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THE COMOVEMENTS OF EMERGING STOCK MARKETS OF CENTRAL AND EASTERN EUROPE: IMPACT OF EU ENLARGEMENT

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Abstract

This paper examines the short and long run behaviour of emerging stock markets in Bulgaria, the Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia and assesses the impact of the EU on stock market linkages as revealed by the time series behaviour of their stock market indices.

A time-series framework is adopted which incorporates: cointegration analysis including the Johansen procedure, Granger Causality tests, Variance Decompositions and Impulse Response analyses. Our main empirical results show that mostly one and, on some occasions, two cointegrating vectors exist in both pre- and post- EU periods that confirm the existence of long run relationships between markets. Granger Causality relationships are identified among the most advanced emerging markets. The Variance Decomposition analyses show that regional integration is evident amongst the markets. Furthermore, the Impulse Response function illustrates that the shocks in returns persist for a very limited period of time; and in less than one week, there is no measurable reaction to the innovations among them in terms of small shock responses. The results hold for all twelve markets in the CEE.

Keywords: Emerging Markets, Johansen Cointegration, Granger Causality, Variance Decomposition, Impulse Response

1. Introduction

The extent of financial market cointegration is one of the most important issues for a large number of economic agents. The size and evolution of the cointegration between market returns in emerging equity markets are important for appropriate portfolio selection. In this paper we examine the implications for European investors of the recent European Union (EU) expansion to encompass former Eastern block economies. Capiello, Engle and Sheppard (2006) question whether the formation of European Monetary Union (EMU) within the EU has increased the correlation of national assets. This clearly has important implications for investors wishing to diversify across national markets. Should investors diversify outside the Central and Eastern European (CEE) countries? It could be argued that the former Eastern block economies constitute emerging markets which typically offer attractive risk adjusted returns for international investors.

In this paper we are concentrating on the twelve emerging markets, which are part of the EU's largest enlargement ever. The countries concerned are: the Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia (EU members since 1st May 2004) along with Bulgaria and Romania (EU members since 1st January 2007). These CEE countries have been in process of liberalization from the communist regime at the end of the 1980s through to the beginning of the 1990s. During this time the CEE countries have established functioning stock markets as part of the transition process. Throughout the process of preparing for admission to EU these equity markets have been modelled along similar paths of joining procedures to those in developed market economies.

According to the FTSE group, the Czech Republic, Hungary and Poland are regarded as Advanced Emerging Markets Economies. Of these, the Czech Republic has the most developed and industrialized economy in CEE. The aim of this research is to relate the remaining nine emerging markets of the EU to the above three, with Czech Republic being the primary reference point. We explore a number of important aspects of portfolio selection and investment opportunities and their implications for CEE based investors through cointegration analysis of these markets pre- and post- EU expansion. This paper specifically deals with inter-relationships between our twelve emerging markets and does not attempt to include any developed markets. This could form the basis of a further study which we recommend in our conclusions.

2. Literature Review

Various aspects of equity market relationships have been explored, including volatility spillover effects, market correlation structures or market efficiency, and financial crisis contagion. Also the aspect of cointegration between markets has been broadly analysed. (For a discussion of this type of approach, see Allen and MacDonald (1995)) A great number of studies have investigated possible linkages between the world's developed markets and in particular US and European stock markets. Authors have mainly used cointegration techniques to examine linkages and long-term relationships between developed and emerging markets. Among them are Scheicher (2001), Gilmore and McManus (2002, 2003), Gilmore, Lucey and McManus (2005), Voronkova (2004), Egert and Kocenda (2007), Syriopoulos (2007) and Fadhlaoui, Bellalah, Dherry, and Zouaoui (2009). The study of linkages between the principal emerging stock markets in Europe, namely the Czech Republic, Hungary and Poland, has been conducted by Scheicher (2001), who compared those three markets to the Financial Times (FT) index. He reported on the Granger Causality test and found similar influencing patterns between the countries studied, with FT having an impact in all three countries. Scheicher observed shocks' persistence and found that in less than one week there is no measurable reaction to the innovations, and these results hold in all three main European markets.

Gilmore and McManus (2002) examined the possibility of diversification benefits for US investors in the three most important Central European equity markets, namely the Czech Republic, Hungary and Poland. They concluded that US investors can get a higher level of returns from diversification in CEE markets since there is no evidence of multilateral cointegration for those markets. In their publication in 2003 they, as the first ones, looked for evidence of long-term links of the equity markets of the Czech Republic, Hungary and Poland with the German market. Again they found lack of cointegration. However, in a time period which includes the 2004 expansion, Gilmore, Lucey and McManus (2005) examined bilateral and multilateral cointegration properties of the German market and the three major CEE countries, and found evidence of an emerging long-term relationship between the German and UK markets and the Czech Republic, as well as cointegration within the group of CEE markets. These results are supported by Egert and Kocenda (2007) who reported no robust cointegrating relationship between the relatively new markets of the Czech Republic, Hungary and Poland and the developed ones of Germany, UK and France.

Another study on the existence of long-term relationships between the three CEE markets of the Czech Republic, Hungary and Poland and the three developed markets of France, Germany and UK was undertaken by Voronkova (2004). She found evidence of stronger cointegration relationships than had previously been reported. As her paper accepted a more general view of cointegration, the author supported the hypothesis that the emerging CEE markets have become increasingly integrated with world markets. She claimed that international investors should be aware of the implications of this closer international integration for the purpose of risk management strategies.

Chelley-Steeley (2005) found evidence of markets moving away from the segmentation process in the equity markets of Hungary, Poland, the Czech Republic and Russia. While applying the variance decomposition model, the author found evidence of increased market integration.

Fadhlaoui, Bellalah, Dherry, and Zouaoui (2009) examined short and long-term relationships between G7 developed and three Central European emerging markets. The results showed no cointegration between the developed and emerging markets. These results indicate that the increase in financial integration degree and comovements between equity markets has not significantly affected the expected benefits from international diversification in these emerging markets. They explained these results, firstly by the recent emergence of those markets after liberalization from the communist regime in the 1990s, and secondly by the weak economic and financial relationship between the economies of these countries as a group with the economies of developed countries.

Another important topic for discussion is the implementation of one currency, € (euro), across the CEE countries and becoming a member of EMU. In 2007 Slovenia was the first of the studied twelve countries to adopt the European currency, followed by Malta and Cyprus in 2008, Slovakia in 2009 and Estonia in 2011. All the others are progressing towards being accepted into the EMU in the near future. Yang, Min and Li (2003) found that the long-run linkage between eleven developed European markets and the US generally strengthened after the EMU, because long-run relationships are restored more quickly after system-wide shocks. This is evidenced by the non-member country (UK) showing lessened linkages. At the same time the authors agree that it is difficult to disentangle the impact of the EMU from other channels that also might affect European stock market integration. A similar conclusion is found by Hardouvelis, Malliaropoulos and Priestly (2006), who support the finding of increased stock market integration. Conversely, Syriopoulos (2007) found no dramatic shocks or any particular impact in the post-EMU period while testing cointegration relationships between the emerging markets of Poland, the Czech Republic, Hungary, Slovakia and the developed ones of Germany and the US.

Jorion and Goetzmann (1999) suggested that many emerging markets are actually re-emerging markets that for various reasons have gone through a period of relative decline. They pointed out that Poland, Romania and Czechoslovakia had active equity markets in the 1920s prior to being subsumed into the Eastern block. This means that the attractive returns apparently offered by emerging markets may be a temporary phenomenon, an observation they backed up by simulations.

Overall, the majority of past studies on stock market comovements and integration have concentrated mainly on mature developed markets or advanced emerging markets such as the Czech Republic, Hungary and Poland whilst the behaviour and inter-relationship of all others has been neglected. Little attention is given to the investment potential in CEE equity markets only. Thus the literature lacks a model which analyses the interaction and integration of these markets at a regional and global level. The purpose of this paper is an attempt to fill this gap.

In this paper, we examine the short and long run behaviour of CEE emerging stock markets and assess the impact of the EU on stock market linkages as revealed by the time series behaviour of their stock market indices. This includes the Johansen procedure, Granger Causality tests, Variance Decompositions and Impulse Response analyses. We also attempt to estimate an error correction model to integrate the dynamics of the short-run with the long-run adjustment process.

3. Description of the Data

The statistical data in this study consists of the daily stock market indices of the twelve CEE stock markets¹ (Bulgaria, Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia). The data is obtained from DataStream's database for the period from January 1, 1995 to May 16, 2011. The twelve countries joined the EU during the latest two enlargements which took place on 1st May 2004 for the Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia and 1st January 2007 for Bulgaria and Romania. Based on those two accession dates the sample period is divided into three phases: one pre-EU period (1st Jan 1995 - 30th Apr 2004) and two post-EU periods (1st May 2004 - 16th May 2012 for the first enlargement and 1st Jan 2007 - 16th May 2012 for the second and final enlargement). One common currency, the euro is used to express stock market

prices in order to provide comparable findings (after Scheicher (2001) and Syriopoulos (2007)). The common currency is assumed for a euro-based investor, who does not hedge currency risk. **Hata! Başvuru kaynağı bulunamadı.** provides some information on the stock exchanges of the twelve markets, such as market capitalization, number of companies and turnover. The CEE stock markets show a growing trend. Stock valuations appear to be at a reasonable level, but the size and liquidity of the markets remain comparatively low in comparison to international markets.

4. Empirical Methodology

4.1 Non-stationarity of time series

A necessary condition in the cointegration analysis is to test each series for the presence of unit roots, which indicates whether the series are nonstationary and integrated of the same order. Therefore, we undertake this using the Augmented Dickey-Fuller test (1981), which is a modified version of the pioneer work of Dickey and Fuller (1979) and the Phillips-Perron (1988) non-parametric test. We employ Akaike Information Criterion and Schwarz Bayesian Criterion to select the appropriate lag length.

Table 1: Institutional background

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Market capitalization of listed companies (in mln US\$)																
Bulgaria	61	7	2	992	706	617	505	733	1,755	2,804	5,086	10,325	21,793	8,858	7,103	7,276
Cyprus	2,516	2,355	2,011	2,618	6,950	4,351	6,187	4,990	4,804	4,880	6,583	15,900	29,479	7,955	4,993	6,834
Czech Rep	15,664	18,077	12,786	12,045	11,796	11,002	9,331	15,893	17,663	30,863	38,345	48,604	73,420	48,850	52,688	43,056
Estonia	0	0	1,101	519	1,789	1,846	1,483	2,430	3,790	6,203	3,495	5,963	6,037	1,951	2,654	2,260
Hungary	2,399	5,273	14,975	14,028	16,317	12,021	10,367	13,110	16,729	28,711	32,576	41,935	47,651	18,579	28,288	27,708
Latvia	10	151	338	382	391	563	697	715	1,141	1,655	2,527	2,705	3,111	1,609	1,824	1,252
Lithuania	157	900	1,693	1,074	1,138	1,588	1,199	1,463	3,510	6,463	8,183	10,191	10,134	3,625	4,477	5,661
Malta	154	472	461	785	1,916	2,046	1,376	1,383	1,830	2,841	4,097	4,504	5,633	3,572	1,982	2,399
Poland	4,564	8,390	12,135	20,461	29,577	31,279	26,017	28,750	37,165	71,102	93,873	149,054	207,322	90,233	135,277	190,235
Romania	100	57	627	1,016	873	1,069	2,124	4,561	5,584	11,786	20,588	32,784	44,925	19,923	30,325	32,385
Slovakia	1,235	2,182	1,826	965	1,060	1,217	1,558	1,904	2,779	4,410	4,393	5,574	6,971	5,079	4,672	4,150
Slovenia	311	663	1,625	2,450	2,180	2,547	2,839	4,606	7,134	9,677	7,899	15,182	28,963	11,772	11,766	9,428
Listed domestic companies, total																
Bulgaria	26	15	15	998	828	503	399	354	356	332	331	347	369	334	376	390
Cyprus	41	39	49	54	60	120	145	154	152	149	144	141	141	135	128	123
Czech Rep	1635	1588	276	261	164	131	94	78	63	54	36	29	32	28	16	16
Estonia			27	26	25	23	17	14	14	13	15	16	18	18	16	15
Hungary	42	45	49	55	66	60	57	48	49	47	44	41	41	41	43	48
Latvia	17	34	51	69	70	64	63	62	56	39	45	40	41	35	34	33
Lithuania	351	460	607	63	54	54	54	51	48	43	43	44	40	41	40	39
Malta	5	6	6	7	7	10	12	12	13	13	13	14	15	18	20	20
Poland	65	83	143	198	221	225	230	216	203	225	248	267	328	349	354	569
Romania	7	17	76	5753	5825	5555	5140	4870	4484	4030	3747	2478	2096	1824	1824	1383
Slovakia	18	816	872	837	469	493	515	354	306	258	209	173	153	120	107	90
Slovenia	17	21	26	28	28	38	38	35	134	140	116	100	87	84	76	71
Stocks traded, total value (in mln US\$)																
Bulgaria	4	0	0	12	54	58	70	172	197	511	1,388	1,509	5,498	1,651	401	198
Cyprus	301	462	292	616	6,649	9,261	3,436	622	306	176	409	4,304	5,338	2,269	947	632
Czech Rep	3,630	8,431	7,071	4,807	4,120	6,582	3,349	6,083	8,797	17,663	41,040	32,875	41,934	43,034	20,606	14,083
Estonia	0	0	1,484	922	285	326	220	241	564	828	2,478	972	2,096	783	374	322
Hungary	355	1,641	7,472	16,042	14,395	12,150	4,818	5,941	8,300	13,011	23,911	31,183	47,497	30,802	25,940	26,466
Latvia	0	12	84	85	45	228	165	124	145	110	96	111	140	42	20	27
Lithuania	37	47	233	221	290	202	210	182	198	464	741	2,094	1,024	489	303	296
Malta	16	14	22	56	335	185	47	53	42	94	151	255	89	74	18	27
Poland	2,770	5,538	7,951	8,918	11,149	14,631	7,432	5,842	8,498	16,569	29,974	55,041	84,568	67,955	55,778	77,464
Romania	1	6	268	596	317	236	256	403	442	943	3,399	4,260	8,095	3,675	1,885	1,702
Slovakia	832	2,321	2,155	1,032	474	896	966	789	664	655	69	90	30	22	175	174
Slovenia	345	401	351	702	733	465	794	1,003	732	1,170	788	1,019	2,713	1,408	1,021	272

4.2 Cointegration analysis

Cointegration assesses the long-run link between economic variables. Cointegration of two or more time series suggests that there is a long-run or equilibrium relationship between them. Therefore, the economic interpretation of cointegration is that if two or more series are linked to form an equilibrium relationship spanning the long-run, then, even though the series themselves may be non-stationary, they move closely together over time and their difference will be stationary. Their long-run relationship is the equilibrium to which the system converges over time, and the error term can be interpreted as the disequilibrium error or the distance that the system is always from equilibrium at time t . Cointegration has emerged as a powerful technique for investigating common trends in multivariate time series, and provides a sound methodology for modelling both long-term and short-term dynamics in a system. In this paper we applied the Johansen (1991) cointegration testing framework to determine those relationships among all variables of the twelve CEE stock markets.

4.2.1 Johansen Cointegration Test

Let X_t denote a vector that includes n non-stationary variables ($n = 11$ for pre-EU series data and $n = 12$ for post-EU series data in this study). Assuming existence of cointegration, the data generating process of X_t can be appropriately developed in an error correction model (ECM) with $k-1$ lags, we can express this using a general VAR model with k lags:

$$\Delta X_t = \Pi X_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-i} + \mu + \varepsilon_t \quad (t = 1, \dots, T) \quad (1)$$

where Δ represents the difference operator ($\Delta X_t = X_t - X_{t-1}$), X_t is a $(n \times 1)$ vector of prices, Π is a $(n \times n)$ coefficient matrix whose rank determines the number of cointegrating relationships, Γ_i is a $(n \times n)$ matrix of short-run dynamics coefficients and $\varepsilon_t \sim iid(0, \Sigma)$ is a $(n \times 1)$ vector of innovations. If the coefficient matrix Π has reduced rank $r < n$, then there exist $n \times r$ matrices α and β each with rank r such that $\Pi = \alpha\beta'$ and βX_t is stationary. X_t is stationary in a case when $r = 0$ which is equivalent to $\Pi = 0$. However, if the rank $r = n$, the coefficient matrix Π is of full rank and the variables X_t are non-stationary. r is a number of cointegrating relationships, the elements of α are known as the adjustment parameters in the vector error correction model (VECM) and each column of β is a cointegrating vector.

4.2.2 Vector Error Correction Model

Once the cointegration relationship is established, a vector error correction model (VECM) can be estimated. VECM is a restricted VAR designed for use with non-stationary series which are known to be cointegrated. The VECM has cointegration relations built into the specification so that it restricts the long-run behaviour of the endogenous variables to converge to their cointegration relationships while allowing for the short-run adjustment dynamics. The cointegration term is known as the error correction term (ECT) since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments. In the presence of cointegration, the coefficient matrix Π can be expressed as a system of two matrices and defined as $\Pi = \alpha\beta'$. Thus the equation (1) can be rewritten in the below form:

$$\Delta X_t = \alpha\beta' X_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta X_{t-i} + \mu + \varepsilon_t \quad (2)$$

where α is a $k \times n$ matrix which represents the speed of adjustment of the cointegrated variables towards their equilibrium value, which also is known as ECT. A low value of α implies a fast adjustment to the long-run equilibrium.

4.3 Granger Causality

The Granger causality test is a technique for determining whether one time series is useful in forecasting another (Granger, 1969). Let $F(X_t | I_{t-1})$ be the conditional probability distribution of X_t given the bivariate information set I_{t-1} consisting of an L_x -length lagged vector the bivariate of X_t , say $X_{t-L_x}^{L_x} = (X_{t-L_x}, X_{t-L_x+1}, \dots, X_{t-1})$, and an L_y -length lagged vector of Y_t say $Y_{t-L_y}^{L_y} = (X_{t-L_y}, X_{t-L_y+1}, \dots, X_{t-1})$. Given lags L_x and L_y , the time series $\{Y_t\}$ does not strictly Granger cause $\{X_t\}$ if:

$$F(X_t | I_{t-1}) = (X_t | (I_{t-1} - Y_{t-L_y}^{L_y})); \text{ where } t = 1, 2, \dots \quad (3)$$

If the above equation does not hold, then knowledge of past Y values helps to predict current and future X values, and Y is said to strictly Granger cause X . Bivariate regression for all possible pairs of (X, Y) series in the group can take a form of:

$$\begin{aligned} \Delta X_t &= \sum_{i=1}^q \alpha_i X_{t-i} + \sum_{j=1}^p \beta_j Y_{t-j} + u_t \\ \Delta Y_t &= \sum_{i=1}^p \alpha_i Y_{t-i} + \sum_{j=1}^q \beta_j X_{t-j} + u_t \end{aligned} \quad (4)$$

where u_t and u_t are white noises, p is the order of the lag for Y and q is the order of the lag for X . The test statistic is the standard Wald F-statistic which is calculated for joint hypothesis: $\beta_1 = \beta_2 = \dots = \beta_j = 0$ for each equation. The null hypothesis is that x does not Granger cause y in the first regression and that y does not Granger cause x in the second regression.

4.4 Forecast Error Variance Decomposition

Forecast variance error decomposition (FEVD) indicates the amount of information each variable contributes to the other variable in VAR model and determines how much of the forecast error variance of each of the variable can be explained by exogenous shocks to the other variables. This method provides a direct test on the information asymmetry pattern in the short-run dynamics sense (Yang, 2003). If a

market informationally leads other, this market's returns should most significantly be explained by its own innovations and not as much by other markets' innovations. Instead, innovations from this market should be able to significantly explain other market returns.

If the MA representation in the first difference is given by

$$\Delta X_t = \mu + \sum_{i=0}^{\infty} \Theta_i \varepsilon_{t-i}, \quad t = 1, 2, \dots, T \quad (5)$$

where Θ_i is the coefficient matrices in the MA representation (as demonstrated in Lutkepohl, 1991 and forwarded by Pesaran and Shin, 1998), the n -step ahead generalized forecast error variance decomposition of variable i due to the shock in variable j in the VAR is given by

$$\psi_{ij}(n) = \frac{\sigma_{ii}^{-1} \sum_{i=0}^{n-1} (e_i' \Theta_i \Sigma e_j)^2}{\sum_{i=0}^{n-1} (e_i' \Theta_i \Sigma \Theta_i' e_i)} \quad (6)$$

where $i, j = 1, 2, \dots, p$; σ_{ii} is the ii th element of the variance-covariance matrix Σ ; e_i is the selection vector defined as $e_i = (0 \dots 0 \ 1 \ 0 \dots 0)'$ where 1 is the i th element in selection vector; $e_i' \Theta_i \Sigma \Theta_i' e_i$ is the i th diagonal element of the matrix $\Theta_i \Sigma \Theta_i'$, which also enters the persistence profile analysis.

4.5 Impulse Response

The concept of generalized impulse response (IR) function is set out in Pesaran and Shin (1998) where was shown that the concept can be applied to multivariate models such as VAR. This analysis deal with the three main issues. Firstly answer the question how the dynamic system was hit by shocks at time t . Secondly, investigate the state of the system at time $t-1$, before the system was hit by shocks. And finally illustrate the expectations about future socks and how system might react over the interim period from $t+1$ to $t+N$. For this puprose equation (6) can be written as the sum of squares of the generalized responses of the shocks to the i th equation on the j th variable in the

model, namely $\sum_{i=0}^N (GI_{ij,i})^2$, where $GI_{ij,i}$ is given by

$$GI_{ij,N} = \frac{e_j' \Theta_N \Sigma e_i}{\sqrt{\sigma_{ii}}}, \quad i, j = 1, 2, \dots, p \quad (7)$$

Above equation represents the generalized IR function of a unit shock at the horizon N . The generalized impulse responses are invariant to the ordering of the variables in the VAR. It is also worth to note that the two impulse responses coincide only for the first variable in the VAR, or when Σ is a diagonal matrix.

5. Empirical results

5.1 Cointegration analysis

The first stage in the Johansen procedure is to test whether the time series are stationary. We tested for the presence of unit roots, where the null hypothesis of the ADF and PP tests assume that the series has a unit root and is non-stationary. We found all the price series to be first order integrated ($I(1)$) and the return series to be stationary at the 5% significance level. For brevity we do not present the full results here.²

The next step is to determine whether a group of CEE emerging markets is cointegrated or not. For this purpose a VECM is estimated for each sub-period discussed in the study³. Two alternative models have been chosen to compare the behaviour of data series: the first a model of unrestricted intercept and no trend specifications (Case 1) and the second model of unrestricted intercept and trend specifications (Case 2). To find existence of cointegrated vectors we applied standard maximum eigenvalue and trace test statistics. Those two statistics test the null hypothesis of r (number of cointegrating vectors) against the alternative hypothesis of n cointegrating relations. The empirical findings support the presence of at least one cointegrating vector in the pre-EU as well as in the post-EU period (in both scenarios). There are two cointegrating vectors in Case 1 for pre-EU period and in Case 2 for post-EU: 2004-2011 period⁴. The presence of cointegrating vectors confirms the existence of a long-run relationship between CEE markets.

Table 2: VECM for pre-EU period, 1995-2004

Normalized cointegrating vectors										
Case 1: intercept and no trend in the VAR										
Bulgaria	Czech R	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovakia	Slovenia
-0.049*	1.000	0.014	-0.451*	0.009*	-0.027	0.002*	0.000	-0.033*	0.039*	0.005*
(0.028)		(0.018)	(0.119)	(0.003)	(0.026)	(0.001)		(0.011)	(0.028)	(0.002)
23.786*	0.000	4.101	42.303	1.257	-31.733*	-1.020*	1.000	15.683*	-13.938	-2.872*
(16.669)		(10.546)	(69.349)	(2.319)	(15.332)	(0.632)		(6.813)	(16.451)	(1.564)
Case 2: intercept and trend in the VAR										
Bulgaria	Czech R	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovakia	Slovenia
-0.003	1.000	0.029*	-0.396*	0.010*	-0.043*	-0.002*	0.000	-0.010*	0.032*	0.002*
(0.011)		(0.009)	(0.058)	(0.001)	(0.014)	(0.001)	(0.000)	(0.004)	(0.012)	(0.001)
Case 1						Case 2				
ECT(-1)	-0.042		ECT(-2)	0.000		ECT(-1)	-0.078			
	(0.010)			(0.000)			(0.012)			
	[0.000]*			[0.224]			[0.000]*			

Note: number of cointegrating vectors $r = 2$ (Case 1) and $r = 1$ (Case 2); normalized cointegrating vector shows the coefficient value with its asymptotic standard error in parentheses; ECT shows the coefficient value with its standard error in parentheses and t-ratio in square brackets; * indicates significance at 5% level; ^ indicates significance at 10% level

For the pre-EU data, the statistic suggested two (Case 1) and one (Case 2), cointegrating vectors at the 5% significance level. Given this evidence in favour of at least one cointegrating vector, the data was normalized on the Czech Republic and Polish stock markets for Case 1 and on the Czech Republic market for Case 2⁵ and was found to have a combination of negative and positive cointegrating vector values while Poland's variable equals zero (Table 2). Even though we developed and analysed two different case scenarios all of the results are similar in the specification of the error correction form. This implication provides evidence for the limits of portfolio diversification amongst those stock markets because they move closely together in the long run and share common trends. The coefficient of ECT has been calculated and equals -0.042(0.010) and -0.078(0.012) in Case 1 and Case 2 respectively, is statistically significant, but rather small, suggesting that it would take a long time for the equation to return to its equilibrium once it is shocked.

For the post-EU: 2004-2011 period, the statistic test indicates one (Case 1) and two (Case 2) cointegrating vectors at the 5% significance level. As previously, we normalized the data in a similar way as for the previous case, however the outcome is different. We found a significant negative cofactor for most of the CEE markets, including Bulgaria, Cyprus, Estonia, Hungary, Latvia, Malta, Poland and Slovakia. A different finding is that the Lithuanian and Romanian coefficients are positive (see Table 3) and only the coefficient sign of Slovenia changes depending on the case scenario. In summary, during the years 2004-2011, post-EU phase, there is no evident difference to the values in the long-run variables regardless of the case scenario. We normalized the second cointegrating vector on the Polish data but found no significance at a 5% level, so for brevity we do not show the full results here. The results for the VECM are presented in Table 3. The coefficients of the ECT, 0.009(0.003) and 0.008(0.003) respectively of case scenario, are statistically significant but again very small, which indicates a slow returning to the equation's equilibrium.

The above results for the post-EU: 2004-2011 period are broadly in line with the post-EU:2007-2011 period (compare Table 3 with **Hata! Başvuru kaynağı bulunamadı.**). The one difference is observed for the Cyprus coefficient of the cointegrating vector, which now is positive. The ECT is again positive but small and equal to 0.010(0.005) in both cases.

In terms of the speed of adjustment of the CEE emerging markets, all the stock markets in pre-EU and post-EU periods adjust back to the long-run equilibrium very slowly, with the pre-EU period having the fastest adjustment speed of nearly 8% as compared to the 1% of post-EU period. Interestingly we found the coefficient of the ECT sign changes between pre- and post-EU periods from negative to positive.

Table 3: VECM for post-EU period, 2004-2011

Normalized cointegrating vectors											
Case 1: intercept and no trend in the VAR											
Bulgaria	Czech R	Cyprus	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovakia	Slovenia
-0.009	1.000	-0.000	-0.054*	-0.427*	-0.008	0.040	-0.012*	-0.004*	0.050*	-0.073*	0.002
(0.029)		(0.003)	(0.039)	(0.222)	(0.017)	(0.054)	(0.053)	(0.001)	(0.023)	(0.028)	(0.002)
Case 2: intercept and trend in the VAR											
Bulgaria	Czech R	Cyprus	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovakia	Slovenia
-0.120*	1.000	-0.011*	-0.040	-0.501*	-0.069*	0.123*	-0.009*	0.000	0.038*	-0.040*	-0.002
(0.073)		(0.009)	(0.046)	(0.273)	(0.027)	(0.065)	(0.004)		(0.023)	(0.032)	(0.002)
Case 1			Case 2								
ECT(-1)	0.009		ECT(-1)	0.008		ECT(-2)	-0.000				
	(0.003)			(0.003)			(0.000)				
	[0.002]*			[0.023]*			[0.003]*				

Note: number of cointegrating vectors $r = 1$ (Case 1) and $r = 2$ ⁶ (Case 2); normalized cointegrating vector shows the coefficient value with its asymptotic standard error in parentheses; ECT shows the coefficient value with its standard error in parentheses and t-ratio in square brackets; * indicates significance at 5% level; ^ indicates significance at 10% level

Table 4: VECM for post-EU period, 2007-2011

Normalized cointegrating vectors											
Case 1: intercept and no trend in the VAR											
Bulgaria	Czech R.	Cyprus	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovakia	Slovenia
-0.104*	1.000	0.012*	-0.061*	-1.000*	-0.050*	0.150*	-0.003	-0.000	0.039*	-0.071*	0.000
(0.041)		(0.005)	(0.043)	(0.346)	(0.031)	(0.088)	(0.004)	(0.001)	(0.018)	(0.027)	(0.002)
Case 2: intercept and trend in the VAR											
Bulgaria	Czech R.	Cyprus	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovakia	Slovenia
-0.081*	1.000	0.004	-0.114*	-0.728*	-0.059*	0.208*	-0.012*	-0.001	0.041*	-0.227*	0.001
(0.047)		(0.006)	(0.082)	(0.376)	(0.043)	(0.138)	(0.009)	(0.002)	(0.023)	(0.130)	(0.002)
Case 1			Case 2								
ECT(-1)	0.010		ECT(-1)	0.010							
	(0.005)			(0.004)							
	[0.071]^			[0.012]*							

Note: number of cointegrating vectors $r = 1$ (Case 1 and 2); normalized cointegrating vector shows the coefficient value with its asymptotic standard error in parentheses; ECT shows the coefficient value with its standard error in parentheses and t-ratio in square brackets; * indicates significance at 5% level; ^ indicates significance at 10% level

In general we found that the number of cointegrating vectors remains the same in all the studied sub-periods and is equal to one. Even though there is evidence for two cointegrating vectors on some occasions, there is no significance in the normalized vector form solutions or the ECT is not conclusive but equal to zero. Therefore the conclusion on the impact of the EU enlargement on stock market linkages is not straightforward. However, as there is a presence of at least one cointegrating vector, this indicates that in all sub-periods a long-run relationship exists between all twelve studied stock market indices. The evidence of cointegration has several important implications. First of all, based on diagnostic tests, superior correlation has been ruled out. This means that relationships in which variables have no direct causal connection are eliminated; subsequently opening the alley to the existence of a unique channel for either uni-variate or bi-variate Granger causality effects. Secondly even where economic theory posits a long-run equilibrium function for a variable, disequilibrium could exist in the short run, as the cointegration vector does not capture the dynamic responses to the system. While the cointegration vector captures the long-run relationship between variables, it does not capture the dynamic response. These are encompassed by the ECT (as a part of ECM analysis), which is meant to measure the short-run movements in the dependent variable in response to fluctuations in the independent variables and measures the speed of adjustment of the dependent variable to its long-run value. Thirdly, the investors have a difficult task in setting up their portfolios as several stock markets present similar behaviour with regards to internal and external shocks. This limits the diversification effects as stock markets move closely together in the long run and share common trends. This is also an answer to the market globalization process of increasing economic integration between countries which could lead to a single European market. Finally, cointegrated stock market indices approach a common long-run equilibrium path, as common macro and micro economic policies are more integrated following EU regulations.

5.2 Granger Causality

The Granger causality test was applied to the first difference of the twelve stock markets in all sub-periods. Since the test is highly sensitive to the lag length level, the AIC selection criterion was used as reasonable estimate of the longest time over which one of the variables could help predict the other.

Table 5 shows results for the pre-EU Granger causality test based on the eleven-dimensional vector autoregression with one lag. Granger causality implies the highest influence to be that of the Czech Republic stock market over the other five CEE markets, namely Estonia, Hungary, Lithuania, Poland and Slovenia. There are also uni-variate Granger causality patterns as follows: Bulgaria influences Romania, Estonia influences Hungary and Lithuania, Hungary influences Lithuania and Slovenia, Poland influences Bulgaria and finally Slovakia influences Hungary. There is no evidence of bi-variate Granger causality during this time frame. We also found that the four stock markets of Latvia, Lithuania, Malta and Romania have no influence on any other stock markets.

The post-EU period (2004-2011) Granger causality test is based on the twelve-dimensional vector autoregression with two lags, are results are presented in

Table 6. On this occasion we found that the highest influence among the developed emerging markets is exerted by the Czech Republic, Hungary and Poland on the other CEE markets. All of the CEE markets affect changes in the seven other stock markets, and between them only one feedback effect is observed, which exists between the Czech Republic and Poland. It is worth mentioning here, that as Hungarian and Polish stock markets have such a strong influence on other stock markets, the two markets do not appear to significantly influence each other. All the other causality effects are presented in

Table 6. As for pre-EU period we do not account for feedback effect, in post-EU phase this bi-variate effect is observe for a number of markets and mostly relates to Bulgaria and Romania. We established that the Maltese stock market is isolated from all others, as it is the only one which does not appear to be caused by the others, nor does it have any influence on them.

For the other post-EU period 2007-2011, the results seems are somewhat different (refer to Table 7). The Granger causality effect is very strong again for the Czech Republic, which seems to have taken a lead role among all studied CEE countries. The role of Bulgarian and Cyprus stock markets is also significant as they influence six and seven other stock markets respectively. There are bi-variate effects between several countries, but this mostly relates to Bulgaria, Cyprus and Czech Republic stock markets. The position of the Slovakian stock market appears to be stronger as, in comparison to the other post-EU period, it is now caused only by one stock market (Malta – feedback effect) but itself influences the five other stock markets of the Czech Republic, Latvia, Lithuania, Malta and Slovenia.

Table 5: Granger Causality test for returns, pre-EU period, 1995-2004

y_t Granger causes x_t	Bulgaria	CzechR	Estonia	Hungary	Latvia	Lithuan	Malta	Poland	Romania	Slovakia	Slovenia
Bulgaria	–	0.005	0.010	0.047	0.048	0.717	0.253	0.022	5.118*	0.728	0.330
Czech Rep	1.820	–	7.834*	7.622*	0.342	7.032*	0.146	9.105*	0.004	2.618	9.159*
Estonia	1.780	0.133	–	7.383*	0.439	25.240*	0.181	0.327	3.473	0.086	0.004
Hungary	1.343	0.520	0.000	–	2.126	6.612*	0.275	0.025	3.003	0.048	9.869*
Latvia	1.331	1.314	0.353	0.004	–	0.403	1.020	0.337	0.453	0.044	0.019
Lithuania	0.011	2.239	1.872	2.934	1.467	–	2.983	0.303	0.395	0.040	1.832
Malta	3.172	1.339	0.224	2.267	0.117	2.894	–	0.074	0.871	0.355	0.577
Poland	3.989*	0.007	0.914	1.604	0.362	0.668	0.104	–	0.008	0.102	0.295
Romania	0.002	1.025	4.660	0.412	0.451	0.332	0.023	0.011	–	0.448	1.069
Slovakia	0.020	0.569	0.551	4.005*	0.185	0.893	0.003	0.030	3.209	–	0.362
Slovenia	2.154	0.151	1.247	0.024	0.044	0.032	0.206	0.679	0.111	1.796	–

Table reports F -statistics (Wald statistics test); * indicates significance at 5% level

Table 6: Granger Causality test for returns, post-EU period, 2004-2011

y_t Granger causes x_t	Bulgaria	CzechR	Cyprus	Estonia	Hungary	Latvia	Lithuan	Malta	Poland	Roman	Slovakia	Slovenia
Bulgaria	–	4.952*	9.742*	1.840	1.654	3.897*	6.052*	2.149	1.789	7.896*	2.256	11.008*
Czech Rep	20.150*	–	2.653	12.813*	2.287	17.279*	12.496*	1.553	6.305*	9.676*	0.624	16.753*
Cyprus	49.428*	2.900	–	8.421*	0.589	13.240*	7.163*	0.924	1.362	5.927*	0.726	34.550*
Estonia	3.704*	0.885	0.833	–	0.003	12.394*	8.486*	1.708	1.582	0.262	4.128*	1.997
Hungary	14.608*	13.139*	2.040	15.952*	–	11.927*	14.311*	3.019	0.079	8.585*	0.849	14.183*
Latvia	1.609	0.196	0.054	0.198	0.107	–	3.397*	0.768	0.703	1.701	3.839*	0.902
Lithuania	1.053	0.131	1.608	1.032	0.703	15.449*	–	2.101	1.681	0.009	3.741*	0.313
Malta	0.140	1.637	0.105	0.454	1.294	0.190	0.392	–	1.206	1.125	1.738	0.388
Poland	18.032*	15.568*	0.899	21.951*	1.901	19.260*	14.985*	0.968	–	16.522*	0.757	17.641*
Romania	18.416*	2.140	2.459	2.519	1.989	4.807*	2.746	2.121	3.371*	–	1.591	5.606*
Slovakia	0.338	3.861*	3.637*	2.482	0.593	2.102	2.278	1.665	2.279	4.262*	–	4.295*
Slovenia	4.972*	0.779	0.664	1.134	0.150	3.839	0.070	0.875	0.195	4.906*	0.618	–

Table reports F -statistics (Wald statistics test); * indicates significance at 5% level

Table 7: Granger Causality test for returns, post-EU period, 2007-

y_t Granger causes x_t	Bulgaria	CzechR	Cyprus	Estonia	Hungary	Latvia	Lithuan	Malta	Poland	Roman	Slovakia	Slovenia
Bulgaria	–	3.430*	9.419*	0.803	0.691	4.749*	3.946*	3.667*	2.131	5.326	1.112	8.183*
Czech Rep	14.268*	–	3.752*	8.373*	3.050*	16.312*	13.963*	1.861	8.070*	5.776*	0.554	11.669*
Cyprus	42.114*	2.233	–	5.795*	0.289	14.143*	9.044*	4.277*	0.513	6.932*	0.875	25.544*
Estonia	1.948	0.527	0.784	–	0.023	11.358*	4.180*	3.244*	1.165	0.322	4.351	1.353
Hungary	10.605*	11.583*	2.388	10.208*	–	12.006*	15.735*	2.994	0.346	5.788*	0.181	10.275*
Latvia	0.983	0.208	0.984	0.114	0.037	–	0.349	1.863	1.206	0.552	3.002	0.897
Lithuania	2.970	0.875	3.105*	0.340	1.207	11.877*	–	4.916*	4.028*	0.481	1.860	0.662
Malta	0.786	1.965	0.364	0.075	1.277	0.267	2.095	–	0.742	1.027	3.065*	0.865
Poland	14.183*	13.344*	0.060	16.264*	0.356	17.890*	12.553*	0.777	–	12.934*	0.003	12.152*
Romania	12.239*	1.874	3.208*	1.738	1.595	0.267	1.494	1.354	2.256	–	1.891	4.542
Slovakia	1.401	5.584*	2.002	1.578	0.941	17.890*	3.478*	3.102*	1.771	4.977	–	4.284*
Slovenia	4.014*	0.894	0.511	0.801	0.369	4.943*	1.213	1.852	0.344	2.834	0.979	–

2011

Table reports F -statistics (Wald statistics test); * indicates significance at 5% level

The presence of Granger causality between CEE countries is expected because of the strong trade, economic ties and direct investment they have with each other. Furthermore, six of those countries share the euro as a common currency, thus they share common monetary policy. The implication of finding Granger causality among the CEE stock markets is that this implies that short term profit strategies can be formulated buy investors in the sense that if Granger causality is present, a movement in one stock market causes a preceding movement in the other stock markets. As a result, predicting the movement of the stock market that is being led is possible by assessing the movement of the leading stock market. In contrast, where Granger causality is not found then interdependencies are absent among those stock markets and thus portfolio diversification is beneficial in the short run. The downside of Granger causality not being present is that short term profit strategies cannot be formulated because the movement of one stock market does not cause a movement in another stock market.

5.3 Forecast Error Variance Decomposition of returns

The variance decomposition results of 1-day, 3-day, 5-day and 10-day horizon ahead forecast error variances of each stock market are shown in Table 8 to

Table 10. In those tables each row indicates the percentage of forecast error variance which is explained by innovations in the particular columns. The evidence of the least affected stock market could be beneficial for investors for portfolio diversification purposes.

The results in Table 8 show that in the pre-EU period the Czech Republic stock market is the most influential. While no other market studied can explain more than 1 percent of the Czech Republic error variance, the Czech Republic (based on a horizon of 5 days) explains 3.08 percent for Lithuania, 9.03 percent for Estonia, 17.18 percent for Poland and 19.7 percent for Hungary of forecast error variance. On average, the Czech Republic market explains 5.33 percent of the error variance, which value can be compared with 1.36 percent for Hungary and 1.32 percent for Estonia. Besides, the Czech Republic innovation accounts for 95.91 percent of its own variance. As the Czech Republic partially explains Polish and Lithuanian stock markets, the innovation in Poland market is also explained 8.56 percent by Hungary and in Lithuania 7.83 percent by Estonia respectively. Table 8 also provides evidence that most of the studied countries act like a follower in CEE stock markets. Innovations in those markets fail to explain any substantial part of error variances of the others.

Table 8: Forecast Error Variance Decomposition of returns, pre-EU period, 1995-2004

	Horizon (days)	Percentage of forecast error variance explained by innovations in:											
		Bulgaria	CzechRep	Cyprus	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovakia	Slovenia
Bulgaria	1	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	91.83	0.52	5.63	0.46	0.05	0.30	0.02	0.03	0.07	0.60	0.02	0.46
	5	91.41	0.53	5.81	0.47	0.05	0.30	0.02	0.04	0.17	0.60	0.02	0.57
	10	91.41	0.53	5.82	0.47	0.05	0.30	0.02	0.04	0.17	0.60	0.02	0.57
Czech Rep	1	4.83	74.54	20.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	4.96	71.90	20.00	0.10	1.28	0.02	0.07	0.24	0.82	0.03	0.38	0.20
	5	4.96	71.81	19.98	0.11	1.28	0.03	0.08	0.24	0.83	0.03	0.38	0.26
	10	4.96	71.80	19.98	0.11	1.28	0.03	0.08	0.24	0.83	0.03	0.38	0.27
Cyprus	1	4.59	0.00	95.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	5.11	0.42	92.65	0.04	0.06	0.03	0.12	0.03	0.56	0.27	0.39	0.32
	5	5.11	0.43	92.54	0.07	0.06	0.04	0.13	0.04	0.57	0.28	0.39	0.34
	10	5.11	0.43	92.54	0.07	0.06	0.04	0.13	0.04	0.57	0.28	0.39	0.34
Estonia	1	4.16	5.62	3.25	86.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	4.25	6.41	5.06	82.62	0.47	0.06	0.03	0.06	0.62	0.09	0.28	0.04
	5	4.29	6.41	5.11	82.47	0.47	0.07	0.03	0.07	0.67	0.09	0.28	0.04
	10	4.29	6.41	5.11	82.46	0.47	0.07	0.03	0.07	0.67	0.09	0.28	0.04
Hungary	1	1.41	26.94	15.44	0.29	55.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	1.53	26.95	15.20	0.28	54.82	0.00	0.08	0.14	0.68	0.21	0.08	0.04
	5	1.53	26.93	15.20	0.29	54.78	0.01	0.09	0.14	0.69	0.21	0.08	0.06
	10	1.53	26.93	15.20	0.29	54.77	0.01	0.09	0.14	0.69	0.21	0.08	0.06
Latvia	1	4.38	1.29	1.33	4.59	0.02	88.39	0.00	0.00	0.00	0.00	0.00	0.00
	3	4.55	1.95	2.82	4.92	0.06	84.48	0.48	0.10	0.24	0.08	0.30	0.02
	5	4.60	1.95	2.85	4.92	0.06	84.37	0.48	0.10	0.26	0.08	0.30	0.04
	10	4.60	1.95	2.85	4.92	0.06	84.36	0.48	0.10	0.26	0.08	0.30	0.05
Lithuania	1	5.93	4.85	3.06	8.47	0.11	1.27	76.31	0.00	0.00	0.00	0.00	0.00
	3	6.36	5.67	4.29	8.68	0.36	1.23	72.47	0.09	0.17	0.15	0.28	0.24
	5	6.37	5.68	4.30	8.67	0.36	1.24	72.31	0.11	0.22	0.16	0.29	0.29
	10	6.37	5.68	4.31	8.67	0.36	1.24	72.30	0.11	0.22	0.16	0.29	0.30
Malta	1	0.36	0.01	0.06	0.04	0.00	0.07	0.17	99.28	0.00	0.00	0.00	0.00
	3	0.64	0.12	0.17	0.14	0.17	0.09	0.26	98.01	0.04	0.11	0.25	0.00
	5	0.67	0.12	0.19	0.14	0.17	0.09	0.28	97.88	0.05	0.14	0.25	0.01
	10	0.67	0.12	0.19	0.14	0.17	0.09	0.28	97.88	0.05	0.14	0.25	0.01
Poland	1	3.73	27.80	20.48	0.60	10.12	0.01	0.00	0.03	37.22	0.00	0.00	0.00
	3	3.84	27.50	20.27	0.68	10.34	0.04	0.05	0.14	36.63	0.27	0.17	0.07
	5	3.84	27.49	20.26	0.69	10.33	0.04	0.05	0.15	36.61	0.27	0.17	0.09
	10	3.84	27.49	20.26	0.69	10.33	0.04	0.05	0.15	36.61	0.27	0.17	0.09
Romania	1	5.09	6.26	11.68	1.39	1.06	0.38	0.48	0.03	0.33	73.29	0.00	0.00
	3	5.49	7.01	12.37	1.40	1.35	0.49	0.46	0.16	1.13	69.36	0.35	0.44
	5	5.54	7.01	12.47	1.41	1.35	0.50	0.46	0.16	1.14	69.17	0.34	0.44
	10	5.54	7.01	12.47	1.41	1.35	0.50	0.46	0.16	1.14	69.17	0.34	0.44
Slovakia	1	0.52	0.09	0.01	0.17	0.03	0.09	0.00	0.01	0.22	0.00	98.86	0.00
	3	0.71	0.34	0.15	0.53	0.10	0.28	0.23	0.23	0.33	0.10	96.98	0.02
	5	0.72	0.36	0.17	0.56	0.11	0.29	0.23	0.23	0.33	0.11	96.86	0.03
	10	0.72	0.36	0.17	0.56	0.11	0.29	0.23	0.23	0.34	0.11	96.86	0.03
Slovenia	1	7.64	1.80	2.66	1.67	0.09	1.40	0.62	0.00	0.01	1.45	0.01	82.66
	3	7.32	2.48	8.99	1.42	0.11	1.19	0.61	0.06	0.11	1.37	0.43	75.91
	5	7.40	2.57	8.91	1.41	0.12	1.22	0.61	0.06	0.13	1.36	0.44	75.77
	10	7.40	2.57	8.91	1.41	0.12	1.22	0.61	0.06	0.13	1.36	0.44	75.77

The post-EU: 2004-2011 period is mostly dominated by the two stock markets of Cyprus and the Czech Republic, which two on average can explain 8.66 percent and 7.22 percent, respectively, of the forecast error variances of the other studied CEE markets. The

Cyprus stock market explains nine other stocks, from 2.85 percent (for Latvia) to 20.26 percent (for Poland), at the same time explaining 92.54 percent of its own innovations. In comparison, the Czech Republic market explains shocks to the other eight, whilst explaining only 71.8 percent of its own. The other noteworthy contribution is from the Bulgarian stock market which on average explains 4.09 percent of forecast error variances of another nine. As for the previous post-EU time period there are a number of exogenous variables, as they explain more than 90% of their own innovation. The Maltese and Slovakian markets appear the most exogenous, with Poland and Hungary being the least.

Table 9: Forecast Error Variance Decomposition of returns, post-EU period, 2004-2011

	Horizon (days)	Percentage of forecast error variance explained by innovations in:											
		Bulgaria	Czech Rep	Cyprus	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovakia	Slovenia
Bulgaria	1	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	91.83	0.52	5.63	0.46	0.05	0.30	0.02	0.03	0.07	0.60	0.02	0.46
	5	91.41	0.53	5.81	0.47	0.05	0.30	0.02	0.04	0.17	0.60	0.02	0.57
	10	91.41	0.53	5.82	0.47	0.05	0.30	0.02	0.04	0.17	0.60	0.02	0.57
Czech Rep	1	4.83	74.54	20.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	4.96	71.90	20.00	0.10	1.28	0.02	0.07	0.24	0.82	0.03	0.38	0.20
	5	4.96	71.81	19.98	0.11	1.28	0.03	0.08	0.24	0.83	0.03	0.38	0.26
	10	4.96	71.80	19.98	0.11	1.28	0.03	0.08	0.24	0.83	0.03	0.38	0.27
Cyprus	1	4.59	0.00	95.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	5.11	0.42	92.65	0.04	0.06	0.03	0.12	0.03	0.56	0.27	0.39	0.32
	5	5.11	0.43	92.54	0.07	0.06	0.04	0.13	0.04	0.57	0.28	0.39	0.34
	10	5.11	0.43	92.54	0.07	0.06	0.04	0.13	0.04	0.57	0.28	0.39	0.34
Estonia	1	4.16	5.62	3.25	86.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	4.25	6.41	5.06	82.62	0.47	0.06	0.03	0.06	0.62	0.09	0.28	0.04
	5	4.29	6.41	5.11	82.47	0.47	0.07	0.03	0.07	0.67	0.09	0.28	0.04
	10	4.29	6.41	5.11	82.46	0.47	0.07	0.03	0.07	0.67	0.09	0.28	0.04
Hungary	1	1.41	26.94	15.44	0.29	55.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	1.53	26.95	15.20	0.28	54.82	0.00	0.08	0.14	0.68	0.21	0.08	0.04
	5	1.53	26.93	15.20	0.29	54.78	0.01	0.09	0.14	0.69	0.21	0.08	0.06
	10	1.53	26.93	15.20	0.29	54.77	0.01	0.09	0.14	0.69	0.21	0.08	0.06
Latvia	1	4.38	1.29	1.33	4.59	0.02	88.39	0.00	0.00	0.00	0.00	0.00	0.00
	3	4.55	1.95	2.82	4.92	0.06	84.48	0.48	0.10	0.24	0.08	0.30	0.02
	5	4.60	1.95	2.85	4.92	0.06	84.37	0.48	0.10	0.26	0.08	0.30	0.04
	10	4.60	1.95	2.85	4.92	0.06	84.36	0.48	0.10	0.26	0.08	0.30	0.05
Lithuania	1	5.93	4.85	3.06	8.47	0.11	1.27	76.31	0.00	0.00	0.00	0.00	0.00
	3	6.36	5.67	4.29	8.68	0.36	1.23	72.47	0.09	0.17	0.15	0.28	0.24
	5	6.37	5.68	4.30	8.67	0.36	1.24	72.31	0.11	0.22	0.16	0.29	0.29
	10	6.37	5.68	4.31	8.67	0.36	1.24	72.30	0.11	0.22	0.16	0.29	0.30
Malta	1	0.36	0.01	0.06	0.04	0.00	0.07	0.17	99.28	0.00	0.00	0.00	0.00
	3	0.64	0.12	0.17	0.14	0.17	0.09	0.26	98.01	0.04	0.11	0.25	0.00
	5	0.67	0.12	0.19	0.14	0.17	0.09	0.28	97.88	0.05	0.14	0.25	0.01
	10	0.67	0.12	0.19	0.14	0.17	0.09	0.28	97.88	0.05	0.14	0.25	0.01
Poland	1	3.73	27.80	20.48	0.60	10.12	0.01	0.00	0.03	37.22	0.00	0.00	0.00
	3	3.84	27.50	20.27	0.68	10.34	0.04	0.05	0.14	36.63	0.27	0.17	0.07
	5	3.84	27.49	20.26	0.69	10.33	0.04	0.05	0.15	36.61	0.27	0.17	0.09
	10	3.84	27.49	20.26	0.69	10.33	0.04	0.05	0.15	36.61	0.27	0.17	0.09
Romania	1	5.09	6.26	11.68	1.39	1.06	0.38	0.48	0.03	0.33	73.29	0.00	0.00
	3	5.49	7.01	12.37	1.40	1.35	0.49	0.46	0.16	1.13	69.36	0.35	0.44
	5	5.54	7.01	12.47	1.41	1.35	0.50	0.46	0.16	1.14	69.17	0.34	0.44
	10	5.54	7.01	12.47	1.41	1.35	0.50	0.46	0.16	1.14	69.17	0.34	0.44
Slovakia	1	0.52	0.09	0.01	0.17	0.03	0.09	0.00	0.01	0.22	0.00	98.86	0.00
	3	0.71	0.34	0.15	0.53	0.10	0.28	0.23	0.23	0.33	0.10	96.98	0.02
	5	0.72	0.36	0.17	0.56	0.11	0.29	0.23	0.23	0.33	0.11	96.86	0.03
	10	0.72	0.36	0.17	0.56	0.11	0.29	0.23	0.23	0.34	0.11	96.86	0.03
Slovenia	1	7.64	1.80	2.66	1.67	0.09	1.40	0.62	0.00	0.01	1.45	0.01	82.66
	3	7.32	2.48	8.99	1.42	0.11	1.19	0.61	0.06	0.11	1.37	0.43	75.91
	5	7.40	2.57	8.91	1.41	0.12	1.22	0.61	0.06	0.13	1.36	0.44	75.77
	10	7.40	2.57	8.91	1.41	0.12	1.22	0.61	0.06	0.13	1.36	0.44	75.77

Table 10: Forecast Error Variance Decomposition of returns, post-EU period, 2007-201

	Horizon (days)	Percentage of forecast error variance explained by innovations in:											
		Bulgaria	Czech Rep	Cyprus	Estonia	Hungary	Latvia	Lithuania	Malta	Poland	Romania	Slovakia	Slovenia
Bulgaria	1	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	89.79	0.57	7.11	0.41	0.03	0.37	0.21	0.22	0.11	0.31	0.25	0.62
	5	89.23	0.61	7.32	0.41	0.04	0.37	0.21	0.26	0.27	0.31	0.25	0.72
	10	89.22	0.61	7.33	0.41	0.04	0.37	0.21	0.26	0.27	0.31	0.25	0.72
Czech Rep	1	6.83	69.07	24.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	6.73	65.53	22.68	0.07	1.87	0.01	0.19	0.42	1.11	0.06	0.89	0.44
	5	6.72	65.39	22.62	0.09	1.88	0.04	0.20	0.42	1.12	0.06	0.90	0.56
	10	6.72	65.38	22.62	0.09	1.88	0.04	0.20	0.42	1.12	0.06	0.90	0.58
Cyprus	1	6.18	0.00	93.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	6.91	0.81	89.37	0.01	0.12	0.01	0.36	0.12	0.88	0.42	0.29	0.69
	5	6.91	0.82	89.16	0.04	0.14	0.04	0.38	0.12	0.89	0.42	0.31	0.76
	10	6.91	0.82	89.16	0.04	0.14	0.04	0.38	0.12	0.89	0.42	0.31	0.77
Estonia	1	5.40	7.04	3.47	84.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	5.28	7.61	5.20	79.23	0.50	0.06	0.01	0.04	1.15	0.53	0.24	0.14
	5	5.29	7.61	5.25	79.04	0.51	0.07	0.01	0.06	1.22	0.55	0.24	0.15
	10	5.29	7.61	5.25	79.04	0.51	0.07	0.01	0.06	1.22	0.55	0.24	0.15
Hungary	1	2.63	24.56	18.94	0.39	53.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	3	2.63	25.01	18.44	0.38	51.96	0.01	0.25	0.09	0.58	0.32	0.18	0.14
	5	2.63	24.99	18.41	0.39	51.90	0.03	0.25	0.10	0.59	0.32	0.19	0.19
	10	2.63	24.99	18.41	0.39	51.89	0.03	0.25	0.10	0.59	0.32	0.19	0.20
Latvia	1	7.12	1.92	1.31	4.96	0.12	84.57	0.00	0.00	0.00	0.00	0.00	0.00
	3	7.45	2.96	3.69	5.63	0.21	78.65	0.26	0.01	0.27	0.16	0.66	0.05
	5	7.51	2.99	3.74	5.62	0.22	78.43	0.27	0.01	0.29	0.17	0.67	0.09
	10	7.50	2.99	3.74	5.62	0.22	78.42	0.27	0.01	0.29	0.17	0.67	0.10
Lithuania	1	9.65	7.26	4.99	14.97	0.05	3.20	59.87	0.00	0.00	0.00	0.00	0.00
	3	9.96	8.16	7.12	14.91	0.59	2.92	54.38	0.59	0.24	0.09	0.70	0.36
	5	9.96	8.18	7.14	14.86	0.59	2.92	54.15	0.59	0.32	0.10	0.70	0.49
	10	9.96	8.18	7.14	14.85	0.59	2.92	54.13	0.59	0.32	0.10	0.70	0.51
Malta	1	0.76	0.17	0.00	0.12	0.07	0.00	0.08	98.81	0.00	0.00	0.00	0.00
	3	1.50	0.25	0.73	0.44	0.22	0.06	0.22	95.13	0.29	0.45	0.65	0.05
	5	1.58	0.27	0.83	0.45	0.24	0.07	0.22	94.86	0.31	0.45	0.66	0.05
	10	1.59	0.27	0.84	0.45	0.24	0.07	0.22	94.84	0.31	0.45	0.66	0.05
Poland	1	5.47	25.53	25.29	0.64	8.83	0.10	0.02	0.10	34.01	0.00	0.00	0.00
	3	5.59	25.33	24.35	0.66	9.55	0.14	0.40	0.16	33.22	0.17	0.21	0.21
	5	5.60	25.30	24.32	0.69	9.55	0.15	0.40	0.17	33.18	0.18	0.22	0.25
	10	5.60	25.30	24.32	0.69	9.55	0.15	0.40	0.17	33.17	0.18	0.22	0.26
Romania	1	7.27	7.55	17.10	1.57	1.88	0.60	1.87	0.00	0.19	61.96	0.00	0.00
	3	7.51	7.87	17.93	1.52	2.00	0.60	1.80	0.21	1.64	57.60	0.64	0.69
	5	7.51	7.88	18.07	1.55	2.00	0.62	1.80	0.22	1.64	57.38	0.64	0.70
	10	7.51	7.88	18.07	1.55	2.00	0.62	1.80	0.22	1.64	57.37	0.64	0.70
Slovakia	1	0.76	0.06	0.03	0.44	0.01	0.01	0.06	0.07	0.06	0.12	98.39	0.00
	3	0.86	0.28	0.22	0.95	0.10	0.16	0.10	0.59	0.11	0.25	96.37	0.00
	5	0.86	0.30	0.25	0.96	0.12	0.16	0.11	0.59	0.11	0.26	96.27	0.01
	10	0.86	0.30	0.25	0.96	0.12	0.16	0.11	0.59	0.11	0.26	96.26	0.01
Slovenia	1	9.50	1.79	2.36	1.79	0.07	2.69	0.66	0.01	0.06	1.70	0.01	79.38
	3	8.77	2.66	9.77	1.52	0.08	2.24	0.64	0.09	0.12	1.58	0.51	72.03
	5	8.82	2.85	9.65	1.50	0.10	2.25	0.64	0.09	0.15	1.59	0.51	71.85
	10	8.81	2.85	9.65	1.50	0.10	2.25	0.64	0.09	0.16	1.59	0.51	71.85

The post-EU: 2007-2011 period seems to be quite similar to the previous post-EU period. We can again observe a leading role of three markets: Bulgaria, the Czech Republic and Cyprus, as markets which explain the most number of shocks in the other CEE markets. The difference is only regarding the average percentage of explained variables, which now constitutes 10.69 percent for Cyprus and 5.76 percent for Bulgaria. The Czech Republic percentage stays the same. The increase in percentage value of variables explained by innovation is on average higher in comparison to the previous period, while at the same time we can observe a decrease in the percentage of self explained variables.

5.4 Impulse Response

The pattern of dynamic responses of each CEE stock market is presented in

Figure 1 to

Figure 3. These graphs illustrate to what extent the shock of one market is persistent in terms of its effect on the other markets in the system. The impulse response function of each CEE market is traced over a ten day time frame from a unitary standard deviation shock.

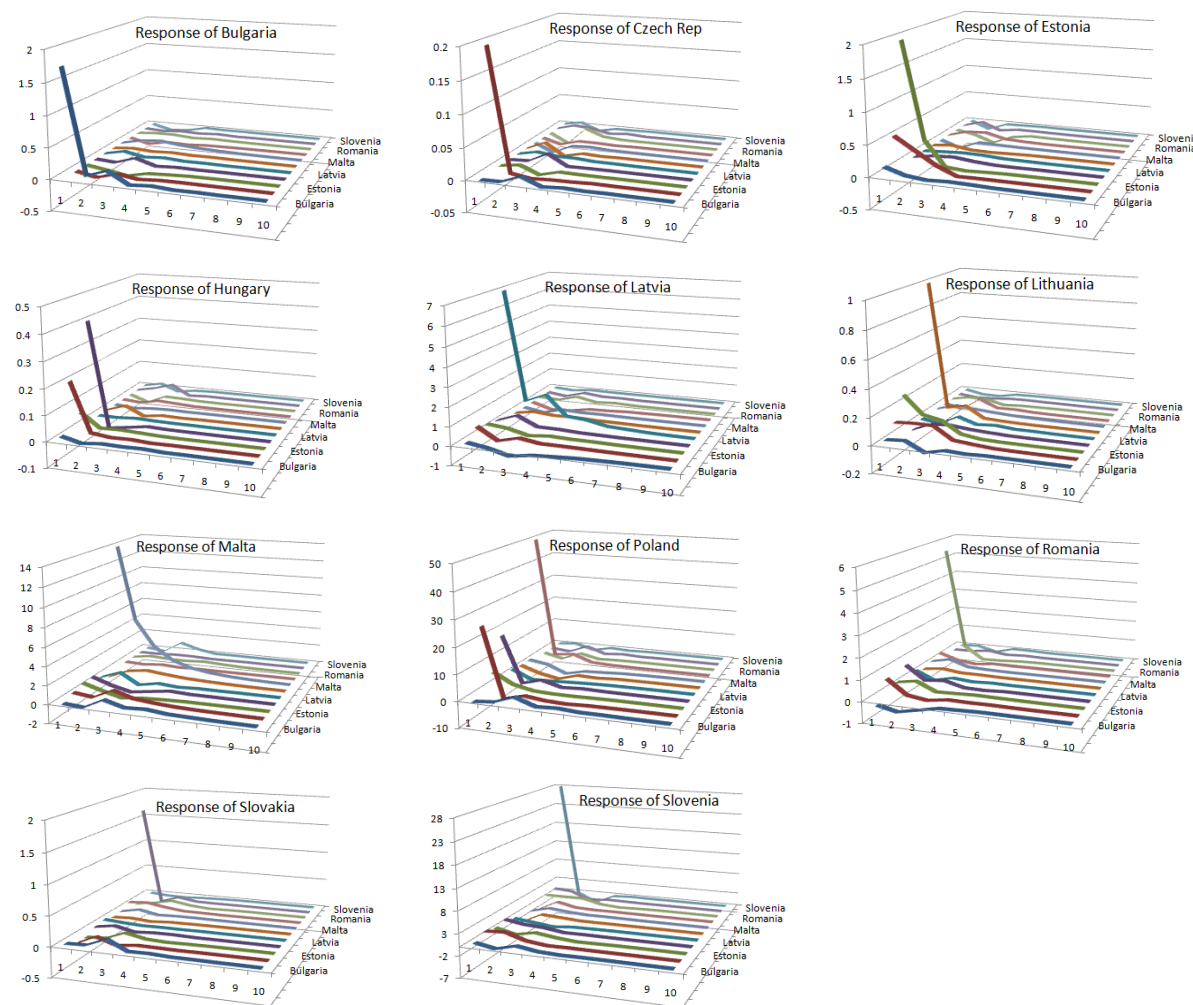


Figure 1: Impulse Response of CEE stock market to Cholesky One S.D. Innovations, pre-EU period, 1995-2004
 Note: Eleven lines on above graphs are representing markets of Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia accordingly.

The response to shocks of most of the markets in the pre-EU period seems to cause very small or almost no fluctuations in any other markets (see

Figure 1). We can observe some responsiveness of Poland to innovations which affect Hungary and the Czech Republic. Those innovations in the Polish stock market are rapidly transited to all the other markets, however after day 3 they fade away. Similar behaviour is observable for Estonia and Hungary, where innovations are transmitted to the Czech Republic, Malta, Lithuania, Romania, Slovakia and Slovenia. Conversely in those cases the responses to shocks are quicker and they diminish after day 2.

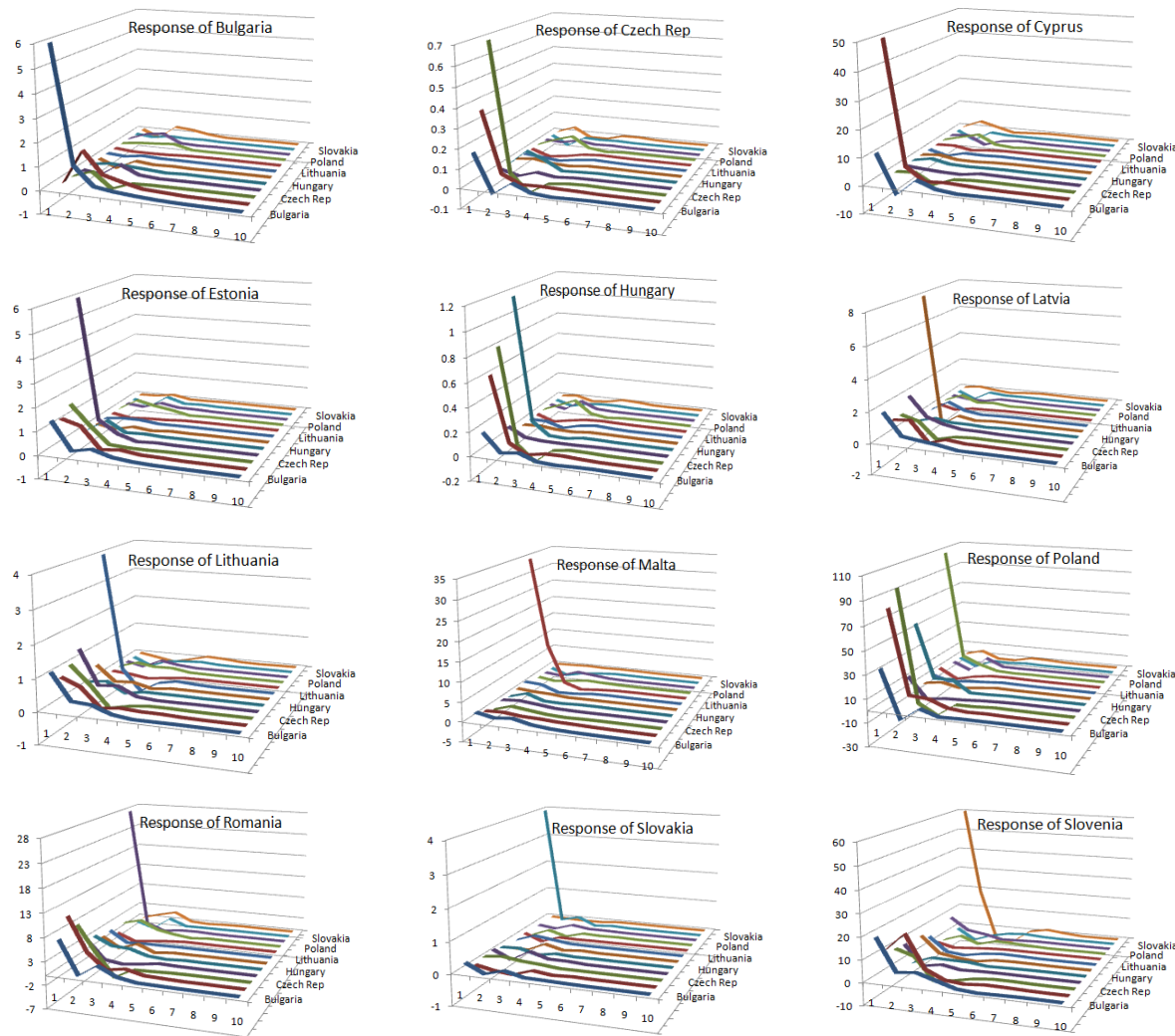


Figure 2: Impulse Response of CEE stock market to Cholesky One S.D. Innovations, post-EU period, 2004-2011
 Note: Twelve lines on above graphs are representing markets of Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia accordingly.

A different pattern appears after EU enlargement in 2004. Results in

Figure 2 illustrate significant responses in several markets. In comparison to the previous period, almost all markets respond dramatically to Polish shocks in the first few days and then rapidly taper off. A similar pattern of responses is observed for shocks in Romania, Lithuania and Slovenia. The responsiveness to shocks in the Czech Republic and Hungary seems to be significant as they influence each other as well as Cyprus and Bulgaria. Slovakia and Malta appear to be isolated, with shocks in these markets not impacting other markets. This pattern is also apparent for the post-EU, 2007-2011 phase.

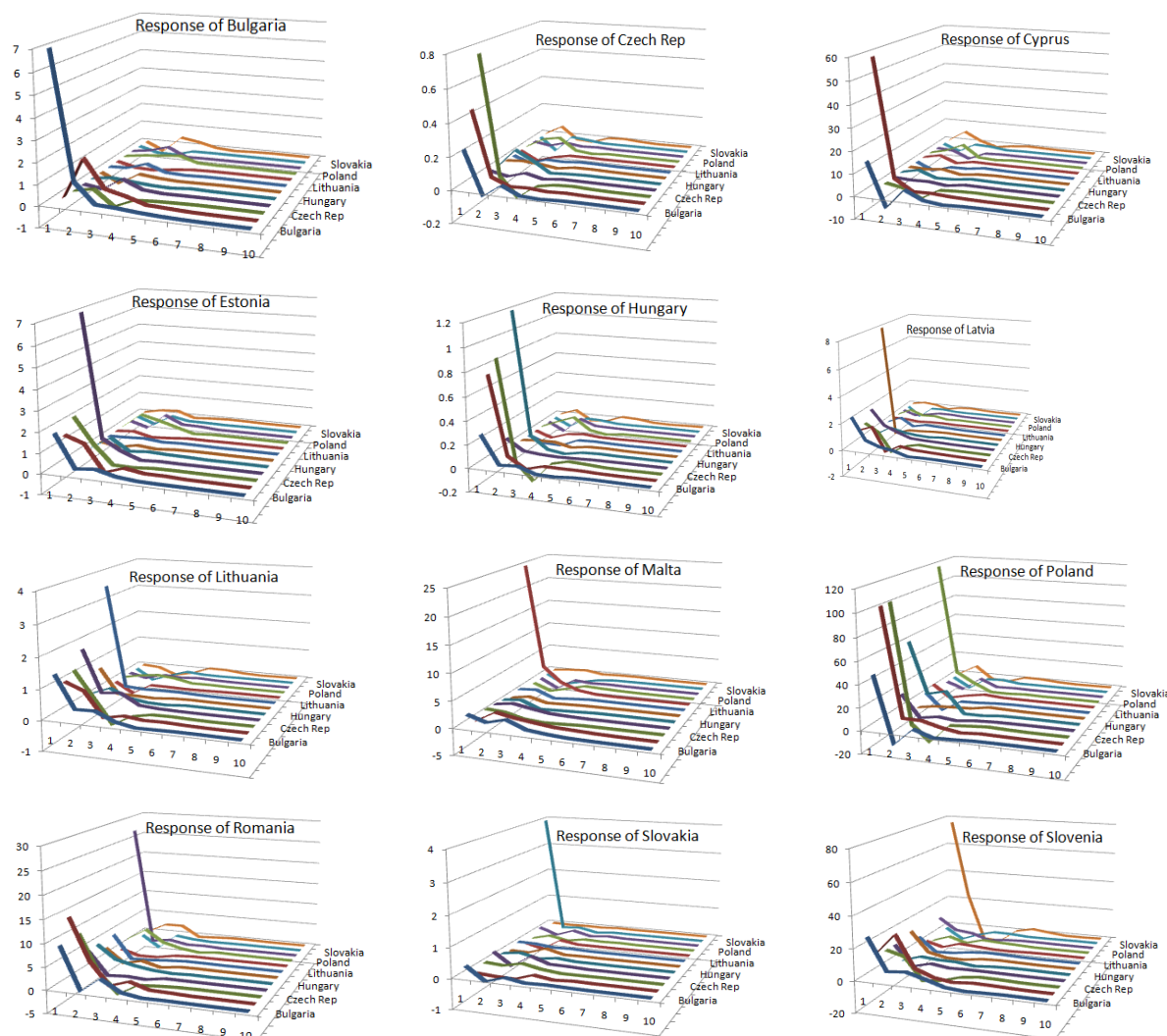


Figure 3: Impulse Response of CEE stock market to Cholesky One S.D. Innovations, post-EU period, 2007-2011
 Note: Twelve lines on above graphs are representing markets of Bulgaria, Cyprus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia accordingly.

In view of our findings that many of the responses are complete in about three days after a shock, the pattern of impulse response emerging from the VAR analysis seems to be broadly consistent with the concept of informationally efficient European stock markets. Implications for investors are that it would be difficult to earn unusual profits by investing in a particular market, knowing that information is available at the time the investment is made.

6. Conclusion

In summary, having established that all stock indexes are $I(1)$ variables, our VAR analysis significantly rejects non-cointegration among all alternative sets of twelve stock markets. The Johansen analysis produces evidence of at least one cointegrating vector in existence. Results from the VECM are consistent with the FEVD, showing a greater degree of integration between CEE emerging markets after accession to the EU. The Impulse Response function illustrates that the shocks' impact on returns dies out in less than one week. Granger causality relationships have also been identified between CEE markets, showing dominance of the more advanced emerging markets of the Czech Republic, Hungary and Poland. The significance of those three markets has already been recognized by the FTSE and MSCI groups as advanced emerging markets. Furthermore, Estonia has developed into a strong international player through its membership in the EU. On the other hand the Maltese and Slovakian stock markets appear to display more self-directed independent behaviour than their peers.

As the majority of past studies on stock market comovements and integration have concentrated mainly on mature developed markets or advanced emerging markets only, we tested the behaviour and inter-relationship of CEE emerging markets only. We can argue that our results show growing investment potential in those equity markets and provide good opportunities for European investors as well as important indications for economic stability, growth and integration of the CEE markets in the post-EU period. We detected no dramatic shocks during the accession phase in the post-EU period. This could be explained by the fact that those macroeconomics policies have been subject to an adjustment process for a long period of time. Throughout the process of preparing for admission to the EU these equity markets have been modelled along similar paths of joining procedures to those in developed market economies. Moreover, we documented regional integration among the twelve countries. Given this information, EU based investors may observe stock market behaviours in one group of markets as one investment opportunity instead of single separate classes of assets. Ideally, an investor based in the more developed markets of the EU would like to be able to invest in these Euro-denominated 'emerging markets' and benefit from risk diversification. Paradoxically, the diversification benefits appear to be reduced in terms of the findings of increased cointegration. On the other hand, there is also evidence of a lowering of average risk, in terms of variance based measures post-joining the EU.

Those emerging markets are progressing very rapidly in their reforms and stability in domestic economies while in the process of becoming members of the EU. Please remember that the aim and the greatest achievement of creation of the EU is to develop a single

market through a standardised system of laws which apply in all member states. Thus restrictions between member countries on trade and free competition have gradually been eliminated. As an outcome of those reforms and expansion, the EU has more influence on the world stage when it speaks with a single voice in international affairs.

A future extension of our study will consider the effects of developed markets on our cointegration analysis with the objective of verifying the assumption that the relationships between emerging EU markets would be broadly preserved.

Notes

1. SOFIX (Bulgaria), SEPX (Czech Republic), CYSE (Cyprus), OMX Tallinn Stock Exchange (Estonia), BUX (Hungary), OMX Riga Stock Exchange (Latvia), OMX Vilnius Stock Exchange (Lithuania), MSE (Malta), WIG (Poland), BET (Romania), SAX (Slovakia) and SBI (Slovenia)

2. The unit root test results are available on request. The optimal lag length is determined by usage of the Akaike Information Criteria (AIC)

3. The optimal lag length is determined by usage of the AIC in the VAR model and the following have been chosen: VAR(2) for pre-EU period, VAR(3) for 2004-2011 post-EU period and VAR(2) for 2007-2011 post-EU period.

4. Our analysis is based on the maximum eigenvalue test statistics, as only from these statistics we can get significant values in the VECM. An analysis of trace test statistics showing no significance at all (test results are available on request).

5. In the case of one cointegrating vector, the model has been normalized on the Czech Republic data, as the most advanced emerging market; the FTSE group classified this market as advanced. In the case of two cointegrating vectors three markets have been taken into account: Czech Republic, Hungary and Poland, as those three are classified as advanced emerging markets. The combinations of two have been analyzed, and cointegrating vectors have been normalized as: Czech Republic and Hungary, and Czech Republic and Poland. However, results presented in this paper only include Czech Republic and Polish markets, as the other analysis showed no significance for cointegrating vectors. Calculations are available on request.

6. Table 3 reports only one normalized cointegrating vector as the other one showing now significance at 5% level.

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BLOCK HOLDING BY OTHER NONFINANCIAL FIRMS MITIGATES FINANCIAL CONSTRAINTS FOR INVESTMENT IN BRAZIL

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Abstract

We analyze how corporate ownership structure can contribute to mitigate the financial constraints of Brazilian firms. Based on a sample of 289 nonfinancial firms listed in the São Paulo Stock Exchange during the period 1995-2006, we confirm the existence of financial constraints on capital expenditures. Our results show that block holding by other nonfinancial firms has a beneficial effect in mitigating financial constraints. Brazilian firms can reduce financial constraints by incorporating into their ownership structure a blockholder that is an industrial or commercial company. This ownership structure favors access to external financing as it reduces asymmetric information problems that are at the origin of financial constraints.

Keywords: financial constraints, ownership structure, nonfinancial firm blockholder, cash flow, Brazil.

1 Introduction

The literature about financial constraints on capital expenditures has consistently shown the effect of such constraints on investment (Fazzari et al., 1988; Schiantarelli, 1996). Recently, a new line of research has focused on how corporate ownership structure can mitigate the effect of financial constraints (Allen and Phillips, 2000; Filatotchev et al., 2007; Goergen and Renneboog, 2001). At the same time, the literature has called attention to the need for more research to better understand the effects of agency conflicts and ownership structure on firms' investment and financial policies (Hennessy et al., 2007; Schiantarelli and Sembenelli, 2000).

International evidence, mainly centered in developed economies, has shown that the use of internal funds by firms is a consequence of financial constraints in the USA, Germany, the UK, Canada, and Spain (Audretsch and Elston, 2002; Bond et al., 2003b; Fazzari et al., 1988; Maestro et al., 2007; Whited and Wu, 2006). Consistent evidence has also been found in the transition economies of the Czech Republic (Lízal and Svejnar, 2002), Bulgaria (Rizov, 2004a), Romania (Rizov, 2004b), and Russia (Perotti and Gelfer, 2001). However, there is a lack of research about financial constraints in developing economies where such financial constraints more often impede countries' economic growth (Galindo and Schiantarelli, 2002; Galindo et al., 2007). As suggested by Stiglitz (1989) and Khanna and Palepu (1997, 2000) asymmetric information problems may be more severe in emerging markets due to the lack of adequate disclosure practices, weak corporate governance, and the reduced ability of market institutions to adequately assess firms' investment projects and financial status.

Following this promising avenue for research, our paper focuses in how blockholders could mitigate the effect of financial constraints in Brazilian firms. Our research focuses on whether block ownership by other nonfinancial firms, either as the main voting shareholder or by ownership concentration in hands of the other firms, is associated with the intensity of financial constraints. To measure financial constraints we use investment-cash flow sensitivity, as it has been previously identified as a signal of financial constraints since it is the consequence of higher costs of external finance forcing firms to use internal funds for investment (Allayannis and Mozumdar, 2004; Alt, 2003; Bond et al., 2003c; Bond and Meghir, 1994a; Fazzari et al., 1988; Schiantarelli, 1996).

We find evidence indicating the existence of financial constraints in Brazil, consistent with previous works. More important is the finding that firms with other nonfinancial firms as blockholders face fewer financial constraints than others; such positive effect is even more pronounced when such nonfinancial firms are industrial/commercial companies.

The paper is organized as follows. The second section describes the theoretical foundations and sets forth the hypotheses statements. In section 3 work method, sample and econometric models are detailed. Section 4 discusses results, and, the final section contains conclusions of the work.

2 Theoretical background and hypotheses

The Brazilian financial system has experienced dramatic structural changes since the 1990s, improving the efficiency of the financial system with positive effects in firm investment financing (Baer and Coes, 2001; Studart, 2000). The liberalization and privatization processes have attracted new investors, especially through the Brazilian stock market. Studart(2000) has documented that the volume of

transactions in the Brazilian stock exchange grew 741% from 1992 to 1997. Furthermore, the wave of privatizations has significantly modified the corporate ownership structure by decreasing the state participation and underling the role played by nonfinancial firm blockholders. The literature on the influence of nonfinancial firms as large shareholders, mainly centered in developed countries, has found beneficial effects in alleviating financial constraints and increasing the value of the firms (Allen and Phillips, 2000; Schiantarelli and Sembenelli, 2000). To date no research about it has dealt with the Brazilian experience.

Brazil institutional characteristics result in a high cost of external funds (Marques and Fochezatto, 2007; Omar, 2008). The protection of minority shareholders and creditors is still inadequate, while at the same time, there is evidence of high benefits of control (Dyck and Zingales, 2004). Together with the inherent asymmetric information problems in capital markets, these characteristics motivate us to formulate the following hypothesis for Brazilian firms, which is consistent with previous works about financial constraints in Brazil (Kalatzis et al., 2008; Moreira and Puga, 2000; Terra, 2003).

Hypothesis 1: Market imperfections affect firm investment policy such that firms face financial constraints for investment in Brazil.

Ownership concentration reduces financial constraints and thus improves firms' financing policies. Higher ownership concentration, with a reduced number of blockholders, minimizes agency conflicts between managers and owners since it facilitates management monitoring and alleviates the free-rider problem, improving communication with financing markets, thus easing access to external finance (Chirinko and Schaller, 1995; Goergen and Renneboog, 2001; Schaller, 1993). Chirinko and Schaller (1995) suggest that financiers consider high ownership concentrated firms as less likely to misrepresent the quality of investment projects which is important in the bond and debt market. On the other hand, the possibility that controlling blockholders could expropriate minority shareholders may raise difficulties for equity finance (Filatotchev et al., 2007).

The identity of the blockholders, and its possible effects on investment and financing policy, has received the attention of researchers. Goergen and Renneboog(2001) present two theoretical arguments to investigate whether ownership concentration in hands of certain categories of shareholders can mitigate financial constraints. First, certain blockholders can reduce overinvestment through better managerial supervision, which can minimize the possibility of misusing internal funds. Second, information asymmetry between management and shareholders is reduced to the extent that important blockholders receive more well-timed information, which can also positively influence the relations with external creditors. There is evidence that foreign ownership, for example, is a factor that lessens difficulties of access to external finance for investment (Galindo and Schiantarelli, 2002; Harrison and McMillan, 2003; Mickiewicz et al., 2004).

There are a number of arguments favoring the presence of other nonfinancial firms in ownership. Some of them are related to strategy concerns (Allen and Phillips, 2000; Khanna and Palepu, 1997, 1999, 2000) while others are associated with agency conflicts and financing policy (Allen and Phillips, 2000; Boehmer, 2000; Jensen and Ruback, 1983; Schiantarelli and Sembenelli, 2000).

Under the strategic view, the literature finds a number of positive effects: the alignment of interests and objectives of firms sharing ownership can lead to a combination of both firms' interests and reputations resulting in strategic alliances, the creation of a common group brand, and the improvement of a firm's image; an integrated business group can also train their own work force, bypassing the labor market institutions' inefficiencies; and the combined firms can use funds and management ability from their existing operations to start new ventures, overcoming the need for intermediaries such as venture capital firms.

In terms of agency conflicts and financing, there are also some positive results as a consequence of block ownership by nonfinancial firms: an increased availability of collateral for firms to support bank financing; the possibility of more active management monitoring; the reduced likelihood of fund squandering and overinvestment; the lower chance of misuse of managerial discretion; the reduction of agency conflicts between ownership and control; the possibility of mutual funding among firms; and an improvement in communication with financing markets with the reduction of information asymmetry problems causing underinvestment.

The effects of block ownership held by nonfinancial firms on investment and financing policies for developed countries are inconclusive, unlike the effects in emerging and transition economies. Hoshi et al. (1991), working with a sample of Japanese firms, have found evidence that the membership in corporate groups eases external funding; Manos et al. (2007) have found similar results in India. Allen and Phillips (2000) found evidence that in the USA the presence of a nonfinancial firm as a reference blockholder has positive effects on a firm's level of investment and performance, as well as in reducing the intensity of financial constraints. In contrast, for British firms, the results of Goergen and Renneboog (2001) indicate that the presence of a nonfinancial firm as a large shareholder increases the use of internal funds for investment. They interpret this result as an indication of overinvestment as a consequence of benefits of control, as well as of a financial constraints problem and the blockholders' resistance to a high leverage condition.

In Brazil there has been a significant reduction of state participation in firm ownership as a consequence of the privatization process. This process, together with other structural changes, has caused an increase in block ownership by nonfinancial firms as well as the emergence of new relevant shareholders. Specifically in the case of Brazil, such ownership may help to overcome the natural limitations of the institutional framework. (Khanna and Palepu 1997, 2000). In addition, the alignment of firms' interests can favor internal funding between firms, as found in India by Manos et al.(2007). The market may also have a positive view of the improvement in management monitoring.

Based on these arguments and the previous evidence of a reduction of financial constraints due to block ownership by nonfinancial firms, we propose the following hypotheses:

Hypothesis 2: Large voting share blocks held by other nonfinancial firms has a positive effect in mitigating financial constraints faced by Brazilian firms.

Two groups of nonfinancial firms can be identified in Brazilian firm ownership. First, there is a set of firms clearly identified as industrial or commercial companies. Second, there is group of blockholder firms that are either holdings or asset management companies. This second group of firms is known in Brazil as participation companies. Participation companies are usually associated with structures created to maintain pyramidal ownership structures with more diffuse interests. The first set of firms is more clearly focused on value creation since such firms associate their names directly with the controlled company. The link between firms and the industrial or commercial blockholder should influence the collateral requirements and management monitoring of the controlled firm. Thus we consider whether industrial/commercial companies as large shareholders can lead to higher benefits with investment funding than asset management firm blockholders and make the following hypothesis:

Hypothesis 3: The positive effect of industrial or commercial firms, as large voting shareholders, in mitigating financial constraints is stronger than that of asset management firms.

3 Sample, models and methodology

The identification of different financial regimes of dividend and share issue policies has been considered a good method to evaluate possible financial constraint situations. This strategy has been used in a number of relevant studies in developed economies (Bond and Meghir, 1994a, 1994b; Cleary, 1999; Kaplan and Zingales, 1997; Maestro et al., 2007; Whited and Wu, 2006) and also in Bulgaria (Rizov, 2004a), a transition economy. We use three different financial situations that may be indicative of financial constraints for a firm (Figure 1). According to Criterion 1, firm i is not considered under financial constraint in year t ($DF_{i,t} = 0$) if it pays dividends, and increases or, at least, maintains the present dividend payout, otherwise the firm is considered under financial constraints ($DF_{i,t} = 1$). The two other more restrictive criteria incorporate new share issuance. Criterion 2 defines a firm as not financially constrained if it pays dividends, and increases or maintains dividend payout and does not issue new stock in the current year. Finally, according to Criterion 3, a firm is not considered under financial constraint if it pays and does not reduce dividend payout and does not issue new stock in the most recent two consecutive periods.

Figure 1. Categorization criteria for a firm being financially constrained

Criteria	Condition to consider a firm out of financial constraints
Criterion 1	Pay dividends, and maintain or increase dividend payout in period t
Criterion 2	Pay dividends, and maintain or increase dividend payout, and does not issue new stock in period t
Criterion 3	Pay dividends, and maintain or increase dividend payout, and does not issue new stock in periods t and $t-1$

Ownership concentration in hands of other nonfinancial firms is measured using the Herfindahl index, following Maury and Pajuste(2005). Annual Herfindahl index ($HI_{i,t}$) for each firm is calculated by the sum of squares of the proportions of voting shares owned by nonfinancial firms that are among the five largest voting stockholders.

The recent bond market growth in Brazil reported by Sanvicente(2002) has motivated us to use two measures of debt (D): total debt, which includes bank and bond debt, and bank debt only. This use of two different measures of debt is also important for robustness of the results. Thus, each of the three proposed models has been estimated for each measure of debt separately.

3.1 Sample

To contrast the proposed hypotheses, we have used a sample of Brazilian firms with annual firm data collected from the Economática database. We have built an unbalanced panel data of 289 nonfinancial firms listed in the São Paulo Stock Exchange (BOVESPA) during the period 1995-2006, for a total of 2,808 firm-year observations. Firms from fifteen sectors of the economy are represented in the sample (Table 1). To allow for dynamic analysis, only firms with six or more consecutive years of valid data have been kept in the sample. Firm-year observation variables have been “winsorized” at the top and bottom 5% levels to remove the impact of outliers (Bhagat et al., 2005; Cleary, 1999, 2006).

Table 1. Sample by sector

Sector	Observations		Firms	
	N	%	N	%
Chemicals	231	8.23	22	7.61
Electrical and instrument engineering	104	3.70	11	3.81
Mining, metals and metal goods	430	15.31	44	15.22
Motor vehicles, and transport equipment	234	8.33	23	7.96
Wood, paper and paper products	101	3.60	9	3.11
Communication and media	122	4.34	15	5.19
Textile, clothing, leather and footwear	293	10.43	28	9.69
Petroleum and fuel products	94	3.35	9	3.11
Food, drink and tobacco	209	7.44	21	7.27
Miscellaneous manufacturing industries	209	7.44	20	6.92
Electrical	310	11.04	34	11.76
Building and transportation	152	5.41	17	5.88
Business sector services	117	4.17	12	4.15
Trade and retailing	103	3.67	11	3.81
Miscellaneous services	99	3.53	13	4.50
Total	2,808	100.00	289	100.00

3.2 Models

We estimate models of investment that take into account the proposals of the pecking order theory. Such models are based on the Euler equation for optimal capital accumulation in the presence of convex adjustment costs proposed by Bond and Meghir (1994a). The models are based on the first-order condition of a maximization process. Investment is explained by discounted expected future investment, adjustment costs, output fluctuations, cash flow, and leverage.

In the absence of financial regimes indicative of possible financial constraints, no investment–cash flow sensitivity is expected. In this Euler equation model, investment in capital goods is adjusted for expected changes in input prices and net marginal output while controlling for future profitability on investment spending, cash flow, and leverage. Future unobservable variable values are approximated by instrumental variables. In the estimated models current investment (Inv/K) is the dependent variable as seen in equation models (1), (2) and (3).

$$\begin{aligned} \left(\frac{Inv}{K}\right)_{i,t+1} = & \varsigma + \beta_1 \left(\frac{Inv}{K}\right)_{i,t} + \beta_2 \left(\frac{Inv}{K}\right)_{i,t}^2 + \beta_3 \left(\frac{CF}{K}\right)_{i,t} + \beta_4 \left(\frac{Y}{K}\right)_{i,t} + \beta_5 \left(\frac{D}{K}\right)_{i,t}^2 + \\ & \beta_6 DF_{it} \left(\frac{Inv}{K}\right)_{i,t} + \beta_7 DF_{it} \left(\frac{Inv}{K}\right)_{i,t}^2 + \beta_8 DF_{it} \left(\frac{CF}{K}\right)_{i,t} + \beta_9 DF_{it} \left(\frac{Y}{K}\right)_{i,t} + \beta_{10} DF_{it} \left(\frac{D}{K}\right)_{i,t}^2 + \delta_{t+1} + \alpha_i + \mu_{i,t+1} \end{aligned} \quad (1)$$

$$\begin{aligned} \left(\frac{Inv}{K}\right)_{i,t+1} = & \varsigma + \beta_1 \left(\frac{Inv}{K}\right)_{i,t} + \beta_2 \left(\frac{Inv}{K}\right)_{i,t}^2 + \beta_3 \left(\frac{CF}{K}\right)_{i,t} + \beta_4 \left(\frac{Y}{K}\right)_{i,t} + \beta_5 \left(\frac{D}{K}\right)_{i,t}^2 + \\ & \beta_6 DM_{it} \left(\frac{Inv}{K}\right)_{i,t} + \beta_7 DM_{it} \left(\frac{Inv}{K}\right)_{i,t}^2 + \beta_8 DM_{it} \left(\frac{CF}{K}\right)_{i,t} + \beta_9 DM_{it} \left(\frac{Y}{K}\right)_{i,t} + \beta_{10} DM_{it} \left(\frac{D}{K}\right)_{i,t}^2 + \delta_{t+1} + \alpha_i + \mu_{i,t+1} \end{aligned} \quad (2)$$

$$\begin{aligned} \left(\frac{Inv}{K}\right)_{i,t+1} = & \varsigma + \beta_1 \left(\frac{Inv}{K}\right)_{i,t} + \beta_2 \left(\frac{Inv}{K}\right)_{i,t}^2 + \beta_3 \left(\frac{CF}{K}\right)_{i,t} + \beta_4 \left(\frac{Y}{K}\right)_{i,t} + \beta_5 \left(\frac{D}{K}\right)_{i,t}^2 + \\ & \beta_6 HI_{it} \left(\frac{Inv}{K}\right)_{i,t} + \beta_7 HI_{it} \left(\frac{Inv}{K}\right)_{i,t}^2 + \beta_8 HI_{it} \left(\frac{CF}{K}\right)_{i,t} + \beta_9 HI_{it} \left(\frac{Y}{K}\right)_{i,t} + \beta_{10} HI_{it} \left(\frac{D}{K}\right)_{i,t}^2 + \delta_{t+1} + \alpha_i + \mu_{i,t+1} \end{aligned} \quad (3)$$

In these models, t refers to time period; i refers to firm; δ_{t+1} is the error term related to time-specific effects; α_i is the error term associated with firm-specific effects (which includes unobservable firm-specific characteristics); $\mu_{i,t+1}$ is the random error term; K is firm capital stock; Inv refers to investment in capital goods, measured as the increment in K during the current year, adjusted for depreciation $((1-\lambda)K_t)$, where λ is the depreciation rate; CF is the cash flow, defined as the sum of net profits and depreciation; output fluctuation (Y) is proxied by year sales; and D refers to debt.

Models are composed of basic variables (previous investment, adjustment costs, cash flow, output and debt) and interacted variables that take into account three aspects: annual evaluation of a firm for financial constraints, the presence of another nonfinancial firm as the main voting shareholder, and ownership concentration in the hands of other nonfinancial firms. First, in model (1) basic variables are interacted with a dummy variable indicator of possible financial constraints of firm i in year t ($DF_{i,t}$). This model is used as a baseline

model to check the existence of financial constraints. Model estimation allows the evaluation of possible differences of each coefficient across the whole sample and the subsample characterized by the presence of financial constraints. Second, in model (2) basic variables are interacted with a dummy variable indicator of the presence of a nonfinancial firm as the main shareholder of firm i in year t ($DM_{i,t}$). Model estimation allows the assessment of possible differences of each coefficient across the whole sample and the subsample characterized by having another nonfinancial firm as the main shareholder. And, in model (3), basic variables are interacted with a variable that represents the Herfindahl index of ownership concentration in hands of other nonfinancial firms relative to firm i in year t ($HI_{i,t}$). As in the previous models, estimation of model (3) allows the assessment of possible differences of coefficients across the whole sample and the subsample that accounts for ownership concentration in hands of nonfinancial firms.

3.3 Empirical Method

Models are estimated using panel data methodology, which allows the treatment of unobservable heterogeneity associated with fixed firm effects. Unobservable specific firm errors can be eliminated from the equation through variable transformation by first differences (Arellano and Bover, 1990). We estimate the models using Arellano and Bond's (1998) system estimator that provides better estimators when the period of study is relatively short (Blundell and Bond, 1998). We use the two-step system estimator (SE) with adjusted standard errors for potential heteroskedasticity as proposed by Blundell and Bond (1998). This econometric method considers the unobserved effect transforming the variables into first differences and uses the generalized method of moments (GMM) to deal with endogeneity problems. Those differences are reflected in the quality of the instruments involved (Levine et al., 2000). The existence of weak instruments can lead to a poor asymptotic precision in finite samples (Alonso-Borrego and Arellano, 1999). Therefore, in this dynamic model, we must use an estimator that lessens this problem, substituting the specification in differences with the original regression specified in levels such as the system estimator (Blundell and Bond, 1998; Huang and Ritter, 2010; Öztekin and Flannery 2009). Performing the model that way, the system estimator involves two kinds of equations with their own instruments. The first category of equations is in levels and its instruments are the lagged differences in the dependent variable and the independent variables. The second category of equations consists of equations in first differences with the levels of the dependent variable and the independent variables as instruments (Antonioni et al., 2008; Arellano and Bond, 1998; Wooldridge, 2002). In our case, by using the GMM method, we can build instruments for those variables that are potentially endogenous.

To test model specifications' validity, we calculate the Sargan/Hansen test of over identification of restrictions. This test examines the lack of correlation between the instruments and the error term. Given the use of first-difference transformations, we expect some degree of first-order serial correlation, although this correlation does not invalidate results. However, the presence of second-order serial correlation does signal omitted variables. Thus, we use the adjustment for small samples suggested by Windmeijer (2005). Since our sample size is not very large, the Windmeijer proposal improves the robustness of our results and avoids any potential downward bias in the estimated asymptotic standard errors.

4 Results

Table 2 reports summary descriptive statistics of the sample variables. Average investment intensity of 11.58% is a bit inferior to other more advanced markets such as 12.9% in the United States (Chiao, 2002), 13.9% in Germany (Harhoff, 1998), 12.5% in Belgium, and 11.7% in the United Kingdom (Bond et al., 2003a). Brazilian firms present an average (CF/K) ratio of 37.56% with an average output ratio (Y/K) of 256%. Total leverage ratio is high at 107.5%, while bank debt is approximately 80%.

Table 2. Sample descriptive statistics

Variable	Mean	Std. Dev.	Min.	Max.
Inv/K	0.1158	0.5384	-0.8823	3.8316
CF/K	0.3756	1.1013	-1.2839	2.9916
Y/K	2.5607	2.6906	0.0000	8.5936
Debt/K	1.0750	1.3848	0.0000	4.3110
Bank Debt/K	0.8003	0.9552	0.0000	2.9585

Notes: (1) K is firm's capital stock. (2) Inv refers to investment in capital goods, measured as the increment in K during the current year, adjusted for depreciation $((1-\lambda)K_t)$, where λ is the depreciation rate. (3) CF is the cash flow, defined as the sum of net profits and depreciation. (4) Output fluctuation (Y) is proxied by year sales. (5) Debt (D in models equations) refers to debt.

The theoretical dynamic adjustment cost model predicts a negative investment–cash flow correlation under the assumption that a firm may raise the required funds to finance its investment projects at a given cost, which corresponds to the absence of financial constraints.

Results in Table 3 refer to model (1) estimated for each of the three criteria used to classify firms under financial constraints annually (Figure 1). Models are estimated using the Generalized Moments Method (GMM) in system. The Sargan/Hansen test of over identifying restriction of the instruments does not reject the null hypothesis of valid instruments, and, the Arellano-Bond test of second order autocorrelation in the residuals also does not reject the null hypothesis of the absence of such correlation. Both tests also validate the other models estimated as outlined in the following discussion. In addition, all standard deviations are estimated robust to heteroskedasticity. As previously mentioned, to avoid omission bias, all models incorporate industry dummies (unreported by virtue of space priority).

According to the results reported in Table 3, the capital expenditures of the firms in our sample depend on their corporate financial status. This result is consistent with the literature on financial constraints and corroborates the existence of such constraints among Brazilian firms. Indeed, investment of firms *a priori* considered as more prone to face financial constraints is more sensitive to their liquidity situation. For each of the three criteria used to evaluate whether a firm is under financial constraints a specific subsample of firm-year observations is created. In each subsample, we create interacted variables corresponding to the product between the dummy that indicates a situation of financial constraint in the year, and the basic variables in model (1). The proposition is that estimated coefficients may differ across the whole sample and the financially constrained subsample. We estimate the dynamic model of equation (1) for each of the files associated with each criterion established in Figure 1.

Table 3 reports coefficients of model estimates for the sample with firm-year observations classified according to criteria 1, 2 and 3 (Figure 1), in Panels A, B and C, respectively. In accordance with Criterion 1, 1,869 firm year observations (66.56% of the sample) are considered to be under financial constraints ($DF = 1$). Results for system GMM estimates show that the subsample of firms classified as under financial constraints exhibits a significant positive sensitivity of investment to cash flow [$DF*(CF/K)$] in contrast to the absence of such correlation in the whole sample (CF/K). A Wald test rejects the null hypothesis of equality between both cash flow coefficients of the whole sample and of the subsample of financially constrained firms (p -value = 0.0653) indicating that the coefficient for the subsample of firms considered to be under financial constraints is actually higher (Table 3, Panel A).

According to Criterion 2, the subsample of 2,041 firm year observations (72.69% of the sample), classified as under financial constraints, also present significant positive investment–cash flow sensitivity compared to the whole group of firms where such sensitivity is absent (Table 3, Panel B).

A positive and significant sensitivity of investment to cash flow is also verified for the group of 2,263 firm year observations (80.59% of the whole sample) considered as under financial constraints according to Criterion 3 (Table 3, Panel C). A Wald test rejects the null hypothesis of equality between the two cash flow coefficients (p -value = 0.0879), showing that the subsample cash flow coefficient is significantly superior. Results are robust to the estimation of model (1) using two distinct measures of debt (total debt and bank debt). These findings corroborate that, consistent with previous evidence, the investment policy of Brazilian firms is financially constrained, as proposed in Hypothesis 1.

Table 3. Euler-equation model, three evaluation criterion for financial constraints situations

	Panel A - Criterion 1 1,869 firm year observations (66.56%)		Panel B - Criterion 2 2,041 firm year observations (72.69%)		Panel C - Criterion 3 2,263 firm year observations (80.59%)	
Variables	Total debt	Bank debt	Total debt	Bank debt	Total debt	Bank debt
$(Inv/K)_{i,t}$	0.0775 (0.229)	0.0953 (0.212)	-0.0503 (0.277)	-0.0404 (0.278)	-0.1156 (0.395)	-0.1263 (0.407)
$(Inv/K)^2_{i,t}$	-0.0398 (0.082)	-0.0465 (0.075)	0.0013 (0.098)	-0.0021 (0.098)	0.0699 (0.156)	0.0678 (0.163)
$(CF/K)_{i,t}$	-0.0319 (0.061)	-0.0235 (0.056)	-0.032 (0.069)	-0.022 (0.062)	-0.0268 (0.085)	-0.0315 (0.077)
$(Y/K)_{i,t}$	0.1048*** (0.029)	0.0876*** (0.028)	0.087*** (0.028)	0.081*** (0.028)	0.0627** (0.029)	0.0588** (0.029)
$(D/K)^2_{i,t}$	0.0005 (0.011)	0.0018 (0.024)	-0.004 (0.011)	-0.017 (0.027)	0.0043 (0.016)	0.0168 (0.031)
$DF_{i,t}*(Inv/K)_{i,t}$	-0.1309 (0.308)	-0.1337 (0.296)	0.064 (0.363)	0.060 (0.369)	0.0534 (0.456)	0.0728 (0.470)
$DF_{i,t}*(Inv/K)^2_{i,t}$	0.0463 (0.109)	0.0472 (0.104)	-0.019 (0.130)	-0.017 (0.132)	-0.0770 (0.179)	-0.0774 (0.187)
$DF_{i,t}*(CF/K)_{i,t}$	0.1871*** (0.066)	0.1681*** (0.062)	0.174** (0.071)	0.150** (0.068)	0.2025** (0.088)	0.2056** (0.086)
$DF_{i,t}*(Y/K)_{i,t}$	-0.0374 (0.028)	-0.0278 (0.029)	-0.019 (0.026)	-0.021 (0.027)	-0.0022 (0.025)	-0.0134 (0.025)
$DF_{i,t}*(D/K)^2_{i,t}$	0.0021 (0.011)	0.0018 (0.022)	0.008 (0.011)	0.031 (0.025)	-0.0010 (0.018)	-0.0010 (0.033)
Intercept	1.1290** (0.545)	0.0484 (0.563)	1.492* (0.780)	1.436* (0.744)	-0.0596 (0.386)	0.0701 (0.395)
No. obs.	2,808	2,808	2,808	2,808	2,808	2,808
No. firms	289	289	289	289	289	289
F	2.98	3.26	3.24	3.46	2.58	2.64
p-value	0.0000	0.0000	0.000	0.000	0.0000	0.0000
AR2	0.728	0.687	0.753	0.709	0.83	0.781
Sargan/Hansen	281.99	282.19	281.31	281.51	278.5	279.26
p-value	0.3890	0.3860	0.400	0.397	0.4470	0.4340

Notes: Models estimated by system generalized method of moments (GMM). Estimated coefficients and standard errors robust to heteroskedasticity (in parentheses), concerning model of Equation 1, are presented. Dependent variable $(Inv/K)_{i,t+1}$. Sargan/Hansen is the test of overidentifying restrictions. AR2 is the test of absence of second-order correlation in the residuals. ***, **, and * denote statistical significance of the coefficients at 1, 5, and 10% levels. 1,869 firm year observations (66.56%) classified under financial constraints according to criterion 1; 2,041 firm year observations (72.69%) classified under financial constraints according to criterion 2; and 2,263 firm year observations (80.59%) classified under financial constraints according to criterion 3.

Having found evidence that Brazilian firms are financially constrained, the most important contribution of this work is the search for possible effects of large block ownership by other nonfinancial firms on the financial constraint situations. To check whether companies with relevant block ownership are less prone to face financial constraints, as proposed by Hypothesis 2, we have identified firms with nonfinancial firms among the five main voting shareholders. Such blockholders are considered as the main voting shareholder; ownership concentration in their hands has been calculated using the Herfindahl index.

In Table 4, we identify a nonfinancial firm as the main voting shareholder in 2,113 firm-year observations (75.25% of the sample). As previously mentioned, the nonfinancial firms have been divided into two groups: industrial/commercial firms and asset management companies. Industrial/commercial firms appear as the main voting shareholder in 1,266 firm-year observations (45.09%) while asset management companies are the main shareholder in 30.16% of the cases. The industrial/commercial firms also hold greater proportions of shares according to the Herfindahl index, 0.2483, versus 0.1419 for asset management firms. As a whole, we can see that the presence of nonfinancial firms in the ownership of Brazilian companies is significant, whether industrial/commercial firms or asset management companies.

Table 4. Ownership in hands of other nonfinancial firms

Panel A - Nonfinancial firm as main voting shareholder				
	N. observ.	%	N. Firms	%
Nonfinancial firm	2,113	75.25	239	82.7
Industrial/commercial firm	1,266	45.09	167	57.79
Asset management firm	847	30.16	113	39.1

Panel B – Ownership concentration in hands of nonfinancial firm				
	Mean	Std. Dev.	Min.	Max.
Nonfinancial firm	0.3902	0.3292	0.0000	1.0000
Industrial/commercial firm	0.2483	0.3278	0.0000	1.0000
Asset management firm	0.1419	0.2589	0.0000	1.0000

Models (2) and (3) were estimated to assess the effects of the presence of nonfinancial firms in corporate ownership on financial constraints. Model (2) refers to the presence of a nonfinancial firm as the main shareholder while model (3) accounts for ownership concentration in hands of other nonfinancial firms. Models (2) and (3) were estimated for the sample with interacted variables accounting for the whole group of nonfinancial firms (Table 5). Then, both models were estimated for the sample having the interacted variables accounting only for other nonfinancial industrial/commercial firms as blockholders (Table 6). Finally, the two models were estimated for the sample with interacted variables taking into account ownership in hands of asset management firms as large shareholders (Table 7).

For all models' estimations (Tables 5, 6, and 7), the Sargan/Hansen test of over identifying restriction of the instruments has not rejected the null hypothesis of valid instruments, and, the Arellano-Bond test of second order auto-correlation in the residuals also has not rejected the null hypothesis of the absence of such correlation. All standard deviations are estimated robust to heteroskedasticity.

Estimates for all nonfinancial firms as large voting shareholders (Table 5) show that there is a substantial difference in the investment-cash flow sensitivity between the whole sample and the subsample characterized by the strong presence of other nonfinancial firms in ownership, as proposed in Hypothesis 2. Looking at Panel A, one can see the significant cash flow coefficient (CF/K) for the whole sample in contrast to the absence of such relation in the sub-group of firms that have another nonfinancial firm as the main voting shareholder [DM*(CF/K)]. Results are robust to model specifications using total debt and bank debt only. Similar results can be seen for the subsample characterized by high ownership concentration in hands of other nonfinancial firms (Table 5, Panel B). The significant positive coefficient of cash flow for the whole sample contrasts with the non-significant negative coefficients for firms with a strong presence of other nonfinancial firms as measured by the Herfindahl index. Additionally, there is a signal that higher ownership concentration in the hands of other nonfinancial firms eases access to bank financing, as can be captured from the positive significant coefficient of the cross variable [HI*(Debt/K)²] in Table 5, Panel B.

Table 5. Influence of ownership by other nonfinancial firms on financial constraints

Panel A Nonfinancial firm as the main shareholder			Panel B Ownership concentration in hands of nonfinancial firms		
Variables	Total debt	Bank debt	Variables	Total debt	Bank debt
$(Inv/K)_{i,t}$	0,0421 (0,230)	0,0212 (0,211)	$(Inv/K)_{i,t}$	-0,0302 (0,161)	0,0423 (0,160)
$(Inv/K)^2_{i,t}$	0,0018 (0,084)	0,0217 (0,074)	$(Inv/K)^2_{i,t}$	-0,0100 (0,058)	-0,0408 (0,056)
$(CF/K)_{i,t}$	0,1544** (0,076)	0,1404** (0,066)	$(CF/K)_{i,t}$	0,1912*** (0,062)	0,1881*** (0,062)
$(Y/K)_{i,t}$	-0,0070 (0,019)	0,0009 (0,017)	$(Y/K)_{i,t}$	-0,0144 (0,026)	-0,0059 (0,024)
$(D/K)^2_{i,t}$	0,0002 (0,000)	0,0019* (0,001)	$(D/K)^2_{i,t}$	0,0001 (0,000)	0,0003 (0,002)
$DM_{i,t}*(Inv/K)_{i,t}$	0,0895 (0,252)	0,0211 (0,228)	$HI_{i,t}*(Inv/K)_{i,t}$	0,1216 (0,283)	0,0852 (0,300)
$DM_{i,t}*(Inv/K)^2_{i,t}$	-0,0971 (0,093)	-0,0824 (0,082)	$HI_{i,t}*(Inv/K)^2_{i,t}$	-0,0689 (0,103)	-0,0554 (0,103)
$DM_{i,t}*(CF/K)_{i,t}$	-0,0486 (0,093)	0,0142 (0,082)	$HI_{i,t}*(CF/K)_{i,t}$	-0,1398 (0,118)	-0,1262 (0,110)
$DM_{i,t}*(Y/K)_{i,t}$	0,0073 (0,022)	0,0050 (0,021)	$HI_{i,t}*(Y/K)_{i,t}$	0,0597* (0,034)	0,0396 (0,031)
$DM_{i,t}*(D/K)^2_{i,t}$	0,0000 (0,000)	0,0003 (0,002)	$HI_{i,t}*(Debt/K)^2_{i,t}$	0,0001 (0,000)	0,0062* (0,003)
Intercept	1,8629* (1,125)	1,8333 (1,130)	Intercept	2,1706 (1,358)	2,3858 (1,393)
No. obs.	2808	2808		2808	2808
No. firms	289	289		289	289
<i>F</i>	2,77	3,19		2,61	2,55
<i>p</i> -value	0	0		0	0
AR2	0,962	0,884		0,86	0,977
Sargan/Hansen	255,5(244)	258,54(264)		278,93(264)	279,12(264)
<i>p</i> -value	0,294	0,583		0,252	0,25

Notes: Models estimated by system generalized method of moments (GMM). Estimated coefficients and standard errors robust to heteroskedasticity (in parentheses), concerning model of Equations 2 and 3, are presented. Dependent variable $(Inv/K)_{i,t+1}$. Sargan/Hansen is the test of overidentifying restrictions. AR2 is the test of absence of second-order correlation in the residuals. ***, **, and * denote statistical significance of the coefficients at 1, 5, and 10% levels.

Estimated models for the sample which take into account the presence of other industrial/commercial firms (Table 6) show similar results to those obtained for the whole group. The significant dependence of investment on cash flow for the whole sample contrasts with the situation of subsamples with a strong presence of other industrial/commercial companies, either as the main shareholder (Table 6, Panel A) or for ownership concentration in hands of other nonfinancial industrial firms (Table 6, Panel B). This is indicated by the positive and significant coefficients of cash flow (CF/K) for the whole sample which contrast with the non-significant negative ones for the subsample of firms that have a nonfinancial industrial/commercial firm as the main voting stockholder [$DM*(CF/K)$] (Table 6, Panel A) or with high ownership concentration in hands of other nonfinancial industrial firms [$HI*(CF/K)$] (Table 6, Panel B). Wald tests have shown that cash flow coefficients of the whole sample and subsamples are significantly different in both. It is worth mentioning that firms with an industrial/commercial firm as the main voting shareholder have superior investment persistence (Table 6, Panel A). While there is a negative correlation between actual and previous investment (Inv/K) for the whole sample, such correlation changes to positive and significant for the subgroup of firms with a nonfinancial industrial/commercial firm as the main voting shareholder [$DM*(Inv/K)$] (Table 6, Panel A). This is one more signal that Brazilian firms, in which there is block ownership by other industrial/commercial firms, are less financially constrained to invest than those Brazilian firms with no such ownership structure.

Table 6. Influence of ownership by nonfinancial industrial firms on financial constraints

Panel A			Panel B		
Industrial/Commercial firm as the main shareholder			Ownership concentration in hands of industrial/commercial firms		
Variables	Total debt	Bank debt	Variables	Total debt	Bank debt
$(Inv/K)_{i,t}$	-0,2308*	-0,2657*	$(Inv/K)_{i,t}$	-0,1548	-0,1695
	(0,135)	(0,123)		(0,132)	(0,114)
$(Inv/K)^2_{i,t}$	0,0762	0,0881*	$(Inv/K)^2_{i,t}$	0,0335	0,0400
	(0,049)	(0,049)		(0,048)	(0,041)
$(CF/K)_{i,t}$	0,1242**	0,1701**	$(CF/K)_{i,t}$	0,1638***	0,1796***
	(0,062)	(0,070)		(0,057)	(0,056)
$(Y/K)_{i,t}$	0,0181	0,0144	$(Y/K)_{i,t}$	0,0164	0,0074
	(0,023)	(0,021)		(0,028)	(0,024)
$(D/K)^2_{i,t}$	0,0000	0,0015	$(D/K)^2_{i,t}$	-0,0001	0,0000
	(0,000)	(0,002)		(0,000)	(0,002)
$DM_{i,t}*(Inv/K)_{i,t}$	0,5074***	0,5633**	$HI_{i,t}*(Inv/K)_{i,t}$	0,3240	0,3713
	(0,193)	(0,176)		(0,261)	(0,235)
$DM_{i,t}*(Inv/K)^2_{i,t}$	-0,2515***	-0,2669***	$HI_{i,t}*(Inv/K)^2_{i,t}$	-0,1769**	-0,1994**
	(0,068)	(0,065)		(0,090)	(0,084)
$DM_{i,t}*(CF/K)_{i,t}$	-0,1026	-0,1351	$HI_{i,t}*(CF/K)_{i,t}$	-0,1217	-0,1587
	(0,098)	(0,098)		(0,123)	(0,126)
$DM_{i,t}*(Y/K)_{i,t}$	0,0086	0,0255	$HI_{i,t}*(Y/K)_{i,t}$	0,0544	0,0524
	(0,026)	(0,025)		(0,041)	(0,038)
$DM_{i,t}*(D/K)^2_{i,t}$	0,0003	0,0010	$HI_{i,t}*(Debt/K)^2_{i,t}$	0,0024***	0,0074
	(0,000)	(0,002)		(0,001)	(0,005)
Intercept	3,0225*	2,8713*	Intercept	1,9530	2,1852
	(1,549)	(1,473)		(1,216)	(1,329)
No. obs.	2808	2808		2808	2808
No. firms	289	289		289	289
<i>F</i>	5,54	5,34		4,58	4,66
<i>p</i> -value	0	0		0	0
AR2	0,976	0,941		0,886	0,889
Sargan/Hansen	280,65(264)	280,95(264)		279,85(264)	278,29(264)
<i>p</i> -value	0,23	0,226		0,24	0,261

Notes: Models estimated by system generalized method of moments (GMM). Estimated coefficients and standard errors robust to heteroskedasticity (in parentheses), concerning model of Equations 2 and 3, are presented. Dependent variable $(Inv/K)_{i,t+1}$. Sargan/Hansen is the test of overidentifying restrictions. AR2 is the test of absence of second-order correlation in the residuals. ***, **, and * denote statistical significance of the coefficients at 1, 5, and 10% levels.

Although similar, results of models (2) and (3) estimated for subsamples that take into account the presence of asset management companies in voting ownership are not as strong as those with industrial/commercial firms in ownership as proposed in our third hypothesis. In Table 7, Panel A, there is a significant correlation between investment and cash flow for the whole sample; yet there is an absence of such correlation in the asset management firm subsample. However, the difference is not as strong where industrial/commercial firms are present, as seen in Table 6. Furthermore, firms with a strong presence of asset management blockholders-- either as an ownership concentration (Table 7, Panel B) or as the main shareholder (Table 7, Panel A)-- have shown inferior investment persistence as depicted by the negative correlation between current and previous investment $[DM*(Inv/K)$ and $HI*(Inv/K)]$. That could be a consequence of financial constraints as well as of conflicts of interest between these blockholders and others.

Table 7. Influence of ownership by asset management firms on financial constraints

Panel A			Panel B		
Nonfinancial asset management firm as the main shareholder			Ownership concentration in hands of asset management firms		
Variables	Total debt	Bank debt	Variables	Total debt	Bank debt
$(Inv/K)_{i,t}$	0,1893 (0,144)	0,1781 (0,135)	$(Inv/K)_{i,t}$	0,1760 (0,109)	0,2067** (0,103)
$(Inv/K)^2_{i,t}$	-0,1318** (0,053)	-0,1242** (0,049)	$(Inv/K)^2_{i,t}$	-0,1231*** (0,038)	-0,1312*** (0,037)
$(CF/K)_{i,t}$	0,1074* (0,058)	0,1011* (0,056)	$(CF/K)_{i,t}$	0,0690 (0,048)	0,0697 (0,052)
$(Y/K)_{i,t}$	0,0499** (0,020)	0,0539*** (0,019)	$(Y/K)_{i,t}$	0,0490** (0,024)	0,0532*** (0,019)
$(D/K)^2_{i,t}$	0,0002* (0,000)	0,0019 (0,001)	$(D/K)^2_{i,t}$	0,0004* (0,000)	0,0031* (0,002)
$DM_{i,t}*(Inv/K)_{i,t}$	-0,8202*** (0,269)	-0,7653*** (0,252)	$HI_{i,t}*(Inv/K)_{i,t}$	-1,0188*** (0,316)	-0,9217*** (0,264)
$DM_{i,t}*(Inv/K)^2_{i,t}$	0,3458*** (0,098)	0,3181*** (0,096)	$HI_{i,t}*(Inv/K)^2_{i,t}$	0,5446*** (0,122)	0,4959*** (0,097)
$DM_{i,t}*(CF/K)_{i,t}$	0,0481 (0,095)	0,1071 (0,098)	$HI_{i,t}*(CF/K)_{i,t}$	0,1061 (0,134)	0,1050 (0,133)
$DM_{i,t}*(Y/K)_{i,t}$	-0,0515* (0,027)	-0,0538** (0,024)	$HI_{i,t}*(Y/K)_{i,t}$	-0,0760* (0,044)	-0,0652 (0,042)
$DM_{i,t}*(D/K)^2_{i,t}$	-0,0001 (0,000)	0,0011 (0,003)	$HI_{i,t}*(D/K)^2_{i,t}$	-0,0006 (0,000)	-0,0020 (0,003)
Intercept	1,7118 (1,251)	1,5519 (1,202)	Intercept	1,8232 (1,688)	1,5944 (1,134)
No. obs.	2808	2808		2808	2808
No. firms	289	289		289	289
F	5,2	5,74		6,55	4,34
p-value	0	0		0	0
AR2	0,616	0,573		0,624	0,594
Sargan/Hansen	256,85(232)	256,08(232)		275,9(264)	276,85(264)
p-value	0,126	0,133		0,295	0,281

Notes: Models estimated by system generalized method of moments (GMM). Estimated coefficients and standard errors robust to heteroskedasticity (in parentheses), concerning model of Equations 2 and 3, are presented. Dependent variable $(Inv/K)_{i,t+1}$. Sargan/Hansen is the test of overidentifying restrictions. AR2 is the test of absence of second-order correlation in the residuals. ***, **, and * denote statistical significance of the coefficients at 1, 5, and 10% levels.

As a whole, our estimation results, which are robust to model specification using two different measures of debt, provide evidence that the Brazilian firm faces financial constraints for investment as depicted by the dependence of investment on the firm's liquidity situation (Table 3). Estimations of model (1) for samples composed of firm-year observations that account for possible financial constraints situations (Figure 1), have shown that the subsample of firms classified as under financial constraints indeed have investment policies dependent on internally generated funds.

More relevant is the evidence that Brazilian firms with block ownership by other nonfinancial firms are less prone to suffer the consequences of financial constraints. This result is shown by a decreased investment-cash flow sensitivity verified in subsamples characterized by the strong presence of other nonfinancial firms in ownership (Tables 5, 6 and 7). The identification of two categories of nonfinancial firms, industrial/commercial firms and asset management firms, has led to specific estimations of models (2) and (3) for samples of firms that account for each blockholder's identity separately. Results are very strong when considering the presence of other nonfinancial industrial/commercial firms. Firms characterized by the high ownership presence of nonfinancial industrial/commercial firms have an investment policy that is not dependent on internal funds, and, additionally, they are also more persistent in their investment process.

5 Conclusions

We study whether block ownership by other nonfinancial firms can moderate financial constraints of Brazilian firms; we provide supporting evidence from a panel data of 2,808 firm-year observations relative to 289 nonfinancial firms quoted in the São Paulo Stock Exchange in the period 1995-2006.

Our findings confirm the effect of financial constraints on the capital expenditure process of Brazilian firms. The sensitivity of investment to cash flow as a signal of financial constraints is verified, showing that investment by Brazilian firms is financially constrained. Results show that investment of firms classified as more prone to face financial constraints, based on dividend payout and share issue policies, is more dependent on internal funds.

Most important, we find evidence that Brazilian firms with relevant block ownership by other nonfinancial firms are less prone to face financial constraints. Firms characterized by the strong presence of other nonfinancial firms in voting capital ownership do not depend on internally generated funds to undertake their investment projects in contrast to other firms. This result is consistent in model estimations for samples of nonfinancial firms as a whole and, also, separately, in two categories of nonfinancial firms (industrial/commercial firms and asset management firms) as relevant blockholders. The strong presence of industrial/commercial firms in ownership appears to be even more beneficial to firm investment policy. Such presence as the main voting shareholder, besides mitigating financial constraints, is also positive to the persistence of the firm's investment process.

Considering the additional evidence of financial constraints in Brazil, the implications of our paper are twofold. On the firm level, we stress the relevance of informational problems for corporate finance. Our research, in accordance with most of the literature in the international arena, suggests that financial constraints arise as a consequence of the imperfect substitutability of internal and external funds due to adverse selection. Thus, firms should try to improve disclosure of corporate information in order to minimize information asymmetry while they should also adopt better corporate governance practices. Our results indicate that the presence of nonfinancial firms in the ownership structure of Brazilian companies helps to mitigate such information asymmetry thus reducing financial constraints. On the country level these financial constraints often force companies to under-invest in countries where investment is needed to foster growth in their fight against poverty. Then, policy makers should implement new institutional conditions able to strengthen capital markets in a way to help mitigate financial constraints and promote corporate investment and economic growth.

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THE STUDY OF NANOTECHNOLOGY R&D'S EFFECT ON ECONOMIC GROWTH

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ABSTRACT

Science and technology is the production of research activities and if the research activities through the production could combined with other economical and social and cultural activities, will certainly achieve sustainable development. Nanotechnology is a new technology that has engulfed the whole world. Predicting huge market for nanotechnology products and its rapid growth provokes the governments of different countries to do sustainable investments in research and development for staying beyond the rear of the race this technology. This paper aimed to study how nanotechnology's R&D influent selected developing and developed countries economic growth using panel data approach over the period 2000-2007. Findings show that Nanotechnology research and development has positive and meaningful effect on these countries economic growth.

KEYWORDS: Nanotechnology - R&D - Economic Growth – Panel Data

1.INTRODUCTION

The rapid development of emerging technologies in recent decades and pivotal role these technologies could play in economic growth and development are the issues which have drawn the attention of many policy makers and researchers in both developed and emerging countries. As a result, policy makers have become particularly interested in planning issues relating to both development of high technology as well as applications of these technologies for economic growth and development. Development of strategies for technological progress at the national level includes an extensive range of techniques and mechanisms which are generally defined under the rubric of "national policy for science and technology". National technology policies consist of aggregate planning which pays particular attention to some primary high technologies such as nanotechnology, biotechnology, and information technology, among others. However, each of these technologies consists of different areas, and adopting a single technology policy is not optimal for all. Accordingly, countries should carefully adopt a set of technology policies so that each policy is aimed at addressing the specific requirements of a specific high-tech category [1].

Modern economies and firms invest an increasing amount on resources in research and development (R&D). These two activities are of different nature, but both contribute to technical progress. The first result of these activities is a set of intangible goods, basically knowledge, expertise and new designs for goods and equipment. These intangible goods usually materialize into new and improved products and superior process technology. Process development involves the creation and introduction of new technology typically embodied in new or improved capital equipment in production. Such technology raises productivity in firms, industries and the overall economy. Companies, thus, invest in process technology to compete through prices. Product development involves the creation of new or improved goods; companies invest in product development in order to secure competitive advantages, such as exclusive or superior products [2]. The aim of this paper is to study the nanotechnology's R&D effect on economic growth of selected developed and developing countries using panel data approach over the period 2000-2007.

2. LITERATURE REVIEW

2.1 Sources of macroeconomic growth

Over the period 1870-1979, Canada's output per person-hour grew by a factor of 11. This is slightly lower than the ratio for the US, more than the UK and much lower than Japan. What are the principal determinants of this growth?

The productive potential of an economy is determined by available resources and by how these resources are used. Economists use the concept of production function to describe the productive potential of an economy at the given time. Economic functions, however, are rarely at the frontier of its potential. Imperfect allocations of resources, unemployment of factors of production, poor economic and social organization are among reasons why in the real world the productive potential of an economy is never quite reached. The gap between the potential and actual product of an economy depends on its economic efficiency and social organization. The production possibility frontier itself is determined by the technology available to and mastered by firms and institutions of the given economy [3].

The size of an economy grows as more inputs (workers, machines, material inputs, energy, etc.) are used in production. The rate of growth of labor is generally constrained by the population growth. Since capital investment (machines, production equipment, buildings, etc.) is financed by savings, the growth of capital is limited by the willingness of the society to postpone consumption and save. Thus, if there were no change in transforming inputs into outputs, i.e. no technological change, economic growth in terms of GDP per capita would necessarily come to a limit determined by demography and willingness to save. Since an economy is practically never at the frontier of its production possibilities, an observed change in productivity is a combination of a change in economic efficiency and a change- an outward shift- of the production possibility frontier, i.e. a change in technology [4].

2.2 Technological paradigms and revolutions

Some new technologies become "generic" in the sense that they open up a wide range of possibilities for further innovation in many sectors of the economy (Nelson and Winter, 1982). Other economic historians who observed the importance of inter-related innovations developed similar ideas about "systems", "trajectories" and "paradigms" [5, 6, 7]. Economists conceptualize today technological progress as an interaction between demand for new products and processes and technology push, i.e. scientific and technical advances that make it technically possible and affordable to create new products and processes. Sahal and Perez go further. Sahal maintains that "technology both

shapes its socio-economic environment and it is in turn shaped by it ». Perez develops the interplay between institutional change and technical change in her concept of "techno-economic paradigms". The productivity potential of a new "techno-economic paradigm" is at first realized only in one or a few leading sectors. Only when these effects have been clearly demonstrated, does the diffusion process begin to affect the whole economy. But, since what is involved is now a new infrastructure, many institutional changes, universal availability of skills, as well as new types of equipment and materials, there is inevitably a prolonged period of structural adaptation [8]. Freeman argues that the new "information technology" paradigm (according to some estimates, computer based capital equipment already accounts for between a quarter and a half of all new investment in plant and equipment) is explaining the productivity paradox. The ever increasing use of information technologies has so far failed to bring about significant increase in productivity. On the contrary, actual rates of productivity increase have declined since the levels achieved in the 1960s. To Freeman "the slowdown in average labor productivity gains over the 1970s and 1980s by comparison with the 1950s and 1960s is the aggregate outcome of a structural crisis of adaptation or change of techno-economic paradigm, which has accentuated the uneven development in different sectors of the economy [9].

2.3 Appreciative theories of technology and growth

The formal models of economic growth discussed above provide a theoretical underpinning for a more realistic representation of interaction between various aspects of technical progress and economic growth. Long before the theorists succeeded to formulate mathematical models of economic growth, economic historians and students of technological change accumulated and interpreted wealth of empirical evidence on specific aspects of technological change and its relationship to economic growth. To paraphrase Nelson, appreciative theorizing is mostly expressed verbally and is the analyst's articulation of what he or she really thinks is going on. Both theoretical modeling and appreciative theorizing work in harness, though not without significant time lags between their various analytical concerns. Theoretical economists are now trying to absorb the findings of an increasing amount of empirical research and appreciative theorizing and incorporate a more realistic set of assumptions in their models. We now turn to appreciative theories regarding empirical evidence on the relationship between new technology and economic growth on the macro-economic level [10].

3. DATA and METHODOLOGY

The sample used in this paper is a balanced panel consisting of 40 developing¹ (21) and developed² (19) countries for a period of eight years (2000-2007). The data source used in the study is World Development Indicator 2010 (WDI) and Staff of the Iranian Nanotechnology. The information collected through this source has been used to construct the following variables for each of 40 countries:

R&D Expenditure: Expenditures for research and development are current and capital expenditures (both public and private) on creative work undertaken systematically to increase knowledge, including knowledge of humanity, culture, and society, and the use of knowledge for new applications. R&D covers basic research, applied research, and experimental development.

Nanotechnology R&D: Due to limited data of nanotechnology R&D for the studied countries, the papers in nanotechnology used as a proxy variable in this study.

Investment Security: Security of investment is ensuring the preservation of principal and interest on invested capital. As a proxy for this variable we used percentage of GNP is spent on investment.

Foreign direct investment: Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net outflows of investment from the reporting economy to the rest of the world and is divided by GDP.

Considering these issues and based on the basic model in Falk study [11], to investigate these factors effect on economic growth the model is:

$$\ln p_{it} = \alpha_0 + \alpha_1 LARN_{it} + \alpha_2 LRD_{it} + \alpha_3 LSEC_{it} + \alpha_4 LFDI_{it} + \mu_{it} \quad (1)$$

That: i and t represent country and time, LGDP logarithm of GDP, LARN nanotechnology R&D Logarithm, LRD logarithm of R&D Expenditure, LSEC Investment Security logarithm and LFDI, Foreign direct investment.

4. EMPIRICAL RESULTS

Due to the lack of homogeneity of variance and autocorrelation in model, the estimation method is GMM. The starting point of GMM estimation is a theoretical relation that the parameters should satisfy. The idea is to choose the parameter estimates so that the theoretical relation is satisfied as "closely" as possible. The theoretical relation is replaced by its sample counterpart and the estimates are chosen to minimize the weighted distance between the theoretical and actual values. GMM is a robust estimator in that, unlike maximum likelihood estimation, it does not require information of the exact distribution of the disturbances. In fact, many common estimators in econometrics can be considered as special cases of GMM.

To estimate our equation we first use the F-Leamer test for choosing between Panel data and Pooling methods. This statistics null hypothesis is choosing pooling method and its priority than panel data. To choose between two methods for fixed effects and random effects Hausman test is calculated. The test H0 hypothesis, represents selecting the random effects method. The estimation results using fixed effects are shown separately in developing countries and developed countries in table1.

¹ MNG_MEX_CHN_COL_ECU_IRN_KGZ_MYS_ROM_SAU_TJK_TUN_TUR_BRA_DZA_CZE_CHL_RUS_ARG_PAN

² BEL_AUS_CAN_FRA_ITA_JPN_KOR_ESP_SWE_USA_DNK_FIN_LUX_ISL_NLD_SVN_AUT_GBR_SGP

Developed Countries	Developing Countries	Variable
***0/16	***0/16	LARN
***0/06	***0/04	LRD
***0/06	**0/26	LSEC
2885/2	2110/2	F Leamer
54/2	39/2	Hausman Test
0/99	0/99	R2
1/57	1/66	D.W
152	168	Observations
19	21	Countries

Table1: Model Estimation Results

Mark *, **, *** respectively indicate significance levels of 10, 5 and 1 percent

The estimation results of all coefficients are consistent with economic theories and arguments expressed in the previous sections.

According to the results, in developing countries nanotechnology R&D has positive impact on GDP at the 99 percent significance level. A one percent increase in nanotechnology R&D contributes to 0.16 percent of GDP. R&D expenditure has also positive and significant impact at the 99 percent significance level and any increase in contributes to 0.04 percent of economic growth.

In developed countries nanotechnology R&D impact on GDP at the 99 percent significance level is positive and significant and any percent increase in nanotechnology R&D contributes to 0.16 percent of GDP. R&D expenditure effect is also positive and significant at the 99 percent significance level and any increase in contributes to 0.06 percent of economic growth.

5. SUMMARY and CONCLUSION

To enhance the competitiveness of their industries, countries around the world, offer different guidelines that investment in emerging technologies is the most important one. Nanotechnology is one of these emerging technologies that not only includes all industry it also will create new industries. To maintain its leadership in scientific and technological fields, enhance competitiveness of their industries, developing and developed countries do significant investments in research and development of nano science and technology.

The results of statistical studies in this research show that economic growth is affected of R&D expenditure, nanotechnology R&D, also FDI and investment security.

Development of technology markets, helping incubators and technology parks, use of investment and insurance funds, application of technology development funds and setting up the idea registration centers and so, are the recommendations suggested based on experts studies and experiences.

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THE STUDY OF THE EFFECTS OF MONETARY AND FISCAL POLICIES ON IRAN STOCK MARKET

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ABSTRACT

The present study aimed at investigating the effects of monetary and fiscal policies on Iran stock market. The effects of monetary and fiscal policies and factors, such as liquidity money, oil price, exchange rate, and budget deficit, on the total index of the stock market between 1999: 3 and 2008:4 were periodically studied. The analysis methods used in this study are Auto-distributed Regression, Impulse Response Function and Variance Decomposition. The results of the study indicate that financial policy has a negative effect on stock market, and monetary policy has a positive effect on it.

Keywords: monetary policy, fiscal policy, stock market, foreign exchange rate, oil price

1. INTRODUCTION

Investment market has a close relationship with the economic structure of any country. The low or high trend in investment market can be a true reflection of the country's economic situation. Developing the investment market may have an important role in increasing the national revenue as well as the public welfare of the country. Statistics show that the developed stock markets are located in developed countries in which investment security is provided for domestic and foreign investors to enter the stock market [1].

The purpose of the present study is determining the effect of monetary economic policies and their dimensions including the amount of liquidity money, oil price, exchange rate, and budget deficit in Iran stock market.

2. The THEORETICAL BASES of the STUDY

The relationship between fiscal structures and economic development can be tested by different theories about the fiscal structure. Fiscal structures include bank, shares, and fiscal services. The theory of 'bank basis' emphasizes the positive effect of banks in the economic development as well as the problems and the shortcomings of the monetary system of the shares. According to this theory, in developing countries banks are more effective in economic growth [3]. Based on the process of transfer of money, monetary policy makers do not often relate their policy making tools to the final goals since the effects of financial policies are unclear at different times, and there is uncertainty with regard to the effectiveness of monetary policies. As such, the policy makers delineate middle range objectives. Monetary policy making has a three stage process.

First, the central bank has tools and instruments for the fulfillment of its goals. Second, the use of mentioned tools affects the middle objectives such as the amount of money, interest rate, and the current predictions about the rate of inflation. Third, the assumption is that the middle objectives, if in the right direction, lead the economy to the final goals such as a specific level of inflation, unemployment, currency exchange, and stability in fiscal markets. However, if the middle objectives leading to the final goals are fully controlled, the problem of economic policy makers, measuring the final goals and determining their rate as well as simultaneous selection of several goals are, in some cases, incongruent.

In addition to the above-mentioned problems, simultaneous selection of several final goals may cause incongruities among them. In addition to the mentioned issues about the middle objectives, they are also important for their degree of effect on final goals. Fiscal markets are one of the basic, economically effective markets in any country. One of the important elements of fiscal markets is bonds stock market. Bonds market is also a center for collecting savings and the liquidity of the private sector for the fiscal support of long run investment projects. The present study is based on Lapodis (2009). In a research entitled "the effect of fiscal policy and stock market efficiency" he concluded that there is a relationship between budget deficit and stock market. In other words, budget deficit affects stock market. This study tried to answer the question of whether the index of budget deficit- an indicator of fiscal policy- and the index of liquidity money- an indicator of monetary policy- affect stock market. On one hand, the effect of budget deficit on the lower interest rate of bonds has been investigated, which, in turn, causes lower stock market activities. In other words, in addition to the national revenue, deposits, investment and budget deficits affect stock market. On the other hand, higher interest rate leads to lower investment and the collection of foreign investment. The research by Lapodis is important because higher budget deficit prepares those involved in stock market to expect increase in taxes in the future. The deficit helps the market match its expectations to the cash flow in the future and change it according to the changes in the interest rate. In this way, the investor is informed of the exact details of the budget deficit and acts accordingly. On the other hand, since the government's performance affects monetary policies, the more the increase in expenditures, the higher the budget deficit and the interest rate. The higher interest rate adversely affects economic growth, and the central bank is compelled to balance the mentioned effect by increasing the amount of money. As such, it is necessary to study the effects of monetary policy variable of M_2 and the financial policy of BD on stock market. Therefore, Lapodis model would be as given in Formula (2), given below:

$$y_t = \alpha_0 + \beta_1 z_t + \sum_{i=1}^{n_1} B_{2,i} BDy_{t-i} + \sum_{j=1}^{n_2} B_{3,j} M_2 G_{t-j} + et \quad (1)$$

in which y_t is the index of stock price, BDy_{t-i} is the budget deficit as a percentage of GDP, $M_2 G_{t-j}$ is nominal liquidity, and Z_t shows the macro-economy variables vectors (in this study Z_t is the oil price and the exchange rate).

Kurov (2010) studied the behavior of investors in stock market and the response of the stock market to the monetary policy. The results indicate that the shocks from the monetary policies have a great effect on the behavior of investors in recession periods. Meanwhile, stock market is extremely sensitive to monetary policies and shows extreme responses against them.

Ioannidis and Kantonikas (2008) studied the effect of monetary policy on the return of shares for 13 OECD countries using ordinary Least Squares (OLS). The results indicated that monetary policy affects return of the shares, to a great extent, causing transfers and changes in stock market. In 80 countries, the changes in interest rate were related top return of shares; the criterion for the rate of interest for the monetary policies of the mentioned countries decreases the return of shares.

Lapodis (2006) used Vector-Auto-Regression to study the relationships among stock market, economic activity, inflation, and monetary policy. The results of research model indicate that there is a negative correlation between the rate of stock return and inflation. Also there is a negative relationship between the stock return and the public budget.

Osman and Yacup (2004) studied the performance of macroeconomic indices and the real return of shares in Turkey. The real efficiency of the return in Turkey is analyzed regarding the macroeconomic indices including the supply of money, currency rate, and business balance, using the models offered by Engel-Granger and Johansen Josillius. The results showed that the economic variables didn't have a significant role in directing the changes in the index of stock market prices. Moreover, there is no relationship between the index of the shares price and the stock, and no systematic relationship was observed between share prices and macroeconomic indices.

3. The theoretical framework of the study

The present study has investigated the effects of fiscal and monetary policies on its factors including the amount of liquidity money, oil price, exchange rate, budget deficit on total stock exchange during 1999 and 2008.

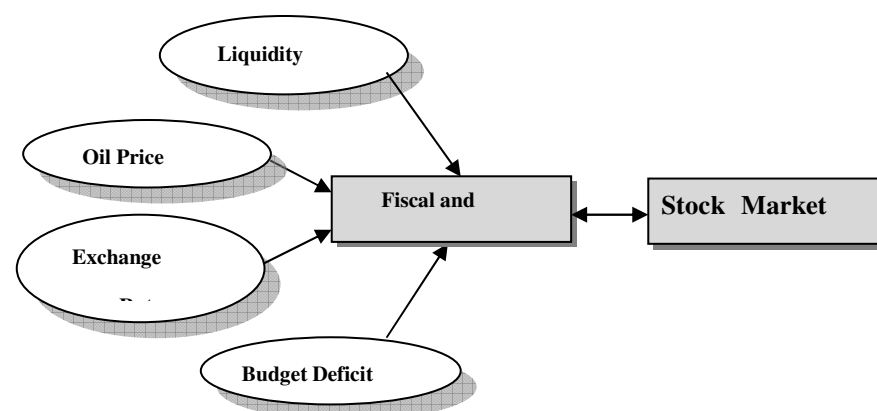


Figure1. The theoretical framework of the study

4. RESEARCH HYPOTHESES

The following hypotheses were formulated:

1. Monetary policies affect stock market.
2. Fiscal policies affect stock market.
3. The effect of monetary policies on stock market is greater than the effect of fiscal policies.

5. RESEARCH METODOLOGY

The present study is a causal comparative internet based documented library research. The statistics and related information were collected from Central Bank statistical information and the annuals of Iran Stock Market. Data analysis was done by auto-distributed regression model in a periodical basis between 1999 and 2008. First the stability of the variables was studied. Later auto-distributed regression model, impulse response analysis (stimulus-response), and variance decomposition were carried out.

The first stage in estimating time series, is studying the stability of the variables. Using augmented Dicky-Fuller and Philip-Perron tests the stability of the variables was tested. Top-bottom approach was used to study the cointegration of the variables. To test the reliability of the variables, the third pattern was used (i.e. the pattern with width from the start and trend) and the significance of the variable of trend was tested. If the variable of trend is significant in the third pattern, it is suitable for studying the reliability of the variable.

Otherwise, the second pattern (which only has width from the start) is estimated. In this pattern, the significance of width from the start is studied. If the width from the start was significant, the stability of the variable was studied based on the second pattern. Otherwise, the third pattern (without width from start and trend) was used. Sims suggested two stages for Vector-Auto-Regression model: The first phase is determining the variables that must enter the model. The second phase is determining the appropriate number of lags for the model.

The tests for determining the length of lags are used to find the optimal pause. One should note that in Vector-Auto-Regression models, no attempt is made for eradicating or reducing the parameters in the model. In Vector-Auto-Regression model, the matrix for the width from the start includes n parameters and each of matrix coefficients also has n^2 parameters. $n+pn^2$ parameters are needed (p is the number of lags and n is the number of variables).

To have stationary Vector-Auto-Regression model, the inverse roots of multi-sentential AR should be inside the same circle. Otherwise, the results of the analysis of impulse response and variance would not be correct. Totally there would be kp roots in which k shows the number of endogenous variables, and p shows the number of applied lags.

In impulse response analysis, the effect of standard deviation of shock on other variables is analyzed. In contrast to impulse response in which the effect of the shock of a variable on other variables is studied, in variance analysis, there is an attempt to study the effect incurred by one variable on the other variables of the model. In fact, using this method the amount of the effectiveness of variables on a specific variable in short term, middle term, and long term are compared.

6. RESULTS and DISCUSSION

6.1 Analyzing the Stability of the Variables

1. The logarithm of Shares Return (LSR): Top bottom analysis indicates that the second model or the model with width from the start is suitable for determining the reliability of the logarithm of shares return. The results of the reliability analysis of the mentioned variable by generalized Dicky-Fuller test at this level indicate that the variable is not at a reliable level. The value of the obtained statistic is -1.90 that is smaller than the critical value at the probability level of 5. The test of Philips-Perron common root also showed an unreliable shares logarithm return.

Due to the unreliability of logarithm shares return at this level, with one subtraction the stability of this variable may be tested. The results of both generalized Dicky-Fuller and Philips-Perron indicates that at the significance level of 95, the variable becomes stationary. Therefore, this variable has a cointegration value of one. (I(1)). (Table 1)

6.2 Budget Deficit (BD)

The application of top-bottom analysis shows that the third pattern (the pattern including width from the start and trend) is the right pattern to study the reliability of budget deficit as a variable which is a percentage of GDP. Both Dicky-Fuller and Philips-Perron indicate that budget deficit at the significance level of 95 is reliable. The value for Dicky-Fuller test is -6.86, and the value for Philip-Perron test is 7.87 that are higher than the critical value at the probability level of 5. Therefore, the null hypothesis regarding the existence of the same root at the significance level of 95 is rejected, leading to the conclusion that at this level of probability the variable is reliable.

6.3 Logarithm of Real Exchange Rate (LRER)

The third pattern (including the width from the start and trend) was used to determine the reliability of the real rate of exchange. As evident in Table (1), based on both Dicky-Fuller and Philips-Perron tests, the mentioned variable is not reliable. To test the degree of cointegration of the mentioned variable, one subtraction is done and for its differential common root test is applied again. The value obtained from Dicky-Fullere test for the subtraction of the mentioned variable was 3.82, reflecting the lack of one root for the differential of the foreign exchange rate at the significance level of 95. The results from Philips-Perron test are also similar to Dicky-Fuller test, and at the significance level of 95 percent, the null hypothesis referring to the existence of one root for the differential of the foreign exchange rate is rejected.

6.4 The Logarithm for Oil Price (LOIL)

The results of one root Dicky-Fuller common root test and Philips-Perron for logarithm of oil price are not the same. In the third pattern, (with width from the start and trend), according to Dicky-Fuller, the logarithm for oil price is not reliable, and after one subtraction, it becomes reliable, but it is reliable according to Philips-Perron test. Since the results of Philips-Perron test are more documented than generalized Dicky-Fuller test, the logarithm for oil price can be considered as being reliable (Table 1).

6.5 Increases in Liquidity (M2)

The second pattern (width from the start) was only used for determining the degree of cointegration for the growth of liquidity. As evident in table (1), the mentioned variable is not reliable based on Dicky-Fuller test; it becomes reliable after one subtraction, but based on Philips-Perron test, the variable is reliable.

Table (1): The test of the stability of the variables in ADF and Philips-Perron Tests

One subtraction		Level		variable
<i>Phillips-Perron</i>	<i>ADF</i>	<i>Phillips-Perron</i>	<i>ADF</i>	
***-3.91	***-3.91	-2.10	-1.90	<i>LSR</i>
-	-	***-7.87	***-6.86	<i>BD</i>
** -3.97	** -3.82	-2.62	-3.11	<i>LRER</i>
-	-	***-4.23	-2.37	<i>LOIL</i>
-	-	***-8.10	-2.51	<i>M2</i>

* Significant at 10 percent, ** significant at 5 percent, significant at 1 percent

According to the information given in table (1), except for logarithm of stock return and logarithm of real exchange rate which become stationary with one subtraction, the other variables are stationary and don't have a unit root.

6.6 Estimating Vector-Auto-Regression

Having examined the reliability of the variables through statistical information, the maximal lags of Vector-Auto-Regression model are analyzed. Table (2) shows the statistical data for Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) and Hannan-Quinn Information Criterion (HQ), up to three lags.

Table (2): Determining the number of optimal lags in auto-distributed regression

Hannan-Quinn Statistical Information	Schwartz Statistical Information	Akaike Statistical Information	The Number of lags
-3.25	-3.10	-3.32	0
-10.92	*-10.00	-11.37	1
-10.79	-9.10	-11.62	2
*-11.42	-8.97	*-12.63	3

*Optimal lags

Table (2) shows that the number of optimal lags for auto-distributed regression is 3 in both Akaike and Hannan-Quinn statistics; however, Shwartz statistics has found one pause for optimal lags. Since both Akaike and Hannan-Quinn statistics have the same values, Akaike criterion was selected as the criterion for optimal lags, and 3 lags was selected as the optimal pause. Having determined the number of optimal lags, auto-distributed regression model was estimated the results of which are given in table (3).

Table (3) the VAR Results

	LSR	M2	LOIL	LRER	BD
LSR(-1)	0.775958 [3.46952]	-0.109832 [-0.01641]	-0.005372 [-0.39602]	-0.002722 [-0.06744]	0.216815 [0.41656]
LSR(-2)	0.082454 [0.28038]	0.949221 [0.10787]	0.007792 [0.43686]	0.056556 [1.06576]	-0.577296 [-0.84351]
LSR(-3)	-0.115595 [-0.63966]	2.073373 [0.38345]	0.015321 [1.39783]	-0.014487 [-0.44425]	0.462168 [1.09892]
M2(-1)	0.000880 [0.09316]	0.011323 [0.04005]	0.000336 [0.58707]	-0.000169 [-0.09901]	-0.010903 [-0.49578]
M2(-2)	-0.015185 [-1.82055]	0.407482 [1.63273]	0.000435 [0.85969]	-0.000793 [-0.52713]	-0.047403 [-2.44204]
M2(-3)	-0.015372 [-1.64005]	-0.567553 [-2.02376]	0.000143 [0.25200]	-0.001922 [-1.13670]	0.005832 [0.26738]
LOIL(-1)	0.689514 [0.23072]	27.69503 [0.30972]	0.820096 [4.52453]	-0.353034 [-0.65466]	-1.778473 [-0.25572]
LOIL(-2)	0.071950 [0.02196]	-9.766964 [-0.09961]	-0.163021 [-0.82019]	0.176769 [0.29893]	-9.972073 [-1.30755]
LOIL(-3)	-3.767086 [-1.61140]	32.45262 [0.46394]	0.025109 [0.17709]	0.570776 [1.35304]	6.229377 [1.14499]
LRER(-1)	3.707458 [3.22606]	-83.85054 [-2.43849]	0.072908 [1.04600]	0.936509 [4.51600]	1.703009 [0.63675]
LRER(-2)	-1.506167 [-0.89610]	40.00876 [0.79553]	-0.008175 [-0.08019]	-0.143372 [-0.47271]	-1.988164 [-0.50827]
LRER(-3)	-0.854723 [-0.61886]	5.658257 [0.13692]	-0.015470 [-0.18467]	-0.192221 [-0.77128]	2.312280 [0.71939]
BD(-1)	-0.254776 [-2.33124]	2.938795 [0.89870]	-0.009258 [-1.39671]	0.000283 [0.01434]	-0.311696 [-1.22551]
BD(-2)	-0.371023 [-3.12498]	-1.178700 [-0.33179]	-0.022496 [-3.12403]	-0.018143 [-0.84682]	-0.184814 [-0.66887]
BD(-3)	-0.268502 [-1.98756]	-3.193812 [-0.79013]	-0.017131 [-2.09082]	-0.055006 [-2.25647]	0.081020 [0.25770]
C	17.36668 [1.94398]	-126.8563 [-0.47458]	2.266853 [4.18367]	-0.275548 [-0.17093]	30.92326 [1.48737]
R-squared	0.990821	0.728438	0.997533	0.993112	0.590992
Adj. R-squared	0.982217	0.473848	0.995220	0.986654	0.207547

To estimating Vector-Auto-Regression Figure (2) and table (4) show the roots of Vector-Auto-Regression. All roots for Vector-Auto-Regression are estimated and are located inside a common circle. Therefore, the estimated model is stationary and the results can serve as sources for documentation.

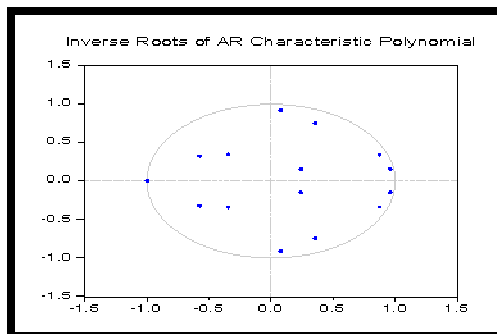


Figure (2): Inverse roots of AR multi-sentential index

Having ensured the stability of the estimated auto-descriptive regression model, the features of disturbance Vector-Auto-Regression sentences were examined. The sentences for the disturbance Vector-Auto-Regression model should be normal and without auto-correlation and Heteroscedasticity of variance. Table (5) shows the results of normalized disturbance sentence. Jarque- Bera was bused for testing the normalization of disturbance sentences.

As the results indicate, the null hypothesis was not rejected in terms of normal error terms at the probability level of 5. Therefore, we can conclude that the distribution of the error terms was normal. Auto-distribution in error terms in Vector-Auto-Regression model is often due to the lack of optimal determination of lags, or the pause in the inclusion of appropriate variables to the model. Table (6) shows the results of LM test for examining the auto-correlation of the error terms. The error terms of the auto-descriptive regression model have no correlation. The auto- descriptive regression model is often due to the lack of exact determination of the number of optimal lags or the inability to include the appropriate variables to the model. Table (7) shows the results of the heterogeneity of the disruptive sentence models. The results indicate that the error terms of the auto-descriptive regression model have no heterogeneous variance. Since the auto-descriptive regression model has no theoretical basis, and the coefficients in this model have no economic interpretations. Therefore, to test the mutual effect of the variables, using auto-descriptive regression model, the impulse response and variance analysis was used.

Table (5): The Results of test for Normal Error terms

Probability value	Degrees of freedom	Statistical Value of Jarque-Bera
0.89	105	87.57

Table (6): The results of test for auto-correlation of error terms

Probability value	The value of LM statistics	pause
0.67	21.27	1
0.25	29.11	2

Table (7): The Results for the Normal Error terms

value	degree	Statistical value
0.35	450	460.46

7. IMPULSE RESPONSE FUNCTION

Figure (3) shows the reaction of the logarithm of stock return to the shocks on the variables of budget deficit, real foreign exchange rate logarithm, oil price logarithm, and increase liquidity. The results in table (8) show that the response of the variable of shares return. Logarithm to the incoming shock to budget deficit until the 8th round has a falling trend, but later the decreasing trend stops and gradually increases. The decrease in stock return as a response against the incoming shock on budget deficit is due to the fact that the increase in budget deficit increases the rate of interest, which, in turn, decreases the amount of investment and consumptive expenditures leading to a decrease in real economic activities. The final result is a decrease in the price of return and family wealth in fiscal markets. In addition, the costs of rent (a kind of investment) increases leading to a decrease in investment. Ultimately, higher interest rates and a decrease in real activities leads to more budget deficit, and the negative effects will be repeated. The response of the stock return to the incoming shock ha a rising trend, to the extent that, during the ten periods under study, the return of the stock return was growingly increasing due to the shock on cash increase. The increase in liquidity causes a decrease in interest rate which, in turn, causes an increase in investment and an increase in real economic activities. This causes higher benefits for the production enterprises and consequently an increase in stock return. As a

response to the shock on the rate of real exchange rate, the return of shares had a rising trend until the fourth round, but later it takes a falling trend. Therefore, after the seventh period it causes the return of shares decrease to lower than its balanced amount. Moreover, the shock on oil price logarithm has caused a continuous increase in return of shares.

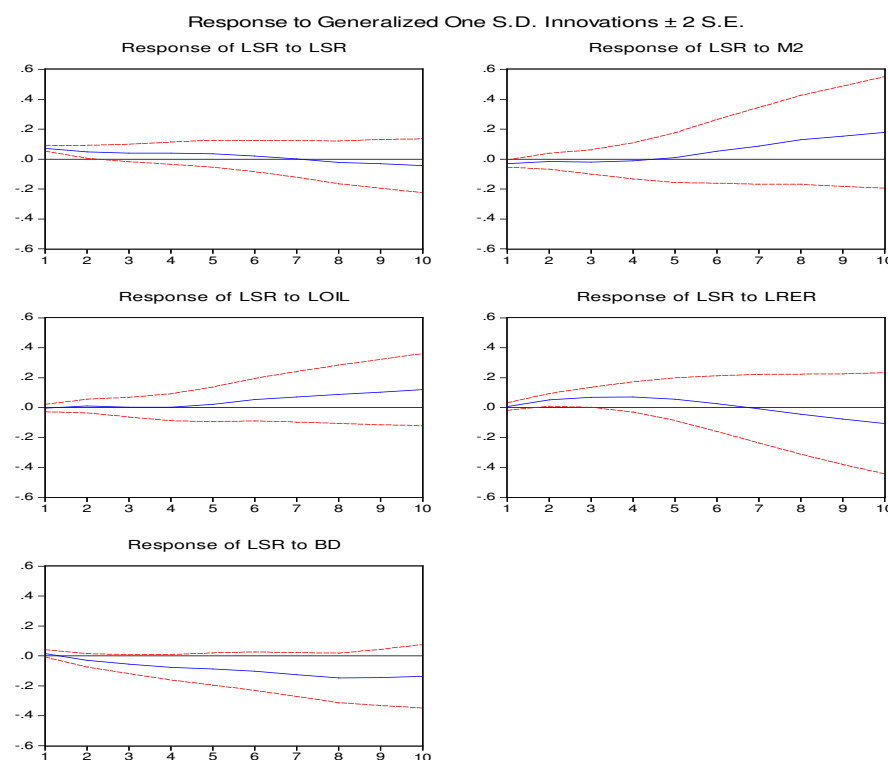


Figure (3): The response of return of shares logarithm to the shocks on the model variables

8. CONCLUSION and SUGGESTIONS for FURTHER RESEARCH

The results of the research hypotheses are as follows:

1. The expanding fiscal policies had a negative effect on the return of shares. This hypothesis was tested with the impulse response function. The results indicated that the expanding fiscal policies had a negative effect on the return of the shares.
2. The expanding monetary policies had a positive effect on stock market. This hypothesis was also was tested by impulse response function. The results indicated that the hypothesis was correct, and the expanding monetary policies had a positive effect on the return of the shares.
3. The effect of monetary policies on the stock return of more shares from the fiscal policies. This hypothesis was tested by the analysis of the variance. The results indicated that the monetary policies improved the return of the shares, in the long run, but in short term, it had a negative effect on the return of the shares. The reason for this negative effect is the fact that an increase in budget deficit causes an increase in the interest rate which, in turn, causes a decrease in investment and the expenditures resulting in the lower real economic activities. As a result, the price of stock and the wealth of the families decrease. Moreover, the expenditures on the rent (a kind of investment) increases, but investment decrease. Ultimately, higher interest rate and lower real activities leads to higher budget deficit, and the negative effects would be repeated.

The results indicate that the monetary policies had a positive effect on the return of the shares. In economy, assets in cash causes a lower interest rate which increases investment and higher real economic activities leading to higher benefits for the production enterprises and higher return of the shares. Moreover, the results of the study indicate that oil price has a positive effect on the return of shares, and the real foreign exchange rate causes an initial increase in the return of the stock return, but later the trend decreases.

The economic explanation for this issue is the fact that higher real foreign exchange rate (decrease in the value of national currency) causes higher competitiveness of the enterprises and there are more foreign demands for exports. This leads to higher marginal benefits of the production enterprises and higher return of the shares. On the other hand, the fluctuations in the real rate of foreign exchange can increase the price of the intermediary investment goods for the domestic firms causing a lower return of the shares for the firms.

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THE STUDY OF THE EFFECT OF MONETARY POLICY INSTABILITY ON TOTAL RETURN OF STOCK MARKET IN IRAN

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Abstract

The Objective of this paper is to study the effect of monetary policy instability on total return of stock market in Iran, during a seasonal period of 1999:3 to 2008:2. For this purpose, in addition to the theoretical analysis of the topic, the effects of research topic through time series analysis will be studied using EGARCH model and OLS technique. The research results indicate that liquidity of money and monetary policy instability; have meaningful and positive effects on total return of stock market. Therefore, 1% increasing in the monetary policy instability, increases 0.1% total return of stock market and 1% increasing in the liquidity of money, increases 0.52% total return of stock market. The interest rate doesn't have a meaningful effect on total return of stock market.

Keywords: Monetary Policy, Stock Market, Liquidity of money, EGARCH

1. INTRODUCTION

Monetary variables and financial markets are in interaction with each other and monetary variables affect financial markets and the important factors such as returns and interest rates, while the existence of integrated expanded financial market plays a role in the transmission of monetary policy to the whole economy [1]. In general, monetary policy impacts stock returns of the three parallel channels including: Interest rates, cash flow, risk and uncertainty. In the first step the importance and efficiency of monetary policy is determined by measuring its effect on interest rate.

Central banks can change money stock through tools that are available and money stock changes can change the interest rate. Interest rate is closely correlated with the discount rate, which plays a fundamental role in determining the value of capital assets. In addition to Interest rate and without considering the risk, another factor that affects the stock returns is present and expected cash flows. A condition that causes investors to adjust cash flows forecasting, results a change in stock price. In general, monetary policy will change the level of economic activity and this causes cash flows changing. Risk and uncertainty is the third issue must be considered. Monetary policy changes and adopting a strict monetary policy is effective on the level of uncertainty or risk [2].

This study aims to study the monetary policy instability effect on the total return of stock in Iran during 1999-2008. We use EGARCH model and OLS technique in Eviews6. The study's hypotheses are:

1. Liquidity of money affects stock total return.
2. Producer price index affects stocks total return.
3. Interest rate affects stock total return.
4. Monetary policy instability affects total stock return.

2. LITERATURE REVIEW

Monetary policy is the process by which the government, central bank, or monetary authority of a country controls the supply of money, availability of money, and cost of money or rate of interest to attain a set of objectives oriented towards the growth and stability of the economy [3]. Monetary theory provides insight into how to craft optimal monetary policy.

Stock market is from one hand, the center for gathers savings and liquidity of money in private sector in order to finance long-term investment projects and from other hand, a formal and reliable reference that the holders of stagnated savings can seek suitable and relatively safe place to invest and put their surplus funds to invest in firms or by purchasing the bonds of the government and reliable firms and are entitled to certain and guaranteed benefits [4].

Daisy Li et al have studied the impact of monetary policy shocks on stock prices and found that monetary policy shocks has significant impact on Canada stock prices in America [5].

Hilde C. Bjornland, Kai Leitemo investigated the relationship between America stock market and monetary policy in long-term and short-term in their study and showed that there is a strong dependence between interest rates and stock prices. So stock market is an important resource for guiding monetary policy in the United States [6].

"Investor sentiment and the stock market's reaction to monetary policy" has studied by Kurov [7]. He showed that monetary policy decisions have meaningful impact on Investor sentiment that this effect depends on market conditions.

In his study "Monetary policy shocks and stock returns", Grigoriou using some evidence from the UK market has studied the predicted and unexpected Interest rates effect on stock total return in the United Kingdom. Findings showed a noticeable structural failure of stock market response to monetary policy changes in 2001 so that before the credit crisis, the relationship was negative and after the crisis was positive [8, 9].

In 2007 Baharumshah [10] et al have studied the relationship between stock price and money demand in China using VAR Autoregressive model in a correlation framework and seasonal observations of period 1990-2005 and found that Over the long term income elasticity has not much different with stock price continuity in the money demand equation.

Abbasian et al [11], found exchange rate and trade balance long-term positive effect on stock and long-term negative effect on inflation, liquidity of money and interest rate in their study titled "macroeconomic variables effect on Tehran stock market total index using seasonal period 1377-1384 and cointegration method, error correction models and also impulse-response-functions and variance decomposition.

3. DATA and METHODOLOGY

Based on objective the study is of applied type and needed data is descriptive and seasonal time- series from the third season 1378 to the second season 1387. First monetary policy instability acquired by EGARCH approach and then the stability of the variables has been studied. Finally, using OLS method the model has been estimated. In this study data, statistics and related information were collected from Central Bank statistical information.

4. EMPIRICAL RESULTS

In this section, we offer the empirical results for our sample period (1999: 3 – 2008: 2) as follow:

4.1 Model

According to Eq. (1), the model studied in this paper is derived from The He model [12], and the monetary policy instability is emphasized. To estimate monetary policy instability index, first we tested the stationary of liquidity of money and then using ARIMA model liquidity of money response has been predicted. In the second stage using related tests, the autocorrelation and heteroscedasticity have been tested and considering heteroscedasticity of liquidity of money predictor model, the EGARCH model has been selected:

$$LSPT = \beta_1 + \beta_2 LPPT + \beta_3 LLq + \beta_4 LRAT + \beta_5 LRESA \quad (1)$$

LSPT: stock total return index logarithm

LLPT: producer price index logarithm

LLq: liquidity of money logarithm

LRAT: interest rate logarithm

LRESA: monetary policy (liquidity of money) instability logarithm

4.2 Monetary Policy (Liquidity of Money) Instability

To obtain liquidity of money instability using EGARCH approach, after using ARIMA model to predict the liquidity of money response, the conditional variance of liquidity of money is estimated. Then Akaike and Schwartz Criteria were used to choose the best option for GARCH and ARCH that according them, best pauses (1,0) was selected for GARCH and ARCH and then this variable's conditional variance was estimated and monetary policy instability was obtained from conditional variance. The obtained conditional variance formula is as Eq. (2):

$$\ln(h_t) = 2.21 + 0.9 \varepsilon_{t-1} / (h_{t-1})^{0.5} + 0/8 \ln(h_{t-1}) \quad (2)$$

$$Z = 3.56 \quad Z = 8/13$$

4.3 Variables Stationary

Table (1) provides the variables stationary using the ADF³ test.

Table (1): ADF Unit Root Test on Variables

Variable	Stationary type	intercept	trend and intercept	None
LRAT	level	-1.56	-2.38	-1.44
		-2.94	-3.54	-1.95
	1 st difference	6.01	-5/98	-5.74
		-2.95	-3.54	-1.95
LRESA	level	-1.18	-2.50	1.16
		-2.95	-3.60	-1.95
	1 st difference	-6.90	-0.73	-4.23
		-2.95	-3.75	-1.95
LLq	level	-0.01	-2.15	2.43
		-2.98	-3.55	-1.95
	1 st difference	-3.35	-2.005	-0.38
		-2.98	-3.59	-1.95
LSPT	level	-1.81	-1.17	1.53
		-2.95	-3.54	-1.95
	1 st difference	-3.81	-4.10	-3.34
		-2.95	-3.54	-1.95

Note: Numbers in the bold rows, show ADF statistics and numbers in the white line represents the Mackinnon critical values

In model variables stationary test in level, choosing the best option (intercept, trend and intercept, none), ADF test statistic is less than Mackinnon critical amounts in error level of five percent, so H_0 hypothesis to having a unit root is not rejected and all variables are unstable in level. But in 1st difference all variables are stable so H_0 hypothesis is rejected and all model variables are I (1). So our model is estimated.

4.4 Model Estimation

To estimate the model, primary estimation is done as Eq. (3)⁴:

$$LSPT = 2.84 + 3.02 LPPT - 0.62 LLq - 0.04 LRAT - 0.11 LRESA \quad (3)$$

(0.27) (1.72) (-0.59) (-0.01) (-0.68)

Table (2), shows the collinearity test results:

Table (2): Variables Collinearity Test Results

LRESA	LRAT	LLq	LPPT	Collinearity Test
0.81	-0.83	0.99	1	LPPT
0.83	-0.86	1	0.99	LLq
-0.81	1	-0.86	-0.83	LRAT
1	-0.81	0.83	0.81	LRESA

According to table (2), there is an intensive collinearity between variables LLq and LPPT with 90 percent. There are different ways investigated to remove this problem. First we changed the sample but model degree of freedom reduced and the problem was not resolved. So the only option was to eliminate one of these variables. As our study was about monetary policy instability, LPPT was eliminated and the other estimation has done as Eq. (4):

$$LSPT = 1.04 LLq + 0.13 LRAT - 0.25 LRESA \quad (4)$$

(4.46) (0.41) (-1.65)

³ Augmented Dickey-Fuller

⁴ Numbers in the parenthesis below variables, represent t-statistic of the variable

Tables (3), (4), (5) and (6) show the serial autocorrelation test results using Breusch-Godfrey⁵ test. The results related to first-order serial autocorrelation test of error terms in the new model in table (3), represent that in 95% confidence level, probability values (prob) related to F and nr^2 statistics are less than 0/05 and null hypothesis to not having first-order serial autocorrelation is rejected and error terms have first-order serial autocorrelation. To remove this problem, auxiliary variable, AR(1), is added to model and the estimation is done as Eq.(5).

$$LSPT = 0.30 LLq + 1.38 LRAT + 0.06 LRESA + 0.90 AR(1) \quad (5)$$

(1.53) (1.56) (1.29) (20.11)

Again according to the first-order serial autocorrelation test result in table (4), AR (2) is added to model as second auxiliary variable, Eq. (6).

$$LSPT = 0.52 LLq - 0.08 LRAT + 0.10 LRESA + 1.43 AR (1) - 0.51 AR (2) \quad (6)$$

(3.03) (-0.10) (2.71) (7.98) (-2.92)

In table (5) the results of first-order serial autocorrelation test for Eq. (6), show that there is not first-order serial autocorrelation between error terms. So we test the second-order serial autocorrelation for Eq. (6) and the results in table (6), represent lack of second-order serial autocorrelation for error terms in this model.

Table (3): 1st Correlation test results

Status	prob	Statistic	Test
1 st autocorrelation	0.000	100.91	F- statistic
1 st autocorrelation	0.000	26.20	obs*R-squared

Table (4): 1st Correlation test results

Status	prob	Statistic	Test
1 st autocorrelation	0.0463	4.34	F- statistic
1 st autocorrelation	0.0353	4.34	obs*R-squared

Table (5): 1st Correlation test results

Status	prob	Statistic	Test
Lack of 1 st autocorrelation	0.5723	0.32	F- statistic
Lack of 1 st autocorrelation	0.5315	0.39	obs*R-squared

Table (6): 2st Correlation test results

Status	prob	Statistic	Test
Lack of 2 st autocorrelation	0.5487	0.61	F- statistic
Lack of 2 st autocorrelation	0.4737	1.49	obs*R-squared

Table (7) shows the heteroscedasticity test results using ARCH and White tests. According to table (7), null hypothesis is not rejected and there is heteroscedasticity between error terms:

Table (7): heteroscedasticity test results

وضعية	prob	Amount	Statistic	Test Type
Lack of heteroscedasticity	0.3634	1.1943	F- statistic	White
Lack of heteroscedasticity	0.3247	16.9034	Obs*R-squared	
Lack of heteroscedasticity	0.5452	13.7417	Scaled explained SS	
Lack of heteroscedasticity	0.3814	0.7892	F- statistic	ARCH
Lack of heteroscedasticity	0.3651	0.8202	Obs*R-squared	

⁵ Breusch-Godfrey Serial Correlation LM Test

5. ESTIMATION RESULTS

Research findings are:

1. Liquidity of money affects stock total return.
2. Interest rate affects stock total return.
3. Monetary policy instability affects total stock return.

After investigating the stationarity of variables, we estimated the model using OLS method and results show that, liquidity of money and the instability resulting from liquidity are both meaningful and have positive effect on stock total return. So a 1% increase in the liquidity of money contributes to 0.52 percent in stock total return and a 1% increase in monetary policy instability causes to 0.1 % increase in stock total return. Interest rate is not meaningful and represents no effect of interest rate on stock total return. It was found that the graph related to liquidity had upward trend during the studied sample period. So the instability in sudden increase of liquidity has chosen as monetary policy instability index.

The reason of positive impact of monetary policy instability on total stock returns in the final model is the fact that according to Tobin q theory, when there is a sudden increase in liquidity, people feel that they have more money than they wanted and in this condition they want to get rid of it through spending or investing. As one of the convenient places for investment is stock market, so people invest some of their money in stock market and this causes to increase in demand of shares in the stock market and so increase in shares price and increase in stock total return.

6. SUMMARY AND CONCLUSIONS

The aim of this paper was to examine the effect of monetary policy instability on stock total return in Iran. The analysis was conducted for the sample period, namely 1999: 3 – 2008: 2. The empirical results show that liquidity of money and monetary policy instability has meaningful and positive effects on stock total return and interest rate doesn't have any meaningful effect on stock total return.

Given the emerging nature of the stock market and lack of knowledge of the majority of people about stock market as an important source of capital flows in the country economy, it is suggested that policymakers should pay special attention to this market at the macro-economic planning to direct stranded investments towards this market.

Due to Lack of public knowledge of capital market, a large percentage of people have no information of how the stock market and financial assets performance are. In Iran capital market there aren't necessary facilities to choose bonds by investors with different preferences and risks. Only certain groups are willing to invest in this market. It is recommended that, by expanding the country's capital market, through more contributing of people using physical and electronic development of stock market, various tools to invest in the stock market be defined and designed and accelerating of privatization and setting up the international stock be considered.

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A CASE STUDY OF THE EFFICACY OF INVESTMENT IN HUMAN-CAPITAL ON ECONOMIC GROWTH WITHIN ORGANIZATION OF ISLAMIC CONFERENCE

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ABSTRACT

Investment in Human-Capital is proven to have the best and most sound and sustainable influence within the economies and prosperity of the participating countries/economies. Briefly stated, the purpose of this Study is to compare the eventual results and efficacies of "Investment in Human-Capital (education, trainings i.e.) vs. "Investment in traditional Investment in Capital-goods, as it has been the case within dormant economies of the countries with Closed-Economies. In undertaking this study, we have utilized all available data and statistics, from O.I.C. countries during the period of 1998-2010, just as well as extrapolating the data and information available through World-Bank. To make this study more meaningful, realistic, we have naturally referred to other information, data, articles, books, relevant economical journals both domestic as well as international. Furthermore, by using scientific-journals, Internet etc. we have amalgamated the ensuing results, and made use of a Simulation-Module as a result of such data from the panel undertaking this study. The outcome of this study clearly manifests itself in that: "To invest in Human-Capital " the ensuing result paramount exceeds the results of if only invested in traditional Capital-Goods-Investment -approach. In summary, this study clearly shows that for developing countries such as participating Islamic economies and for them to reach a sound and sustainable economic-growth, investment in Human-Capital in the answer.

Keywords: Human-Capital, Economic Growth, Consolidated data, "OIC" Organization of Islamic Conference.

INTRODUCTION

One of the very important economical discussions and debates during the last decades has been about the importance of "Human-Capital" and the very importance of "Investing in Human Capital". Human capital quality of the work force or those inherent-talents imbedded in each of us, does, can cause increase and productivity. Most economists believe that the lack of investment in human capital sectors is the main cause of the lack of growth amongst developing countries.

The same economist ardently advocate the principle that as long as these nations developing countries continue negligence in investing and improving Education, Increasing Professional Skills of their work force, they will continue suffering from low productivity, lack of being competitive in the scale of the world market, and their economic growth will be slow and in reality with much more heavy expenses. The importance of human capital in economic growth through endogenous growth models has been studied. Within Neoclassical Economics growth models, sustainable growth rate is thought to be in parity with growth in technology, but new models of economic growth merits attention to the following 5 factors. However, as with "neoclassical" it is worth mentioning that:

1. Human capital in the arena of production, productivity; is achieved through increased. Productivity and efficiency of productivity-factors thus do offset declining PCI per capita income growth which helps income in the long term, and in the event of the lack of development in technological sectors.
2. Lack decreasing return in capital, versus increasing or constant returns to scale of production-functionality are esteemed form the role of physical capital and human capital as well as the public-infrastructure.
3. Amongst models of endogenous economic growth, convergence in growth is unforeseen, it is expected that a country's per capita income level, and its trend will remain stable.
4. Given the key role in the accumulation of human capital and economic growth.
5. The impact of Knowledge and the availability of knowledge, know-how in investment.

In this study we will investigate the role of human capital in OIC countries will output growth, and will survey the factors affecting economic growth, to build and test a model to explain the role of human capital. Also the rate of investment in education is considered as an indicator of human capital.

REVIEW OF THE LITERATURE

Quality of human resources is the most important factor in improving productivity. In fact the very qualitative aspects of mankind, itself is a valuable human capital, and as such, these characteristics can lead to higher production and increased productivity. Schultz, the father of "human capital theory" argues that improving the quality of the work force which is achieved through investment in human capital, one of the determinants of growth in the traditional analysis of factors affecting economic growth which has been forgotten. The more training of the workforce, investing in human resources, monitoring quality and quantity of productivity, these accumulations will result in increased

productivity, which also results in personal income, and satisfaction. Adam Smith (1779) compared a skilled, trained worker to an expensive car. Adam Smith was the first economist who presented a clear concept of what human capital was like, and what it can produce, result. He saved a part of general human capital (human capital plus non-human capital) stated that any community or country general store was formed from the following sources:

- A) All tools and machinery that use less labor and that it will be easy.
- B) All useful buildings that is capable of producing income.
- C) All saved useful capabilities that are bound to benefit the residents or members of the society.

Smith added that considerations of such talents, while they are undergoing education, training, education and studies and vocational trainings are themselves a sort of value that get imbedded within a person as a capital. However, Smith did not get involved to issue a theory or suggesting any trend, (how to do) in estimating human capital. Until the early 1950s and early 1960s “nation’s wealth” was considered to be: Accumulation of physical capital. But from that period and after, gradually the concept of work force, replaced itself with Human wealth. In the ensuing period, they were numerous articles and books written on the said subject. Theodor Schultz whom I will refer to his works and history shortly, did write an article in 1961 and there he researched and examined various ways and approaches to prove this theory that “The key to Human Development is the Human himself and not the Financial sources”. He added that in the past “Capital” was defined those goods that could be produced again, such as recycling capital goods and as such they did not pay attention to the most important “Human-Capital. In the opinion of Theodore W. Schultz, developing human resources consists of 5 elements. As I was about to mention above, in the opinion of Theodore W. Schultz, developing human resources consists of 5 elements.

- A) Health Care facilities and the life expectancy, ability, vitality that increases endurance and happiness in life.
- B) All expenses related to technical and vocational education.
- C) Education from primary to secondary level and university level education
- D) Vocational training and literacy programs offered by economic enterprises, private and public sectors.
- E) Individual immigration to other countries in order to achieve better employment opportunities and increased monetary.

In general the investment in educational sector must consist of the followings:

1. Investment in research
2. Investment in education and discovering talents and capabilities.
3. Investment in education that is compatible with work environment and job demands.
4. Investment in education sector itself in order to create experienced educational staff.
5. Investment in education and with the purpose of future needs.

Expected return on investment in human capital, high levels of income and job satisfaction is high. Blaug highlights the relationship between education and income in such a way:

A simple explanation that a general relationship between education and earnings across various economic sectors, industries and occupations in this category are those “who are generally better trained, flexible and are transferable from one career to another professions, jobs. And easily adapt themselves to new environmental changes, are very comfortable with themselves and benefit from more training and work experience. Guardian ship and steward ship responsibilities are and take them very quickly, in short: these have higher productivity than those that have less education, training. Even though, such trainings may not be directly related to a particular job.

Mincer (1982) in the case of coordination and balance between human capital and physical capital formation in developing countries for social and economic development so that the expression for the development, planning is necessary in the structure of cultural, social and economic “well-balance” and balanced ways. For developing an economic structure and creating an enhancement for and driving changes, direction, balance, coordination and harmony between the human and physical capital is deemed essentially vital for economic-growth.

Speaking of economic growth, one should consider that one basic rule is somewhat common; “construction and construction equipment” shall be in forefront of attention and planning. Even if the existing work force lacks the skills and knowledge necessary for the job....in such countries the growth-rate due to the balance between investment inhuman capital and investment in physical capital, the margin of differences is evidently limited. To put it simply; those countries where they have been able to avoid, circumvent the emergence of asymmetry between human capital and physical capital separation, have been able to see a very large growth rates. From the view-point of Lucas, the accumulation of human capital, social activities means activities involving groups of people that are so similar in physical capital accumulation. Shultz, (1961) as in a theory of human capital had emphasized that Investing and improving the quality of the work force as one of the determinants of growth in the traditional analysis of factors affecting economic growth, has been forgotten. Accordingly, a group of economists have tried by using elements of production, excess production due to higher educational levels, skills.... they have tried to prove and present that:

“Increase in education, increases production, productivity, and the presence of educated, skilled workforce causes increase in the capacity of the economy, thus growth of the country’s economics. Harbinger and Selovsky to show the contribution of education to economic growth in Chile during the period from 1962 to 1940 used in the rejected growth equation. They used the following production-function, assuming constant returns in the scale of such as in: $Y = F(K, L, Q)$

Where Q is very similar and close to the quality of labor and the pay is close to Schultz’s proprietarily salary. Thus we can claim that: $Q = R_k E$

By utilizing the “differential equation” $Y = F(K, L)$ and dividing both sides of the Y, we have

$$\frac{1}{Y} \cdot \frac{dY}{dt} = \frac{1}{Y} \frac{dK}{dt} \cdot \frac{\partial Y}{\partial K} + \frac{1}{Y} \frac{dL}{dt} \cdot \frac{\partial Y}{\partial L}$$

Harbinger and Selovsky adding quality work force and the remaining factor, they completed the following Growth-Equation:

$$g_y = k \cdot f_k + g_1 + s_1 + q_1 + R$$

g_y of the annual average growth rate, k the ratio of investment to production, f_k final production of capital, g_1 growth rate in labor force, s_1 labor income share, q_1 the quality of the labor force and R is the residual component of the quality of the labor share of capital devoted to training esteems from the newly arriving work force. And its algebraic definition is as follows.

Hbinger and Selovsky estimated equation for the state share of education in Chile during the period from 1962 to 1940 which showed 15% growth in this country. Mankiw & et al (1992) by using the schools, enrolment ratio as a variable alternative for Human-Capita. They present their estimation by the following formula:

Of secondary school enrollment rates in schools as an alternative to using human capital variables, and they estimate the following equation.

$$Lny = A + \alpha_0 \ln\left(\frac{I}{Y}\right) + \beta_0 \ln\left(\frac{I_n}{Y}\right) + \gamma_0 L(N)$$

These 3 economists reach the conclusion that the coefficient of human capital with physical capital will compete. In the above equation y represents the product of effective. Labor per capital net physical investment I , the investment education I_n and N is labor. Manikw and Rommer consider work force as an indicator with mid high school education for Human Capital.

Huger Sterling another economics expert (2001) in his examination of the role of human capital in economic growth came to the conclusion that efficient and educated work force as human capital is saved and through innovation and improvement of quality, the development of economic growth becomes attainable.

He studied in endogenous growth models based on R & D and found the similar answers.

Vladimir Kohl Teles, a professor of Economic Growth, Macroeconomics, in his studies of the role of human capital in economic growth, used economic data and statistics belonging to the 2nd half of the 20th century, amongst the select rich and poor countries of the world. He used 2 models of human capital belonging to Lukas and Phillips, and concluded that the Lucas model with human capital and growth in rich countries are well explained. He went on to present that however, Philips model to explain the relationship between human capital and economic growth in poor countries is appropriate (Teles, 2004, 71).

CORRECTING MODEL AND INTRODUCING THE VARIABLE

To obtain the equation of a production-function of Chub-Douglas which is in the form of an equation (1) we start with the following:

$$Y(t) = K^\alpha(t) H^\gamma(t) [A(t) L(t)]^{1-\alpha-\gamma} \quad (1)$$

From the above equation (1) we now have

$$\ln\left(\frac{Y(t)}{L(t)}\right) = \ln A(0) + gt + \left(\frac{\alpha}{1-\alpha-\gamma}\right) \ln(S_k) + \left(\frac{\gamma}{1-\alpha-\gamma}\right) \ln(S_h) - \left(\frac{\alpha+\gamma}{1-\alpha-\gamma}\right) \ln(n+g+\delta)$$

Islam (1) showed us that the following connection exists as with "growth":

$$\frac{d[\ln(y(t))]}{dt} = \beta(\ln(y^*) - \ln(y(t)))$$

And

$$\beta = (n+g+\delta)(1-\alpha)$$

After solving the said equation, now we will have:

$$\ln(y(t_2)) = (1 - e^{-\beta\tau}) \ln(y^*) + e^{-\beta\tau} \ln(y(t_1))$$

Furthermore, after $y(t_1)$ the initial level of income and a series of algebraic operations, we reach at:

$$\ln(y(t_2)) - \ln(y(t_1)) = (1 - e^{-\beta\tau})(\ln(y^*) - \ln(y(t_1)))$$

In sustainable situation $y(t_1)$ is recognized by means of value S_h, S_k, n

$$\begin{aligned} \ln(y(t_2)) - \ln(y(t_1)) &= (1 - e^{-\beta\tau}) \left[\left(\frac{\alpha}{1-\alpha-\gamma}\right) \ln(S_k) + \left(\frac{\gamma}{1-\alpha-\gamma}\right) \ln(S_h) - \left(\frac{\alpha+\gamma}{1-\alpha-\gamma}\right) \ln(n+g+\delta) \right] \\ &\quad - (1 - e^{-\beta\tau}) \ln(y(t_1)) + (1 - e^{-\beta\tau})(\ln(A_0) + g(t_2 - e^{-\beta\tau} t_1)) \end{aligned}$$

Then we have

$$\begin{aligned}
 Ln(y(t_2)) = (1 - e^{-\beta\tau}) & \left[\left(\frac{\alpha}{1 - \alpha - \gamma} \right) Ln(S_k) + \left(\frac{\gamma}{1 - \alpha - \gamma} \right) Ln(S_h) - \left(\frac{\alpha + \gamma}{1 - \alpha - \gamma} \right) Ln(n + g + \delta) \right] \\
 & + e^{-\beta\tau} Ln(y(t_1)) + (1 - e^{-\beta\tau}) (Ln(A_0) + g(t_2 - e^{-\beta\tau} t_1))
 \end{aligned}
 \tag{3}$$

This formulation represents a dynamic model is with pool model.

Equation (3) can be estimated by using a panel pattern, as in the follow in

$$Ln(y_{it}) = \alpha_0 Ln(y_{i,t-1}) + \alpha_1 Ln(Sk_{it}) + \alpha_2 Ln(Sh_{it}) + \alpha_3 Ln(n_{it} + g_{it} + \delta_{it}) + \mu_i + \xi_t + v_{it}$$

Where $\alpha = e^{-\beta\tau}$ and v_{it} are error component with means of zero.

Like Will, Romer and Mankiw, in our study we also consider the error value at about 5%. In order to calculate and making use of software, we make the following corrections

$$LY = \alpha_0 LY1 + \alpha_1 LSK + \alpha_2 LSH + \alpha_3 LGL$$

Whereby

LY logarithm of effective per capita income

LY1 is logarithm of effective per capita income "during the previous period"

LSH logarithm human capital (relativity of expenses for teachings of production, productivity)

LGL logarithm growth in work force

LSK logarithm physical capital (relativity of investment in production

ESTIMATION METHOD

Data variables required for the period 2010-1998 obtained from the statistical of the World Bank relevant to the study of a number of countries:

These data are based in Fixed-Price for the year 2000 and in US Dollars. From amongst 57 countries, members of Organization of 13 Nations, due to these countries lack of data, those were, have been deleted in this study⁶. Accordingly, we have used the data and statistical of the remaining 44 member countries. For elements effecting changes in physical capital, we have used the ratio of capital to production, just as well we have used elements of change in human capital, rate of investment in education i.e. that portion of income that is used in education. The pool data will be used to estimate the model in the next section. The ratio of physical capital relative to variable capital and variable production, Human capital investment rates in education, the proportion of income used in the training, education.... we have used such variables. The pool data will be used to estimate the model in the next section we will explain it. For classifying countries with open-economies and closed-economic indicators of economic openness on the proportion of total exports and imports of production, we will use:

$$\frac{\text{Export} + \text{Import}}{\text{GDP}}$$

In doing so, we come to realize that in general the middle of this ratio i.e. Those countries that sustained more than average in this study, are countries with Open- Economies, and the rest that did not qualify to sustain this period under investigation, are countries with Closed-Economies.

The average ratio for the whole countries is equal to 2145/76 percentage is determined. Thus, 25 countries are found to have Open-economy, and 19 with closed-economy. 57 OIC member countries are as follows: Afghanistan(1969)⁷ -Algeria(1996) - Chad(1969) - Egypt(1969) -Guinea(1969) -Indonesia(1969) -Iran(1969) -Jordan(1969) - Kuwait(1969) -Lebanon(1969) -Libya(1969) -Malaysia(1969) - Mali(1969) - Mauritania(1969) -Morocco(1969) -Mozambique(1969) -Niger(1969) -Pakistan(1969) - Palestine(1969) -Saudi Arabia(1969) -Senegal(1969) -Somalia(1969) -Sudan(1969) - Suriname(1996) -Tunisia(1969) -Turkey(1969) -Yemen(1969) -Bahrain(1972) - Oman(1972) -Qatar(1972) -Sierra Leone(1972) -Syria(1972) -UAE(1972) - Bangladesh(1974) -Burkina Faso(1974) -Cameroon(1974) - Gabon(1974) -Gambia(1974) -Guinea-Bissau(1974) -Uganda(1974) -Iraq(1975) -Kamrvz(1976) -Maldives(1976) - General(1983) - Benin(1983) -Brunei(1984) -Nigeria(1986) -Albania(1992) - Kyrgyzstan(1992) -Tajikistan(1992) -Turkmenistan(1992) -Kazakhstan(1995) - Uzbekistan(1996) -Togo(1997) -Guyana(1998) -KutDlyvr(2001).

ESTIMATING THE MODEL

To estimate the model, assuming that the width of the source is different for different countries (fixed or random effects)...

To see if the width of the source for all sections is the same or not, we have tested **F** and statistics of **F** we show as follows:

$$F = \frac{(SSR_{pool} - SSR_{Fixed}) / N - K}{SSR_{Fixed} / (NT - (N + K))}$$

on those data these date have

NT-(N+K), N-K

If the denominator in which SSR_{pool} total square error in estimating the width of the same origin and SSR_{fixed} the sum of squares error in the estimation method is proven to work and **N**, **K**, **T**, respectively during the period the number of independent-variables and the number

⁶ The number in parentheses is the year of membership in the organization

⁷ Afghanistan-Palestine-Djibouti-Iraq-GuineaBissau-Libya-Qatar-Somalia-Brunei-Suriname-Turkmenistan-UAE-Yemen

of sections are apparent. To experiment the theory of H0 with its compatibility with those estimations that have accidental or inadvertent effects in front of H1 as incompatibility of accidental statistics, has man estimates that we use this formula:

$$h = X^2(k) = [b - \hat{\beta}] \sum^{-1} [b - \hat{\beta}]$$

Where by

$$\sum = Var[b - \hat{\beta}] = Var[b] - Var[\hat{\beta}]$$

And **b** is representative of Fixed-Effects estimation of the methods, their effects in and $\hat{\beta}$ estimation of the methods is random effects, computational statistics for the test and the test of Human as in Table 1. Shown below, is used.

Table 1

	F	h-statistic
Volume	3.5626	45.580
Prob	7.10E-07	1.06E-09

Source: Finding of the research

According to Table 1, this brings us to the conclusion that the model should be estimated by using fixed effects. We now know that in previous time series data and before calculating the respective Model/s, we should have made sure of the sustainability, stability of the variables. However, in accordance with the findings of (Gogerd-chian, Ahmad, Tayyebi and Seyed Kamil) if are less than 10 years, then there is no need to verify the validity, sustainability of the variables. The ensuing results assembled as with “Model-estimation” and in Accordance with the “Fixed-effects scheme” is shown on Table 2.

Table 2: Estimating the fixed effects-model

LGL	LSH	LSK	LY1	Intercept	Coefficient
volume	0.73 (0.209)	0.89 0.024	0.025 (0.002)	0.069 (0.020)	0.012* 0.023
t	0.588	3.37	8.85	35.68	3.49
R²	0.99				

Source: Findings of the study (numbers inside parenthesis are the coefficients of the standard deviation at a level of 5%).

* At a level of 5% has no meaning.

To examine, to find out if the logarithmic growth of labor force growth has statistically any significant effect on test, we utilize Wald logarithm of the ratio of labor force growth, so that it can be statistically significant coefficient “zero” or not?

$$H_0: \beta_5 = 0$$

$$H_1: \beta_5 \neq 0$$

The results attained from Wald Test shown on table 3

Table 3: the coefficient of LGL

Test Statistic	Value	df	Probability
F-statistic	0.294416	(1, 259)	0.5879
Chi-square	0.294416	1	0.5874

Source: Finding of the research

As the results indicate, that there is no reason to reject the zero-theory as the logarithm of the ratio of growth “workforce “could be zero. Because of the logarithmic growth we remove workforce and re-estimate the model, again:

Table 4: Estimation for the totality of the sample after removal of LGL

Coefficient	Intercept	LY1	LSK	LSH
volume	0.64 (0.161)	0.9 (0.021)	0.025 (0.002)	0.067 (0.019)
t	3.51	9.001	42.86	3.97
R²	0,99			

Source: Findings of the research

As seen from the results in Table 4, all results were significant and the signs of all coefficients are in accordance with theoretical expectations. It also has a very R2 high estimate of the signal-strength, which is an evidence for high strength of the explanations derived from the model. Data/statistics of Durbin-Watson is also equal to 2.3 and since it is close to the number 2, thus the model does not show consistency. Also to delete variations/fluctuations in consistency, we have used estimation by means of “weight.” Coefficient of the logarithm of physical capital equal to 0.025, this means that an increase in physical capital, 0.025 percent of output growth is added. Coefficient of the logarithm of human capital equal to 0.067 percent increase in the per-capital production. Logarithm of the ratio of physical capital is human capital, in other words; Tendency and attractively of human resources is much more than tendency towards physical capital.

SAMPLE ESTIMATIONS FOR COUNTRIES WITH OPEN-ECONOMY AND THOSE COUNTRIES WITH CLOSED-ECONOMY:

In this section, we divide our sample in to two groups:

1 - Countries with open-economies

2 - Countries with closed- economy

The indicator for the degree of openness in the economy has been compared to total exports and imports of each country's GDP Gross-Domestic-Products. The more this equation is big for a nation, it means that nation has a big share in international trade and as such is an open-economy. We calculated this index, the average ratio for each of these 44 countries under-study in the period 1997-2010 and calculations are based on such classifications. The average ratio for all countries during the period studied is 76.21 percent. Countries where their total volume of import-export is greater than 76.21 percent these countries are considered to have open-economies, and the rest are countries with closed-economies. Accordingly, the total of 44 countries surveyed in this research; 25 countries are found to have open-economies and 19country-groupsare found to have closed-economies.

We now estimate the same model separately for both country groups. The result from testing F Hussmann's test shows this reality that the "Equivalency of the width of the source and pattern of the random-effects model and the fixed effects are no longer valid, therefore, we must use fixed-effects model for future estimations.

Table 5: Test F Haussmann's test for countries with open and closed economies

	Closed economies		Open economies	
	F	<i>h _ statistic</i>	F	<i>h _ statistic</i>
Volume	4.241	29.765	2.888	132.693
prob	6.87E-06	5.46E-06	0.000145	0

Source: Findings of the research

Table 6: results of estimations for countries with Open-Economies

	Intercept	LY1	LSK	LSH	LGL
volume	0.51 (0.48)	0.93 (0.052)	0.01 (0.007)	0.07 (0.02)	.024 (0.55)
t	1.059	17.88	2.22	2.06	0.58
R^2	0.99		d.w	2.09	

Table 7: The results of estimations for countries with Closed-Economies

	Intercept	LY1	LSK	LSH	LGL
volume	0.78 (0.204)	0.87 (0.02)	0.02 (0.001)	0.064 (0.023)	-0.011 (0.019)
t	3.83	36.64	17.98	3.06	-0.605
R^2	0.99		d.w	2.31	

Source: Findings of the research

Now, in order to see if the logarithmic of the growth of the labor-force in both Group of countries, as with the statistics, has any effect/influence in growth, or not? We utilize "Vald's Test" by utilizing Logarithm of the Ratio of labor -force growth in both countries, we do"

$$H_0: \beta_5 = 0$$

$$H_1: \beta_5 \neq 0$$

The results of the Wald Test on the logarithmic growth rate for countries and groups in open economies are shown in the table below:

Table 8: The results of the Wald Test

Test Statistic	Value	df	Probablity
F-statistic	0.304519	(1, 109)	0.5822
Chi-square	0.304519	1	0.5811

Source: Findings of the research

As the table-results shows, there is no rational to reject the zero assumption. In the words the coefficient of the logarithm of labor-force growth can be zero. Accordingly, we delete the logarithm of labor-force growth from the model, and re-estimate our model, again.

Table 9: Wald Test on coefficient of LGL in the closed-economy cases:

Test Statistic	Value	df	Probability
F-statistic	0.366520	(1, 145)	0.5459
Chi-square	0.366520	1	0.5459

In accordance to the results driven from theoretical table (to assume zero = zero in coefficient of LGL, thus such coefficient cannot be denied amongst the countries with closed-economies. Due to being zero LGL Coefficient, we remove LGL from both country groups, and thus re-estimate the model, again.

Table 10: Re-estimating countries with open and closed economies, after deleting LGL

Variable's name	Countries with open economies			Countries with closed economies		
	coefficient	Deviation of criteria	Data t	coefficient	deviation of criteria	Data t
LY1	0.93	0.045	20.58	0.87	.021	41.32
LSK	0.010	0.009	2.35	0.027	0.001	17.33
LSH	0.070	0.020	2.83	0.064	0.017	3.12
R^2	0.99			0.99		
d.w	2.08			2.29		

According to the results in Table 10 coefficients of the logarithm of human capital for closed-economies respectively 0/070 percent and 0/064 percent. This supports the reality of findings that an increase of 1 percent in human resources creates an increase /growth of 0/07 percent within PCG Per Capita Growth of countries with open economies, and diversely 0/064 percent amongst countries with closed-economies. This point is also noteworthy that the efficiencies shown are of an acceptable meaning. Comparing the coefficients of the logarithm of human-capital in the two groups of countries, we find that the coefficient of human capital in countries with open-economies. As with numbers is greater than those with closed economies. The question now is what these coefficients can statistically be larger than they really are? For this purpose, we use Test t . the theory of zero and its counterpart/opposite theory can be shown as below:

$$H_0: \beta_3 = \beta_4$$

$$H_1: \beta_4 > \beta_3$$

We now address:

β_3 = coefficient of physical capital

β_4 = coefficient of capital

Totality of the sample

$$t = \frac{\beta_4 - \beta_3}{\sqrt{\text{var}(\beta_4) + \text{var}(\beta_3) - 2\text{cov}(\beta_4, \beta_3)}} = \frac{0.067 - 0.025}{0.017} = 2.47$$

Closed sample

$$t = \frac{\beta_4 - \beta_3}{\sqrt{\text{var}(\beta_4) + \text{var}(\beta_3) - 2\text{cov}(\beta_4, \beta_3)}} = \frac{0.064 - 0.027}{0.015} = 2.46$$

Open sample

$$t = \frac{\beta_4 - \beta_3}{\sqrt{\text{var}(\beta_4) + \text{var}(\beta_3) - 2\text{cov}(\beta_4, \beta_3)}} = \frac{0.07 - 0.01}{0.02} = 3$$

It is clearly ascertained that t in all three computations is more than t in tables. Thus, to assume coefficients equal zero is rejected and assumption of its opposite is acceptable

TOTAL		coefficient	Deviation of criteria	covariance
	sk	0.025	0.002	0.000038
	sh	0.067	0.019	
OPEN		coefficient	Deviation of criteria	covariance
	sk	0.01	0.009	0.000036
	sh	0.07	0.02	
CLOSED		coefficient	Deviation of criteria	covariance
	sk	0.027	0.001	0.000025
	sh	0.064	0.017	

CONCLUSION AND SUGGESTION:

There have been numerous researches undertaken about the subject of economic growth, whether here in Iran, or of course many in other countries, ostensibly in America and in the Western Europe. With a separate approach and emphasis upon a particular variable; and in order to clarify and explain the influential factors on economic- growth, as mentioned in the section on experimental studies, here. In most cases, the effect of human capital on economic growth has been positive and in some cases, depending on the desired indicator for human capital, in cases we have noticed adverse, negative effects of this index over country's economic growth.

As such there have been scrutinizing worthy of attention studies, research undertakings, which have separately focused eye ostensibly over economic growth. For example the signs of human capital on economic growth among men and among women, been studied and they often concluded that these effects can vary depending on gender or other factors. The first approach was to study. The effects of human capital among the OIC Member States what was/were clearly observed in this study were:

1. The main factors affecting the growth of per capita national productivity among the variables considered, and existing human capital is intended for human capital indicators (portion of production that is spent in education). The larger the index, the more money is spent in education/ training. As a result, the quality of workforce increases through education, and with this increase in education and training means more readiness to be able to use modern technology through increased. As a result, the quality of workforce increases through education , and with this increase in education and training means more readiness to be able to use modern technology which in return means more productivity, more readiness to join the international market place, and net result, better income and satisfaction of the nation. This research also resulted in ardent belief that the positive effects of these parameters on the production will help enhance and increase growth in productivity/production.
2. In this research I undertook to study, and investigate the effect of human capital on the economical- growth of the countries studied. To do so, I chose to divide the countries subject of my research into 2 groups:

A. Countries with Open-Economies

B. Countries with Closed – Economies

I used the index relevant to country's/countries' total volume of export-import as an evidence of openness of those economy/economies. Within the ensuing results of our estimation model/s, for studying the said 2 groups, I came to be convinced that the net result of the human resources/capital in countries with open-economies "over the issue of economic growth is by far more than the countries with closed-economies. The results of the estimation model for these two countries shows the effect of human capital on growth in Countries with more open economies countries with closed economies. 3. Comparing the coefficients of the logarithm of human-capital and logarithm of physical- capital, it is clearly seen that coefficient of the logarithm of human-capital is greater than physical- capital and it is the elasticity and impact of human- capital on Per Output growth is greater than the effect of physical capital. The same finding is true BOTH within countries with open economies, or closed-economies, i.e. the net influence of human-capital are far greater than the traditional style investment in physical-capital. 4. Given the positive effect of human-capital (Proportion of cost of education compared with cost of production)over the issue of economic-growth, attention to education and investment in education and training is both in quantitative and qualitative terms, seems to be very necessary. To speed up the process of trade liberalization, of wider economy by increasing foreign trade among countries seems necessary.

5. In view of indefatigable positive influence of investment in human-capital (education-training) that appears to be more tangible in countries with open-economies, than the countries with closed-economies, it is highly recommended that in order to help free trade, and to help open more of economies, the planning and genuine attempts to increase foreign trade amongst the nations is a must, a trend much worthy of the economic authorities of the countries.

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INCREASE OF ORGANIZATIONAL PERFORMANCE, EFFECT OF APPLYING THE PROCEDURES OF STAFF MANAGEMENT AUDIT

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Abstract:

At the basis of this work were the current realities in the sphere of public organizations, on the performances obtained by them and the need to increase them on the background of increasing the global socio-economic requirements.

The analysis of the facts presented and the major theories on the strategic importance of the audit and not only, encouraged us to deepen our research on the impact of the effective implementation of staff management audit procedures on the organization's performance.

Thus, the main objective of the paper is to identify the elements of the staff management audit elements which contribute to the increase of organizational performances amid a continuing course of the administrative reform.

Keywords: SM (staff management) activities audit, efficiency / performance of the organization, audit findings, implementing solutions, advising of the manager of human resources.

1. Improving performance – cvasi-general objective in public organizational systems

The specialty literature shows that the acceleration of reform process of public administration is given, firstly, by the need to increase the economic performance, designed to influence all the components of the national socio-economic system, as a result of Romania's transition to the status of country membership of the European Union. Therefore, as regards the harmonization of the legal framework with EU regulations, we think that the following elements have a major role for Romania for the public administration and especially for its people [9]:

- ensuring the long-term consistency and stability of the system of norms and rules with direct impact on the management system applicable to national public administration;
- the initiation of a comprehensive action to improve the existing regulations and to develop new rules, based on the principles of the Constitution and of the European Charter of Local Autonomy⁸.

Obviously, the modernization of public administration system involves the application of well-known principles, but also the carrying out of a specific set of processes, characterized by a certain dynamic. For Romania to reach its goals, objectives influenced and harmonized by and with the current European policies aiming at improving the economic performance, it is necessary to actually accelerate the process of legislative and institutional reform of public administration, action required after making some rapid and qualitative analysis and prior impact studies.

The orientation of the interest for results based on efficiency, effectiveness and overall quality of services should be the centre of gravity of each public entity, of each group of human resources. Efficiency and effectiveness improve when the involvement of the civil servants increases, when responsibilities are transferred to the lower levels of government, with the determination of the responsibilities system, on each level.

On the other hand, according to Armand V. Feigenbaum, American expert in quality control and total quality management, famous businessman, total quality management is an organizational system that allows the integration of all efforts of developing, maintaining and improving the quality made by the entity, so as to ensure that studies (analysis of citizen needs), manufacturing (preparation of the public services offer), marketing (providing services, citizens' needs towards them) and customer (citizen) service by the human resources of public administration to be made at a cost (taxes) „as low as possible”, while allowing to obtain full satisfaction of the customer (citizen).

In addition, the specialty literature points out and the practice confirms the fact that a company increases if it has a system of values and rules which are respected and applied in the same way as the sanctions are, when the set of values, principles and rules are ignored and violated.

Or, the manner in which the procedures and regulations with legal, administrative, managerial force are applied and are obtained the results strategically forecast, can be met through continuous assessment, monitoring of a sector or another, the ongoing reporting of what is desired and what you need to achieve in terms of the results of a human community or another. These findings lead us to pay a special attention to the audit system [2] and, especially, to the procedures of Staff Management Audit (SMA) engaged in all the organizational public sector.

Also, the management decisions related to achieving the objectives regarding the organizational performance growth depend, as the international management theory and practice have already shown, by considering the results of various audits.

2. Reconsideration of the position to audit in the organizational management of the public domain

The science of public management studies processes and relations existing between the administrative system components, but also within them, in order to discover general principles and laws, methods and techniques to improve forecasting, organization and coordination, resource management and activities assessment in order to enhance the degree of satisfaction of the public interest [5]. Then,

⁸ The reference includes the Administrative Procedure Code, the Administrative Code and the Election Code.

it has in view to identify the principles and general and specific laws for the public sector in general and for the public institutions in particular, which by their content, provide the foundations to satisfy the public interest.

Public management principles and laws are actually a result of processes of analysis and synthesis of a representative number of practical situations identified in the public sector, which were generalized and considered to have influence over the conduct of activities in the public sector [6].

The fundamental objective of public management is to increase the degree of satisfaction of the public interest, as determined by the general and specific needs. The general and specific social needs system fully determine the content of public interest.

In order to achieve the fundamental objective, the public management, through the exercise of its functions by public managers must ensure a realistic prediction of the overall objectives system [8].

Achieving this objective requires the management and execution staff to have additional responsibility to manage all types of resources available to the public sector, namely human, information, material and financial resources.

The knowledge of the manner in which the resources attracted in the system are used and the identification of the extent to which general and specific social needs are met determine a permanent monitoring by audit/control and evaluation of performance levels achieved in the public sector in general and in every public institution in particular.

The information resulting from the audit/control and the analysis effectuated in the public administration system are the basis for improving management performance obtained in the process of achieving the fundamental objective of public management.

The new guidelines aim to design and implement the management system which to ensure the satisfaction through activities developed, of the social needs determined and summarized in the contents of the public interest, as its fundamental objective.

For our part, we argue that the effective implementation of the public management, focusing on the component of the managerial control/audit at all levels and on the manner in which we use various types of resources (financial, material, human, etc.) is able to ensure the modernization of the national administrative sector.

3. Public organizational structures concerned by Staff Management Control/Audit (SMA) in the Romanian public system

The most common organizational structures in public institutions and authorities in Romania are the functional hierarchical, territorial and mixed.

• *The functional hierarchical structure* consists in the organization of the institution or public authority in hierarchical levels and areas, depending on the types of public services it produces and provides [4]. The main features of this type of organizational structure are:

- the existence of distinct operational and functional departments - clearly defined in the configuration of the structure - and of a large number of hierarchical levels;
- the heads of departments exercise all such powers of management and manage the subordinate executive officials of all departments over which they preside;
- the executive civil servants receive instructions from their hierarchical leaders and also from the leaders of the functional departments, being double or even multiple subordinates;
- the executive civil servants are subordinate to the hierarchical superior and to the head of the latter.

Some features of this type of structure exist in public administration in Romania, where institutions were created with general physical competence, which mainly operate in all spheres of social life [1].

At the central level are working the ministries, other central bodies of state administration with standard functional hierarchical structures derived from the legislation: government decision, government ordinance, minister order etc. They differ only by the number of compartments and the number of civil servants provided by the legislature.

There are also a number of such structures of public institutions at the local level, which are identified in certain administrations, inspectorates, regional agencies, etc. Organizational structures for such public institutions are mainly developed and approved by public institutions and authorities under the authority of which they operate and any change in the pattern of the organizational structure is made only by the hierarchical authorities.

• *The territorial structure* designate the organization of the institution or of the public authority in relation to the territorial-administrative unit in which they exercise their jurisdiction.

The main features of the territorial structure are [4]:

- the scope for the exercise of authority by the components of the structure is determined by the territorial administrative unit assigned by the institution or the hierarchical functional authority
- the number of compartments is determined by the level and intensity of social needs identified in the administrative-territorial unit managed by the institution or public authority with such a structure;
- the reduced number of hierarchical levels, the high percentage of functional relations between the departments of the structure and their great flexibility, the structure being adaptable to the territorial needs identified and managerial objectives pursued
- the existence of a large number of operational compartments in which are effectuated and provided public services of general and specific interest for the administrative-territorial unit in which that institution is exercising its jurisdiction.

In the public sector in Romania are identified two categories of institutions with two forms of the same type of structure: institutions with central jurisdiction, which comprise regional structures, but with a high degree of formalism and excessive rigidity and institutions with limited territorial jurisdiction, which also have well-defined territorial structures in the territorial administrative unit: city-town, village.

• *The mixed structure* combines the features of the first two types of structures that fit into the internal mechanism of organization of the institution or authority.

This structure is identified in each area of activity in the public sector, where the elements of the hierarchical and functional structure are combined with those of the territorial structure.

4. Application of SMA in the institutional area

As the managerial theory and practice in the Western Area has shown in the recent years, in the absence of a correct management of the human resources function in an organization, appears the risk of increases of costs and resources related to the functioning of any organization. The poor definition of the function of human resources leads to lower efficaciousness of the employees and hence, the poor performance of the organizational activity.

Therefore, the importance of auditing has grown significantly - both generally and in particular when it comes to human resources audit or staff management, as established over time in the field.

What gives it a special value is its function of management consulting, which makes the management decisions about objectives on the increase of organizational performance to be based on consideration of the results of various audits.

4.1. Human resources audit

It is known that the audit is to analytically examine the matter subject to audit to obtain evidences to be reported to a pre-established referential system. The number of samples, their size and the quality of the expected results condition the reveal of reasonable conclusions on which is based the audit opinion (Audit Standard 500.2).

The application of SMA in the institutional field aims to determine if various elements of the subsystem of human resources (HR) are effective in achieving the objectives set at the managerial level.

We identify an interesting definition of human resources audit in I. Marin [7]: “The human resources audit means a complex of activities of monitoring and collection of information that ensure the manager that activities are carried out as planned, measuring progress towards goals and detecting deviations from the project to take corrective actions.”

According to the specialty literature, this specific type of auditing has emerged as an intrinsic need of organizations to eliminate the difficulties of staff management. The disposal of human resources audit in the context of the concept of general audit and the highlight of its importance in the evolutionary context of an entity reflects the need for such assessments.

Specifically, human resources audit evaluates the activity of human resources in an organization in order to improve these activities. This is the one which provides feed-backs on the staff function, on the way activities of these functions are carried out.

4.2. SMA - organizational diagnostic tool

SMA is a diagnostic tool to identify strengths and weaknesses of an organization. Its effectiveness is shown only if stimulates the creativity, identifies positive aspects and organizational deficiencies, or if it delivers significant recommendations to improve organizational performance.

According the same source, SMA requires a verification of the activities of human resources at the level of a department or of an entire organization and how these activities support the organization’s strategy, providing a series of advantages [7]:

- it highlights the contributions of human resources department in the organization;
- it enhances the professional image of the human resources department;
- it encourages to assume greater responsibilities within the same department;
- it discovers critical issues of human resources;
- it reduces the costs of human resources by more effective and efficient staff procedures.

The application of specific procedures includes several steps, comprising the decision-making on the selection of the most appropriate specific tools, their implementation, the drafting an action plan etc.

At the basis of SMA are the national and international reference standards and norms for reporting human resources audit, providing a basis for comparison on the criteria according to which the audit is effectuated. Interviews with employees and human resources staff have a great importance.

The annual achievement of SMA reveal, through indicators used, the development of organization’s policy in the human resources field and the evaluation of its application.

The organization-specific indicators [3] considered are those on the staff number (number of permanent employment positions and their actual distribution in the department, division by gender, age, seniority, education, domicile), wages, working conditions, etc.

As a result of the SMA, the audited entities will be able to (re)design their structure and to redefine HR processes based on their own strategy, ensuring and optimizing the use of human capital.

In practice [13] the use of SMA is about moments of change or crisis, when the productivity is not as expected or when the level of employees’ motivation decreases. It also becomes necessary to obtain an accurate diagnosis of the company in terms of staff and when necessary:

- the assessment of quality practices, procedures and results of HR department;
- the determination of performance standards for RU staff;
- the identification of what should be optimized or modified in the activity of HR department;
- the evaluation of RU programs with impact on the organization objectives;
- HR department involvement in strategic activities;
- the preparation of an external audit or reducing staff costs.

The SMA process starts by a detailed investigation of the HR functions and of the related procedures and processes, as well as those related to staffing planning, system performance evaluation, recruitment and training strategies, methodology of integrating new employees, etc.

SMA's purpose is to analyse the human resources function in the organization, focusing on identifying the level of development of human resources activities, in line with current and future requirements of the entity, and the development/improvement of human resources processes within the organization.

Most often, people involved in SMA interviews (but also in other tests, evaluations, etc.) are [13]:

1. Senior management staff of the entity
2. The Officer of the Human Resources Department
3. The Department heads and coordinators
4. The employees designated by applying the method of selection based on surveys, in proportion to the number of employees in each Department.

Mainly, SMA requires the analysis of the specific documentation of human resources in the organization and the implementation of structured interviews, conducted according to an audit questionnaire.

Regarding the sources of information considered by the SMA, they relate to personnel policies and procedures of the organization, employees' records, job descriptions, descriptions of features, post specifications, internal reports, individual and collective labour contracts, relationships with trade unions, reports on the results of performance evaluation etc.

In the sphere of development of procedures for SMA, a major role is played by the programmatic documents of international entities or by some reference documents: The Institute of Internal Auditors (USA), the French Institute of Audit, qualification standards, INTOSAI (International Organisation of Supreme Audit Institutions), ISO 19011:2002 etc.

4.3. SMA managerial advising, leverage for an increase of the organizational performance

The possible consequences of the operation deprived of savings, effectiveness and efficiency of public sector organizations, of the non-compliance with the law and therefore of the application of mismanagement have implications across the organisation and may result in the emergence of extremely severe conditions in economic terms.

Among these, we mention the following [10]:

- the improper use of available resources, with large negative effects on the achievement of objectives
- the unfolding without performance benchmarks of the internal processes that make up the specific field of activity
- the enhancing of social tensions due to insufficiently justified subjective decisions
- the disparagement of the process of obtaining the predetermined objectives.

The prevent of certain adverse conditions, on the plane shown is subject to achieving a qualitative SMA, which by definition involves quality solutions. In fact, SMA, as management reference link, emphasizes the coherence of the managerial team and the efficiency of the entire organization.

This, under a proper implementation, allows drawing a representation of the situation which exists at a certain moment within an organization and identify key actions to be taken to improve it.

The completion of the procedures of SMA, after completing the reporting stage, makes the management entity to provide the most valuable tools necessary to support and develop a performance-oriented organizational strategy.

The management counselling conducted by auditors may include from relatively easy suggestions and guidelines, drawn from the social balance sheet indicators - which may include reducing the wages, the increase of staff training activities, the development of the internal mobility - until more complex measures with socio-psychological or cultural background, etc.

5. Difficulties of the Romanian public management system of human resources identified by the system audit

Regarding the issue of the Romanian system of human resource management in the civil service, we have to do with a particular complexity, because there are many disparate pieces of legislation forming the legal regime applicable in the field. This indicates an insufficient regulation and a possible inconsistency in the integrated regulation for the human resource management in public administration.

The contractual staff of public services, including that of the public administration, is determined by the Labour Code [11], as well as its obligations and rights which are similar to those of civil servants, except in prohibitions and incompatibilities. This shows that the Statute of civil servants applies only to the approximately 100,000 civil servants, but not to the contractual staff or to the staff with a special status.

Then, the database on public service and civil servants managed by NACS, do not provide sufficient information on public officials, the problems being related primarily to:

- the lack of the appropriate software for managing and providing complex information in real time;
- the relatively low involvement of public authorities and institutions who are obliged to submit to the Agency information on public service and civil servants within the deadlines
- the reduced development of the integrated information system in public administration.

As for the *wage system*, the main lever of motivation, it is characterized by:

- the low salaries of civil servants and the lack of alternative motivation tools, which, along with a strict regime of incompatibilities and restrictions on civil servants, reduces the attractiveness of civil service and reduces the professional involvement of young specialists.

- the lack of transparency on the wages of some categories of civil servants through misuse of the system of incentives. The existence of various forms of additional wage income for some public authorities and institutions causes discriminations between civil servants from various public authorities and institutions.

- the lack of compensations, taking into account the additional costs for a decent standard of living in big cities or in disadvantaged cities, compared to other localities (“residence allowance”).

The continuous training of civil servants is, in turn, a weak component. We mention that there are difficulties as regards the absence of a structured network of training providers in public administration, the insufficient funding of continuing education in this area and the lack of a direct relationship between the training of civil servants and the development of their career.

Obviously, to all this adds the lack of an adequate external system of auditing the quality of HR processes.

6. Reformulation of specific objectives and courses of action on the modernization of some components of HRM in public administration

The achievement of objectives specific to the public service, including those relating to the continuous training of civil servants, creates the conditions to achieve the overall goal - the modernization of central and local government by increasing the administrative capacity based on the component of human resources.

In our opinion, achieving a modern and efficient civil service is based on human resource skills together, that's why the completing to be made here follow the general line of the change approach within the public system of HR, namely, the action on critical factors.

As for specific objectives for the public function, they can not be out of touch with the scientific management of human resources, which, in fact, we consider to be an essential support of implementing all the measures of modernization [12].

If short-term objectives aim to develop the change management, the long-term ones aim to stabilize and strengthen the civil service system.

The most important objectives and ways of achieving them can be formulated as follows:

- *Development and implementation of a recruitment, evaluation and promotion system, based on merit and competence in the public function.*

The improvement of the recruitment, evaluation and promotion system will be based on:

- the analysis of the post as required by staff needs
- the efficient monitoring and management of competitions organized for public service jobs, so as to commissions of competition and settlement of disputes operate on the principle of neutrality, impartiality, gender equality and transparency, as the current activity of NACS,
- the standardizing of procedures and ensuring a unified practice through:
 - the development of practical guidelines that provide tools and techniques needed for recruitment, evaluation and promotion of civil servants
 - centralizing and publishing vacant public positions on the NACS website to increase the transparency of the recruitment process and ensuring equal opportunities
 - reducing the number of contests by promoting inter-ministries and inter-district competitions for occupying the vacancies in the public function
 - establish the general skills required for the performance of public functions.

We emphasize that special attention should be paid to career development in the public function, as well as to the manner in which civil servants could be motivated.

- *Development of the institutional capacity of NACS to develop, implement, monitor and coordinate the implementation of HR policies in the civil service system.*

To achieve this objective, on short term, we need an objective assessment of the activity and of the staff needs, so as to determine the best solutions to improve the efficiency of NACS.

To increase the quality of services provided by NACS, based on the solutions identified, measures such as those given below are essential:

- improving the organizational structure of NACS,
- supplementing the realistic number of posts in accordance with the complexity and workload, taking into account the absorption ability of staff;
- establishing professional profiles for new positions and the recruitment of civil servants according to the requirements.
- *HRM modernization through:*
 - a better elaboration of civil service legal framework;
 - promote transparency in the civil service system;
 - developing the human resources capacity planning
 - developing integrated information system;
 - implementation of the audit process of public entities in the HR, as a function with mandatory and strategic role to determine the increase in public performances.

7. Conclusion

It is easy to infer that lenders and financiers, government and administrations, the European Union, the International Monetary Fund, the World Bank etc., remain always interested in how managerial decisions generate performance for public organizations.

It is also important to obtain assurances on the quality of management and the use of public budgetary resources.

This paper, dedicated to SMA, reveals appreciably, we think, the role, importance and relevance of such audit in the process of improving the efficiency of public organizations and of their management.

The essential conclusion is that information concerning MRU audited in the most professional way is certainly a powerful management tool.

But what remains fundamental in this respect is that the manager be receptive to the findings of SMA reports and to apply auditors' suggestions.

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IMPORTANCE OF TECHNOLOGY, INNOVATION AND R&D IN INCREASING THE COMPETITIVE CAPACITY OF SMES IN TURKEY

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Small and Medium Enterprises (SMEs) have significant contributions to economic growth due to their flexible structures which help them develop technology and adapt to the rapidly changing market conditions in the condensing competition atmosphere as a result of globalization. Within this framework, SMEs have a significant role in increasing employment, investments, and export all around the world as well as in Turkey.

It is necessary to develop new technologies and produce by using new methods in order to have and maintain a superior position in competition. SMEs started to become committed to research and development (R&D) activities especially in recent years. However, one of the most significant problems SMEs is the lack of financing in developing new technologies and R&D activities. A number of organizations in Turkey support SMEs in order to form highly innovative SMEs which are strong in international markets. Furthermore, with the incentives and policies executed, competitive capacities of SMEs are supported. The objectives of this study are to present the importance of technological innovations and R&D for SMEs in Turkey as essential factors of compatibility. Within this framework, this study deals with the notion and definition of SMEs in Turkey and in the European Union, place and importance of SMEs in the economy, and the problems that SMEs experience. Furthermore, after presenting the importance of technology, innovation, and R&D for compatibility of SMEs, the problems regarding R&D activities, the supports and policies for increasing the competition capacity in Turkey and finally the supports supplied in the European Union are evaluated.

Key Words: Small and Medium Enterprises (SME), Technology, Innovation, R&D, Competition, Turkey.

1. INTRODUCTION

Small and Medium Scale Enterprises (SMEs) are one of the leading and dynamic elements of the economy in Turkey, as is the case throughout the world, and they have an important position in terms of socio-economic development. Moreover, they undertake important functions as a tool for the protection of competition, development of entrepreneurship, creation of jobs and regional development. They also support and complement the large industrial organizations.

Under the rapidly developing and changing market conditions, SMEs are very important in terms of the value they contribute to the economy and they play a key role in the enhancement of competitive powers of the countries as well as their development. SMEs have a structure that may adapt easily to innovations as well. However, the R&D activities that they should undertake in order to benefit from the technological innovation remain inadequate due to the problem of low financing. However, the competition rising with the globalization makes technological innovation necessary for the enterprises. Moreover, in developing countries like Turkey, the presence of large scale enterprises with high competitive power also depends on the creation of a structure of dynamic and stable small and medium scale enterprises. Within this framework, many organizations support SMEs in order to create innovative SMEs with high competitive power in the international market.

The purpose of this study is to explain the place of SMEs in the economy and the importance of technology, innovation and R&D in terms of competitiveness of SMEs, and to evaluate the problems of SMEs regarding R&D activities as well as the support and policies implemented in Turkey to enhance competitive power.

2. Description Of SME In Turkey and In The EU

The size implied by the concept of SME can differ between countries. Countries have created their own descriptions considering their own economic status, level of development, operational and industrial structures and needs. While defining SME, one or more of the criteria such as the number of employees, balance sheet size and turnover can be used. In general, SMEs are defined as independent structures with employees below a certain number [1].

In Turkey, there was no common SME definition expressing Small and Medium Enterprises until recently. KOSGEB, Halk Bankası, Eximbank, Undersecretariat of Treasury, Undersecretariat of Foreign Trade all acted on different definitions of SME and this caused differences in practice and also caused the emergence of different statistical data. The problems caused by the lack of a standard definition have been overcome by the "Regulations Regarding Definition, Qualifications and Classification of Small and Medium Scale Enterprises" published in the Official Gazette dated 18th November 2005 and numbered 25997 and enforced as of 18th May 2006. With this legislation, an official definition based on the number of employees, balance sheet and sale sizes has been applicable in classifying SMEs, just like the case in the EU [2]. However, as the SMEs in Turkey have a smaller size than the average in the EU in terms of capital and turnover sizes, the values were set lower than the values in the EU for such criteria.

According to this legislation, the enterprises with number of employees below 250 and with annual net sale proceeds or financial balance sheet below 25 million TL are defined as SME. In Turkey, the enterprises employing less than 10 employees and with net annual sale proceeds or financial balance sheet below 1 million TL are considered as micro enterprises; the enterprises employing less than 50

employees and with net annual sale proceeds or financial balance sheet below 5 million TL are considered as small scale enterprises, and the enterprises employing less than 250 employees and with net annual sale proceeds or financial balance sheet below 25 million TL are considered as medium scale enterprises [3]. (Table 2.1)

Table 2.1. Definition Of SME in Turkey And In The EU

	Definition Criteria	Micro Enterprise	Small Scale Enterprise	Medium Scale Enterprise
EU	Number of Employees	0–9	10–49	50–249
	Net Annual Sale Proceeds	≤ EURO 2 Million	≤ EURO 10 Million	≤ EURO 50 Million
	Annual Financial Balance Sheet	≤ EURO 2 Million	≤ EURO 10 Million	≤ EURO 43 Million
TURKEY	Number of Employees	0–9	10–49	50–249
	Net Annual Sale Proceeds	≤ TL 1 Million	≤ TL 5 Million	≤ EURO 25 Million
	Annual Financial Balance Sheet	≤ TL 1 Million	≤ TL 5 Million	≤ EURO 25 Million

Source: KOSGEB and European Commission.

According to the definition by the EU, the enterprises with less than 250 employees are accepted as SME. According to the European Commission Report dated 8th May 2003 within this scope, with regards to SMEs: enterprises with less than 10 employees and with annual turnover up to Euro 2 million or with balance sheet up to Euro 2 million are considered as micro enterprises; enterprises with less than 50 employees and with annual turnover up to Euro 10 million or with balance sheet up to Euro 10 million are considered as small scale enterprises; enterprises with less than 250 employees and with annual turnover up to Euro 50 million or with balance sheet up to Euro 43 million, on the other hand, are considered as medium scale enterprises [4].

3. The Importance Of SMEs In Turkish Economy

Before 1970's, large scale enterprises were considered as more competitive compared to small scale enterprises due to their ability to produce at low costs by benefiting from scale economy, to use advanced techniques and their strong financial standing. Therefore, the governments implemented policies in favor of the creation of large scale enterprises and had a positive attitude for the mergers and acquisitions of the enterprises. However, especially during the post-1979's era, it was seen that these policies did not create the expected positive effect on the growth of the countries and also that large scale enterprises had their disadvantages as well, such as not being flexible, not being able to respond quickly to the changing demands and decreasing competitiveness in the markets; and criticism of such policies emerged [5].

Starting from early 1970's, SMEs have started to assume a considerable function in terms of economic and social development of the countries due to their advantages such as their ability to rapidly adapt to the changing market conditions, their flexible production structure, their role in regional development, decline of unemployment and creation of new jobs [1].

In Turkey, there are 3.222.133 enterprises with less than 250 employees according to 2009 data. SMEs constitute 99.9% of all the enterprises, including the service sector, and create 78% of total employment. The share of SME investments in total investments reach 50%. The share of SMEs in total export is 59% and this sector had a share in total banks below 25% [2].

Table 3.1 The Importance Of SMEs In Economies Of Some Countries (2010)

Country	Share in all enterprises (%)	Share in total employment (%)	Share in added value (%)
USA	98,9	57,9	50
India	97,3	66,9	-
Japan	98,2	66	49,3
South Korea	99,9	87,7	49,2
Brazil	99,9	67	-
Malaysia	99,9	65,2	31,2
EU 27	99,8	67,4	57,7
England	99,6	54,1	51
Germany	99,5	60,4	53,6
Italy	99,9	81,1	71,3
Turkey	99,9	78	55

Source: KOSGEB

Table 3.1 lists the place and importance of SMEs in economy respectively by countries. It is found that SMEs make up nearly all of the total enterprises in all of the countries, and this is a proof that SMEs have an important place not only in Turkey but also in the economies of other countries. If the share of SMEs in total employment is examined, it is found that this rate is changing from 50% to 70%; however, when examination is based on respective countries, it is found that SMEs contribute strongly to employment especially in South Korea and Italy. With regards to the added value created by SMEs in economy, Italy is listed as the first country among the listed countries. While the average of 27 countries member to the EU is 57.7%, the share of SMEs in Turkey in total added value is 55%.

In Turkey, SMEs constitute the most dynamic part of the economy and they engage in activities in nearly all aspects of the service and manufacturing sectors. The sectors that they are mostly involved in are textile, garments, metal processing, machinery, food, plastic and rubber products and furniture. The cities with intense SME presence are Istanbul, Izmir, Bursa, Denizli, Gaziantep, Kayseri and Eskişehir [6]. Micro scale enterprises constitute 95.62% of the total and 82% of the SMEs engage in activities in services and trading sector, while 13% engage in activities in manufacture and industrial sector. Micro scale enterprises that mostly cover enterprises engaging in labor intensive activities are usually family enterprises in nature. (Figure 3.1)

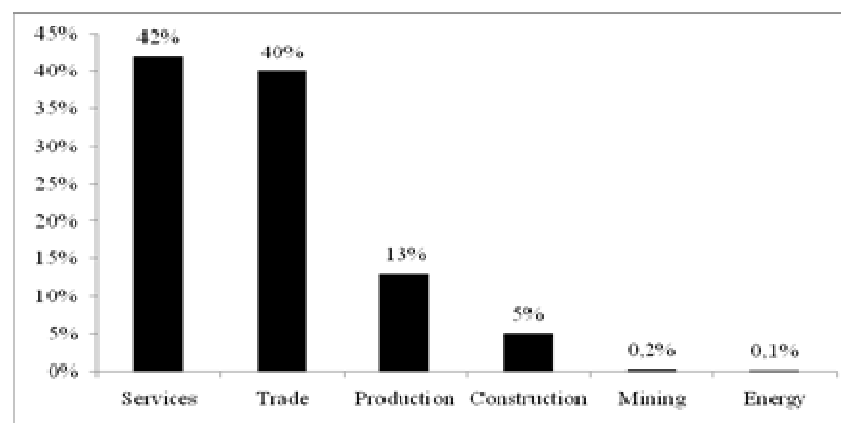


Figure 3.1 Distribution Of SMEs Based On Sectors (2009-TUIK)

Service sector has an important share in total employment and adds value among sector groups; however, its share in total export remains at 3%. Trade sector, with the highest total added value and export shares by SMEs, is listed as the last among all sectors in terms of added value per employee [2]. Turkey needs a fast transition from products with low added value to high added value. For this purpose, the efforts in recent years put in place for innovations should be accelerated and made efficient in order to ensure continuous export.

These data are an indication of how important SMEs are for economy. The benefits contributed by SMEs to the economy of a country are not limited to just the foregoing. We can list the contributions of SMEs to the economy as follows in general [7]: Ensuring an increase in economic and social welfare, decreasing the difference in development among regions, creating jobs, encouraging entrepreneurship, swift adaptation to changes, enabling product diversity, having a structure that is less affected by the fluctuations in economy, disposition to technological innovations, and supporting and complementing large scale industrial enterprises.

4. Importance Of Technology, Innovation And R&D In Terms Of Competitiveness Of SMEs

Innovation implies the commercialization, application or transformation of a new idea into a product, service or process. It also serves for replacement of an existing products, systems and resources through increasing profit by increasing sales or reducing costs [8]. Technological innovation, on the other hand, means the use of information for the purpose of inventing and applying new technologies, and it is one of the most essential factors in competition.

With the use and importance of technology ascending as a result of globalization, technology becomes more emphasized in competition. The enterprises that fail to attain the necessary technological development turn out to be unsuccessful in the race for competition. Developing new methods of production and service based on R&D and innovation, designing new and functional products and adapting to the new technologies is literally an obligation for the SMEs at present [9].

Moreover, the fact that small scale enterprises yield more outcomes per unit of expense for innovation makes SMEs even more important. For example, it is also seen that SMEs can produce innovation 2,5 times more as compared to the large scale enterprises per employee [10]. Therefore, it is thought that innovative SMEs with high potential for growth play a key role in the enhancement of productivity and protection of competitive power [11]. In Turkey, on the other hand, it is observed that less SMEs have these qualifications; however, an attempt is made to take these facts into consideration while recreating SME policies during recent years.

At present, different institutions engage in indexing efforts in order to determine the regional competitive powers on a global scale and to create an interregional listing. For example, the World Economic Forum – WEF publishes Global Competitiveness Index, GCI issued every year on a country level. Considering regional competitiveness as a whole of the policies and factors with an impact on the productivity level of the country, WEF uses 12 different basic variables (Institutions, infrastructure, macroeconomic environment, health and primary education, higher education and training, goods market efficiency, labor market efficiency, financial market development, technological readiness, market size, business sophistication, innovation) that are considered to have a direct impact on the competitiveness and productivity of the countries in index efforts [12].

In the global competitiveness index, competitiveness is defined as a set of institutions, policies and factors determining the efficiency level of a country. Within this framework, productivity, being an indicator of competitiveness, seriously impacts both the level of income from investments and also sustainability of high level of income for the country as well as the potential for economic growth [13].

Table 4.1 Rankings Of Countries In Selected Fields Influencing Competitiveness

Country	Global Competitiveness Index	Technology Availability	Innovation Capacity	Company R&D Spending
Switzerland	1	5	4	2
USA	4	7	6	6
Germany	5	17	1	4
Japan	6	18	2	3
United Kingdom	12	15	15	14
France	15	16	8	13
S.Korea	22	23	18	12
Malaysia	26	35	25	16
China	27	94	21	22
Italy	48	73	27	39
India	51	41	33	37
Brazil	58	50	29	29
Turkey	61	48	55	62
Greece	83	59	105	126

Source: WEF, The Global Competitiveness Report 2010–2011

Table 4.1 shows the standing of Turkey and some other countries in the listing of global competitiveness for years 2010–2011. Accordingly, it is seen that developed OECD countries mostly fill in the top places, followed by the rising technologically competitive countries. Moreover, it is understood that vanguard economies in terms of innovation, with high R&D expenditures, also have high competitive power. Turkey, on the other hand, remains in lower places in terms of competitive power as compared to the countries that it is trying to compete with. Turkey is placed on 61st position in global competitive power index. Moreover, Turkey is also behind many developed and developing countries in terms of innovation and R&D expenditures. In contrast, the takeoff of China, South Korea and Malaysia in their competitive powers through their expenditures in R&D is noteworthy.

The studies in Turkey reveal that enterprise managers think that "innovation activities are suitable for large scale enterprises, while it can be too costly for SMEs" about innovation activities in SMEs. However, the most innovative and different products and services in USA and EU come from SMEs. Innovative activities, in turn, yield competitive power, originality, differentiation and growth to SMEs. Advanced manufacture technologies ensure efficiency, quality and decline in cost, which are the requirements of global markets [14].

5. Problems Of SMEs In Turkey Regarding Technological Innovation and R&D Activities

In Turkey, SMEs manufacture for domestic market only using traditional methods; however, they have to compete with foreign firms in local market. Turkish SME's are behind foreign firms in terms of technology as the products are with low added value. As the cooperation between universities and industry is weak and technical equipment is inadequate, difficulties are faced in development of project funds and research labs. In addition, mostly large firms benefit from tax incentives and financing difficulties are faced in efforts for R&D and new inventions [15]. Especially during the times of crisis, financing resources are considerably reduced and SMEs have to seek bank loans with high interest rates. Decline of receivables in times of declined sales causes operational capital to decline as well in many countries. The fact that SMEs are unable to provide short-term financing is proven by the increasing rates of bankruptcy [16].

R&D activities are long-term and risky activities with high costs. Thus, in environments with no political and economic stability, the enterprises hesitate in engaging in such activities. In fact, the flexible structure of SMEs can make them much more advantageous for innovation activities as compared to large scale companies [17]. However, the real issue is that R&D culture is not developed enough in Turkey despite the incentives and supports provided in Turkey. Within this scope, a substantial part of R&D activities in Turkey are limited to large scale enterprises, with R&D activities of SMEs unable to attain the desired level. However, it should be noted that R&D is the only way out and sustainable, competitive technologies providing high added value may not be actualized without R&D [18].

Public R&D supports should actually be used if the private sector increases R&D expenditures. In order for the provided R&D support to be efficient, the potentially increasing innovation activities should eventually translate into increasing innovation outcomes. In order to put the purpose of innovation into action, the share of expenditures in R&D should increase in GDP [19]. However, while the rate of R&D expenditures to GDP was 0.84% in 2010, such rate was 1.90% in the EU, and 2.33% in OECD countries as of 2008 for Turkey. (Figure 5.1)

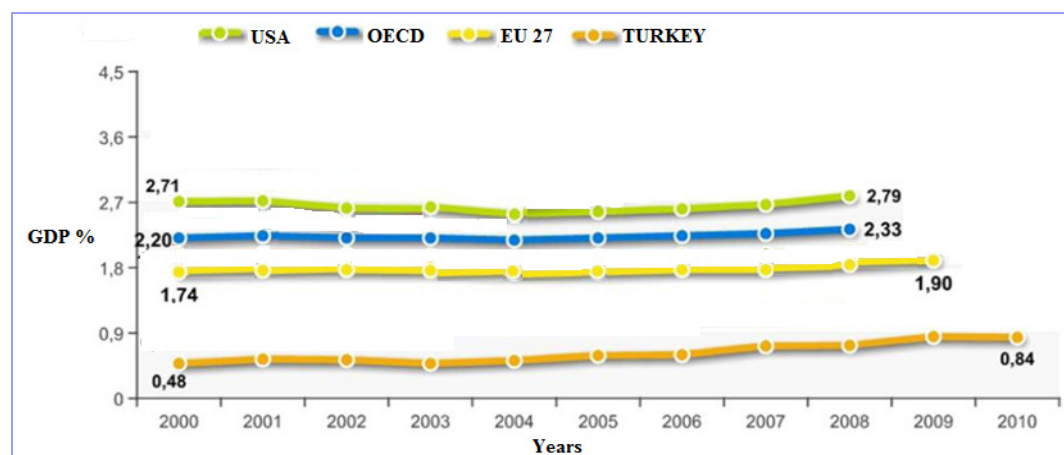


Figure 5.1. R&D Expenditure / GDP Ratio (2010-TUBITAK)

Among the top 10 economies of the world, the rate of R&D expenditures to GDP targeted by USA, Germany and France for year 2020 is 3%, by Japan and Finland is 4% and by China is 2.5%. This rate is targeted as 3% for year 2020 by the European Union. Within this scope, such rate is estimated as 1.82% for Turkey; however, it is also considered that the target rate of R&D expenditures to GDP can be set as 3% as is the case for many other countries [20].

Table 5.1 The Rates Of Enterprises Engaging In Technological Innovations By Sector And Scale (2006–2008)

Sector	Rate of enterprises engaging in technological innovations (%)	Rate of enterprises with financial support for technological innovation (%)
Mining	22.7	21.1
Manufacture	34.7	30.1
Energy	17.8	23.1
Wholesale	24.5	12.2
Services	23.2	12.3
Scale		
Small (10–49 employees)	27.6	23.7
Medium (50–249 employees)	38.4	27.9
Large (250-employees)	48.6	23.7

Source: KOSGEB

In Turkey, SMEs are inadequate in terms of innovativeness culture and technology management skills. The sector with the highest incidence technological activities is manufacture sector, with 34.7%. On the other hand, 86.8% of the SMEs in manufacture industry engage in activities in sectors with low and medium-low technologies. During the 3 year period in 2006–2008, 48.6% of the large scale enterprises engaged in technological innovation activities, which percentage remained at 27.8% for small scale enterprises. The percentage of those receiving financial support for technological innovation, on the other hand, is at a level of 23–27%, remaining unvaried regardless of the enterprise size. Due to all these reasons, the SMEs in Turkey have difficulty in employing staff qualified for R&D and innovation, and they are inadequate in terms of following up technological innovations and accessing technological information [2].

6. Policies And Incentives To Increase Competitiveness Of SMEs In Turkey

Upon globalisation, the importance of technological advancements are gradually increasing in today's business environment. In every country, different support and incentive models are designed, developed and implemented with a concentration to improve R&D and innovative activities. In this scope; it is targeted to increase the number of joint undertakings based on university-industry cooperation, to popularise R&D activities among SMEs, to commercialise R&D outcomes, consequently to provide employment for information society by virtue of gradually increasing R&D capacities, to improve nationwide R&D capacities to enhance R&D expenses/GDP ratio, to increase number of R&D personnel as well as national and international issues and patents [21]. For this reason, corporations and institutions such as KOSGEB (Small and Medium Industry Development Organisation) Technology Development Centres, TUBITAK (Turkish Scientific and Technical Researches Institution) (TEYDEB), Technology Development Foundation of Turkey, Ministry of Industry and Commerce and Undersecretariat of Foreign Trade provide services and give supports to SMEs in order to facilitate, support and help the companies that seek to conduct R&D activities in Turkey.

Founded in 1990, KOSGEB implements programmes such as SME Project and support Programme, R&D Innovation and Industrial Practices Support Programme, Entrepreneurship Support Programme and supports SMEs to enhance their competitive power. Established in 1992 for the first time, KOSGEB Technology Development Centers (TEKMER) reached to 28 in 2010. These centers were founded to support small-size enterprises that rely on technological advancements, to allow them design new production methods for new products, to support R&D, innovation and industrial practices' activities, make contributions to university and industry cooperation. Under cooperation protocols between Technology Development Centers and universities, 1800 R&D projects have been supported since 1992. 174 projects have been completed successfully, 853 commercialised and 312 patent specifications have been obtained [2].

One of the most significant tools for giving SMEs technological support is the Technology Development Areas founded in 2001. Such areas enable and safeguard an institutionalised structure between universities and industry in order to generate and commercialise technology, and their number has reached to 45 by 2012. These areas intend to generate technological data; commercialise any data generated; enhance product quality and standard for products and production methods; design and develop innovations to improve productivity and reduce production costs; harmonise small and medium sized enterprises with innovative and advanced technologies; offer a business opportunity for researchers; accelerate foreign capital input in the country to invest in advanced technologies and increase competitive power of industry [22].

Intended purpose of the supports provided by Turkish Foundation for Development of Technology (TTGV) is to allow enterprises to gain maximum favour from the potentiality of technology development, hence they grow to become a technology leader business in the global market by virtue of the technologies they design and develop. 2187 technology development projects filed applications to TTGV as from 1992 until 2009. 891 of these applications were supported, total support was 298,5 million Dollars. 32 out of the supported projects are Strategic Focal Point Projects and they provided 3,4 million Dollars. With such supports, a contribution of R&D volume above 606 million Dollars was made to the private industry by the end of 2009 [23]

‘SME R&D Initial Support Programme’ conducted by TUBITAK through Technology and Innovation Funding Programmes Directorate (TEYDEB) enables SMEs to produce a new product, develop and improve an existing one, enhance product quality or standard or to develop new techniques or production methods to reduce costs. With the help of the programme, it is targeted to improve technological and innovation capacities of SMEs. In addition to this, TEYDEB has supports such as Technology Transfer Support Programme for SMEs and Industry R&D Support Programme [24].

It is important that the industry is able to meet its needs and requirements based on R&D, and solve their R&D and technology oriented needs through the cooperation with universities. In this context, Industrial Thesis (San-Tez) Programme that is regulated by ‘Ministry of Industry and Commerce Regulation on Supporting Thesis Projects’ came into force in 2007 which functions as a support mechanism to ensure SMEs that represent a substantial part of the industry attain an R&D and technology culture and have the opportunity of solving their problems in cooperation with the universities.

Following the evaluations in this context, 1180 applications were filed in total in 2006-2011 and 401 of them were found eligible for support. An agreement was executed for 350 of the projects that were resolved to be supported by 2011 and pre-contractual process still continues for other projects. 75% of the periodical payments for contractual projects shall be made by ministry, whereas 25% shall be made by the company that is the project partner [25].

The primary means of encouraging R&D is a financial support and in many countries it is actively used to support the R&D activities and innovation. The outmost basic purpose of these incentives is to decrease the actual cost of R&D and thereby increase the R&D activities of the companies [26]. The tax incentives decrease the cost of R&D as well and encourage the companies to undertake more innovative activities [27]. However the tax incentives need to be developed in certain ways. For example, the direction towards advanced technology needs to be made attractive; the usage of old technology needs to be diminished or prohibited. Furthermore, the government needs to facilitate the Access to foreign financial resources, such as banks and foreign investors, for the general investment environment [28].

Within this framework, in The Ninth Development Plan 2007-2013, it has been determined that one of the development axis is to increase the competitive power of a country. In order to realize this target, the plan focuses on increasing the competitiveness of the SMEs, adjusting them to EU competitive environment, and thereby increasing the R&D expenditures and focus on the innovation. Encouraging entrepreneurship, aiming at technology development, and implementing the innovative ideas in real life and therefore broaden the risk capital and similar means. Furthermore, it is going to be encouraged that the private sector would establish research institutes and/or centers in determined priority areas. The workforce with respect to research will be developed in terms of qualifications and cardinality and employment of researchers in the private sector is going to be encouraged. Furthermore, with the purpose of recovering the working environment for many SMEs, new arrangements are going to be effectuated and a facilitating taxation will be arranged, which would encourage working and undertaking business in this area, and decreasing the pressure, due to taxes and premiums, which create a burden for the companies and decrease their competitive power, and that the infrastructural opportunities would be enhanced. In this respect, increasing the competitive power is aimed at by developing the R&D activities [29].

On taking a look at the quality, variety and fiscal size of grant-in-aids provided to SMEs in Turkey in proportion to the added value, employment opportunities to SMEs, taxes payable etc., it remains insufficient compared to the supports and services provided in EU states. From this point of view, works have already taken place to coordinate the practices in EU and in Turkey so that the Turkish SMEs are able to compete against enterprises of other member states. For this, accession and harmonisation of Turkey with the important enterprising incentives applied in EU countries has become more important to solve financing problems of the SMEs in Turkey.

The 7th Framework Program and Competitive and Innovation Framework Program within the EU scope are the primary programs, which are concerning the Small and mid scale companies in Turkey. The 7th Framework Program is aiming at gathering all EU enterprises of EU related to research under a common ceiling. It has been established to advance the successes, achieved during the previous Framework Program, which was aiming at building the European Research Area, and established with the purpose to create a information based economy and community in Europe. The 7th Framework Program is composed of Special Cooperation Program, Ideas Special Program, Special Program for Supporting the Individual and Capacities Special Program. The budget of the program, which will be

implemented between 2007-2013, is above 50 billion Euro. It is explicit that, the Small and mid scale companies, who would participate in this program, should possess systematic R&D activities and having overcome the financial problems [30].

The Competitiveness and Innovation Framework Program (CIP) is forecasting a support of 3,6 billion €, to be distributed to about 350.000 Small and mid scale companies, for all investment they would make for innovation and growth. Within the scope of the program, the effective usage of energy, renewable energy sources, and more innovative utilization and development of the information and communication technologies are listed within issues of priority.

The coordination of this program in Turkey is effectuated by the Ministry of Science, Industry and Trade. The sub-programs, which will be implemented within the scope of the program have been specified as “Entrepreneurship and Innovation Program (EIP)”, “ICT Policy Support Program (ICT PSP)” and “Intelligent Energy Europe Program (IEE)”. Furthermore, in order for the entrepreneurship and development of the companies to be supported, within the scope of Competitiveness and Innovation Framework Program, it is aimed at building a new network, on which the Companies have been United on the basis of the services, which have been undertaken by the European Information Centers and Innovation Transfer Centers and thereby offering the information and support activities more effectively [31].

7. CONCLUSION

Small and medium scale enterprises have an important role in the development of the society from both economic and social perspectives; and they also have the function of complementing large scale enterprises. Accordingly, all countries, especially including developed countries, develop and implement policies aimed at SMEs.

SMEs are flexible and easily adaptable to innovations by nature; they are open to innovation and developments. However, they have shortcomings in terms of developing new products and being creative. Therefore, policies to encourage SMEs should be pursued if the aim is to increase investments and exports, to increase employment rate and reduce the unemployment rate and to have an economy that is strong against economic crisis in Turkey.

Among the supports for SMEs, raising the technology levels and improving their financial means are the most important two. On the other hand, enhancing the efficiency, competitive power and share in added value of SMEs and guiding them to export and R&D should be the first and foremost goal of Turkey. There is link between high added value and innovation efforts and R&D. In SMEs, products with high added value should be produced in order to increase the added value. This can be possible through systematical engagement into R&D and innovation activities.

In order for the SMEs that engage in global market activities to attain the level of the developed countries, they should have advanced technologies enhancing their competitive powers and provide technologies increasing efficiency. For this purpose, it must be ensured that the encouraging and supporting arrangements and strategies included in SME Strategy and Action Plan, which is issued in Turkey taking into consideration the legislation and practices about SME in the EU as well, are actually implemented in the most appropriate manner.

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CAPITAL FLOWS TO TURKEY: MULTIVARIATE VAR APPROACH

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Abstract

The gradual raising of capital flows in developing countries has made developing countries over the last 20 years more interesting to investigate. Turkey is a typical example of a developing country that achieved tremendous growth rate in the foreign capital attraction, especially throughout the last decade. I aim to investigate linkage between foreign direct investment (FDI), foreign portfolio investment (FPI) and foreign bank entry (FBP) in Turkey using quarterly data from 1994Q1 to 2009Q4 in this paper. In order to obtain information about causal relationship among the time series variables, VAR based Block Exogeneity Wald test is performed. The finding from such test indicates that; changes in FBP significantly lead to changes in FDI; there is also unilateral causality which runs from FDI to FPI. I also find out using the Variance Decomposition technique that FDI and FPI have little explanatory power for the evolution of FBP in Turkey; the contribution of FBP to the variability of FDI is more than that of FPI; the contribution of FDI to FPI variability ranges between 0.217% and 9.070% throughout 12 quarter periods whilst the contribution of FBP to FPI variability ranges between 4.755% and 12.451%.

Keywords: Capital Flows; VAR; Granger Causality

JEL Classification: F23, C22, F21

1. INTRODUCTION

Capital flows to most of the developing countries have substantially jumped in last 2 decades, except current global crisis period. According to the Institute of International Finance (IIF), capital inflows to developing countries reached to peak point in 2007 with US\$ 1222 billion from approximately US\$ 200 billion in 2000 but declined to US\$ 780 billion in 2008⁹. In case of the composition of capital inflows, portfolio investment is dominant with 48% of total capital inflows in 2009 in developing countries excluding China. The share of direct inflows in total inflows is 34% while other inflows accounted for 18% of total inflows to developing countries. Apart from the portfolio theory¹⁰, this pattern in developing countries can be explained by the minimisation of government controls on the most of the sectors, macroeconomic stability, financial deregulation and the willingness of governments to attract foreign capital because of its necessity to fund domestic projects¹¹. The distribution of capital flows has also changed at the same period. Although the lion share of capital flows had been attracted by developed countries until the end of the 1990s, the share has declined dramatically the beginning of the 2000s. Thus, the portion of capital flows that developing countries attracted have significantly increased. These factors encourage researchers to investigate capital flows that go to developing countries. Turkey is a typical example of a developing country that achieving tremendous growth rate in the foreign capital attraction, especially over the past decade. This factor and the on-going negotiation between the EU and Turkey about the integration of Turkey into the EU have made Turkey a more interesting country to investigate and opened new debate on foreign investment in Turkey.

Turkey did not face the difficulty to adapt itself to liberalization process in the world at the beginning of the 1980s. The liberalisation process in Turkey started with the implementation of Economic Stabilisation program - which was supported by the IMF and World Bank – to minimize the intervention of Turkish government in monetary policy and finance system and to restructure Turkish economy on 24 January 1980. Other improvements in the 1980's are capital account liberalisation, reopening Istanbul stock exchange, the acknowledgment of Foreign Capital Decree. However, until the beginning of the 2000s, the capital flow could not be attracted as expected because of internal crises, ethnic problems, political and macroeconomic instability, more importantly, bureaucratic barriers for foreign projects.

Over the period 1994-1999, the accumulated net capital flow to Turkey is US\$ 15 billion. The accumulated net FDI and FPI in this time period are \$US 3 and \$US -0.4 billion, respectively. However achieving macroeconomic and political stability as a result of sound fiscal and monetary policies have attracted more and more foreign investors to Turkey since the beginning of the 2000s. From 2000 to 2005, the accumulated net capital flow that Turkey attracted is US\$ 57 billion, which is more than three-fold relative to previous period. At the same period, FDI, FPI and FBP increased to approximately US\$ 16, \$US 15 and \$US 15 billion, respectively, this is mainly because of new FDI law, restructuring of the banking system, and the acceleration of privatisation. Even in the current crisis period -2006 to 2010-, the accumulated net capital flow in Turkey jumped approximately \$US 250 billion. Consistent with the pattern of capital flows in Turkey, FDI, FPI and FBP substantially increased at the period of 2006-2010, as shown in Table 1.

My findings from VAR based Block Exogeneity Wald test show that one way causality from FBP to FDI is also detected at 5% level. Moreover, changes in direct investments of multinational enterprises significantly lead to changes in FPI in Turkey. However, the null hypothesis that FPI does not granger cause FBP cannot be rejected. This situation is not different in the reverse causality. I also find that FBP appears most exogenous within the foreign investment variables; FBP appears to have higher influence than FPI on FDI in Turkey; the contribution of FDI to FPI variability ranges between 0.217% and 9.070% throughout 12 quarter periods whilst the contribution of FBP to FPI variability ranges between 4.755% and 12.451%.

⁹ The database of IIF involves around 50 low, middle and high income developing countries.

¹⁰ According to the portfolio theory, an investor prefers to invest in a foreign market where rate of return is more relative to that in home market (see Cuddington [1]).

¹¹ As well known, short and long term capital flows to a host country are one of the important ways to finance public deficit and current account.

Table 1. Capital Flows in Turkey (Million US\$)

Period	FPI	FDI	FBP	Capital Flow
1994-1999	-468	3208	6972	15365
2000-2005	15146	16130	15438	57467
2006-2010	20313	70831	75317	191549

Source: the Central Bank of the Republic of Turkey and The Banks Association of Turkey

2. LITERATURE REVIEW

Capital flows to most of the developing countries have substantially jumped over the last 20 years, except current global crisis period. This trend encourages researchers to investigate the factors that motivate investors to invest abroad and the impact of foreign investment on the development and the performance of emerging markets. Therefore, rising capital flows in the world have encouraged researchers to investigate this field either empirically or theoretically. The impact and determinant of capital flows, specifically FDI and FPI, have taken considerable attention by researchers.

As a result of deregulation, financial integration and globalisation, the impact of capital flows on a host market has been investigated, more and more. Rising capital flows to developing countries are likely to accelerate economic growth rates, this, however, may also trigger economic or financial crisis as a result of capital flow reversal. While Clarke [2], Claessens et al.¹² [3], Grabel¹³ [4] underlined the importance of capital flows on the volatility of host countries financial markets. Liquidity and currency risks of host country can be affected dramatically as a result of instant capital outflow. The result of capital outflows can be more tragic if banking system is not developed and lacks a sufficient regulatory framework. Turkey in 1994 and 2001, Mexico in 1994, Asia in 1997, and Argentina in 2001 can be good example for this situation. In contrast, Tesar and Warner [5] and Bakaert¹⁴ [6] conclude that rising capital flows as a result of financial liberalisation does not trigger volatility in the finance markets.

In case of the impact of FPI on the host markets, there is trade-off between its benefits and costs. This is because while some authors underline the importance of FPI on economic and financial stability, others blame FPI as a main reason behind the volatility in finance sectors in the world¹⁵. Nevertheless, authors, who analyses the pattern of FDI, mostly underline the stability factor of FDI on a host country's economy rather than its costs. For instance, Lipsey [7-8]¹⁶, Albuquerque¹⁷ [9] and Wei [10] examine the stability effect of FDI and FPI on host countries' economies and find that FDI is less volatile than FPI¹⁸. More recently research is done by Levchenko and Mauro [11] to analysis the behaviour of types of capital flows. Their finding is similar to the finding of Lipsey [7-8], Albuquerque [9] and Wei [10]. Regarding foreign bank entry, the results of recent empirical and theoretical studies is less complex about the effect of FBP on financial stability because the majority of researchers underlined the importance of FBP on credit availability and financial stability (see, [12]). In line with such findings, Altinkemer [13] and Yeldan [14] perform empirical model to identify the impact of capital flows on Turkish banking sector. They clearly conclude that capital inflows to Turkey increase credit availability in the market and provide extra financial source to fund additional investment projects.

To benefit the direct or indirect advantages of capital flows, governments, initially in developed countries and then in developing countries, have tried to implement some innovative ways to accelerate foreign investment to their countries. This wave has encouraged researchers to investigate the determinant of capital flows. In general, the factors that affect capital flows can be divided into two parts which are push and pull factors. The factors have been deeply analysed in the literature. The study of Chuhan et al.¹⁹ [15]; Claessens et al. [16]; Fernandez-Arias [17]; Agenor [18]; Mody et al. [19] and Ferrucci et al. [20] determined the factors that affect the destination of capital flows in the context of two factors which are the pull and push factors.

Pull factors refer to global motivation factors of capital flow to emerging markets. Such factors are also called "country specific factors" reflect risk and domestic opportunities in general [21]. Bekaert [22] examines the relationship between investment barriers and market integration in nineteen countries and also investigates whether the expected return are related to the measure of openness. His finding indicates that opportunities and risks in the host markets are important factors for attracting foreign investment.

¹² They use the data of five developing and developed countries.

¹³ The primary aim of the study of is to examine the hypothesis that financial liberalisation tend to volatile stock markets in six developing economies which are Argentina, Chile , Colombia, Korea, Philippines and Venezuela.

¹⁴ [5] investigate the effect of U.S. equity flows to 64 emerging economies using annually data from 1978 to 1991 whereas [6] uses the data of nineteen emerging economies between 1985 and 1992.

¹⁵ 1994 Mexican and 1997 Asian crises can be good example for this situation.

¹⁶ [7] is purpose to analysis the pattern of the types of capital flows in US, Japan, Europa, Asia and Latin America from 1970 to 1996 while Lipsey (2001) only focuses on the volatility of the forms of capital flow in the three crises which are Latin America, Mexico in 1994 and East Asia in 1997.

¹⁷ He aims to model the forms of capital flow under the assumptions of imperfect enforcement of financial contracts. His model is based on the model is used by Thomas and Worral [23]. The data sample that used in this paper from 1975 to 1997.

¹⁸ However, [3] put forward that FDI is as volatile as other types of international investment.

¹⁹ They use the date of US capital flows in 9 Latin American and 9 Asian countries between January 1988 and September 1992.

The second is push factors reflecting external determinants. Many authors put forward that push factors economic growth, stock price, interest rates, and regulations related to the foreign investment are likely to be important factors affecting the capital flows originating in the capital abundant countries. Calvo et al. [24] point out that the pattern of foreign investment in U.S. can be explained by push factors such as the decrease in interest rates. Kim et al. [25] performed the VAR model to investigate the macroeconomic effects of capital account liberalisation in Korea. Their finding revealed that regulations on the capital account transactions are the main determinant of capital flows to Korea. The determinant of foreign portfolio investment in Turkey is examined by Çulha [26] between the periods of 1992 and 2005. His finding shows that rising US interest rate is associated with more and more foreign portfolio and short-term capital flows. Balkan et al. [27] purpose to examine the relationship between macroeconomic variables and short term capital flows in Turkey, using monthly data from 1992 to 2002. Their finding indicates that rising stock market prices is associated with higher short term capital flow to Turkey, whereas the ratio of public sector borrowing requirement to GNP does not have any significant impact on it.

Ruffin and Russek²⁰ [28]– tried to examine the hypothesis that US direct investment in developing countries is a perfect substitute for US portfolio investment and vice versa. Their finding puts forward that these two forms of capital flows are perfectly substitute in developing countries. Moreover, they concluded that there is no significant effect of multinational enterprises on the net capital flows. Contrary to the finding of Ruffin and Russek, Kant [29] finds that portfolio investment in developing markets is increased by 54 cent as a result of increasing one dollar in US direct investment. In other words, relationship between FDI and FPI is complementary. Feldstein and Horioka [30] reported that their most striking finding was that there is no relationship between two types of capital flows - FPI and FDI. This is because rising FDI by a dollar is associated with declining FPI by a dollar to restore capital market equilibrium in a domestic market [31].

Although the impact and determinant of FBP, FDI, and FPI were deeply examined by researchers, either empirically or theoretically, the linkage between these variables still remains a puzzle. Meaning that, this paper aims to reveal what the relationship between FBP, FDI, and FPI in Turkey using multivariate VAR approach. The analysis can be applied to any developing country.

The paper adopts a four-stage procedure to test the relationship among foreign investment variables which are FBP, FDI, and FPI. As an early step, KPSS and ERS point optimal unit root tests are performed to detect the stationarity of the time series variables, in other words to detect the integration order of the time series variables. In the second stage, VAR based Block Exogeneity Wald test is performed in order to obtain information about causal relationship among the time series variables. Apart from the VAR based Block Exogeneity Wald test, the Variance Decomposition technique is also applied.

Data

The data used in this paper are foreign bank penetration (FBP), foreign direct investment (FDI) and foreign portfolio investment (FPI). The data of such variables are collected from the *Central Bank* of the Republic of *Turkey* (CBRT) and the Banks Association of Turkey (BAT). The time series variables used in the empirical tests of this paper consists of the quarterly for the period 1994Q1 to 2009Q4 which includes 64 observations. The definition of time series variables are shown below;

FBP: Total assets held by foreign banks in the banking sector. Holding 50% share acquisition by a foreign bank or foreign investor in a host country is accepted as a minimum requirement to have important influence on the management of acquired bank in Turkey. In other words, acquiring 50% or more shares of domestic bank are recorded as a foreign bank in most of the countries.

FDI: Foreign direct investment is one of the types of international investment. Such investment arises when a foreign investor acquires 10% or more shares of domestic company and obtains, moreover, managerial control on domestic company.

FPI: Another type of international investment is foreign portfolio investment which arises when a foreign investor does not have any managerial control on domestic company in a host country²¹.

3. EMPIRICAL MODELLING AND FINDINGS

3.1 Unit Root Test

The early papers - Dickey and Fuller [32-33] - investigate how to test unit root in time series variables. Then, Phillips and Perron [34] developed another unit root test which is called PP unit root test. However, the early version of such tests has some weaknesses relative to newly developed unit root tests. Augmented Dickey Fuller (ADF) and *Phillips-Perron* (PP) tests have low power when the process is stationary but coefficient of y_{t-1} in the regression is close to 1. In addition, when trend adds to the regression in these tests, the power of these tests reduces therefore, including only constant in the regression has more power than test that including both intercept and trend.

²⁰ The primary aim of the study of [30] is to investigate linkage between domestic investment and domestic saving in 21 OECD countries using annually data from 1960 to 1974.

²¹ The time series variables are expressed in its logarithmic transformation.

Because of these disadvantages of the PP and ADF tests, newly developed and more efficient techniques – KPSS and ERS point optimal tests – are applied to decide whether the time series variables have unit root or not²².

Before deciding to perform restricted or unrestricted VAR model, it is pre-request to the test stationarity of time series variables which was detected by KPSS [35] and ERS– Point Optimal [36] unit root tests²³. Whereas the ERS point optimal test tests the null hypothesis that a time series variable has a unit root, the KPSS test tests the null hypothesis that the variable is stationary. The KPSS test statistics are calculated as

$$\text{Eq. (1)} \quad \tau_t(q) = T^{-2} \sum_{t=1}^T s_t^2 / \sigma^2(q)$$

Where $\sigma^2(q)$ is a consistent estimate of the long-run variance. The lag truncation parameter is presented by Q term. A test of $\sigma^2(q) = 0$ is a test to detect whether a times series variable is stationary or not. T symbol shows the number of observation and s^2 is the residual of a regression.

I also use the ERS point optimal test in this paper to detect the stationarity of time series variables. Such test is based on the quasi-differencing regression which is defined as; $d(v_t|a) = d(z_t|a)' \square(a) + e_t$; where $d(v_t|a)$ and $d(z_t|a)$ are quasi-differenced data for v_t and z_t , respectively. Moreover, e_t is the residual term and $\square(a)$ is the coefficient to be estimated in the quasi-differencing regression. While the null hypothesis tested is $\alpha = 1$, the alternative hypothesis tested is $\alpha = \bar{a}$ where $\bar{a} = 1-7/T$ when z_t contains only constant, and $\bar{a} = 1-13.5/T$ when z_t contains both a constant and a trend. The test statistic in the ERS point optimum to test H_0 is defined as; $P_T = (SSR(\bar{a}) - (\bar{a}) SSR(1)) / f_0$ where f_0 , at frequency zero, is an estimator for the error spectrum.

Table 2. Unit Root Test

	ERS Point Optimal ^a		KPSS ^b	
	C ^{a1}	C & T ^{a2}	C ^{b1}	C & T ^{b2}
FBP	81.944	38.850	0.883	0.162
DFBP	0.747***	2.685***	0.230***	0.0773***
FDI	11.037	6.242*	0.889	0.155
DFDI	0.674***	3.461***	0.0442***	0.0447***
FPI	0.799***	2.90***	0.138***	10.487***
DFPI	NA	NA	NA	NA

C and C&T denote constant and constant and trend, respectively. D initial letter denotes the first difference of time series variables.

***, **, and * denote statistically significant at 0.01, 0.05, and 0.10 levels, respectively.

^{a1} including only constant, one-sided test of the H_0 that the variable has unit root; critical values are equal to, 4.008, 3.023, and 1.900 at 10%, 5%, and 1% levels, respectively.

^{a2} including a constant and a trend, one-sided test of the H_0 that the variable has unit root; critical values are equal to 6.777, 5.689, and 4.235 at 10%, 5%, and 1% levels, respectively.

^{b1} including only constant, one-sided test of the H_0 that the variable is stationary; critical values are equal to, 0.347, 0.463, and 0.739 at 10%, 5%, and 1% levels, respectively.

^{b2} including a constant and a trend, one-sided test of the H_0 that the variable is stationary; critical values are equal to 0.119, 0.146, and 0.216 at 10%, 5%, and 1% levels, respectively.

Table 2 displays the outcome of the KPSS and ERS point optimal tests at levels and first differences to find out the order of integration for FBP, FDI and FPI variables in Turkey. These tests for the levels and first differences are performed with only constant and with a constant and a trend. For the first variable –FBP–, integration of order zero $I(0)$ is not found because the calculated KPSS test statistics which are 0.883 (the model with an intercept) and 0.162 (the model with trend and intercept) are greater than 5% critical values of 0.463 (the model with an intercept) and 0.146 (the model with trend and intercept), respectively. The result of the ERS point optimum test is in line with the result of the KPSS test in both cases; (1) the model with an intercept and (2) the model with an intercept and a trend. Therefore, the variable has unit root at the integration of zero order. At the first difference, $I(1)$ of FBP, both t-statistics (with only intercept and trend and intercept) are less than critical values at 1% and 5% levels. Thus, the null hypothesis of nonstationarity can be rejected and the variable is integrated of order 1 for all tests. This situation is not different for FDI variable. However, both results of KPSS and ERS point optimal tests also indicate that the level of FPI seems stationary in both cases; (1) the model with an intercept and (2) the model with an intercept and a trend. Therefore, in multivariate VAR models, the first difference of FBP and FDI is used whereas the level of FPI is used.

3.2 Block Exogenous Wald Test

The main purpose of this study is to investigate relationship among foreign investment variables which are FBP, FDI and FPI. Therefore, such information can be gathered by performing a multivariate vector autoregressive (VAR) model. The VAR model is useful to analysis the behaviour of economic and financial time series. Simply, such model provides a multivariate framework where for example, change in variable A are related to change in lagged values of the variables of B and C and its own lagged values. Therefore, The VAR model for three time series variables can be written as:

²² The conventional PP and ADF tests are still most popular unit root test in macroeconomic and financial modelling, despite these disadvantages of the conventional PP and ADF tests.

²³ To get further information about these unit root test (see [35] and [36]).

$$\begin{bmatrix} \gamma_{1(t)} \\ \cdot \\ \gamma_{3(t)} \end{bmatrix} = \begin{bmatrix} \hat{a}_{11}(Z) \dots \hat{a}_{13}(Z) \\ \hat{a}_{31}(Z) \dots \hat{a}_{33}(Z) \end{bmatrix} * \begin{bmatrix} \gamma_{1(t)} \\ \cdot \\ \gamma_{3(t)} \end{bmatrix} + \begin{bmatrix} e_{1(t)} \\ \cdot \\ e_{3(t)} \end{bmatrix}$$

where $[\gamma_{1(t)}, \dots, \gamma_{3(t)}]$ represents a vector of dependent variables, including FBP, FDI and FPI; $[\beta_{ij}(Z)]$ is a 3*3 matrix of polynomials in the lag operator Z ; $[e_{1(t)}, \dots, e_{3(t)}]$ is a vector of errors. Thus, the system involves three different equations and each one of the three dependent variables lagged values of the foreign investment variables and its own lagged values. For each equation, the chi-square statistic from the Block Exogenous Wald test indicates whether a dependent variable can be treated as exogenous.

I detect whether there is causal relationship among the foreign investment variables using the Block Exogenous Wald test. The primary criteria to perform VAR granger causality test is to have stationary variables because if the time series variables have unit root, the Wald (χ^2) test statistic will be worthless and VAR stability will not meet. Therefore, in the multivariate VAR models, the first differences of FDI and FBP variables are used whereas the level of FPI variable is used. Therefore, the primary criterion for performing the VAR model is achieved.

This paper employs the Block Exogeneity Wald test to examine the short-run causal relationships among the foreign investment variables which are FDI, FBP and FPI. The results regarding the short-run causal relationships presented in Table 4 are based on the Chi-square and Probabilities. I test whether there is causality from FDI and FPI to FBP in the first model. I, however, failed to find any causal relationship in this model, meaning that changes in FDI and FPI do not significantly lead to changes in foreign bank entry. The finding in the first model is interesting because as well know, foreign bank entries in most of the host countries record as a foreign direct investment. In other words, to some degree, foreign bank investment involves in FDI in a host market. This finding may indicate the lack of relationship among the sub categories of foreign direct investment which are service, manufacturing and agriculture FDI. The finding of [37] is in line with my finding. They put forward that the entry mode of manufacturing and service FDI can change independently and these sub-categories of FDI can react differently when transaction cost, risk and trust factors change in a host market.

I investigate whether FBP granger cause FDI and (ii) whether FPI granger cause FDI in 2nd equation. The null hypothesis that FBP does not granger cause FDI can be rejected with a $\chi^2 = 12.957$ (p-value = 0.001) at 5% level, indicating that changes in FBP significantly lead to changes in FDI in Turkey. This result mirrors how foreign bank entry is important for the direct investment of multinational enterprises in Turkey. It is well known that foreign banks, especially in developing markets, are more willingly to provide credits to foreign companies than domestic banks and to obtain credit for the investment of multinational enterprises in a host markets is vital in order to realize investment. Therefore, it is rational to find causal relationship from FBP to FDI. Surprisingly, FPI does not granger cause FDI with a $\chi^2 = 1.601$ (p-value = 0.448). The results in Table 3 also suggest that there is unilateral causality which runs from FDI to FPI at 5% level, implies that the changes in FDI significantly lead to changes in FPI in Turkey. As well know, the maturity of FDI is larger than that of FPI. Therefore, direct investors likely to obtain relatively deeper information about the political, social, economic conditions of host markets. Obtaining deep information about the specific sector(s) of host markets is likely to affect other investors' decision. Thus, it is rational to find causal effect from FDI to FPI.

Table 3. Block Exogeneity Wald Test

Ind.	Short-run Relationship	
	Dep.	
	FBP	Df
FDI	[4.705] (0.095)*	2
FPI	[0.273] (0.872)	2
All	[4.868] (0.301)	4
	FDI	
	Df	
FBP	[12.957] (0.001)***	2
FPI	[1.601] (0.448)	2
All	[15.400] (0.003)***	4
	FPI	
	Df	
FBP	[2.103] (0.349)	2
FDI	[6.071] (0.048)**	2
All	[12.424] (0.014)**	4

Notes: Dep. and Ind. denote dependent and independent variables, respectively. FBP and FDI time series variables are in first differences. The numbers in [-] and (-) are chi-squares and probabilities, respectively. ***, ** and * denote statistically significant at the 1%, 5% and 10% levels, respectively. Df denotes degree of freedom. The optimal lag for multivariate VAR model is selected by sequential modified LR test statistic, Akaike and Schwarz information criterion. The result of diagnostics tests such as Portmanteau test for autocorrelations, serial correlation LM test, heteroskedasticity test and the inverse roots of AR characteristic polynomial are reported in Table 5-7 in the appendix, are found to be satisfactory.

3.3. Variance Decomposition

The VAR based Block Exogeneity Wald test provides information about the causality relationship among the time series variables. However, such test does not provide any information about how significant is the causal effects that represented in Table 3 and how the effect changes over time. Such information is provided by the Variance Decomposition. The information about the each shock (innovation) to the dependent variable is provided by the Variance Decomposition which is also called “Forecast Error Variance Decomposition”. Table 4 reports the Generalized Variance Decomposition of each variable over a twelve quarter period. I apply the Variance Decomposition technique to get information about the percentage of the movement in the endogenous variables that are because of their own innovations, against innovations to the other variables. In other words, the technique is performed to test exogeneity of variables [38].

Table 4 shows the findings from the Generalized Variance Decomposition over a twelve quarter period in Turkey. I report only the results in 1st, 6th and 12th quarters. The result from such technique indicates that; while the FDI innovations explain 5.689% forecast error variance of FBP at the 12 quarter horizon, the shock to FBP is only explained by FPI (0.445%) in model. Meaning that, FDI in Turkey contributed relatively more to FBP but foreign bank entry seems exogenous. In other words, FDI and FPI have little explanatory power for the evolution of FBP in Turkey. This is consistent with the finding of the Block Exogeneity Wald test (see Table 3.)

Table 4: Variance Decomposition

Variance Decomposition of FBP:			
Period	FDI	FBP	FPI
1	0.798	99.201	0.000
6	5.567	93.991	0.441
12	5.689	93.865	0.445
Variance Decomposition of FDI			
Period	FDI	FBP	FPI
1	100.000	0.000	0.000
6	77.295	21.559	1.146
12	77.001	21.856	1.143
Variance Decomposition of FPI:			
Period	FDI	FBP	FPI
1	0.217	4.755	95.027
6	9.058	12.449	78.492
12	9.070	12.451	78.478

Notes: FBP and FDI time series variables are in first differences
Standard Errors: Monte Carlo (1000 repetitions)

The shock to FDI is influenced by FBP (21.856%) at 12 quarter period, but the shock to FDI is only accounted for 1.143% of variation in FPI. Therefore, FBP appears to have higher influence than FPI on FDI in Turkey. This may be because of similarity in definition between FBP and FDI. The final variance decompositions, those for FPI, are also reports in Table 4. The contribution of FDI to FPI variability ranges between 0.217% and 9.070% throughout 12 quarters while the portion of FBP shock in the variance of FPI in 1 and 12 quarters are 4.755 % and 12.451%, respectively, indicating that the effect of FDI and FBP on FPI in the long-run is larger than that in the short-run. Thus, foreign bank entry appears to be more important relative to FPI to FDI in Turkey. The very weak contribution of FPI to FDI and FBP in Turkey is in line with the finding from the Block Exogeneity Wald test. This result mirrors the difference between long-term investment and short-term investment and how FPI is passive for effecting the location selection of multinational enterprises in Turkey.

As a part of the diagnostic tests, we applied the numbers of diagnostic tests which are serial correlation LM, "*portmanteau*" test of *Ljung* and *Box* and VAR residual heteroskedasticity, to test the stability of the VAR models. The results from such tests, presented in Table 7 to 9 in the appendix, show that there is no heteroskedasticity, no autocorrelation, and no serial correlation in my models. In addition, the inverse roots of AR characteristic polynomial was performed to detect the stability of the VAR models and the figures of this test presented in Figure 1 in the appendix. The findings in Figure 1 were found to be satisfactory for the multivariate VAR model.

4. CONCLUSION

The paper, using a multivariate VAR approach and Block Exogeneity Wald and Variance Decomposition tests, investigates the short run dynamic relations between FBP, FDI and FPI. To detect whether the time series variables have unit root or not, KPSS and ERS point optimal tests are performed. The findings from such tests indicate that FBP and FDI are integrated of order one whereas FPI is integrated of order zero.

The results regarding the Block Exogeneity Wald test indicates that bilateral causality is detected at 5% level runs from FBP to FDI, implying that changes in the shares of foreign bank significantly lead to changes in direct investments of multinational enterprises in Turkey. This is because the lion share of FDI in the banking sector involves in foreign bank entries in Turkey. Moreover, another causal relationship is detected from FDI to FPI. This is rational to find this direction of causality because long-term investment is likely to affect more short-term investment.

To obtain information about the each shock (innovation) to the dependent variable, the Variance Decomposition technique is employed. The result from such technique indicates that; direct investments of multinational enterprises in Turkey contributed relatively more to FBP but FBP seems most exogenous within three foreign investment variables. Therefore, FDI and FPI have little explanatory power for the evolution of FBP in Turkey. The finding of Variance Decomposition also shows that in Turkey the influence of FBP to the variability of FDI is more than that of FPI. Moreover, my finding indicates that the contribution of FDI to FPI variability ranges between 0.217% and 9.070% throughout 12 quarter periods whilst the contribution of FBP to FPI variability ranges between 4.755% and 12.451%.

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6. APPENDIX

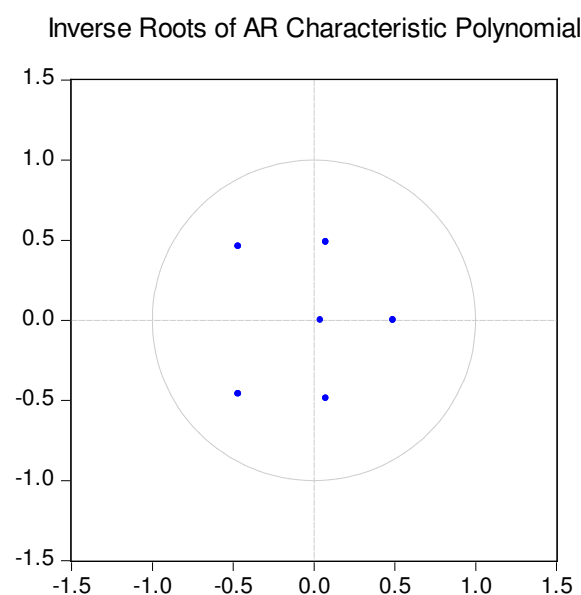


Figure 1: Inverse Roots o

Table 5. Portmanteau Tests for Autocorrelations

Null Hypothesis: no residual autocorrelations up to lag h					
Lags	Q-Stat	Prob	Adj Q-Stat	Prob	df
1	0.865200	NA*	0.879383	NA*	NA*
2	8.471044	NA*	8.738756	NA*	NA*
3	15.80260	0.0711	16.44310	0.0582	9
4	22.62847	0.2053	23.73972	0.1637	18
5	33.41788	0.1836	35.47557	0.1272	27
6	37.59018	0.3962	40.09490	0.2934	36
7	45.85414	0.4366	49.41064	0.3014	45
8	51.89613	0.5560	56.34774	0.3872	54
9	57.55980	0.6698	62.97317	0.4773	63
10	65.28055	0.6993	72.17868	0.4719	72
11	74.59122	0.6789	83.49752	0.4026	81
12	79.88142	0.7686	90.05737	0.4785	90

f AR Characteristic Polynomial

Table 6. Serial Correlation LM Tests

Null Hypothesis: no serial correlation at lag order h		
Lags	LM-Stat	Prob
2	6.046	0.735

Probs from chi-square with 9 df.

Table 7. Heteroskedasticity Tests

No cross terms (only levels and squares)			Includes Cross Terms		
Chi-sq	Prob	df	Chi-sq	Prob	df
79.187	0.262	72	171.032	0.298	162

THE INFLUENCE OF WORLD FINANCIAL CRISIS ON THE ECONOMY OF KAZAKHSTAN

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ABSTRACT

All over the world more and more developing countries try to improve the understanding of influence of growth and trade liberalization on human development. Thus there are investigated interrelations in the field of regulation of macroeconomic indicators, industrial, trading and institutional developments.

This paper focuses on some of the key areas of economic reform to build a picture of how Kazakhstan has developed since independence and after the world financial crisis.

Key words: the world financial crisis, the economy of Kazakhstan, a post crisis development, an export, an import.

INTRODUCTION

It is characterized the external economic policy of the Republic of Kazakhstan from the moment of independence, mainly, the orientation on gradual liberalization of foreign trade activities and an openness of domestic economy as a whole. World experience shows that the economy openness expands possibilities of external factors use in interests of development acceleration. But it means wide application in national economy of the advanced foreign technologies, new generations of cars and equipment, modern experience of management, attraction additional material and financial resources, inclusion possibility in the international industrial cooperation that, unfortunately, has not found reflection in economy of the Republic of Kazakhstan.

The role and economic significance of the countries of Central Asia have been transformed over the past decade. High oil and commodity prices have been a key factor in their impressive growth, but growth has also followed post-independence reforms in economic systems.

Economic reform in Kazakhstan has been more comprehensive than in some other countries in the region. Underlying reform in Kazakhstan is a desire to integrate more deeply with the global economy and to establish Kazakhstan as a significant player in global markets. A closer look at what has actually been achieved so far, however, reveals a mixed picture of economic change, success and persistent problems. Economic development over the past decade has been dependent on oil and mineral exports, coupled with capital inflows, and the impressive growth rates witnessed in Kazakhstan mask ongoing problems within the country and concerns with domestic economic management by the government.

STAGES OF ECONOMIC REFORM AND GROWTH POST-INDEPENDENCE: 1991 – 1994

The first few years of independence were characterized by economic instability and decline. The breakup of the Soviet Union brought with it a collapse in demand for the heavy industry products that Kazakhstan had traditionally exported in the Soviet system, and the economy contracted. The steepest decline occurred in 1994, when GDP fell by 12.6 % (Rakhmatulina, 2006).

1994 – 2000: MACRO-ECONOMIC DEVELOPMENT

In the mid-1990s, these pressures forced the government of Kazakhstan to take more seriously the idea of economic reform. Kazakhstan launched strategies such as “Kazakhstan 2030. Prosperity, security and improvement of welfare of the citizens of Kazakhstan”. Seven national priorities were identified, including privatization of state-owned corporations; foreign investment laws updated and an increase in foreign participation; lifting of restrictions on trade and foreign exchange transactions; modernization of financial systems; laws updated on labour practices, corporate governance and transparency; and upgrading of tax and customs administration.

Essential liberalization of foreign trade has been spent in the period from 1994 to 1995: it is cancelled quoting export of goods, the list of licensed production is reduced, the custom export duties are cancelled, practice of granting of customs and tax privileges is cancelled, the institute of monopoly 13 SFEC engaged in operations of strategic goods. In August 1995 have been cancelled requirements about delivery of 50 % of an export gain.

As a result of an external economic policy spent in the Republic, indicators of trading balance of the Republic have considerably increased. At the same time, openness strengthening bears with itself not only benefits, but also certain dangers, especially to the countries with transitional economy. Thus there are various external risks, such as increase various external risks, such as increase of dependence of separate branches from a world conjuncture, from the trading and financial policy as industrially developed countries, and the countries which are general trading partners, suppression of national commodity producers by foreign competitors etc. Obvious is also what even partial isolation from foreign markets can lead to negative consequences. Exporters can lost commodity markets that can entail reduction of loading of capacities, and, hence, and personnel liberation, competitiveness of the domestic goods will decrease.

Economic performance substantially improved during and after this period, and economic recovery and growth began in earnest in 2000. GDP growth of 8-10 % has been sustained in the last seven years, with real GDP slightly above the average for other transition countries in the region and GDP per capita more than doubling during that period. The budget balance currently stands at 0.2 % of GDP.

The Asian financial crisis, August events in 1998 in Russia, delay of rates of world economic development as a whole and falling of cost on oil and other energy content essential have shown dependence of Kazakhstan on external factors.

Thus, the policy of positive trading balance is spent to those years an example the competing purposes of a macroeconomic policy. From the point of view of big non-admission debts was this policy correct, but from the point of view of strengthening of investment activity by the big import of the equipment, such policy has had an adverse effect. Thus the trading balance developed negative because of considerable volume of unorganized trade, the greatest part which was made by informal import. And relative density of cars and the equipment did not exceed 15-16 % from all import.

In this connection, orientation only on an openness could not remain any more a unique defining direction of the external economic policy of the Republic.

2000 – 2007: BANKING AND FINANCIAL REFORM

Banking reforms have been among the most successful of the government's efforts in Kazakhstan. From 1996, the government began introducing Western banking laws, modern payment systems and tightening prudential regulations, as well as privatizing the management of pension contributions. More recent activity has included liberalization of the currency regime, most notably the removal of the licensing requirement for capital account transactions in early 2007. The government has also established a basic framework to attract foreign direct investment (FDI) into its resource-rich oil and mineral sector, including partial privatization of the electricity sector (World Bank, 2007). FDI inflows, though somewhat erratic, have nonetheless increased significantly since the mid-1990s.

In the financial sector, stock market capitalization has increased in the last ten years, from 6.1 % of GDP to 54.7 %. Annual inflation has fallen from 1,662 % in 1993 to 8.6 % in 2007. All of this has substantially eased the economic pressures that the government of Kazakhstan was facing in the 1990s. The government's budget has been in surplus since 2001 and public debt is now just 6 % of GDP. However, all is not as well as might appear from such figures. The IMF this year cautioned that rapid expansion of money and credit might spill over into inflation. The external debt of Kazakhstan's banks – responsible for much of this external borrowing – has risen steeply in recent years, totaling \$46 billion in mid-2007, 48 % of GDP. In 2007, however, turmoil in global markets caused a sudden halt in capital inflows to Kazakhstan. The central bank has responded by injecting liquidity and supporting the tenge (IMF, 2007).

In terms of economic structure, a similar mix of change, success and persistent problems can be seen. Economic growth has clearly been led by the oil and extractive industry sectors, which continue to dominate exports in particular. However, statistics from the US Central Intelligence Agency suggest that in 2006, while agriculture accounted for 5.7 % GDP and industry for 39.4 %, services contributed 54.4 %.

Industrial output has continued to grow over the past decade, and within Kazakhstan the impact has been broadly positive. Figure 5 shows rates of change of private consumption and output increasing consistently alongside each other. But in addition, unemployment has fallen consistently, from 12.8 % of the labour force in 2000, to 7.8 % at the end of 2006, while average monthly earnings in the economy increased by 20.4 % in 2006. However, potential hindrances to further economic progress are causing concern for the government. A recent study by the Kazakhstan Institute of Strategic Studies (Rakhmatulina, 2006) speaks of a continuing lack of competitiveness of the manufacturing sector, as well as inadequate development of high value added industry. Problems in the banking sector also cause concern: Kazakhstan currently performs poorly in terms of creating an enabling environment for small and medium sized enterprises (SMEs). This has become more marked recently, as increased oil exports and significant capital inflows have led to the tenge appreciating considerably against the US dollar, making it difficult for nonoil exports to remain competitive and bringing talk of «Dutch disease».

A related concern is social and human development within Kazakhstan. Broadly, social indicators have improved markedly since the beginning of this decade. The poverty rate has dropped from over 30 % in 1999 to under 10 % (in 2005), while income distribution has become more even (IMF, 2007). This is compared to poverty rates in the Kyrgyz Republic, for example, of 21.4 % in 2006. However, when such indicators are broken down, a different picture begins to emerge. Kazakhstan has some of the worst health indicators in the Europe and Central Asia region, such as access to safe drinking water, and the World Bank warns that human capital has actually been steadily eroded over the past decade, with high incidence of tuberculosis and HIV/AIDS infection rates increasing very fast (World Bank, 2007). Meanwhile, government expenditure on health and education remains low, both at 2.3 % in 2005 (EBRD, 2007).

Oil and minerals have been the driving force of Kazakhstan's economic development over the past decade and a half and the country's export and import patterns are unsurprising in this respect.

Table 1. Principal exports of Kazakhstan

Products (2006)	% of total exports
Mineral products	71.9
Metals	16.1
Chemicals	4.2
Food products	2.8
Machinery and equipment	1.8
Other	3.2

Source: The Economist Intelligence Unit (2008).

Table 2. Principal imports of Kazakhstan

Products	% of total imports
Machinery and equipment	45.2
Mineral products	14.3
Metals	13.3
Chemicals	10.8
Food products	7.0
Other	9.4

Source: The Economist Intelligence Unit (2008).

Despite the rise of the services sector, oil extraction and oil related construction, transportation and processing still account for the vast majority of exports, and the government stresses that its main economic priority is to diversify and avoid what it regards as over-dependence on the energy sector.

The past fifteen years in Kazakhstan have certainly seen a transformation of the economy of Kazakhstan. Expanded oil production and inflows of foreign capital have led to high growth rates. Oil production looks set to be the main driver of the economy for the foreseeable future, implying continued economic growth, as well as abundant resources with which to further upgrade the country's infrastructure. China for example, has invested billions in oil companies and pipelines to access Kazakhstan's hydrocarbon resources, and output is projected to grow from 1.2 million barrels a day in 2006 to 3.5 million barrels a day in 2020.

The extent to which these economic achievements can be credited to the reforms of the government of Kazakhstan, however, remains unclear. Much has been done to create a more attractive business environment and financial sector in order to attract FDI, but this has been primarily in the oil sector. Concerns remain over corruption, continued barriers to foreign ownership and continued over-regulation of the country's infrastructure. Reforms have perhaps been less far reaching than is commonly believed, and the country's trading patterns and some persistent barriers to trade suggest that the Kazakh economy in 2008 is in some respects not far removed from the 1990s.

Table 3: Transition indicators for Kazakhstan, 2007

Area of reform – Above average Level of progress	Level of progress
Price liberalization	Comprehensive; state procurement at non-market prices largely phased out; only a small number of administered prices remain.
Trade and foreign exchange	Removal of almost all quantitative and administrative import and export restrictions; almost full current account convertibility.
Banking reform and interest rate liberalization	Substantial progress in establishment of bank solvency and of a framework for prudential supervision and regulation; full interest rate liberalization with little preferential access to cheap refinancing; significant lending to private enterprises and significant presence of private banks.
Small scale privatization	Complete privatization of small companies with tradable ownership rights.
Area of reform – Below average	
Large scale privatization	More than 25 % of large-scale enterprise assets in private hands or in the process of being privatized, but possibly with major unresolved issues regarding corporate governance.
Government and enterprise restructuring	Moderately tight credit and subsidy policy, but weak enforcement of bankruptcy legislation and little action taken to strengthen competition and corporate governance.
Competition policy	Competition policy and legislation and institutions set up; some reduction of entry restrictions and some enforcement action on dominant firms.
Securities markets and non-bank financial institutions	Formation of securities exchanges, market-makers and brokers; some trading in

	government paper and/or securities; rudimentary legal and regulatory framework for the issuance and trading of securities.
Overall infrastructure reform (average of indicators covering electric power, railways, roads, telecommunications, water and waste water.)	Power company distanced from government, but there is still political interference. Some attempt to harden budget constraints, but effective tariffs are low. Weak management incentives for efficient performance. Little institutional reform and minimal, if any, private sector involvement.

Source: EBRD (2007).

All of these indicators began at level 1, i.e. “little progress”, in the early 1990s, and they support the fact that significant progress has been made in areas such as banking reform. Price liberalization now even scores 4, close to the standards of an industrialized market economy, and private sector share in GDP was 70 % in 2007, up from 10 % in 1992. Kazakhstan is by no means a “minimum performer” when it comes to reform, but, despite the government’s statements, it is perhaps not as far down the road from centrally-planned economy to free market democracy as is sometimes suggested. According to the Index of economic freedom, after a decade and a half of reform, Kazakhstan’s economy is now 60.5 % free, with its overall score up from last year mainly reflecting an improvement in trade freedom¹. Despite repeated statements of intent, there is clearly much progress still to be made in terms of opening up other areas of the Kazakh economy, most notably large-scale privatization, enterprise restructuring and infrastructure. Even the banking sector, despite reforms, still continues to operate with a number of restrictions, most notably with regard to foreign ownership (of the thirty three banks in Kazakhstan, fourteen are foreign owned; EBRD, 2007) and access of multinational banks to domestic markets.

TRADE AGREEMENTS INVOLVING KAZAKHSTAN

In the last decade, trade agreements have proliferated in every region of the world. Sometimes, though, trade agreements are a declaration of friendship or intent or ambition, without substantial economic consequences. The «rough neighbourhood» of Central Asia (CA) – as President Nazarbayev once called it – is no laggard when it comes to signing weak FTAs and RTAs and only half-heartedly implementing them. This chapter first gives an overview of the existing and proposed trade deals involving Kazakhstan. Then, the interplay of trade agreements and WTO accession is illustrated with the experience of Kyrgyzstan, which joined the WTO in 1998, and is similarly embedded into the CA trade framework as Kazakhstan. Finally, the role of Russia in the CA trading framework and its regional economic diplomacy are highlighted.

Transition from a planned economy to a market economy entails major changes in institutions and, probably, changes in the direction of trade flows. According to recent literature improving the quality of institutions or belonging to a trading bloc can have substantial positive effects on trade. This chapter evaluates the potential benefit of the accession of Kazakhstan to the WTO. The idea is that accession to the WTO involves a short run benefit from further reducing tariff and non-tariff barriers, and a long-term strategy that involves institutional reforms. Economic reform in Kazakhstan began in the 1990’s, and as mentioned in previous chapters, its endeavours to shift from a transition economy to a market economy have been substantial. It is argued in this paper that although Kazakhstan’s trade policy with its major partners is well in place, it still has weak market institutions.

So Kazakhstan’s accession to the WTO will work best with complementary institutional reforms. To provide estimates of the impact of institutional reform on Kazakhstan’s potential trade, this chapter uses conventional empirical methodology and standard data sets. The empirical model chosen is the basic gravity model that is augmented to investigate the impact of institutions on trade and to provide estimates of trade flows between Kazakhstan and its major trading partners.

At the CIS Summit in Yalta in 2003, Belarus, Kazakhstan, Russia and Ukraine agreed to create a CES, which would evolve in three stages: the coordination of customs duties and harmonization of trade and custom regulations; the lifting of current trade barriers and creation of a CU; and the liquidation of internal customs boundaries to be replaced by a common customs boundary and the creation of a supra-national regulating institution. Belarus and Russia even broadened the CES agenda by aiming at a monetary union based on the rouble. This initiative marks a shift in regional policy away from the former objective of forming a CES only after Belarus, Russia and Kazakhstan had become members of the WTO. However, before the ink had dried on the agreement, Ukraine introduced a provision saying that the CES must adhere to the Ukrainian constitution and to Kiev’s strategic goal of joining the European Union, and after the Orange Revolution, in 2004, the future of the CES became even more uncertain. Ukraine’s reinforced Western and EU orientation clearly conflicts with the CES objective of establishing a supranational institution among some former CIS countries and the new plan of creating a monetary union. Ukraine’s accession to the WTO will further complicate the process of agreeing on a WTO compatible CES external tariff. Thus, even though Kazakhstan and Russia last year ceremonially re-emphasized their commitment to realizing the ambitious CES agenda, Ukraine’s objections and even threats to leave the agreement as a whole diminish the already weak prospects for progress. Furthermore, the EAEC and CES initiatives seem to overlap for Belarus, Kazakhstan and Russia, a situation that can only be resolved if the two Customs Unions have the same CET.

Finally, a range of other initiatives on regional economic integration have been launched. In 2003, some members of the Economic Cooperation Organization (ECO) proposed an ECO Trade Agreement (ECOTA), which has been signed, but has not entered into force. In the same year, the Shanghai Cooperation Organization (SCO), including the CARs, Russia and also China, approved programmes to promote regional trade and investment by creating a free trade zone by 2020. There is no obvious reason, however, to expect that these newly proposed RTAs will deliver more than the existing ones. The possibility that they will remain mere paper agreements, lacking proper implementation, cannot be dismissed.

Domestic policy trends indicate that WTO accession might have fallen down on the economic-policy priority scale. Kazakhstan was one of the CIS' «late reformers». These, according to Anders Aslund, adopted sweeping domestic market reforms after the 1998 Russian financial crises, allowing for unprecedented levels of economic growth, backed by the recent boom in commodity prices (Aslund 2007, p 75-81). Kazakhstan has since then generally maintained a steady market-oriented reform course. Yet in the last two years, the tone has somewhat changed. Kazakhstan has recently embarked upon a «clusters» policy strategy¹³ aimed at boosting «infant industries» to help the economy diversify. It is not yet clear how this policy is to be implemented, or how far it relies on market forces and the provision of an adequate investment and competitive climate, as opposed to a pick-and-choose strategy of propping up selected industries. This policy is backed by institutions and government-sponsored funds that echo those set up recently in Russia, which raise similar concerns. These funds include the Investment Fund of Kazakhstan, the SME Development Fund, and the National Innovation Fund. The Development Bank of Kazakhstan is also involved in this policy. Priority sectors are: food, textiles, metallurgy, construction materials, tourism, transport and logistical services, and downstream oil and gas activities. The competitive conditions under which the funds operate require special attention. Some sectors that are to be promoted pose real questions of economic efficiency. Textiles is a case in point.¹⁴ Kazakhstan wishes to promote cotton processing for export, but also other elements in the value chain, such as dye decorating and sewing. In the context of WTO accession, and given the fact that Kazakhstan is a sparsely populated country without comparative advantage in labour-intensive industries, the soundness of this policy deserves deeper scrutiny. Kazakhstan has so far not reneged on its commitment to promoting a market economy. But this new cluster strategy calls for closer scrutiny of its practical implementation. Some elements of the public discourse on WTO accession point to an increased reluctance to face more international competition in the industrial sector. This reluctance is further discussed below. A stronger nationalistic stance can be detected also in terms of investment in the hydrocarbons sector, as the latest state-of-the-nation discourse of President Nazarbayev in early February 2008 suggests.¹⁵ Although there have been no evident signs of re-nationalization in Kazakhstan yet, contrary to what has recently been happening in Russia, the recent disputes with foreign oil majors on the Kashaghan raise questions. This dispute was triggered by the announcement in 2007 that the consortium of foreign oil companies in charge of developing one of the world's major oil fields in the Caspian Sea had run into technical and environmental problems, delaying the launch of production. The dispute was settled in early 2008, averting a major crisis and risks of loss of confidence. Penalties are to be paid by the members of the consortium, and compensatory royalties will be levied as well. In the process of solving the problem, Kazakhstan's national oil company KazMunaigaz increased its stake in the consortium so that its holding is now equal to that of the foreign companies involved. The international investment community has not questioned the legitimacy of the procedure, since the consortium was not delivering on its contract. But the strong demands by the government and the redeployment of assets in favour of the government in the process indicate that the climate has hardened in Kazakhstan. This case follows the adoption in 2005 of a controversial «pre-emption» amendment to its Law on Subsurface Use, raising uncertainty over security of investments in Kazakhstan. President Nazarbayev, in his state-of-the-nation speech in 2007,¹⁶ argued that «accession to the WTO» must be «on conditions favourable to Kazakhstan». He added that «under Kazakhstan's WTO accession process, the Government should defend an acceptable level of internal state assistance to the agricultural sector and realize corresponding adjusting measures preparing industrial enterprises for the effective functioning under WTO conditions». Concretely, Kazakhstan claims the right to the same aggregate agricultural supports levels as the United States. The second argument hints at a more cautious stance towards opening the industrial sector to international competition, and not very clearly defined industrial policy ambitions.

2007 – PRESENT: THE CRISIS AND POST CRISIS DEVELOPMENT

The world crisis of liquidity which has begun in August 2007, together with the falling in 2nd half of 2008 of the world prices have led to a source of raw materials recessions in economic.

In Kazakhstan the financial sector, a manufacturing industry, agriculture, trading and building services have especially hard suffered from crisis and there was a curtailment of production in the field of small and average business.

In a difficult situation there was a banking sector of Kazakhstan. Having lost possibility funding abroad, the Kazakhstan banks in 2008 have practically curtailed credit activity, and also have raised credit rates. As consequence, development of the branches depending on bank crediting has practically stopped. The consumer demand in the country which was in many respects supported by bank credits was sharply reduced.

In the end of 2008 on the instructions of the President of Republic Kazakhstan has been developed the Plan of joint actions of the Government, National Bank and Agency of financial supervision on economy and financial system stabilization for 2009-2010. For financial maintenance of the Plan from National fund 10 bln. dollars of the USA that than 8 % from gross national product are equivalent more are allocated.

5 activity directions have been defined:

- Stabilization of financial sector;
- Developments of housing sector;
- Support of small and average business;
- Agriculture development;
- Realisation of innovative, industrial and infrastructural projects.

With a view of effective postcrisis development of economy of Kazakhstan on March 19, 2010 was confirmed the Decree № 958 of the President of the Republic of Kazakhstan the Government program on the forced industrially-innovative development on 2010-2014 (further - the State program).

The state program is logic continuation of a spent policy diversification of the economy, integrating in itself the basic approaches of Strategy of industrially-innovative development for 2003-2015, and also other program documents in industrialisation sphere.

According to the State program the basic priority of a policy of the forced industrialisation is realisation of large investment projects in traditional export focused economy sectors, with animation of possibilities new business for small and average business through purposeful development of Kazakhstan maintenance, the subsequent repartitions and processing.

Also for achievement of the purposes of the State program realisation of 4 separate programs of financial support of the operating enterprises and investment projects, both on republican, and at local level is carried out. Them concern: «Investor 2020», «Productivity 2020», «Export 2020» and «Business 2020».

The program «**Investor 2020**» promotes attraction of straight lines foreign to the investment by maintenance of privileges and preference, for investors, including creation Free economic zone and maintenance with a necessary infrastructure.

The program «**Productivity 2020**» is aimed at updating of a fixed capital, modernisation and increase of productivity of the existing enterprises.

The program purpose «**Export 2020**» is advancement domestic companies on foreign markets. For export stimulation compensation of expenses on production advancement on foreign markets is provided.

Also for realisation of insurance of export and crediting of trading export operations, and also a number of services of representatives of small and average business of not raw sector of economy is planned the creation of Export-credit Agency (EKA)

Thus the program «**Business 2020**» is aimed at business development in regions and concerns, first of all, small and medium business. The basic directions of the given budgetary program are: interest rate subsidising under credits, partial warranting of credits to small and medium business, grant financing, retraining of personnel and improvement of professional skill, and also a regional infrastructure.

CONCLUSION

From all nomenclature of Kazakhstan industrial output on external the market is in demand, basically, primary raw materials that creates danger of the further fastening of structural shifts in domestic economy and deepening of disproportions in industrial sector in advantage to extraction of irreplaceable power and mineral resources owing to inflow of great volume of investments in the oil –gas sector. Thus raw branches are under strong influence of globalisation and a policy of transnational corporations, and as, a consequence, the Republic economy is not completely protected from negative influence of external factors.

Thus, the national economy in these conditions in certain degree loses prospect of structural transformations, increases the dependence on the world market.

Today it is possible to ascertain, that in the country the market economy based on a private property and a free competition is constructed. In the country market economy institutes are created, about 85 % of a total internal product is created in an economy private sector. Moreover, Kazakhstan is recognized by the USA as the country with market economy that also testifies to an openness of economy and foreign trade policy liberalization. Negotiations on data questions with the European Union are close to end.

In modern world development tendencies of globalization of economic processes, increase of the international competition, the accelerated development of the high and information technologies directed on release of hi-tech and high technology production prevail. In these conditions Kazakhstan is intended to develop ecologically pure manufactures, to keep and develop of the town forming enterprises, to protect a labor market, to make active a policy on maintenance of employment of the population and decrease in level of poverty, and also to restructure energy - work - and material-intensive manufactures.

According to the Decree of the President of the Republic of Kazakhstan № 922 dated February 1, 2010 «On the Strategic plan for development of the Republic of Kazakhstan till 2020» forthcoming decade the Government of Kazakhstan intends to concentrate efforts on five key directions: preparation for post crisis development; accelerated economy; investments into the future; services for citizens; maintenance of the international consent, safety, stability of the international relations.

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THE REGIONAL TRADE POLICY OF KAZAKHSTAN IN PENDING ACCESSION TO THE WTO

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ABSTRACT

The given work represents the scientific analysis in the field of a macroeconomic situation of the Republic of Kazakhstan: prospects of development of a commercial policy under the introduction into the World organization of trade and influences of liberalization of a commercial policy into human development and priorities of a national policy on development of trading services.

WTO membership is a matter of economic strategy, and this study is chiefly concerned with such considerations. For Kazakhstan, though, the decision to join the WTO also involves geopolitical concerns. In the light of these legitimate concerns, this study sketches trade policy alternatives and what these entail.

Key words: the WTO, Kazakhstan, a regional trade policy, Common Economic Space, the Customs Union

INTRODUCTION

Distinctive feature of the WTO - creation of the international rules of trade and disciplinary actions to provide conditions of the free trade based on mutually favorable conditions, an openness and equality of all member states of this organization.

Kazakhstan has been negotiating accession to the World Trade Organization (WTO) for sixteen years. Long accession processes have not been unusual since the creation of the WTO, which covers more policy areas than the General Agreement on Tariffs and Trade (GATT), many of which are of greater complexity and political sensitivity.

Accession to the WTO is likely to have a positive influence on Kazakhstan's regional trade agreements and lower the diversion of trade that these various agreements threaten. Kazakhstan has committed itself to deepen regional trade integration with Russia and other neighbors, but quantitative analysis shows that such political priorities may be economically costly to Kazakhstan. Kazakhstan already trades too much with some of its regional members, and, consequently, too little with other parts of the world. Regional integration will increase this bias, whereas Kazakhstan should be directing its efforts towards reversing it. Kazakhstan's WTO accession, though, is complicated by its entanglement in a wider political and economic complex emerging from Russian pre-eminence and claims to such pre-eminence in the former Soviet Union. The complexity of the situation is compounded by Russia's own difficult WTO accession process. Kazakhstan is economically and strategically strongly aligned to Russia, and taking the step of accelerating WTO accession without waiting for Russia demands strong political resolve by the Kazakh government. Europe and the United States seem to support the «Russia first» policy in the Commonwealth of Independent States (CIS), though by default rather than actively. However, if they wish to see Kazakhstan anchored in the multilateral trading system, a stronger resolve to finalize the process in collaboration with Kazakhstan may be required.

Geography does not make it easy for Kazakhstan to become a successful trading nation. It is a landlocked country, distant from key world markets. It was once a stop along the Silk Road, but it is today surrounded by developing countries with poor transport infrastructure and dubious economic track records. Yet trade and foreign direct investments have been central to Kazakhstan's recent prosperity. Its stellar economic performance would not have been possible without increasing economic integration with the outside world, primarily its export of commodities (which accounts for around 80 percent of its total exports). This study takes stock of Kazakhstan's economic reforms and trade status and analyses issues surrounding its application for membership of the World Trade Organization. The study assesses the costs and benefits that will accrue to Kazakhstan from joining the WTO, and analyses the impact of membership on its trade policy and commercial strategy.

In the last decade, trade agreements have proliferated in every region of the world. Sometimes, though, trade agreements are a declaration of friendship or intent or ambition, without substantial economic consequences. The «rough neighborhood» of Central Asia (CA) – as President Nazarbayev once called it – is no laggard when it comes to signing weak Free Trade Agreements (FTA) and Regional Trade Agreements (RTA) and only half-heartedly implementing them [*Nazarbayev, N (2008)*].

WTO EVOLUTION IN A GLOBALIZATION CONTEXT

For the last five decades the volume of world trade by an industrial output has grown 17 times while the volume of world production has increased only 6 times. Trade has become the major factor of economic growth, in both developed and developing

countries. And it's such influence on economy development all accrues. For last decade rates of annual growth of world trade have reached 6, 5 % whereas cumulative Gross national product (GNP) has increased only on 2, 0 %.

All this dynamism of world trade and its growing influence on economic development have arisen not spontaneously, and on the basis of gradual and consecutive development of the rules coordinated at the international level promoting free moving of the goods, capitals and services. In 1947 between 23 states of the world has been entered into the General agreement on tariffs and trade (GATT) which has developed set of the rules regulating trade by the goods. The next years these rules were improved and supplemented, the quantity of the countries which have joined to GATT grew also. In 1990 GATT is already totaled 90 member countries. In 1995, after a series of long negotiations, has been created the World Trade Organization (WTO) - as heiress GATT and as the international institute which activity is subordinated to ideas of liberalization and a fair order in world trade.

Simultaneously have been accepted and have come into force the General agreement on trade in services (GATS) and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS). Now the WTO unites 155 member countries, and some more tens of states declared the intention to enter into its structure. Thus, it is generated and gains in strength not simply multilateral, and really more and more the planetary trading system which institutional subscribed and contains in many aspects obligatory for all member countries of the WTO of norm and rule. It is possible to assert, that within the limits of the WTO all world unites under the general liberal economic roof, having obeyed uniform for all to activity principles.

GEOECONOMIC SITUATION OF KAZAKHSTAN AFTER THE COLLAPSE OF THE USSR

After the collapse of the Soviet Union in 1991, Kazakhstan and the other Central Asian Republics (CAR) signed a number of preferential and regional trade agreements with one another in order to revive previous linkages and as a way to secure market access for goods within the newly created Commonwealth of Independent States (CIS). In light of the malfunctioning payments arrangements and exchange rate convertibility among the CIS states, limited preferential trade agreements seemed a useful instrument to re-establish old trade relations. So far, Kazakhstan has signed seven FTAs with its regional neighbors. The first came into force in 1995 with Kyrgyzstan and Moldova; then an agreement with Azerbaijan and Uzbekistan followed in 1997; with Georgia in 1999; and with Armenia in 2001. In 2007, Astana signed a bilateral trade deal with Mongolia and FTAs with Pakistan and Jordan are proposed and under consultation. The eruption of bilateral agreements among the CIS states has not, however, achieved any substantial liberalization of regional trade. The agreements state that their aim is full tariff elimination and prohibit the application of quotas, but they allow for exceptions that can be formalized in separate yearly protocols and which in fact exempt goods that account for a significant proportion of trade between the signatories. Furthermore, these FTAs include a comprehensive list of general exceptions ranging from protection of the national interest and defense of public morals and order to restrictions to foreign investment. Overall, the effectiveness of the bilateral deals has been limited by narrow coverage, complex rules of origin, and less-than-full implementation of the agreements.

Besides these bilateral agreements, Kazakhstan is a central and active member in a number of regional initiatives that aim for deeper trade integration. Given its relative economic strength (Kazakhstan accounts for two-thirds of the Gross Domestic Product (GDP) for the whole central Asian region) it forms a cornerstone of RTAs like the Eurasian Economic Community (EAEC) and the Common Economic Space (CES). The EAEC evolved out of the framework of the CIS and supersedes the CIS Customs Union (CU) of the 1990s between Belarus, the Russian Federation, Kazakhstan, Kyrgyzstan and Tajikistan, which never was fully realized. The EAEC entered into force in May 2001 and envisages the implementation of a customs union and, eventually, of a common economic area that would go beyond a common external tariff (CET). In 2006, Uzbekistan joined the EAEC. Armenia, Moldova and Ukraine have observer status and since 2002, when the Central Asian Cooperation Organization (CACO) became part of the EAEC, Georgia and Turkey were brought in as further observers. According to the EAEC agreement a common external tariff should have been adopted by 2006, but so far a CET covering only a bit more than half of tariff lines has been agreed with the remaining tariffs not bound and being set independently by each member. Kyrgyzstan and Tajikistan have not yet adopted even this incomplete Common External Tariff Schedule (CETS). The agreement envisaged the CET to be finalized and implemented in stages over a period of five years from the date of its entry into force. During the transitional period, each country has the right to maintain a list of sensitive goods, which do not exceed 15 percent of aggregate import cost for each state. However, the current EAEC tariff schedule covers only 6,156 tariff lines out of the 11,086 identified in the EAEC classification system. Moreover, EAEC member states have failed to agree on critical matters, such as the accession of a single import tariff and convergence of tax policies. They have also failed to reach agreement on anti-dumping policies. The EAEC being a new organization, it is still too early to see whether the transformation of the CIS Customs Union into the EAEC Customs Union has allowed its members to overcome the problems of the weakly implemented CIS Customs Union.

At the CIS Summit in Yalta in 2003, Belarus, Kazakhstan, Russia and Ukraine agreed to create a Common Economic Space (CES), which would evolve in three stages: the coordination of customs duties and harmonization of trade and custom regulations; the lifting of current trade barriers and creation of a CU; and the liquidation of internal customs boundaries to be replaced by a common customs boundary and the creation of a supra-national regulating institution. Belarus and Russia even broadened the CES agenda by aiming at a monetary union based on the rouble. This initiative marks a shift in regional policy away from the former objective of forming a CES only after Belarus, Russia and Kazakhstan had become members of the WTO. However, before the ink had dried on the agreement, Ukraine introduced a provision saying that the CES must adhere to the Ukrainian constitution and to Kiev's strategic goal of joining the European Union, and after the Orange Revolution, in 2004, the future of the CES became even more uncertain. Ukraine's reinforced Western and EU orientation clearly conflicts with the CES objective of establishing a supranational institution among some former CIS countries and the new plan of creating a monetary union. Ukraine's accession to the WTO will further complicate the process of agreeing on a WTO compatible CES external tariff. Thus, even though Kazakhstan and Russia last year ceremonially re-emphasized their commitment to

realizing the ambitious CES agenda, Ukraine's objections and even threats to leave the agreement as a whole diminish the already weak prospects for progress. Furthermore, the EAEC and CES initiatives seem to overlap for Belarus, Kazakhstan and Russia, a situation that can only be resolved if the two Customs Unions have the same CET.

The FTAs and RTAs in Central Asia aggravate a trade pattern typical for the region: the CARs «under-trade» in general but «over-trade» with each other and especially with Russia at a high cost due to the trade-diversionary effects of their mutual trade agreements [ADB 2006, IMF 2005]. On the one hand, Kazakhstan and its neighbors do not trade «enough» due to their economic structure as mainly exporters of natural resources, their landlocked geographic location, the high costs of transit trade and their excessive regulation. On the other hand, despite their weak implementation and enforcement, limited and unclear coverage and high costs due to incompatible rules of origin, the existing FTAs and RTAs render regional trade among the CARs and Russia still more liberal than the trade with other countries. Consequently they trade more with each other than they would in a WTO MFN (Most-Favoured Nation) free-trade environment. But this relative free trade between Kazakhstan and its neighbors comes at the cost of higher prices for consumers and of recurring protectionism. Instead of really liberalizing trade, the regional trade agreements impede sustainable regional economic development because their loopholes allow that, when one member successfully exports to another, the importing country can impose prohibitive tariffs or quotas. For example, the free trade deals Kazakhstan signed with the CARs and with Russia did not prevent Astana from imposing a ban and a 200 % tariff on some imported goods in the late 1990s. If regional trade were really liberalized, according to ADB 2006, Kazakhstan could triple its exports to Kyrgyzstan and almost quadruple those to Tajikistan while more than doubling its imports from Russia. Thus the question arises, how the existing and proposed trade agreements – if properly and fully implemented – would impact on Kazakhstan's economy in the light of joining the WTO and its commitment to global free trade.

The studies of the ADB 2006 and Tumbarello 2005 provide some interesting information on the welfare effects of a fully implemented EAEC customs union. Tumbarello employs a simple partial equilibrium model simulating the welfare impact on each EAEC member and finds that fewer than two scenarios on the welfare effects would be negative from a consumer point of view. In her first scenario (EAEC CU implementation *prior* to WTO accession) Tumbarello assumes that EAEC members will change their MFN tariffs in the direction of the highest rate currently prevailing among them on those lines for which the tariffs have not yet been bound. She justifies this assumption with that fact that those tariff lines not yet bound correspond mostly to goods being produced in EAEC states, and the latter therefore have a strong incentive to maintain the existing rate of protection on these products. According to her simulations (see table 5.1), Kazakhstan will incur welfare losses of \$31 million, which are then ultimately borne by consumers via paying higher prices. This loss in consumer surplus (- \$255,2 million), however, is only partially offset by an increase in tariff revenue (+ \$223,4 million). Moreover, assuming that tariff rates would not decrease, there would also be no positive change in consumer surplus deriving from imports from EAEC members and thus no trade creation effects in general. For Kazakhstan, Tumbarello's simulation predicts a decline in imports from non- EAEC countries, which will not be offset by an increase in imports from EAEC countries – the aggregate impact of implementing EAEC CU prior to WTO accession is thus net trade diversion. The second scenario (EAEC CU *after* WTO accession) assumes that the EAEC countries change their MFN tariffs to match the EAEC's current CETS and lower their MFN tariffs on goods not covered by the CETS to the lowest levels prevailing in the EAEC countries. Due to their WTO commitments, EAEC members would have difficulties in raising tariffs, and the CET would thus lie below the one assumed in the first scenario. Welfare in Kazakhstan would decline by \$2,3 million due to losses in consumer surplus (- \$19,4 million), which would not be offset by an increase in tariff revenue (+ \$16,9 million). Thus, Tumbarello's simulations of the two sequencing paths show that both paths would cause a loss of economic welfare for Kazakhstan, but that WTO accession prior to implementing the EAEC customs union is less welfare harming compared to the opposite sequencing path from a consumer point of view.

Table 1

Welfare effects on Kazakhstan of Implementing the EAEC Customs Union (in million US dollars)

	Change in tariff revenue	Change in consumer surplus	Net welfare effect
Prior to WTO accession	223.4	(255.2)	(31.8)
Following WTO accession	16.9	(19.4)	(2.4)

Source: Tumbarello (2005).

The ADB 2006 conducts a similar analysis of Kazakhstan by simulating a rising external tariff (from 7.4 % to 10.8 %) when implementing the EAEC CU. The computable general equilibrium model also shows considerable adverse effects: cumulative real GDP from 2005-2015 is almost \$10 billion less than it would be in the absence of the customs union. By 2015, real GDP would be 20.8 % lower than real GDP in the baseline scenario. These losses are caused by substantial trade diversion.

Transition from a planned economy to a market economy entails major changes in institutions and, probably, changes in the direction of trade flows. According to recent literature [Rose 2005] improving the quality of institutions or belonging to a trading bloc can have substantial positive effects on trade. The idea is that accession to the WTO involves a short run benefit from further reducing tariff and non-tariff barriers, and a long-term strategy that involves institutional reforms. Economic reform in Kazakhstan began in the 1990's; its

endeavors to shift from a transition economy to a market economy have been substantial. It is argued in this paper that although Kazakhstan's trade policy with its major partners is well in place, it still has weak market institutions.

The Kazakhstan-Russian relation in the context in the WTO membership

Thus, Kazakhstan accession to the WTO will better operate with additional institutional reforms. Kazakhstan asked for the WTO membership in 1996, after the Russia application in 1993. These two countries are related by geography, history, feeling, and, later, the commonly declared interest to form custom union and «economic space», together with other FSU members. Usually supposed that Russia will join the WTO at first and then Kazakhstan would duly follow it. However, after accession enthusiasm of Russia to the WTO decreased. Whether Russia will join to the WTO in near future is in doubt now. Therefore the following question arises: If the Russian accession is postponed or left, what will happen to Kazakhstan application for membership? This is an issue that can be solved by Kazakhstan, and Kazakhstan can make decision on if Russia is not a WTO member, Kazakhstan should not be a member too. All research provided in earlier chapters assumes that Kazakhstan would proceed to essential economic profit in that way. However the direct economic profit or loss will not necessarily be a determinative in the discussion of Kazakhstan government, and the decision is clear for it to make, though, of course, actions of other governments, Russian and Western can influence on its discussion.

Kazakhstan's accession to the WTO faces several challenges. The first is of an economic and economic policy nature: Kazakhstan's trade patterns are a legacy of distorted trade that could require painful adjustment, and its recent economic policy orientation could conflict with the goal of acceding to the WTO. Kazakhstan's WTO accession is complicated by its entanglement in a wider political and economic complex emerging from Russian pre-eminence and claims to such pre-eminence in the former Soviet Union. The complexity of the situation is compounded by Russia's own difficult WTO accession process. Kazakhstan is economically and strategically strongly aligned to Russia, and taking the step of accelerating WTO accession without waiting for Russia for the sake of its own prosperity demands strong political resolve by the Kazakh government. Europe and the United States seem to support the «Russia first» policy in the CIS, though by default rather than actively. If they wish to see Kazakhstan anchored in the multilateral trading system, a stronger resolve to finalize the process in collaboration with Kazakhstan is required.

Russia has been trying to become a member of the WTO since 1993. In the end of April, 2008 Georgia quit negotiating process on a Russia accession to the World Trade Organization protesting against the decree of Russia President on economic sanction removal concerning Abkhazia and South Ossetia. The WTO negotiations between Georgia and Russia were renewed in March, 2011 by Switzerland and the USA mediation. As Michael McFaul – the Director for Russia and Eurasia of the United States National Security Council declared on May 26, 2011 Russia can finish accession process to the WTO in 2011. Actually the forecast of the American diplomat has come true and Russia was officially accepted in the World Trade Organization in 2011.

According to the Minister for Economic Integration – Zhanar Aitzhanova it is necessary to settle two issues for Kazakhstan accession to the WTO. Recently she reported to Kazakhstan government on how negotiations on Kazakhstan accession to the World Trade Organization proceed.

She noticed that for today all bilateral negotiations on Kazakhstani good accession on the market of 30 WTO members have been finished, 27 of them are European Union countries.

Also all bilateral negotiations with 14 countries on service market have been finished. At the same time the multilateral negotiations with key country-members of the WTO on system-based questions - Kazakhstani content increase particularly in good purchase because of which Kazakhstan government asks for a transition period. The same transition period till 2018 Russian Federation assigned to itself at the WTO negotiations. Kazakhstani content exists in oil and gas branch and in good purchase by national companies whereas in Russia it exists in motor industry said Aitzhanova.

One more issue which Kazakhstan needs to settle is application possibility of the export custom duties on the raw goods.

As she said if Kazakhstan manages to finish all negotiations till the end of 2012 then our country cannot access to the WTO earlier than the middle of 2013. Half-year as explains Zhanar Aitzhanova will be spent for preparation and ratification of appropriate documents in Kazakhstan Parliament.

On April 18, 2012 in Geneva 11th working group session for Kazakhstan accession to the World Trade Organization took place. The Kazakhstan delegation was lead by the Minister for Economic Integration – Zhanar Aitzhanova.

The general trade turnover in 2011 has amounted 125 billion dollars with positive trading balance of 50 bln. USD. The direct foreign investments attracted in Kazakhstan economy in 2011 have made 147 billion USD noted the Minister in the report on social and economic development of the country for last years. She also made familiar the colleagues from other countries with currently approved laws and signed agreements which are aimed at legislative base improvement, economic processes stimulation in the country.

In their turn representatives of the USA, China, Brazil, EU, Saudi Arabia, Turkey, Mexico, Pakistan, Japan, Switzerland, India, Argentina and some other countries expressed their support to Kazakhstan accession to the WTO. «The Republic of Kazakhstan was, is and will be one of the main partners for the European Union who develops very rapidly. We hope that the WTO membership prospers not only Kazakhstan, but all participants of the Organization noted the EU representative in his reporting.

Further the working group passed to discussion on report project. Parties made their remarks and amendments to some of its chapters. Delegations particularly had remarks related to subsoil, investments, competitiveness, rail transportation, agriculture development, etc. Kazakhstan obligation to provide new WTO report project by taking into account all made remarks up to June 1, 2012 was stated at the session.

KAZAKHSTAN ACCESSION TO THE WTO: EXPECTATIONS AND CHALLENGES

The WTO represents the unique global international organization which regulates trade relations between the countries.

The purpose of the WTO activity is assistance to good and service manufacturers, to exporters and importers in their business promotion. Kazakhstan accession to the WTO is inevitable and necessary. Accession process of the Republic to the WTO is a component of the state strategy directed to effective integration of the country in community of the countries with democratic market economy. However, at the moment Kazakhstan accession to the WTO is mostly considered in the context of trade development. Open trade policy is objectively necessary for Kazakhstan having not large home market and demanding access to the extending world markets. It is necessary to expand understanding of an essence and consequences of Kazakhstan accession to WTO. Undoubtedly that the accession to WTO will open new prospects for the country, but at the same time will essentially limit possibilities of Kazakhstan in making of certain decisions.

The complex estimation is necessary for development of concrete directions of a policy concerning separate strategically important branches and a trunk-call position of the country on an accession to the WTO, how changes will raise efficiency of these branches and whether these changes can create additional stimulus of their development what can be negative consequences for other branches, and what steps of their regulation it is necessary to reduce. The special place in this list is occupied by small and medium business. Under the influence of globalization processes and introduction of new technologies the economy from manufacture scale plays the lesser role in manufacture of the goods, works, and services. Moreover, value of a small business and its contribution to macroeconomic development increase. The small and medium enterprises (SME) in the WTO countries on the average make more than 95 % of firms, provide 60-70 % of employment and constantly create new jobs. SMEs have both strengths, and the weaknesses demanding acceptance of special state measures.

However, it is necessary to take into account, that many of traditional problems of SME such as a lack of financing, operation difficulties of high technology equipments, and the lack of management skills, low labour productivity, and administrative barriers are essentially aggravated in the conditions of global integration into the world trade system. Small enterprises require modernization of management skills and information search, and also in updating technological base.

Considering that the WTO is the single international organisation which is engaged in global rules of international trade it is necessary to find balance between acceptance of a unified general complex of rules, privileges and the obligations applied commonly to all the WTO members including the fact, that members of the WTO are at rather various stages of development.

To economic expediency of the accession to the WTO and opening of the national markets can be only stage-by-stage and implemented after difficult structural reorganisation period is passed, steady rates of growth of economy are reached. Accession conditions are measurable with benefits and advantages which each country will receive from membership in this organisation, possibilities to resist to a foreign competition and to protect national commodity producers.

Paramount issue to promote Kazakhstan production on foreign markets is necessity to define the list of priority sectors of economy and degree of their liberalisation without damage to various branches of economy. Now priority branches of economy can be divided into the following basic directions:

1. Basically oriented on foreign markets and development of available resource potential of the country (oil production, black and nonferrous metallurgy);
2. The processing branches generally oriented on home market which develop on the basis of resource potential of the country (easy, chemical, petrochemical, pharmaceutical and medical, food, textile) and making production secondary and further repartitions;
3. Agricultural production.

The first group includes the following branches as priority ones with respect to their development perspective: energy sector, including oil extracting and oil refining; the gas industry; atomic engineering and mining-metallurgical complex.

The power sector of Kazakhstan (development, transfer and electric power distribution) is now practical the open market for the companies of all world and arrival of the foreign companies on our market basically had positive character.

For the second group of priority branches at accessions to WTO application of the complex mechanism of protective measures basically will support competitiveness of production of the light, chemical, petrochemical, pharmaceutical and medical, food and textile industry, one of which principal views will be level of the import custom duties necessary for protection. Development of the given branches of economy is necessary for the decision of social problems from the point of view of occupation level and improvement increase population prosperity of Kazakhstan.

In the field of agriculture and a processing industry there is a list of the priority or the "sensitive" goods demanding certain degree of protection: meat and dairy production, a butter, wheat, peas, rice, sunflower-seed oil, sugar, tomatoes and jams.

Despite agriculture indicators growth for last years which is provided by grain production and realisation, the given sector of economy demands considerable reforms.

Thereupon Kazakhstan is intended to improve the national legislation, in particular concerning the land property, agricultural equipment leasing, protection of the rights and interests of the agricultural enterprises and also to introduce progressive forms of crediting and financing of projects of country economy.

These and a number of other measures also will be directed on the solution of such problems in agriculture as:

- Low level of competitiveness of agricultural production;
- Insignificant volume of investments into agriculture;
- Low material equipment of an agricultural production and weak development of leasing of technics;
- Backwardness of system of purchases of agricultural production, wholesale trade;
- Absence of monitoring of fertility of soil, low the agricultural technician of cultivation of agricultural crops, reduction of application of fertilizers, a weak forage reserve and, as consequence, low productivity in branch;
- Problems of water delivery of southern areas, absence of purposeful state support of questions of hydroland improvement.

If on manufacture agricultural products is created in republic the system of the state support concerning products of processing it is not generated till now. Foodstuffs import as a result increases, danger to food independence of republic is created, it is lost exit possibility on the external grocery markets.

Only 15 % the meat produced and 7,8 % milk goes for processing in the food-processing industry enterprises whereas in 1990 this indicator was equal 71 % and 61,1 %.

Thus available capacities on manufacture of food production, except for mill manufactures are not loaded: capacities of sugar factories are used on 54 %, oil extracted factories on - 26 %, fruit-and-vegetable factories on - 26 %, on manufacture of meat factories on - 50 %, a sausage product on - 40 %, cheese on-30 %, oils creamy on - 47 %. Low-technological and obsolete equipment does not allow making competitive, corresponding to the international standards of production.

Maintenance of the steady economic growth, favorable investment climate, presence of own financial resources and necessity of working out of a new industrial policy for the intermediate term period.

Thus certain accent will be made on the decision of the problem connected with the resource spent structure of the industry. The main reason of the resource spent economy is physical and equipment obsolescence. From above 40 % the worn out fixed capital it is maintained in coal-mining, textile, of the tree processing industries, manufacture of nuclear materials, nonferrous metals, plastic products, in mechanical engineering, municipal services.

In sphere of services is defined the list of sensitive sectors of the services demanding the greatest level of protection for their effective development - financial, legal, commercial, transport, telecommunication, tourist, services in areas of building, researches and workings out.

It is necessary working out of strategy of development of the markets of services of Kazakhstan in the conditions of integration into the WTO in following basic directions:

- Creation of internal standard-legislative base on regulation of trade by services;
- Expansion of potential and increase of competitiveness of domestic sectors of services;
- Development of manpower resources and escalating of technical potential;
- Improvement of forms of granting of services (a telecommunication infrastructure, transboundary trade) working out of national strategy of export of services.

As a whole the export potential of Kazakhstan estimated per capita, considerably surpasses similar to parameter of member countries of the Eurasian Economic Community. However on an export indicator per capita our country essentially lags behind a similar average index of the countries of the Euro zone.

If the structure of export towards escalating of a share of production of the manufacturing industry, ready agricultural and food production from a high share of additional cost prospects of competitiveness of export sector of the country are represented doubtful is not improved. It will negatively be reflected in competitiveness of national economy as a whole.

As show results of the research spent in 2006 year by the Forum of Businessmen of Kazakhstan, only 20,8 % of businessmen are assured that the Kazakhstan businessmen can compete on the same level with foreign after joining to the WTO. Almost third interrogated (31,7 %) are unequivocally assured that will be noncompetitive. According to results of the same research the Kazakhstan businessmen not accurately enough imagine requirements of the World Trade Organization and are not informed enough on occurring negotiating processes. Thereupon the program of development of the Organization United the nations together with the Forum of businessmen of Kazakhstan was accepted the decision on carrying out of some seminars and the round tables devoted to subjects of the introduction of Kazakhstan in the WTO, and also the consequences connected with this process for domestic small and average business. The purpose of these actions is granting to businessmen of fuller information on consequences of joining to the WTO, desire to discuss affirmed stereotypes and, whenever possible, to consider realistic scenarios of succession of events.

Conditions of the WTO more predicted and based on international law will give the chance to Kazakhstan, using favorable internal possibilities to show the competitiveness in competition to trading partners.

The purpose of the introduction of any country in the WTO is reception of certain advantages.

For Kazakhstan they consist in the following:

- Besides Kazakhstan will be recognized by the country with the open market economy integrated into the world economy and world structures, promoting its development, it automatically receives in relations with all members of the WTO a most favored nation treatment (the MFN).
- Kazakhstan will have also additional and favorable ways of transit for the goods. It is especially important for development of foreign trade of Kazakhstan by the domestic goods of a manufacturing industry.
- In short - and, intermediate term prospect the introduction of Kazakhstan into the WTO is important, from the point of view, attraction of investments and, first of all, in a manufacturing industry and in development of hi-tech manufactures.
- the Great value for Kazakhstan can represent a mode of the WTO concerning trading disputes, especially at the antidumping trials applied concerning the export goods of Kazakhstan and will allow to solve trading-political disputes in the frameworks provided in the WTO of procedures, on more fair basis.
- Entering the WTO, Kazakhstan can really count on reception of the right of participation in working out of the norms regulating world trade, being guided by national interests.
- Besides, there will be an access possibility to the operative information on the external economic policy and intentions of the governments, the WTO countries-participants that, finally, will allow conducting more effective commercial policy.
- Creation of conditions of improvement of quality and competitiveness of national production as a result of expansion of presence of high technologies, the goods, services and investments in home market, introductions of the international quality standards.
- In connection with expansion of import the consumer can get access to wide good assortments and under lower prices.

The well-known scientist-economist, the professor, the public figure of Kazakhstan Kenzhegali Sagadiyev completely analyzes Kazakhstan aspiration to an accession to the WTO, and gives his view on a commercial policy of Kazakhstan and allocates the basic advantages and negative to a consequence in a case membership of Kazakhstan in the WTO. As he said, the aspiration of our country building an open society and open economy to become in original sense of this word the full member of the world community is truly welcomed. It will be significant event for all of us because it is the same as transition to market economy. And the prize is obvious – the domestic goods will get access on the markets of other countries without any discrimination, there will be an additional inflow of investments, and not only to raw sector, but also to other branches of economy.

At the same time it is necessary to emphasize that all these benefits and advantages do not come automatically. All depends on when, what conditions and with what degree of readiness to access to this international institute. By no means casually that many countries long time and carefully prepare for a WTO membership. For example, China nobody doubts of its success development prepared today for this action more than 15 years, becoming a member of the organization only in 2001. It is not coincidentally that those countries which did not take seriously preparation process and have hastened with an accession to WTO, not only have not received any benefits, but also have met serious difficulties. They are Kirgizia, Moldova, and Georgia. As a whole it is possible to consider experience of the accession of these countries to the WTO as negative because it has not given that economic growth on which they counted. Kirgizia has opened the borders for all goods and expected that significant investments will come also. And they have not only increased, and, on the contrary, were reduced. If the volume of direct foreign investments in 1997 amounted 96 million USD in 2000 it was reduced to \$39 million USD in this country. Economic indicators of Georgia do not improve. In Moldova, after its accession to WTO, there were serious problems in a number of the vital branches such as agriculture, mechanical engineering, tobacco and the wine industry, and foreign investments in 2000 were reduced to 8,0 %.

By all these examples I do not wish to reject idea of membership of Kazakhstan in the WTO. However, healthy pessimism and suspension should be the main imperatives in a choice of algorithm to access to this Organization. Yes, we advance the above-named CIS countries on rates of economic development and efficiency of reforms. Yes, the USA and Europe recognized Kazakhstan as the country with market economy. It is necessary to give due to reasonableness of strategy of the president, purposeful actions of the government. And still in an introduction question in members of the WTO there should not be no haste and accede with others» [Sagadiyev Kenzhegali, 2003].

Present issues – achievement of the results expected from Kazakhstan membership in the WTO, will mostly depend on terms of Kazakhstan accession to this Organization and obligation degree accepted by Kazakhstan on access provision to the domestic good and service market.

CONCLUSION

Non-economic considerations – in particular the importance Kazakhstan places on good relations with Russia – may play a major role in determining future events surrounding the application of Kazakhstan to join the WTO. Nevertheless, we focus here on economics. First, all of the evidence known to us suggests that WTO membership is a much better option for Kazakhstan, from an economic standpoint, than either the *status quo* (which includes, of course, the unconsummated customs unions that Kazakhstan has entered so freely) or a full fledged customs union with Russia. The evidence suggests that Kazakhstan trades more with Russia than is optimal, and too little with the EU and the rest of world. From an economic standpoint, Kazakhstan should be seeking means of reducing the bias towards trade with Russia, not, as would be the effect of a customs union with Russia, to increase the pressures in that direction. Moreover, while the economy of Kazakhstan has in a short time moved a long way from its Soviet origins, it still has some way to go. It is clear that travelling this extra distance will bring economic gains. It is also clear that it is more likely to be travelled if Kazakhstan places itself in the WTO environment than if it enters a customs union with a larger trading power – especially one that is similarly afflicted by a less-than-complete transition from the habits and thought patterns of the Soviet Union, which express themselves in government control and protectionism. Despite the gains that Kazakhstan stands to make from WTO membership and acceptance of WTO disciplines, a case can be made that the WTO should not raise the price of admission to Kazakhstan too high. The case is that the gains that will *directly* accrue to Kazakhstan from WTO membership – which are essentially the improvements in market access for Kazakhstan's non-mineral exports – are small. The rest of the prospective gains will stem from the government of Kazakhstan setting policy in a WTO-consistent manner, and from Kazakhstan's acceptance of the WTO ethos – an acceptance that is more likely if it is voluntary than if it is forced.

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FRICION IN TRADING PROCESSES: SOME EMPIRICAL EVIDENCE FROM THE INDEXES OF THE CEE EMERGING STOCK MARKETS

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Abstract: This paper focuses on friction in the trading processes in the context of the nonsynchronous trading effects. We investigate some empirical problems that can be attributed to market frictions on the emerging Central and Eastern European (CEE) stock markets. We examine the Fisher's effect in daily returns of major CEE stock market indexes, however, the results are rather controversial. The evidence is that the 'nonsynchronous trading effect II' may substantially disrupt the analysis of domestic market indexes. To analyze the Granger causality, we investigate both the whole sample May 2004 - April 2011 and two equal subsamples: the 'crisis' period and the 'post-crisis' period. Our results show several causal relationships in the whole sample period, in the case of the group of the biggest CEE stock market indexes and the group of the three Baltic market indexes. Moreover, to accommodate the 'nonsynchronous trading effect II' in the Granger causality tests, we propose a modified version of a VAR – type model in the case of the CEE and U.S. stock market indexes. We observe a pronounced feedback relationship for almost all of the analyzed models, both in the whole sample period and in the two subsamples. In light of our results, it seems that taking into account the 'nonsynchronous trading effect II' plays a crucial role in examining the lead-lag relationships among the world stock markets.

JEL Classification: C32, C58, G15

Key Words: CEE stock markets, market frictions, nonsynchronous trading, Granger causality

1. Introduction

An event that had significant impact on a group of Central and Eastern European (CEE) emerging markets was the accession to the European Union (EU) on the 1st of May 2004. Eight economies were successful in the negotiations with the EU and they all accessed the EU. These eight countries, in order of largest population size are: Poland, the Czech Republic, Hungary, the Slovak Republic, Lithuania, Latvia, Slovenia and Estonia (Southall, 2008). For this reason these eight economies are particularly interesting in many respects. The EU enlargement creates a dynamic financial landscape, unique on a world scale (Syriopoulos, 2007).

In this paper, we perform an analysis of some empirical problems that can be attributed to friction in the trading processes, especially in the case of the eight CEE emerging stock markets. We understand frictions as various disturbances in the trading processes. Many authors place nonsynchronous trading in a broader class of market frictions. Some studies distinguish between two nonsynchronous trading effect problems. The first problem, called the 'nonsynchronous trading effect I', occurs when we analyze one selected domestic stock market. The second and potentially serious problem, called the 'nonsynchronous trading effect II', occurs when we examine the relations between the stock markets in various countries.

Probably Lawrence Fisher in 1966 was the first who suggested that the market–index returns first–order autocorrelation was caused by a 'nonsynchronous trading effect I' of the component securities. For this reason, we investigate the Fisher's effect in daily returns of the CEE stock market indexes, in various subsamples in the period from May 1, 2004 to April 30, 2011. We examine the subsamples to check the robustness of the empirical results.

Another interesting problem is the Granger causality analysis on the indexes of the CEE emerging stock markets. It is worth stressing that a potentially serious problem is the use of daily closing prices from stock exchanges in various countries. International stock markets have different trading hours and the time series of market-indexes returns have unequal numbers of observations. We place the data non-synchronicity problem in the class of market frictions. Some of the studies by-pass the non-synchronicity problem by using weekly or monthly data. In this paper, we investigate the Granger causality on the eight CEE stock markets using a daily data-matching process. In our research, we compare the empirical results for both the whole sample and two equal subsamples: 9.10.2007 – 9.03.2009 as the 'crisis' period and 10.03.2009 –

30.07.2010 as the 'post-crisis' period (each consists of 310 observations). Syczewska (2010) proposed somewhat different subsamples, but we advocate March 9, 2009 as the end of the

'crisis' period because of the global minimum of the S&P500 index value in the whole sample, achieved on that day. The overall S&P500 index fell from 1565.15 (October 9, 2007) to 676.53 (March 9, 2009). It lost 56.78% of previous value during the 'crisis' period. We use the bivariate VAR – type Granger causality model to examine for interdependences between the pairs of the selected CEE stock markets. However, the general VAR approach should not be used directly when the 'nonsynchronous trading effect II' is a concern, as it only allows for lagging all the independent variables in the same manner. This study contributes to the existing literature by proposing the modified version of the bivariate VAR – type model to accommodate the

'nonsynchronous trading effect II' in the Granger causality tests. In light of our results, it seems that taking into account the 'nonsynchronous trading effect II' plays a crucial role in examining the lead-lag relationships among the world stock markets.

The remainder of this study is organized as follows. Section 2 presents a brief analysis of the ‘nonsynchronous trading effect I’ and the Fisher’s effect. In Section 3, we present the ‘nonsynchronous trading effect II’ and some data-matching processes. Section 4 specifies a methodological background and a brief literature review of the theoretical framework concerning the Granger causality analysis. In Section 5, we present the data and discuss the empirical results obtained. Section 6 recalls the main findings and presents the conclusions.

2. The ‘Nonsynchronous Trading Effect I’ and the Fisher’s Effect

It is worth stressing that the empirical market microstructure literature is an extensive one recently. High-frequency financial data are important in studying a variety of issues related to the trading processes and market microstructure (Tsay, 2010). For some purposes, market microstructure is central (Campbell et al., 1997).

In 1980 Cohen et al. pointed to various frictions in the trading process that can lead to a distinction between ‘true’ and observed returns. They focused on the fact that transaction prices differ from what they would otherwise be in a frictionless environment. It was reported in the literature that some empirical phenomena can be attributed to frictions in the trading process (e.g. Fisher, 1966; Hawawini, 1980; Perry, 1985; Berglund and Liljeblom, 1988; Iwaisako, 2004; Brzezczynski et al., 2011; Olbrys, 2011a, b). As mentioned in the Introduction, some researchers distinguish between two nonsynchronous trading effect problems. The first problem, called the ‘nonsynchronous trading effect I’, occurs when we analyze one selected domestic stock market. The non-trading effect induces potentially serious biases in the moments and co-moments of asset returns such as their means, variances, covariances, betas, and autocorrelation and cross-autocorrelation coefficients (e.g. Lo and MacKinlay, 1990; Campbell et al., 1997). In (Cohen et al., 1980) six empirical phenomena concerning the ‘nonsynchronous trading effect I’ were presented. The most important of them are: (1) weak serial correlation in individual security daily returns; (2) positive serial cross-correlations between security returns and market index; (3) positive serial correlation in market index returns, with smallest effect for long differencing intervals and those indexes giving the least weight to thin securities returns; this index phenomenon is called the Fisher’s effect since L. Fisher in 1966 hypothesized its probable cause. Fisher showed that the returns of stock market indexes exhibit positive autocorrelation even when they are constructed from individual securities which do not exhibit significant autocorrelations.

It is worthwhile to note that the presence of the Fisher’s effect in the context of the non-trading problem is widely discussed in the literature. Hawawini (1980) points out that the presence of intertemporal cross correlations in daily returns of securities is sufficient to explain the Fisher’s effect. He shows that these correlations are the major source of autocorrelation in the indexes. Perry (1985) stresses the problem of the nonsynchronous trading in the case of the securities of small firms but he reports that non-trading is not the sole cause of market index serial correlation. Berglund and Liljeblom (1988) analyze the value-weighted market index on a markedly thin security market, the Helsinki Stock Exchange in Finland. They conclude that the Fisher’s effect, which is due to a lack of trading in a non-negligible number of stocks almost every day, will not contribute much to observed market serial correlation. Iwaisako (2004) examines the nature of market index autocorrelations and cross-autocorrelations of size portfolios generating index correlations in the Japanese market. The empirical results presented in (Olbrys, 2011a, b) show a pronounced Fisher’s effect in the case of the Warsaw Stock Exchange (WSE) main indexes: WIG, mWIG40 and sWIG80 series. The most clear effect is observed for the sWIG80 series. The sWIG80 index comprises 80 small size companies listed on the WSE. This evidence is consistent with most of the literature on friction in the trading processes because the observed correlation is higher in those indexes that give greater weight to the securities of smaller firms.

To detect for the Fisher’s effect, one can study daily logarithmic returns on the analyzed stock market indexes. The whole sample could be divided into various subsamples to check the robustness of the empirical results. In the first step, partial autocorrelations functions (PACF) should be calculated. To calculate the partial autocorrelations functions, first it should be detected (e.g. based on the Augmented Dickey – Fuller test) that the analyzed series are stationary. In the next step, one should calculate partial autocorrelations functions for individual stationary processes in the selected subsamples and then test the significance of the first-order daily serial correlation coefficients

using the Quenouille’s test. The critical value of the Quenouille’s test is equal to $\frac{u_\alpha}{\sqrt{T}} = \frac{1.96}{\sqrt{T}}$, where T is the number of data points. The evaluation of the first-order serial correlation is carried out by testing the null hypothesis: δ

$$H_0: \rho_1 = 0$$

If the estimate $\hat{\rho}_1$ satisfies an inequality $|\hat{\rho}_1| \leq \frac{1.96}{\sqrt{T}}$ then it is no reason to reject the null hypothesis (1).

3. The ‘Nonsynchronous Trading Effect II’ and Data-Matching Processes

The second and potentially serious problem concerning non-trading, called ‘the nonsynchronous trading effect II’, occurs when we examine the relations between the stock markets in various countries. The national stock markets are operating in diverse time zones with different opening and closing times, thereby making return observations nonsynchronous (Eun and Shim, 1989). These differences arise naturally from the fact that trading days in different countries are subject to different national and religious holidays, unexpected events, and so forth (Baumöhl and Výrost, 2010). Many studies attempted various methods to deal with the ‘nonsynchronous trading effect II’. Some researchers use weekly (e.g. Kadlec and Patterson, 1999) or monthly data to avoid the non-trading problem (e.g. Kwan et al., 1995; Hanousek and Filer, 2000; Masih and Masih, 2001; Drakos and Kutun, 2005). Such solutions, however, may lead to small sample sizes and cannot capture the information transmission in shorter (daily) timeframes (Baumöhl and

Výrost, 2010). Other papers present various daily data-matching processes. For example, Hamao et al. (1990) divide daily close-to-close returns into their close-to-open and open-to-close components. Martens and Poon (2001) use prices recorded at 4:00 p.m. London time for the U.S. (S&P500 index), the U.K. (FTSE100 index) and France (CAC40 index) to study the daily dynamics of the stock index returns. In (Forbes and Rigobon, 2002) the stock market returns are calculated as rolling-average, two-day returns based on each country's aggregate stock market index. In many studies the following approach, also called a 'common trading window', is very popular: the data are collected for the same dates across the stock markets, removing the data for those days when any series has a missing value due to no trading (e.g. Eun and Shim, 1989; Égert and Kočenda, 2011). Černý and Koblás (2008) compare the results of Granger causality and cointegration tests for different data frequencies, and to assure comparability of the results they choose one time for each pair of tested indexes, for example 5:15 p.m. (Western and Central European Daylight Time) for a pair consisting of one U.S. and one European index. Baumöhl and Výrost (2010) perform the Granger causality analysis on the stock market indexes from several markets and they synchronize daily data using their own data-matching procedure. Unfortunately, the majority of studies neither precisely examine nor account for the 'nonsynchronous trading effect II' problem of daily data.

4. The Granger Causality Analysis

The analysis of dynamic linkages between the stock markets is recently one of the most active research areas in economics and finance. To measure any linkage that may exist between the stock markets, the Granger causality test may be employed. If markets are indeed linked, one should observe the Granger causality running from market to market. Smith et al. (1993) found evidence of the Granger unidirectional causality running from the U.S. to the other countries (i.e., the Great Britain, West Germany, and Japan) immediately after the October 1987 world-wide crash. Kwan et al. (1995) applied the Granger causality tests to monthly time series of nine major stock market indexes over the period Jan 1982 – Feb 1991 to examine for causal linkages, in the context of market information efficiency. In 2000, Hanousek and Filer employed the technique of Granger causality to examine whether secondary equity markets in four of the most advanced former communist countries (i.e., the Czech Republic, Hungary, Poland, and Slovakia) exhibit the key characteristic of semi-strong efficiency, i.e., the ability to fully reflect newly-released public information in stock prices. To examine the international stock market interdependence between the U.S. and Latin American Markets in Mexico, Argentina and Brasil, Soydemir (2000) did not analyze the Granger causality but he investigated the transmission patterns of stock market movements between developed and emerging market economies by estimating a four-variable VAR model. Masih and Masih (2001) investigated the dynamic causal linkages amongst nine major international stock price indexes (four developed and five emerging). They pointed out that the bivariate lead-lag relationships between two stock markets, or standard Granger F -tests in a VAR framework, are useful only in capturing the short-run temporal causality. Drakos and Kután (2005) examined the long-run (price), and short-run (return) linkages between the Greek and Turkish stock and foreign exchange markets. They stressed that the finding of cointegration (i.e. long-run linkages) in the bivariate system implies that the Granger causal chain is in place. In other words, causality in at least one direction is guaranteed with the potential for feedback to be present. In 2007, Syriopoulos investigated the short- and long-run behavior of major emerging Central European (Poland, the Czech Republic, Hungary, Slovakia) and developed (Germany, U.S.) stock markets, and assessed the impact of the European Monetary Union (EMU) on stock market linkages. In the paper dated 2008, Černý and Koblás presented cointegration and Granger causality tests in the case of the indexes from the U.S., London, Frankfurt, Paris, Warsaw, Prague, and Budapest stock markets. They used a unique high-frequency dataset. Recently, Baumöhl and Výrost (2010) performed the Granger causality analysis on stock indexes from several Asian, European, and U.S. markets from different time zones. The results support the evidence for a U.S. dominance in the international stock markets. In the literature, the so-called 'Granger causality' is an econometric relationship which tests whether additional information from variable x helps explain y (Smith et al., 1993). A variable x is defined as a Granger – cause for another variable y , if lagged values of x used as additional regressors in a model describing y can improve the quality of modeling/forecasting. The Granger test (1969) of Granger causality is performed in the following way: we estimate a VAR – type equation (Sims, 1980) and check joint significance of lagged x parameters:

$$y_t = \sum_{m=1}^k a_m y_{t-m} + \sum_{m=1}^k b_m x_{t-m} + \varepsilon_t \quad (2)$$

The null hypothesis:

$$H_0 : b_1 = b_2 = \dots = b_k = 0 \quad (3)$$

means that the x does not Granger – cause the y variable. The number of lags k is called the order of the VAR – type equation. The Wald's F - test for joint significance of the parameters $b_{m,1}, m = 1, \dots, k$ is performed to evaluate the null hypothesis (3) (Maddala, 2001). Let $R_{i,t}$, $R_{j,t}$ be two stationary time series with zero means. The simple causal bivariate VAR – type model is (Granger, 1969):

$$\begin{aligned} R_{i,t} &= \sum_{m=1}^k a_{i,m} R_{i,t-m} + \sum_{m=1}^k b_{i,m} R_{j,t-m} + \varepsilon_{i,t} \\ R_{j,t} &= \sum_{m=1}^k a_{j,m} R_{j,t-m} + \sum_{m=1}^k b_{j,m} R_{i,t-m} + \varepsilon_{j,t} \end{aligned} \quad (4)$$

where $\varepsilon_{i,t}, \varepsilon_{j,t}, i \neq j$ are taken to be two uncorrelated white-noise series.

$$R_{i,t}$$

The definition of causality given above implies that $R_{j,t}$ is causing $R_{i,t}$ provided some $b_{i,m}$ is not zero. Similarly, $R_{i,t}$ is causing $R_{j,t}$ if some $b_{j,m}$ is not zero. If both of these events occur, there is said to be a feedback relationship between $R_{i,t}$ and $R_{j,t}$ (Granger, 1969).

$$R_{i,t}$$

According to Granger (1969), a time series, $R_{i,t}$ is caused by another time series, $R_{j,t}$ if the current value of $R_{i,t}$, can be better predicted from past values of $R_{i,t}$ and $R_{j,t}$ than from past values of $R_{i,t}$, alone. Essentially, the Granger's definition of causality is framed in terms of predictability (Kwan et al., 1995).

To determine the optimal number of lags k in a model (4), the Akaike (AIC), Schwartz (BIC) or Hannan-Quinn (HQC) information criteria are generally applied (Baumöhl and Výrost, 2010). The lowest value of the AIC, BIC or HQC indexes indicates the preferred model, that is one with the fewest parameters that still provides an adequate fit to data.

The Granger causality test is reported to work well for stationary variables. Therefore, one should first detect (e.g., based on the Augmented Dickey – Fuller test) that the analyzed time series $R_{i,t}$, $R_{j,t}$ are stationary.

5. Data Description and Empirical Results on the Indexes of the CEE Emerging Stock

Markets

As mentioned in the Introduction, eight CEE emerging markets were successful in the negotiations with the EU and they all accessed the EU on the 1st of May 2004. These eight countries, in order of largest population size are: Poland, the Czech Republic, Hungary, the Slovak Republic, Lithuania, Latvia, Slovenia and Estonia. The raw data consists of daily closing prices of major CEE stock market indexes and the New York market index – S&P500. We removed the data for those days when any series had a missing value due to no trading. Thus all the data are collected for the same dates across all of the markets and finally there are 1531 observations for each series for the period beginning May 4, 2004 and ending April 29, 2011 (seven years). We propose a ‘common trading window’ approach to deal with the ‘nonsynchronous trading effect II’. All analyses are conducted using the open-source computer software Gretl 1.9.7 (Adkins, 2012; Cottrell and Lucchetti, 2012).

5.1. The Fisher's Effect on the CEE Stock Markets

As noted in Section 2, one of the empirical phenomena on a domestic stock market concerning the ‘nonsynchronous trading effect I’ would be the Fisher's effect. To detect for the Fisher's effect on the CEE stock markets in the period investigated, we study daily logarithmic returns on the main CEE stock market indexes (cf. Table 1). Table 1 presents a brief information about the major CEE stock market indexes in order of largest market capitalization size at the end of 2010.

Table 1. The CEE stock market indexes used in the study

	Market	Market Cap., EUR billion, Dec 2010	Market Opening Time (Feb 2012)	Market Closing Time (Feb 2012)	Index	Some Details of the Index Construction
1	Warsaw	142.3	9:00 AM	5:20 PM	WIG	This is the WSE weighted index with relative weights based upon the capitalization of listed shares. It contains all listed companies except companies with free-float below 10%.
2	Prague	31.9	9:10 AM	4:20 PM	PX	This is the PSE price index of blue-chip issues, weighted by market capitalization.
3	Budapest	20.6	9:02 AM	5:00 PM	BUX	This is the official index of blue-chip shares listed on the BSE. It is calculated based on the actual market prices of a basket of shares. This is the index with market capitalization weighting corrected for free-float.
4	Ljubljana	7.0	9:30 AM	1:00 PM	SBI TOP	This is the LJSE blue-chip index and serves as the Slovene capital market benchmark index. It is a

						price index, weighted by free-float market capitalization.
5	Vilnius	4.2	10:00 AM	3:55 PM	OMXV	This is an all-share index. It reflects the current status and changes on the NASDAQ OMX Vilnius.
6	Bratislava	3.4	11:00 AM	3:30 PM	SAX	This is the official share index of the BSSE. It is a capital-weighted index that compares the market capitalization of a selected set of shares with the market capitalization of the same shares as of a given reference day.

7	Tallinn	1.7	10:00 AM	3:55 PM	OMXT	This is an all-share index. It reflects the current status and changes on the NASDAQ OMX Tallinn.
8	Riga	0.7	10:00 AM	3:55 PM	OMXR	This is an all-share index. It reflects the current status and changes on the NASDAQ OMX Riga.

Source: <http://www.fese.be/en>; <http://www.nasdaqomxbaltic.com>; <http://www.world-exchanges.org>

Note: Time is given in Western and Central European Daylight Time.

We divide the whole sample into six subsamples: P1, P2, P3, P4, P5, P6 (see Table 2).

Table 2. Subsamples in the period from May 4, 2004 to April 29, 2011

Subsample		T
P1	May 4, 2004 – April 29, 2011	1531
P2	May 5, 2005 – April 29, 2011	1310
P3	May 4, 2006 – April 29, 2011	1096
P4	May 9, 2007 – April 29, 2011	885
P5	May 6, 2008 – April 29, 2011	666
P6	May 5, 2009 – April 29, 2011	444

Note: T is the number of data points.

In the next step we calculate the partial autocorrelations functions (PACF). To calculate the partial autocorrelations functions (PACF), we first detect (based on the ADF test) that the analyzed series are stationary. Empirical values of the $\hat{\rho}$ -statistic (at the 5% significance level) lie in the following intervals: [-31.19; -24.26] (P1), [-28.94; -22.47] (P2), [-26.53; -20.58] (P3), [-24.27; -18.43] (P4), [-20.78; -15.93] (P5), [-16.56; -13.41] (P6). All empirical values are substantially lower than the critical value equal to -3.41. In the next step we calculate the partial autocorrelations functions (PACF) for individual stationary processes, in the six subsamples P1, P2, P3, P4, P5, P6, and we test the significance of the first-order daily serial correlation coefficients $\hat{\rho}_1$ using the Quenouille's test. Table 3 provides details on the first-order daily serial correlations in the analyzed series. The major CEE stock market indexes are in the same order as in Table 1.

Table 3. PACF estimators of the CEE market indexes (first-order daily serial correlation)

Sample	Critical value of the Quenouille's test	WIG	PX	BUX	SBI TOP	OMXV	SAX	OMXT	OMXR
P1	0.0501	0.027	0.010	0.014	0.129	0.125	0.030	0.130	-0.036
P2	0.0542	0.025	0.011	0.008	0.125	0.124	0.003	0.133	-0.033
P3	0.0592	0.030	0.009	0.010	0.116	0.117	-0.007	0.131	-0.054
P4	0.0659	0.026	0.001	-0.004	0.111	0.119	-0.004	0.109	-0.058
P5	0.0759	0.033	0.005	-0.008	0.068	0.123	-0.000	0.104	-0.051
P6	0.0930	-0.028	-0.068	-0.078	0.075	0.126	-0.009	0.103	-0.050

Source: Authors' calculations (using *Gretl 1.9.7*)

Notes: The table is based on observations of six samples. The major CEE stock market indexes are in the same order as in Table 1. Estimates greater than critical values marked in bold.

The empirical results presented in Table 3 show a pronounced Fisher's effect only in the case of the SBI TOP (Ljubljana), OMXV (Vilnius), and OMXT (Tallinn) series. We have no reason to reject the null hypothesis (1) in the case of the other series. However, these results are rather controversial. It is worthwhile to note that, in contrast to previous findings (cf. Olbrys, 2011a, b), this study finds that there is no Fisher's effect evidence in the case of the WIG series (Warsaw). To wit, we proposed a 'common trading window' approach and we removed the data of those days when any series had a missing value due to no trading. This data-matching

procedure caused a substantial reduction of the number of data points (e.g. from 1760 to 1531 for the Polish market in the whole sample period). One may erroneously conclude that the Fisher's effect do not exist, although it is present. Therefore, it is clear that the 'nonsynchronous trading effect II' induces potentially serious biases in the serial correlation in market index returns and may disrupt the analysis of domestic market index daily returns. It is worth stressing that, probably, this problem concerns not only the Polish market, but other markets investigated as well, and it would be a possible direction for further investigation.

5.2. The Granger Causality Analysis on the CEE Stock Markets

We used the bivariate Granger causality model (4) to examine for interdependences between the pairs of selected CEE stock markets. Let $R_{i,t}$, $R_{j,t}$ be daily logarithmic returns on the two CEE stock market indexes at time t , for markets i, j , $i \neq j$. We use the BIC criterion to determine the optimal number of lags k in the model (4). The lowest value of the BIC index indicates the preferred model, that is one with the fewest parameters that still provides an adequate fit to data.

As mentioned in Section 4, the Granger causality test is reported to work well for stationary variables. Therefore, we first detect (based on the ADF test) that the analysed $R_{i,t}$, $i = 1, \dots, 8$ (cf Table 1), and the $R_{SP,t}$ (the S&P500) series are stationary in the case of all markets, both in the whole sample 4.05.2004 – 29.04.2011 and two equal subsamples: 9.10.2007 – 9.03.2009 (the 'crisis' period), and 10.03.2009 – 30.07.2010 (the 'post-crisis' period). We apply the ADF test with a constant term, and a constant term with a time trend. Various lag lengths were tried and examined. Similar results were obtained. When the unit root test is applied to each subperiod, consistent results are also found. All empirical values of the τ -statistic (at the 5% significance level) are substantially lower than the critical value equal to -3.41 (for the test with a constant and with a time trend). Then, we have to reject the null hypothesis of the presence of a unit root (i.e., the daily logarithmic returns series on the main CEE stock market indexes and the S&P500 index are stationary).

In our analysis of the Granger causality, we concentrate on selected pairs of the major CEE stock market indexes. In our opinion the analysis of two groups of indexes is particularly well-founded: (1) the group of the biggest CEE stock market indexes: WIG, PX, BUX; (2) the group of three Baltic market indexes: OMXV, OMXT, OMXR. Table 4 provides details on the results of the casual bivariate VAR – type models (4). Results of the Granger causality tests of the remaining pairs of indexes are not presented in Table 4, but are available upon request.

Table 4. Results of the Granger causality tests using the model (4)

	Causal relationship $x \rightarrow y$	Whole sample (1)			Crisis (2)			After crisis (3)		
		Optimal lag k	F		Optimal lag k	F		Optimal lag k	F	
1	$WIG \rightarrow PX$	2	5.183 [0.006]	H_1	1	6.593 [0.011]	H_1	1	2.014 [0.156]	H_0
	$PX \rightarrow WIG$		5.364 [0.005]	H_1		4.637 [0.032]	H_1		4.118 [0.043]	H_1
2	$WIG \rightarrow BUX$	1	2.333 [0.127]	H_0	1	0.386 [0.535]	H_0	1	1.091 [0.297]	H_0
	$BUX \rightarrow WIG$		0.011 [0.917]	H_0		0.242 [0.623]	H_0		0.008 [0.927]	H_0
3	$BUX \rightarrow PX$	2	14.634 [0.000]	H_1	2	10.747 [0.000]	H_1	1	0.310 [0.578]	H_0
	$PX \rightarrow BUX$		3.116 [0.045]	H_1		6.106 [0.002]	H_1		0.337 [0.562]	H_0
4	$OMXT \rightarrow OMXV$	1	6.653 [0.010]	H_1	1	2.999 [0.084]	H_0	1	1.742 [0.187]	H_0
	$OMXV \rightarrow OMXT$		2.497 [0.114]	H_0		0.543 [0.462]	H_0		2.200 [0.139]	H_0
5	$OMXT \rightarrow OMXR$	1	10.241 [0.001]	H_1	1	0.756 [0.385]	H_0	1	4.296 [0.039]	H_1
	$OMXR \rightarrow OMXT$		0.652 [0.419]	H_0		0.021 [0.886]	H_0		0.347 [0.556]	H_0
6	$OMXV \rightarrow OMXR$	1	19.523 [0.000]	H_1	1	4.330 [0.038]	H_1	1	6.553 [0.011]	H_1
	$OMXR \rightarrow OMXV$		0.060 [0.806]	H_0		0.065 [0.799]	H_0		1.746 [0.187]	H_0

Source: Authors' calculations (using *Gretl 1.9.7*)

Notes: The table is based on: (1) the whole sample period May 4, 2004 – April 29, 2011; (2) the crisis period Oct 9, 2007 - March 9, 2009, and (3) the after crisis period March 10, 2009 - July 30, 2010; The table contains Wald's F -statistics and p -values in brackets. The model under H_0 is restricted compared to the model under H_1 . The Wald's F -statistics is used to test H_0 versus H_1 .

$x \rightarrow y$ means: H_1 ' x Granger-causes y '.

Several results in Table 4 are worth special notice. First, in terms of causal direction, the F - tests suggest that, in the whole sample period, in 7 out of 12 cases, the null hypothesis of non- Granger causality is rejected at a 5% level of significance. We observe a pronounced uni- directional causal sequence in the case of the following 'Baltic' models: $OMXT \rightarrow OMXV$, $OMXT \rightarrow OMXR$, and $OMXV \rightarrow OMXR$. The latter two relationships are not surprising because the NASDAQ OMX Riga is the smallest Baltic market. Two models, $WIG \rightarrow PX$ and $BUX \rightarrow PX$, reveal bi-directional causality, i.e. exhibit a feedback relationship. Second, focusing on the results in the 'crisis period', we observe a significant uni-directional causal sequence only in the case of the model $OMXV \rightarrow OMXR$, however, the feedback relationship is observed for the same models $WIG \rightarrow PX$ and $BUX \rightarrow PX$ in the entire sample likewise. Finally, we observe only three significant uni-directional causal relationships in the 'post-crisis' period: $PX \rightarrow WIG$, $OMXT \rightarrow OMXR$, and $OMXV \rightarrow OMXR$. There is evidence for lack of any feedback relationships in the 'post-crisis' period. Since the CEE countries are geographically close, they are within

one time zone. As a consequence, the trading hours for the CEE stock markets are about the same. As we can see in Table 1, the Warsaw Stock Exchange has the longest trading hours (from 9:00 AM to 5:20 PM). The New York Stock Exchange trades from 3:30 PM to 10:00 PM CET (Central European Time). Figure 1 presents exchange trading hours (CET) and the trading overlap between the CEE and U.S. stock markets. To simplify the analysis we assume that the CEE and U.S. markets open and close almost sequentially.

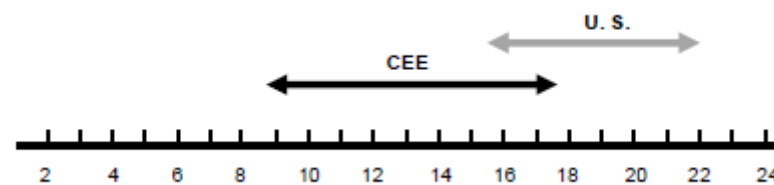


Figure 1. Exchange trading hours (CET).

Note that on a given day, because the CEE stock markets open before the U.S. market (cf. Fig. 1), a daytime information set from the CEE market would have an influence on the U.S. market on the same day, and a daytime information set from the U.S. market would have an influence on the CEE markets on the next day. An information set can be seen in broad terms as the set of all information relevant for pricing an asset at a given time (Baumöhl and Výrost, 2010). Therefore, the information on the closing values of the CEE and U.S. stock markets indexes does not belong to the same information set. To accommodate this ‘nonsynchronous trading effect II’ in the Granger causality tests, we proposed a modified version of bivariate VAR – type model (4) in the case of pairs formed by each CEE index and the S&P500 index:

$$R_{i,t} = \sum_{m=1}^k a_{i,m} R_{i,t-m} + \sum_{m=1}^k b_{i,m} R_{SP,t-m} + \varepsilon_{i,t}$$

$$R_{SP,t} = \sum_{m=1}^k a_{SP,m} R_{SP,t-m} + \sum_{m=0}^{k-1} b_{SP,m} R_{i,t-m} + \varepsilon_{SP,t}$$

where: $R_{i,t}$, $i = 1, \dots, 8$ denote daily logarithmic returns on the appropriate CEE stock market index i at time t ; $R_{SP,t}$ denotes daily logarithmic returns on the S&P500 index, and $\varepsilon_{i,t}$, $\varepsilon_{SP,t}$, $i = 1, \dots, 8$ are taken to be two uncorrelated white-noise series.

It is worth stressing that the general VAR approach should not be used directly when the ‘nonsynchronous trading effect II’ is a concern, as it only allows for lagging all the independent variables in the same manner.

Table 5. Results of the Granger causality tests using the modified model (5)

	Causal relationship $x \rightarrow y$	Whole sample (1)			Crisis (2)			After crisis (3)		
		Optimal lag k	F		Optimal lag k	F		Optimal lag k	F	
1	$SP \rightarrow WIG$	2	49.905 [0.000]	H_1	1	38.303 [0.000]	H_1	1	5.504 [0.019]	H_1
	$WIG \rightarrow SP$		231.94 [0.000]	H_1		137.61 [0.000]	H_1		127.54 [0.000]	H_1
2	$SP \rightarrow PX$	2	113.69 [0.000]	H_1	1	86.002 [0.000]	H_1	1	19.854 [0.000]	H_1
	$PX \rightarrow SP$		239.92 [0.000]	H_1		124.42 [0.000]	H_1		128.39 [0.000]	H_1
3	$SP \rightarrow BUX$	2	48.514 [0.000]	H_1	1	46.976 [0.000]	H_1	1	5.516 [0.019]	H_1
	$BUX \rightarrow SP$		214.16 [0.000]	H_1		153.73 [0.000]	H_1		118.98 [0.000]	H_1
4	$SP \rightarrow SBITOP$	2	127.19 [0.000]	H_1	1	97.993 [0.000]	H_1	1	24.845 [0.000]	H_1
	$SBITOP \rightarrow SP$		46.249 [0.000]	H_1		34.141 [0.000]	H_1		14.998 [0.000]	H_1
5	$SP \rightarrow OMXV$	2	77.998 [0.000]	H_1	2	29.671 [0.000]	H_1	1	16.677 [0.000]	H_1
	$OMXV \rightarrow SP$		37.659 [0.000]	H_1		13.826 [0.000]	H_1		26.046 [0.000]	H_1
6	$SP \rightarrow SAX$	2	1.405 [0.246]	H_0	2	1.633 [0.196]	H_0	1	0.665 [0.415]	H_0
	$SAX \rightarrow SP$		0.336 [0.715]	H_0		0.863 [0.423]	H_0		0.658 [0.418]	H_0
7	$SP \rightarrow OMXT$	2	94.179 [0.000]	H_1	2	39.964 [0.000]	H_1	1	25.361 [0.000]	H_1
	$OMXT \rightarrow SP$		51.933 [0.000]	H_1		21.657 [0.000]	H_1		8.011 [0.005]	H_1
8	$SP \rightarrow OMXR$	2	29.930 [0.000]	H_1	1	28.552 [0.000]	H_1	1	2.397 [0.122]	H_0
	$OMXR \rightarrow SP$		9.280 [0.000]	H_1		10.403 [0.001]	H_1		0.041 [0.839]	H_0

Source: Authors' calculations (using *Gretl 1.9.7*)

Notes: The table is based on: (1) the whole sample period May 4, 2004 – April 29, 2011; (2) the crisis period Oct 9, 2007 – March 9, 2009, and (3) the after crisis period March 10, 2009 – July 30, 2010. The major CEE stock market indexes are in the same order as in Table 1. SP denotes the S&P500 index. The table contains Wald's F -statistics and p -values in brackets. The model under H_0 is restricted compared to the model under H_1 . $x \rightarrow y$ means: H_1 ' x Granger-causes y '.

Table 5 presents further analysis, including more details about the Granger causality in the case of pairs formed by each CEE index and the S&P500 index. We observe a pronounced feedback relationship for almost all of the analyzed models, both in the whole sample

period and in two subsamples. We have no reason to reject the null hypothesis of non-Granger causality only in the case of the pairs $SP \square SAX$, $SAX \square SP$ (in all samples), and $SP \square OMXR$, $OMXR \square SP$ (in the post-crisis sample). The evidence of many feedback relationships in Table 5 may be rather surprising but, as a matter of fact, our results are consistent with those achieved by Baumöhl and Výrost (2010). They examined the Granger causality in the case of several Asian, European, and U.S. markets, and they used the adjusted models to reflect the ‘nonsynchronous trading effect II’. They found that all of the analyzed indexes significantly Granger – cause the S&P500, while the non-adjusted Granger models suggested that none of the examined indexes had an impact on the U.S. index. This therefore confirms that taking into account the ‘nonsynchronous trading effect II’ plays a crucial role in examining the lead-lag relationships among the world stock markets. However, it is important to note that ‘ x Grangercauses y ’ does not imply that y is the effect or the result of x , as Granger ‘causality’ measures linear precedence and information content but does not by itself indicate causality in the more common use of the term (Syriopoulos, 2007).

5.3. Contemporaneous correlations

Finally, to confirm that the use of our modified VAR-type model (5) is well-founded, we calculate the contemporaneous correlation coefficients of daily logarithmic returns on the pairs of the S&P500 index with each CEE index (cf. Table 6). The results are consistent with those in Table 5. To wit, almost all of the cross-market correlations are statistically significant and this evidence confirms the presence of a pronounced feedback relationship for almost all of the analyzed modified VAR-type models (5), both in the whole sample period and in the two subsamples (cf. Table 5). We have no reason to reject the null hypothesis of the lack of contemporaneous correlation only in the case of the pairs: SP/SAX, and SP/OMXR (only in the ‘post-crisis’ period). Moreover, we do not observe that cross-market correlations on daily logarithmic returns are significantly higher in the crisis period than in the other periods, which is rather consistent with the literature (e.g. Ülkü, 2011).

Table 6. Contemporaneous correlations of daily logarithmic returns on pairs: (S&P500/CEE index)

Period	SP/WIG	SP/PX	SP/BUX	SP/SBITOP	SP/OMXV	SP/SAX	SP/OMXT	SP/OMXR
Whole sample	0.449 [0.000]	0.433 [0.000]	0.438 [0.000]	0.186 [0.000]	0.181 [0.000]	-0.012 [0.640]	0.192 [0.000]	0.087 [0.000]
Crisis	0.496 [0.000]	0.446 [0.000]	0.513 [0.000]	0.218 [0.000]	0.204 [0.000]	-0.001 [0.993]	0.231 [0.000]	0.133 [0.020]
After crisis	0.525 [0.000]	0.511 [0.000]	0.515 [0.000]	0.190 [0.000]	0.246 [0.000]	-0.043 [0.449]	0.126 [0.027]	-0.002 [0.970]

Source: Authors’ calculations (using *Gretl 1.9.7*)

Notes: The table is based on: (1) the whole sample period May 4, 2004 – April 29, 2011; (2) the crisis period Oct 9, 2007 - March 9, 2009, and (3) the after crisis period March 10, 2009 - July 30, 2010. The table contains contemporaneous correlation coefficients and p -values in brackets. Non-significant coefficients marked in bold.

6. Conclusion

This study contributes to the existing literature by focusing on the friction in trading processes in the context of the nonsynchronous trading effects I and II. We examine one of the empirical phenomena on a domestic stock market, concerning the ‘nonsynchronous trading effect I’, the so-called Fisher’s effect, in the case of major CEE stock market indexes. The evidence is that the ‘nonsynchronous trading effect II’ induces potentially serious biases in the serial correlation in market index returns and may disrupt the analysis of domestic market index daily returns. Next, we analyze the Granger causality on the selected pairs of major CEE stock market indexes, both in the whole sample 4.05.2004 – 29.04.2011 and two equal subsamples: 9.10.2007 – 9.03.2009 (the ‘crisis’ period), and 10.03.2009 – 30.07.2010 (the ‘post-crisis’ period). However, we observe the presence of only several pronounced causal relationships in the whole sample period, in the case of the group of the biggest CEE stock market indexes and the group of the three Baltic market indexes. We observe only two significant feedback relationships both in the whole sample period and in the ‘crisis’ period. Moreover, to accommodate the ‘nonsynchronous trading effect II’ in the Granger causality tests, we propose a modified version of a VAR – type model in the case of the CEE and U.S. stock market indexes. The evidence is that almost all of the models exhibit a pronounced feedback relationship, however, our results are consistent with the literature (e.g. Baumöhl and Výrost, 2010). In light of our results, it seems that taking into account the ‘nonsynchronous trading effect II’ plays a crucial role in examining the lead-lag relationships among the world stock markets.

A possible direction for further investigation would be to explore whether the Fischer’s effect is present in the case of not only the major, but all of the CEE stock market indexes. To avoid disrupting empirical results, it is well-founded to analyze each CEE market data sample separately, without using a ‘common trading window’ approach. Furthermore, as for the linkages between the stock markets investigated, it is well-founded to analyze the impulse response functions (IRF) to show the effects of shocks on the adjustment path of the variables. The impulse response functions are useful in assessing how shocks to economic variables reverberate through a system of equations (Adkins, 2012). In our opinion, another interesting research direction would be to analyze the Granger causality of the CEE emerging stock markets and the developed European stock markets, both in the ‘crisis’ and ‘post- crisis’ periods.

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TWIN DEFICITS PHENOMENON AND DEFICITS' BIDIRECTIONAL CORRELATION CASE IN TURKISH ECONOMY

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Abstract

Aim of our study is to research correlation between Budget Deficit and Current Account Deficit in a developing economy - Turkey. Being subject to many studies for 10-years in several economies and periods, twin deficits hypothesis is still strictly followed by many modern academicians. Researches that study the relation between Current Account deficit and Budget deficit, are separated in two groups as those accepting Keynesian views and others accepting Ricardian approach. Due to conventional Keynesian proposition, there is correlation between these deficits, and afterwards the proposition expanded with addition of correlation direction from Budget deficit to Current Account deficit. In our study we applied Johansen Cointegration and Granger Causality Test in dataset of Turkish economy ranging from January 1996 to September 2007. Our test results show correlation between Budget deficit and Current Account deficit evidence during relevant period. We found out causality direction from budget deficit to current account deficit at %5 significance level, but direction from current account to budget deficit at %1 significance level. Actuality of our study is finding that, in a rapidly developing economy twin deficits correlation doesn't fully match with Keynesian or Ricardian theories, but the correlation is two-way.

Keywords: current account, budget deficit, Ricardian equivalence, Keynesian approach

JEL codes: H6, H30, E62, F32

1. INTRODUCTION

The simultaneous grow of the budget deficits and trade deficits of the US and other developed economies in the 1980's, directed attention to the relationship between budget deficits and trade deficits. Many researches found out positive relations between those two deficits, and this was named "twin deficits hypothesis". However, there are some different findings about direction and causality of this relation; some researches find direction from budget deficit to current deficit, others claim unilateral direction from current account deficit to budget deficit and yet some find that the causality runs in both ways, i.e. there is feedback between the twins. Finally, the alternative to all these possibilities is that of non-existence of relationship between the two deficits; they are independent.

Developing countries except petroleum exporting countries are faced with twin deficits. Turkey is drawing more attention for its faster development trend among developing countries and in IMF listing Turkey is 18th largest economy in the world. Since 1980, public policies in Turkey resulted in exceeding public expenses more than incomes, i.e. there was growing setback in budget deficit. Fiscal policies for stimulating private sector, politicization in public utility companies made increases in employment and extra financing caused negative effects on budget balance. Increase in budget deficit caused huge internal and external debt.

As real interest rates are high in Turkey, short-term capital inflow triggered hyper-valuation of TRY. Interest rate arbitrage, over-valued TRY and increasing of hot money encouraged import and consumption dissuaded export and direct investments. Increase in import with respect to export worsened case in current operations deficit and foreign trade deficit even after crisis period.

In this paper we studied twin deficits relations with monthly current account deficit, budget deficit and GDP data in period of 1996:01-2007:09. We used monthly figures from databank of Central Bank of Turkey. Paper consists of 5 sections. Second II gives theoretical framework and discusses different approaches. Section III refers to previous related studies, our empirical analysis starts in Section IV that examines the nature of relationship between twin deficits in Turkey. Concluding remarks are offered in Section V. Our findings show that there is bidirectional relationship between twin deficits in Turkish economy

2. THEORETICAL FRAMEWORK

Although there are many different method studies about this relation in literature, but no consensus was achieved so far. Studies are separated into main 2 groups; one accepting Keynesian views suggesting that there is a correlation between twin deficits, other accepting Ricardian approach claiming there is no correlation between twin deficits.

In this section budget deficit and current deficit concepts, Keynesian proposition and Ricardian Equivalence hypothesis are explained.

2.1 Budget Deficit and Current Account Deficit Concepts

Budget deficit, is the difference between budget revenues and budget expenditures in favor of expenditures in a given fiscal year of government. In other words, budget deficit is a result of budget incomes insufficiency in covering predicted budget expenditures.

Budget surplus and budget deficit is somehow related with income level. If income level is high, then budget level is to be high. In this case government will get higher taxes. But if income level is low, government revenues will be also low, and then it will result in budget deficit [1].

Budget balance is calculated with subtracting public expenditures from public incomes. Negative budget balance is budget deficit. It means if expenditures are bigger than incomes, it will result in budget deficit. Not only budget deficit, but also implemented financing techniques make negative effect on whole economy:

- 1- Budget deficit causes inflation expectations.
- 2- If government borrows to cover budget deficit:
 - a. Internal debts, domestic savings for investment are used for covering budget deficit. Thus resulting less domestic funds for investment, interest rates get higher, so investments get lower. This mechanism shows negative effect of internal debt on growth rate.
 - b. External debt will make extra load on Current Operations and Capital accounts of Balance of Payments.
- 3- Money emission will increase money base and money supply so, increase in total demand will result in inflation [2].

Sargent and Wallace (1981) suggest that borrowing may have worse results than Money emission, so that in case of borrowing impossibility Money emission will be higher and it will result in higher inflation.

Inflation negatively effects budget deficit in two mechanisms. First, in inflationist period real tax incomes get less because of the duration between calculating and collecting tax. Second, increasing inflation will affect nominal interest rates, so debt stock will also increase.

Current balance, also defined as current operations balance, is composed of foreign trade balance (export-import balance) of balance of payments, services (service export – service import), investment (factor) incomes (earnings on foreign investments minus payments made to foreign investors) and current transfers (gratuitous foreign incomes – gratuitous foreign expenditures) balances. A country's balance of payments is said to be in surplus (equivalently, the balance of payments is positive) by a certain amount if sources of funds (such as export goods sold and bonds sold) exceed uses of funds (such as paying for imported goods and paying for foreign bonds purchased) by that amount. There is said to be a balance of payments deficit (the balance of payments is said to be negative) if the former are less than the latter.

Current account deficit is caused when a country gives more than it earns in international transactions, i.e. in foreign countries' debt. The only thing to cover current account deficit in terms of foreign currency is to borrow from foreign currency markets. In an economy borrowing from outside Capital Account balance, international capital input – output account, will get misbalanced. So, it will make increase effect on current account deficit and exchange rates.

Empirical researches studying relations between twin deficits may use either current operations deficit or foreign trade deficit with budget deficit, because there is no important difference between current operations deficit and foreign trade deficit.

Twin deficit hypothesis suggest that current operations deficit and budget deficit move together. i.e., they affect each other. So, interaction between two deficits may be in 4 cases.

Table 1. Probable relations between budget deficit and current deficit

1. Budget deficit → Current deficit	Conventional approach
2. Current deficit → Budget deficit	Current operations targeting
3. Budget deficit ↔ Current deficit	Two-directional causality
4. Budget deficit --- Current deficit	Ricardian equivalence hypothesis

2.2. Operations Mechanisms between two deficits

1. Conventional approach: Suggest that individuals have no rational expectations, they are myopic about future. E.g. they can't foresee one tax discount to come back as debt in future. So, increases in public expenditures or tax deduction affect household saving decisions in expendable income and result in increasing consumption with import goods, so cause imbalance in current operations account.

- a. Mundell-Fleming Model: Increase in interest rates cause inflow of foreign capital to a country. Domestic currency gets overvalued with exchange rate fall, so import gets high, export less. This causes disbalance in current operations balance.
 - b. Keynesian Absorption Theory: Increase in expendable income, cause increase in demand for import goods and it results in disbalance in current operations account.
 - c. Kim and Roubini: Increase in budget deficit because of increasing public expenditures or decreasing in tax incomes, on one hand will increase private sector savings on the other hand will increase interest rates because of growing debts. Increasing interest rates will constrict private sector investments, and it causes wide gap between private sector savings and investment. So it will result in disbalance in current operations balance [3].
2. Current Account Targeting: Target is the point where there is no current deficit. Paying foreign debt back causes current deficit. Because of that, increasing exchange rates increase value of foreign debt in terms of domestic currency. It means during debt pay back, on one hand public expenditures increase budget deficit, on the other hand increasing exchange rates result in high budget deficit. The reason causing relation from current deficit to budget deficit is “current operations targeting” mechanism of Summers. Because the main target in managing economy is to decrease current deficit, so import will be constricted, and it will result in declining economic growth. Then government will try to compensate this decline with public expenditure, and it will result in budget deficit.
 3. Two directional Causality: Many modern studies found bidirectional causality. And reason of this relation is explained with real interest rates and export policy with exchange rates. It appears with cyclic operation of above mentioned mechanisms.

2.3. Keynesian Approach

Conventional Keynesian view talks about a relation but it doesn't suggest anything about direction of this relation. But direction of relation – from budget deficit to current operations deficit, was added later. In accordance with this, some empirical researches find relation direction from budget deficit to current deficit, whereas some find causality relation from current operations to budget deficit, others find bidirectional causality relation. Known relevant case for an economy is highly important in deciding correct economic policy.

In an open economy, total domestic product (Y) is composed of consumption (C), investments (I), export (X), and import (M). National income may be denoted as $Y=C+S+T$ or $C+I+G+(X-M)$. This equation may also be written as $(X-M)=(S-I)+(T-G)$. The equation produced with assumption of equality of some economic categories (export-import, public income-public expenditures, private savings-investment level) is unreal in open economy [4]. Almost every country has foreign trade deficit, budget deficit or investment-saving disbalance and these differences have deterministic relation between each other.

Keynesian approach suggest that in an economy with floating exchange rate and capital mobility increase in public expenditure will cause decrease in domestic savings. According to this, decrease in national savings will increase interest rates; high interest rates will draw foreign investors, so national currency will get overvalued. Overvalued national currency negatively affect export and it result in disbalance of current operations and foreign trade deficit [5]. The negative effect of budget deficit increase, originating from public expenditures, on current account balance is called “twin deficits” [6].

2.4. Ricardian Equivalence Hypothesis

Ricardian Equivalence Hypothesis rejects twin deficits theory, suggesting no relation between budget constraint and foreign trade deficit. According to the hypothesis, people will save their money in tax rates reduce thinking that they will pay for that. Because of that, increasing budget constraint or decreasing budget surplus will not cause increase in current account deficit or decrease in current surplus [7]. Ricardian equivalence suggests that it does not matter whether a government finances its spending with debt or a tax increase, because the effect on the total level of demand in the economy is the same.

Due to this approach, assuming government debts constant and lack of borrowing obligation, discount in current tax rates will not affect saving level. Because people know that they will pay for that tax discounts, they will increase saving. According to tax reduce decreasing public savings will be compensated in the same amount of private savings, so current operations balance will not change [8].

In the same mean, increase in tax rates cause decrease in budget deficit or increase in budget surplus, but it makes no changes in foreign trade. Because, taxes will be important source of public expenditures. But increases in tax rates have no base to make changes in private expenditures [9].

3. RELATED STUDY

There is a growing body of empirical literature testing the validity of the twin deficits for a number of developed and developing countries. The empirical evidence on the twin deficits hypothesis provides mixed results. The conventional Keynesian twin deficits proposition is supported by Roubini (1988), Abell (1990), Normandin (1999), Vamvaukas (1999) and Roubini and Setser (2005) whilst the results by Miller and Rusek (1989), Enders and Lee (1990) and Kim (1995) are consistent with the Ricardian Equivalence hypothesis.

Compared to industrial countries, the number of empirical studies investigating the twin deficits hypothesis is rather limited for developing countries. Some studies include Islam (1998) for Brazil, Kouassi et al. (2004) and Gruber and Kamin (2005) for a number of developed and developing countries, Akbostancı and Tunc (2001) for Turkey and Kim and Kim (2006) for Korea. The results by

Akbostancı and Tunç (2001) suggest that there is a long-run relationship between budget deficits and trade deficits in Turkey and thus the Ricardian equivalence hypothesis is not supported by the Turkish data.

Gürsoy, B., and Ceylan, C., (2011), The twin deficits phenomenon: Evidence from Turkey, China-USA Business Review, 10 (8), 636-642.

One of the main features of the Turkish economy is the durability of budget deficit, especially after the

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 period of liberalization of capital years. The budget deficit of a great public sector quantity and rather high current account deficit in Turkey and their impact in the economy, become discussion subject in the last 30 years.

GDP current deficit ratio and GDP budget deficit ratio variables were used in the study. Between 1989 and 2008 there were used total 80 observations quarterly.

Econometric tests analyzed that there are long time balance connections between 2 deficits. Empirical results showed long period balance and also affirmed the direction of connection from budget deficit to current account deficit.

In both of the long and short time it was completed that Ricardian Equivalence Hypothesis is not valid for Turkey in the investigated time.

Holmes, M.J., (2011), Threshold cointegration and the short-run dynamics of twin deficit behaviour, Research in Economics, 65, 271-277.

Some researchers accept the size of the current transactions balance and budget deficit as a indicator of welfare and macroeconomic sustainability.

In the literature there is not any unit idea about the twin deficits and its the main reason is that in the work which cointegration analysis was used, structural breaks and regime change was investigated enough.

In the study the connection between current transactions and budget balance was investigated with the approach of the threshold cointegration helping. United States 3 month-data between 1947-2009 periods was used and supported a long positive cointegration connection.

Datta, K., and Mukhopadhyay, C.K., (2010), Twin deficits phenomenon in Maldives: Spectral and time domain analysis of time series, The IUP Journal of Applied Economics, 9 (2), 98-125.

Approximately in 1970 in the International Economy history one of the main events was the transition from fixed rate system, to the floating rate system. With the adaptation to the floating rate system another new important subject appeared which is known as twin deficits phenomenon. In Maldives economy, study tested the relation between budget deficit and foreign trade deficit with data between to 1979-2003 periods. It was completed with the results supporting Ricardian approach.

Ganchev, G.T., (2010), The twin deficit hypothesis: The case of Bulgaria, Financial Theory and Practice, 34 (4), 357-377.

The model rejects twin deficits theory in a short time, and it showed that in a long time it can be spoken about the relation between two deficits. The results about the values in a short time presents that there is a negative connection between two deficits. However Granger Causality test resulted that there is a two-way causality relation between two deficits.

From the currency board in the middle of the 1997, twin deficits hypothesis are main elements of Bulgarian's finance politics. If the twin deficits were right, the budgets which were in the balance or much, would guarantee foreign and domestic balance. In spite of the budget surplus in the last years, Bulgaria's current accounts deficit expands durable. Study testing twin deficits hypothesis used monthly information for 2000-2010 period for Bulgaria.

Erceg, C., Guerrieri, L., and Gust, C., (2005), Expansionary fiscal shocks and the US trade deficit, International Finance, 8 (3), 363-397.

They used dynamic general equilibrium model to value finance shock's quantitative influence on the foreign trade balance in US. Two alternatives investigated finance shock: the increase in society spending and the decrease in labor income tax rate. The most attractive discovery of work is that without looking to the welding that it is spending increase or tax deduction, a finance deficit has a little impact on the foreign trade balance of United States. They had result that, %1 increase in the GDP which was done in the financial deficit, causes foreign trade balances distorts %2 or less of GDP.

To summarize, the empirical literature provide mixed and often conflicting results for the validity of the twin deficits hypothesis. The results appear to be crucially depending on many factors including the variables considered, country and the time span of the data and estimation techniques. Although, economic theory provides sample explanations between the possible interrelationships between current account and budget deficits their validity appears to be an empirical issue. In the following chapter of this study, we attempt to investigate this empirical issue for the Turkish data in the period of 1996:01-2007:09.

4. EMPIRICAL ANALYSIS

4.1 Data and Model Description

The study aiming to test twin deficits hypothesis, Current Account Deficit (CAD) means ultimate ratio of Current Account Deficit to GDP; Budget Deficit (BUD) represents the ratio of Budget Deficit to GDP. Research datum is monthly figures in period of January 1996 – September 2007.

2007 accordance works of national accounts to European Union standards GDP calculations had some methodology changes. So we ended research period in September 2007 for not to get misappropriation in analysis confidence because of differently calculated data.

Model we used through the study is as following:

$$CAD_t = \alpha_0 + \alpha_1 BUD_t + \mu_t$$

4.2 Methodology and Analysis Results

Unit Root Tests

A stationary time series is one that does not contain a unit root and whose statistical properties such as mean and variance are constant over time and the value of the covariance between the two time periods, depending only on the distance or lag between the two time periods, represents a stochastic process. A stochastic process is said to be stationary if it does not contain a unit root and the mean, variance and autocovariance (at different lags) remains the same no matter at what point we measure them. Such a time series will tend to return to its mean (called mean reversion) and fluctuations around this mean (measured by its variance) will have a broadly constant amplitude. In a non-stationary time series, as lag period increased, autocorrelations fastly diverges from zero and it results with fake sample. Stationarity in time series has vital importance in reflecting true relations of regression. Forecasting with series have unit root causes spurious regression problem. So, in the beginning of analysis we must be sure about time series is lack of unit root and is stationary.

Series may be tested with Augmented Dickey Fuller (ADF), Dickey Fuller GLS (ERS), Philips Perron (PP), Kwiatkowski-Philips-Schmidt-Shin (KPSS) unit root test methods, and if it is non-stationary, difference, lagging, Kalman filtering, etc. methods should be used to make the series stationary.

In our study we used ADF unit root test for stationary. For determining suitable lags for ADF unit root test we referred Akaike Information Criterion (AIC). According to this, the best fitting lag value is that makes AIC value minimum. ADF unit root test results are shown in Table 1 (the values in paranthesis shows lag length).

Table 2. Unit Root Test results

Variable		Augmented Dickey Fuller Test statistic		Result
		None	Trend	
<i>CAD</i>	Level	-0.638(13)	-2.407(13)	Non-stationary
	1 st difference	-3.457(12)*	-3.610(12)*	Stationary
<i>BUD</i>	Level	-1.908(13)	-1.825(13)	Non-stationary
	1 st difference	-2.906(12)*	-8.298(12)**	Stationary

Note: the values in paranthesis in ADF test are the lag length making AIC criterion minimum

* : rejects(H_0) null hypothesis in %5 significance level.

** : rejects (H_0) null hypothesis in %1significance level.

Due to results in Table 2, in level both series have unit root either with trend or not. But testing this non-stationary series in 1st difference, we found series stationary in %5 significance level.

Cointegration

The non-stationary time series is defined as cointegrated if a linear coombination of them is stationary. Many time series are non-stationary but “move together” over time – that is, there exist some influences on the series (e.g. market forces), which imply that the two series are bound by some relationship in the long run . Cointegration tests shows that relation. Cointegrated series move together in long

run and are in a balance. Engle-Granger, Johansen, Johansen-Juselius methods could be used to test cointegration. We ran Johansen-Juselius (1990) method.

In Johansen-Juselius (1990) cointegration test, vectors' cointegration is related with trace statistics in test results and with the maximum eigenvalue statistics.

In trace test, a hypothesis - claiming the existence of maximum r number of cointegrated vectors is tested. The maximum eigenvalue statistics test Null Hypothesis claiming existence of r number of integrated vectors, and Alternative Hypothesis claiming existence of $r+1$ number of cointegrated vectors [10].

To determine number of cointegrated vectors, trace statistics values and the maximum eigenvalue statistics are compared with critical values of those statistics. If both test statistics are bigger than critical values, it means there are cointegrated vectors, i.e. series are tending to move together in long run, and are in balance. But in the contrary case, i.e. trace test values and the maximum eigenvalue test values are smaller than critical values means there are no cointegrated vectors.

In our research, we used Johansen-Juselius (1990) cointegration test to find out if there is long term relation between CAD and BUD, H_0 hypothesis.

Table 3. Johansen-Juselius Cointegration Test results

H_0	H_1	Eigenvalue	Trace statistics	%5 Critical Value	H_0	H_1	Max-Eigen statistics	%5 Critical Value
$r=0$	$r>0$	0.076	15.440	15.494	$r=0$	$r=1$	10.769	14.264
$r\leq 1$	$r>1$	0.033	4.671	3.841	$r=1$	$r=2$	4.671	3.841

r : number of cointegrated vectors

According to above Table 3 Johansen-Juselius (1990) cointegration test results, for H_0 , $r\leq 1$ hypothesis, trace statistics and maximum eigenvalue values are bigger than critical values in %5 significance level, so H_0 null hypothesis-claiming absence of cointegration is rejected. And it means there are 2 cointegrated vectors in CAD and BUD series and these series move together in long run.

VAR (Vector Autoregressive) Model

There is dynamic interaction between economic indicators. One of the methods used to determine these dynamic interactions is VAR (Vector Autoregressive) model [11]. VAR model allow to consider all economic sizes as one whole. By this, econometric variables can be studied simultaneously. The researcher doesn't need to specify which variables are endogenous or exogenous. Analysis with VAR model make more robust results than classical modeling and the relations between variables are better defined . Structural models formed with VAR model reflects dynamic relations between variables without any restriction, and this makes VAR model extensively used in time series analysis [12].

To make robust VAR results, firstly we need to determine most appropriate lag length. For this, there are some criteria like LogL, LR, FPE, AIC, SC and HQ. The lag length is decided with these criteria.

Variables in VAR model are predicted on their own lagged values. Due to these predictions, normal distribution of residuals, variance stability, position of inverse roots of autoregressive characteristic polynomial within the unit circle make VAR model most appropriate.

In Table 4, VAR model is formed with lag length for FPE, AIC and HQ criteria

Table 4. Lag Length selecting criteria for VAR Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-872.533	NA	1451.415	12.956	12.999	12.973
1	-863.448	17.767	1346.107	12.881	13.010	12.933
2	-857.494	11.467	1307.768	12.852	13.067	12.939
3	-849.244	15.645*	1228.104*	12.789*	13.090	12.911*

* : The most appropriate lag length due to heading-column criterion

Due to VAR predict results in Table 5, in a model where BUD is independent variable, CAD dependent variable, because the coefficient is positive number, budget deficit and current account deficit are to move in the same direction.

Table 5. VAR Estimates

Variable	ΔCAD	ΔBUD
$\Delta CAD (-3)$	-0.016	-1041.011
$\Delta BUD (-3)$	5.26E-06	-0.267
C	-0.001	-7.576
R^2	0.118	0.202
Adjusted R^2	0.078	0.166
F -statistic	2.923	5.513

For confidence and consistence of predicted VAR model we need to see inverse roots of autoregressive characteristic polynomial within the unit circle. Here none of inverse roots are out of unit circle. So we can say that, this VAR model is stationary and robust model. Otherwise, one of the eigenvalues out of or on the unit circle would make model non-stationary and unstable [13].

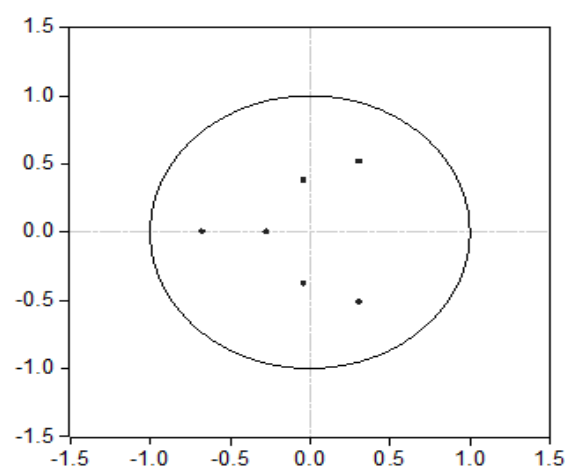
**Figure 1. Position of inverse roots of autoregressive characteristic polynomial within the unit circle**

Table 6 below shows test results of residuals of VAR model. In %5 significance level (H_0) null hypothesis, claiming residuals have normal distribution in Jarque-Bera (JB) residual normality test results, is rejected. So, residuals are not multivariate normal.

LM test statistics results accept (H_0) null hypothesis, claiming no autocorrelation, so there is no correlation between residuals.

Chi-square test statistics rejects (H_0) null hypothesis, residual heteroskedasticity test, so it means residuals have varying variance.

Table 6. Residual Tests of VAR Models

Test	Statistics	Probability	Results
Jarque-Bera Normality Test	6.051	0.049	Residuals are not multivariate normal
LM Test	1.890	0.756	No Residual Serial Correlation
Chi-square test	167.179	0.000	Residual Heteroskedasticity

Table 7 shows results of Granger Causality tests via VAR model. Results show that there is no causality relation between budget deficit and current account deficit in Turkish economy. In %5 significance level there is a causality relation in direction from budget deficit to current account deficit, whereas in %1 significance level, there is a causality relation in direction from current deficit to budget deficit.

Table 7. VAR Granger Causality Test Results

Chi-square	df	Probability	Direction of causality
8.452*	3	0.0375	Budget deficit → Current account deficit
16.649**	3	0.0008	Current account deficit → Budget deficit

** : (H_0) null hypothesis is rejected in %1significance level

* : (H_0) null hypothesis is rejected in %5 significance level

Impulse response functions in VAR model, tracing an external unit shock that is applied to one of the variables, shows the responsiveness of other variables to these shocks. Figure 2 shows response of current account deficit to budget deficit; Figure 3 shows response of budget deficit to current account deficit. In the figures, straight line shows point estimations, dashed line show confidence levels of standard errors. For significance of these actions, these 3 lines must be clustered in one side of zero line, and this effect should gradually seep away in coming periods.

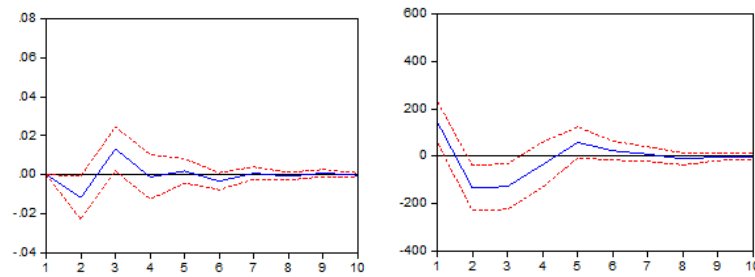


Figure 2. Response of dCAD to dBUD Response of dBUD to dCAD

CONCLUSION

The paper studying relation between budget deficit and current account deficit in Turkish economy resulted in cointegration of variables – Budget Deficit/GDP and Current Deficit/GDP within January 1996 – September 2007 datum, so it means in long-run these twin deficits move together.

The relations between twin deficits of Turkey is analyzed with VAR model, and the results matches with theoretical expectations and shows budget deficit positively effects current account deficit. Results of Granger Causality test shows budget deficit effects current account deficit in %5 significance level, where current deficit effects budget deficit in %1 significance level.

Cointegration between two variables, state of being Granger-cause of twin deficits each other match with conventional Keynesian proposition. Due to results we propose that problem of current account deficit may be handled with decreasing budget deficit.

Applied stability program after 2001 crises is explained with implemented strict financial policy. This strict finance policy made some betterment in budget deficit; but huge pay-back amounts because of past debt load, higher real interest rates and import-based growth policy make current account deficit grow worsen.

Only financial reform is not enough to control twin deficits. Even though budget deficit causes current account deficit, but it is not main reason of current deficit, so strict finance policy must be supported with export-oriented foreign trade policy.

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FINANCING OF ENERGY INFRASTRUCTURES

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ABSTRACT

Carbon finance is a branch of the finance developed, arising from market mechanisms included in the Kyoto Protocol. At first, the Bank played a catalytic role in the global market for carbon emission reductions through the creation of the type to Reduce Carbon Emissions in 1999. The hatching period of carbon finance coincides with the globalization of trade and development of electronic commerce. Company was unable to reduce its emissions to a desired level, must buy credits from a company B, which has invested to reduce emissions. The carbon market is one of the sectors with the strongest growth. By 2020, the global carbon market could reach 565 billion USD according to Point Carbon, a research specialist of Oslo. According to the IPCC, carbon emissions, mainly from fossil fuels, must be stabilized by 2015 and then reduced. Carbon finance principally reduces emissions through projects or programs of activity that known as carbon offsets. In addition to the compliance market, a fast-growing parallel Voluntary Carbon Offset (VCO) market exists to assist companies that want to invest in low-emissions projects outside formal regulation. Regional initiatives, such as the Western Climate Initiative in North America, also help spur carbon finance activities because they use carbon offsets as a cost containment mechanism. The amount of carbon finance fluctuates annually because of factors that include prices and availability in connected emissions trading schemes such as the EU Emissions Trading Scheme, climate policy developments at multiple scales, and overall economic performance. Those who support carbon trading suggest that it is the most politically feasible way of regulating carbon and other greenhouse gas (GHG) emissions and believe that businesses respond to the economic incentive to reduce emissions.

Keywords: Carbon Finance, Energy Infrastructures, Energy Trading, Derivatives

1. Infrastructure and Restructuring

Infrastructure is the basic physical and organizational structures needed for the operation of a society or enterprise, or services and facilities necessary for an economy to function. It can be defined as the set of interconnected structural elements that provide framework supporting an entire structure of development.

The term typically refers to the technical structures that support a society, such as roads, water supply, sewers, electrical grids, telecommunications, and so forth, and can be defined as “*the physical components of interrelated systems providing commodities and services essential to enable, sustain, or enhance societal living conditions*” [1]. Viewed functionally, infrastructure facilitates the production of goods and services, and also the distribution of finished products to markets, as well as basic social services such as schools and hospitals; for example, roads enable the transport of raw materials to a factory. In military parlance, the term refers to the buildings and permanent installations necessary for the support, redeployment, and operation of military forces.

The electricity infrastructure includes a nationwide power grid of long-distance transmission lines that move electricity from region to the region, as well as the local distribution lines that carry electricity to homes and businesses [2].

The electricity industry has undergone substantial changes in the last two decades. These changes affect how our electricity infrastructure operates. Major industry restructuring has separated once vertically integrated electric utilities that supplied generation, transmission, and distribution services into distinct entities.

2. Energy Trading and Carbon Finance

Carbon finance is a branch of the finance developed, arising from market mechanisms included in the Kyoto Protocol. The aim is to reduce in the atmosphere emissions of GHGs by promoting financial investments in cleaner technologies.

These two sectors encouraged to grow in the years to come. In a context, of increasing global energy demand and the price of natural resources, carbon finance aims to reduce dependence on fossil fuels, including the dependence on oil. Awareness of the impact of human development on the environment is a necessity revealed by visible changes which economic impacts can be detrimental to the prosperity of the community and to create wealth on a global scale.

The carbon market based on an absolute fact: No matter where on the planet where we reduce GHGs, they always produce the same positive effect. This market is emerging as a powerful tool for reducing emissions of GHGs and to transfer financial resources and clean technology to the developing world. In this regard, the World Bank continues to support market mechanisms with the goal of reducing emissions in developing countries [3].

At first, the Bank played a catalytic role in the global market for carbon emission reductions through the creation of the type to Reduce Carbon Emissions in 1999. Today, the institution is a trustee of 10 carbon funds and facilities and two post-2012 mechanisms, which capitalized at U.K. \$ 2,740 million, of which U.K. \$ 1,900 million already committed.

The hatching period of carbon finance coincides with the globalization of trade and development of electronic commerce. The information age induced by the widespread use of the internet, allowed the establishment of a global network of exchange of carbon credits to unite efforts across the globe to combat a problem warming, that of global warming. Carbon finance is the result of the new economy that is the knowledge economy.

3. Principle

A company A and company B are each assigned a government quota of emission of GHGs. Company A was unable to reduce its emissions to a desired level, must buy credits from a company B, which has invested to reduce emissions. Company B sees himself financially rewarded for its environmental efforts as the company penalized according to the principle of polluter pays [4].

The mechanisms of carbon finance allows an overall result in a lower cost than what would required for investments in clean technology areas are less developed and more expensive.

There are several carbon exchanges, Euronext (power next), Intercontinental Exchange, the Chicago Climate Exchange, the European Climate Exchange and the Montreal Exchange.

According to the World Bank, the value of the carbon market was 11 billion USD in 2005, the first year of trading EU ETS. The market valued at \$ 30 billion for 2006, and estimated at \$ 200 billion for 2012. The carbon market is one of the sectors with the strongest growth. By 2020, the global carbon market could reach 565 billion USD according to Point Carbon, a research specialist of Oslo.

According to the IPCC, carbon emissions, mainly from fossil fuels, must be stabilized by 2015 and then reduced. Otherwise, the consequences could be disastrous, according to the IPCC chairman. Already in the current situation, in 2020, between 75 and 250 million people in Africa will suffer, water shortages, residents of megacities in Asia threatened by flooding rivers and rising sea levels, number of species will disappear in Europe, and America will experience scorching heat waves [5]. The UN conference in Bali, Indonesia from December 3 to 14, 2007, to launch negotiations for a new international agreement on reducing greenhouse gas emissions to replace the Kyoto Protocol, expiring in 2012.

Carbon finance can be seen as an investment tool that allows the deployment of green technology; in the places where it is most economically efficient to do so. This usually means carbon finance flows from developed to developing countries, where technologies may be older or processes less efficient. In this way, the same investment dollars can create larger amounts of net emissions reductions. Carbon finance principally reduces emissions through projects or programs of activity that known as carbon offsets. These offsets use the investment to generate carbon credits, and link people, places, and environments across space, transcending traditional economic geographies as finance flows one way and carbon credits flow the other.

For the third consecutive year in 2010, the transactions of project-based carbon regressed, mainly due to regulatory uncertainties associated with demand after 2012. Moreover, the carbon market in the US contracted with the same speed at which grew last year, apparently for lack of political support in 2010 [6].

The total recovery of confidence in the viability of carbon markets as an effective tool for development with low emissions will require solid solutions. In terms of the regulatory framework and greater long-term predictability.

The biggest carbon finance mechanism in the world is the Kyoto Protocol's Clean Development Mechanism (CDM), which generates credits that can be used for compliance under Kyoto and in the European Union Emissions Trading Scheme. In addition to the compliance market, a fast-growing parallel Voluntary Carbon Offset (VCO) market exists to assist companies that want to invest in low-emissions projects outside formal regulation. Regional initiatives, such as the Western Climate Initiative in North America, also help spur carbon finance activities because they use carbon offsets as a cost containment mechanism. The first carbon offsets came from large emitters in the United States investing in forestry projects, in Latin America, but the wheels of the modern-day carbon markets oiled by public institutions such as the World Bank and national governments in the early 2000s. Given the profits to be made in emissions trading, however, since 2005, initial investment has come from the private sector [7]. In 2008, CF creating carbon offsets totalled about \$7.2 billion, the bulk of which was between developed and developing countries through the CDM. The amount of carbon finance fluctuates annually because of factors that include prices and availability in connected emissions trading schemes such as the EU Emissions Trading Scheme, climate policy developments at multiple scales, and overall economic performance. Because of the global economic turndown, carbon finance in 2009 amounted to only \$3.3 billion. By creating a policy framework that linked project activities to emissions reductions, and emissions reduction targets, the CDM aimed to reduce emissions as cheaply as possible and help developing countries “leapfrog” dirty industrial development. Although criticized for its geographical skew toward the most industrialized developing countries, the CDM has channelled finance to technologies that reduce emissions primarily in industrial, waste, and energy processes [8].

Economic and industrial activities and changes in land use, such as deforestation, have generated a constant increase in the emission of GHGs to the atmosphere since the Industrial Revolution. A high concentration of GHGs (e.g. carbon dioxide, methane, nitrous oxide, hydro fluorocarbons) may in turn increase the average temperature due to the so-called “greenhouse effect.” On this basis, the subject analytically discussed at international conferences, especially at Conferences of the Parties (COP), which occur a year in different regions of the world. A result of these discussions has been the proposition of market-based instruments to assist industrialized or developed countries -hitherto the most responsible for the greatest percentage of GHGs- in reducing their GHG emissions. Another reason for the emergence of these market instruments is due to the variation in GHG abatement costs that exist among countries. There are differences in costs, but economic incentives exist for countries to begin providing this service, thereby generating a carbon market. The idea is that the reduction, stabilization, and/or elimination of a given pollutant can be achieved through trading carbon credits, since this trade lends greater flexibility for countries to reduce GHG emissions.

4. Pros and Cons of Carbon Trading

Those who support carbon trading suggest that it is the most politically feasible way of regulating carbon and other GHG emissions and believe that businesses respond to the economic incentive to reduce emissions. Some prefer carbon trading over a carbon tax as companies or industries may be able to avoid taxes through lobbying, negating the incentive to reduce emissions. Advocates in the environmental field also suggest that carbon trading is a way to redirect greed toward saving the planet through including carbon and other GHGs in market transactions.

Critics of carbon trading can be divided into those who oppose it based on concern that any limits on carbon emissions could weaken national and global economies and those who want to reduce GHG emissions but do not support carbon trading as the most effective or ethical way to do so. The first group generally opposes cap and trade, a carbon tax, or any type of control over carbon and other GHG emissions and is against any type of regulation that could threaten economic growth. Others, however, oppose cap and trade but support a carbon tax as a more equitable, transparent, and predictable way to reduce carbon emissions. Many economists support a carbon tax over carbon trading because it would provide a more predictable long-term price on carbon and not be subject to manipulation by interests. Others claim that freely distributing permits to polluters is essentially giving a license to pollute, can lead to unethical behavior, and that allocating permits based on a previous baseline can lead to perverse incentives, where an entity would have no reason to cut emissions for fear that it will have fewer emissions allocations in the future. Those in support of emissions trading counter this by claiming that the regulating policies are more likely to be effective if those most affected by the policy (i.e. polluting facilities) receive some benefits. Most likely liabilities they required to assume, and that it would be politically impossible to pass a carbon tax high enough to substantially reduce GHG emissions [9].

The inclusion of carbon offsets in carbon trading is another point of disagreement between advocates and critics. While some argue that by offsetting one's emissions, a person or entity becomes more aware of its own emissions and thus may attempt to reduce them, critics argue that offsets are a false solution designed to allow people and entities to claim carbon neutrality and alleviate a guilty conscience without making any meaningful changes in their carbon emissions. Fundamental to this debate is how rigorous and effective offset programs are in reducing carbon emissions or sequestering carbon. The UNFCCC's CDM is an example of an offset program that has been both heavily criticized and highly lauded. The CDM designed to help ratifying industrialized countries meet their emissions reduction targets under the Kyoto Protocol by offsetting some of their GHG emissions. The funding projects such as reforestation or hydropower development that theoretically reduces emissions in developing countries. While there are many examples of successful CDM projects, many have come under scrutiny both in terms of their actual efficacy in offsetting carbon emissions and in terms of "trade-offs," where carbon sequestered by activities that simultaneously degrade other ecosystem services such as provision of water or soil quality.

Some oppose carbon trading on ethical grounds. For example, groups such as Climate Action Now and Carbon Trade Watch suggest that carbon trading is a form of colonialism under which rich, developed nations allowed to maintain unsustainable levels of consumption and carbon emissions by purchasing inefficient offsets. These critics also point out that the caps in most cap-and-trade programs are far from sufficient in terms of achieving real, scientifically based reductions to avoid dangerous climate change. They argue that this would require the United States and other developed nations to cut emissions by at least 25-40 percent below 1990 levels by 2020 (as opposed to, for example, the U.K. cap-and-trade proposed in the Waxman-Markey Bill, which aims for a 4 percent cut below 1990 levels). It suggested that carbon trading puts too much emphasis on individual lifestyles and carbon footprints and not enough attention on the broader, systemic, political changes that need to take place to create a lower or zero carbon economy. It has also been suggested that while markets may find the easiest way to reduce emissions in the short term, they will not necessarily facilitate the development of long-term solutions that will lead to actual reductions [10].

5. Investment Bank in Energy Infrastructures and Derivatives

The independent investment banking firm offers to its customers around the world several services, including project finance, mergers and acquisitions, as well as advisory services in conventional and renewable energy, oil and gas and industrial infrastructure. The company has succeeded for 30 years, to guide many of the negotiations at the level of development and restructuring. They also succeeded in more than 100 countries, many of the debt financing and investment worth of U.K. £70 billion. The respect of major international and due to its expertise in project finance advisory, in addition to rank high among, global financial institutions that provide consultancy in the field of energy. The company's directors have extensive experience in several areas, including corporate finance and capital, refinancing, ridding the merger and acquisition transactions for clients in the energy companies and infrastructure, in all parts of the world [11].

This helps the company in the development and financing of capital projects, and mergers and acquisitions. It submitted to the project sponsors, investors and government institutions many of the skills, thanks to its long experience (30 years).

We have the company's directors in their offices in Washington, London, Paris, and their office in Dubai.

The rate of emission in the 27 countries that participate in the system of splitting the 2.111 billion tons of emissions of greenhouse gases in return for 2.245 billion tons a year ago, according to the latest published in the month of march, suspended responsible in the center of the blinking of point carbon, based in Oslo in a statement. These figures indicate two things. First, it emphasizes that the contraction leads to lower emissions thanks to the low industrial production and energy demand. They also indicate that the carbon market works as it should. This means that the reduction of emissions in the energy sector due in part to the high price of carbon dioxide in the first quarter of 2008.

Centre continued that the reductions were greatest in the sectors of “cement, lime and glass” and “paper and paper powder”, which “indicates that these sectors are most affected by the crisis it seems. He explained that the sector “electricity production and heat” to reduce its emissions by 6% and sectors of “oil and natural gas” and “metals” by 1% each.

Geographically, Germany is the first source of emissions in Europe (22%), followed by Britain (13%). The figures include 10,391 sites responsible for 94% of the emissions of carbon dioxide.

6. Main Types of Emissions

An organization's active carbon footprint encompasses a wide range of emissions sources from the direct use of fuels to indirect impacts such as employee travel or emissions from other organizations up and down the supply chain.

Figure 1. Main Types of Technology and Its Projects

Technology	Projects	1.000 CERs	CER Rank
Hydro	1.483	162.868	1
Wind	1.029	107.543	2
Biomass Energy	703	45.665	8
Methane Avoidance	601	28.158	11
EE Own Generation	452	57.757	4
Landfill Gas	321	46.081	7
EE Industry	142	5.195	15
Fossil Fuel Switch	127	49.977	6
EE Supply Side	80	32.398	10
N ₂ O	71	50.000	5

When calculating an organization's footprint it is important to try to quantify as full a range of emissions sources as possible in order to provide a complete picture of the organization's impact. In order to produce an established footprint, it is important to follow a structured process and to classify all the possible sources of emissions thoroughly. A rough classification is to the group and report on emissions by the level of control that an organization has over them. An exhaustive classification defined by the Greenhouse Gas Protocol, a widely utilized standard for corporate emissions reporting produced by the World Business Council for Sustainable Development and the World Resources Institute. Three main types of emissions exist:

1. Emissions that result from activities that the organization controls. The majority of direct emissions will result from combustion of fuels that produce CO_2 emissions, for example, the gas used to provide heating for a building.
2. Emissions from the use of electricity, for example, electricity for lighting and equipment, and electricity generation. In the UK, around 75 percent produced through the combustion of fossil fuels such as coal and gas.
3. Indirect emissions from products and services. Each product or service purchased by an organization contributes toward emissions. The way the organization uses products and services, therefore, affects its carbon footprint.

Incorporating all three types of emissions in a carbon footprint calculation can therefore, be a complex task. In addition, published carbon footprints are rarely proportionate for several reasons:

1. Despite emerging international standards, not all organizations follow the same methodology to calculate their carbon footprint.
2. Some carbon footprints expressed on a time-period basis, such as annually, and some measured on a unit basis, such as per product produced.
3. Carbon footprints calculated to include all greenhouse gases and are expressed in tons of CO_2 equivalent (tCO_2e). Some, however, calculate the carbon footprint to include CO_2 only and express the footprint in tCO_2 .

The term carbon neutral is commonly used for something having net zero emissions (e.g. an organization or product). As the organization or product will typically have caused some greenhouse gas emissions, it is ordinarily required to use carbon offsets in order to achieve neutrality; carbon offsets are emissions reductions that have been made elsewhere and that are then sold to the organization that seeks to reduce its impact. Carbon neutral can be anything from a person, to a building, to an organization, or even a city or state- the Vatican in Rome is quickly moving to become the first “carbon neutral state” with the installation of solar panels and the planting of a 37-acre forest in Europe, which is hoped to offset up to 80 tCO_2 a year [11].

7. Result

A variety of methods exist for reducing an individual's or an organization's carbon footprint. Planting trees is one of the most common and simplest forms of carbon footprint reduction because trees absorb CO_2 from the atmosphere. Recycling waste materials such as household, industrial, and construction waste is also beneficial, as the carbon content of the new materials that would have otherwise been used can be offset. Many energy-saving technologies also exist that can contribute toward carbon footprint reduction, from cheap and simple measures such as installing low-energy light bulbs to more expensive measures such as using electric vehicles. Renewable energy generation can also be used for offsetting a carbon footprint, such as wind turbines and solar panels.

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FINANCIAL DEVELOPMENT AND OPTIMAL EXCHANGE RATE REGIME CHOICE IN DEVELOPING COUNTRIES

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ABSTRACT

After more than 40 years of the current monetary system, the issue of choosing the optimal exchange rate regime remains unresolved. Indeed, we experienced a diversity of regimes and an instability of the choices made with many countries switching from one regime to another. The paper investigates empirically the possible link between financial development and the choice of optimal exchange rate regime. To measure financial development, we introduce a composite index via the aggregation of five indices representing the key characteristics of the financial system in 51 developing countries over the period 1996-2007. The aim is to better consider the multidimensional dynamics of financial sector development. We use a multinomial logit model on panel data of the same countries and period. We consider two classifications of exchange rate regimes: “de jure” and “de facto”. The results suggest that financially developed countries are more likely to adopt floating regime. It appears also that the choice of floating regime is, notably, enhanced by financial openness and financial markets development.

Keywords: Exchange rate regimes, developing/emerging countries, financial development index construction, multinomial panel logit model.

INTRODUCTION

Since the demise of the Bretton Woods system, exchange rate choices have been in the heart of policy debates among academic and political circles. The tradeoff between fixed and flexible regime and even a middle solution is not resolved. Traditional exchange rate regime approaches focus on the optimal conditions for macroeconomic adjustments in an open economy. The optimal currency area (OCA) thereafter (Mundell, 1961; McKinnon, 1963; Kenen, 1969) relates the exchange rate regime choice to the country's size, openness, trade links and factors mobility. The stabilization approach associated to the Mundell-Fleming framework focus on a real-nominal variability tradeoff according to which fixed (flexible) exchange rates are preferred as shock absorber in a country facing mainly nominal (real) shocks. Applying the traditional rule-discretion debate on exchange rate regime policies suggest a peg as “policy crutches” for governments lacking credibility (Barro and Gordon 1983). These approaches focus on good and labor markets equilibrium and ignore the financial market. Otherwise, empirical literature shows the limited ability of these approaches to predict real countries regimes choices especially in developing countries (Calvo and Mishkin, 2003). International financial integration renewed interest on the impossible trinity view of Mundell-Fleming. It stresses the role of capital mobility as a factor preventing monetary authorities from allying exchange rate regime stability and monetary policy independence. More recently, an influential paper of Calvo and Reinhart (2002) introduces the “fear of floating” theory. Actually, emerging and developing countries are afraid to allow their exchange rate to fluctuate because of the balance sheet implications in financially dollarized economies, even announcing flexible regimes (Eichengreen and Hausmann, 1999). Arguments advanced by these two theoretical approaches suggest opposite implications of financial sector openness on exchange rate regime choice. Impossible trinity states that financial integration enhances financial innovation and sophistication, which reduces the effectiveness of capital controls and leaves to monetary authorities the only choice of floating to ensure their independence. Although, the “fear of floating” theory suggests a fixed regime, in a country financially open and largely indebted in foreign currency. Moreover, currency crises of the last decade of the twentieth century and their devastating consequences point to the financial sector weaknesses as potential causes of these crises. So, literature on currency crises prevention focuses, among others, on the exchange rate regime that shelters the economy from such crises (Frankel and Rose, 1998; Chang and Velasco, 2000). Otherwise, financial development conditions the effect of monetary policy on growth. Financial system weakness prevents a flexible regime to play its countercyclical role to absorb an external chock (Céspedes, Chang and Velasco, 2004). This idea is later formalized by Aghion et al. (2009). They conclude that weak and repressed financial sector combined with a flexible exchange rate regime hinders productivity growth.

In this paper, we attempt to empirically investigate the role of financial development in the choice of exchange rate regime.

But, measuring financial development is a difficult task. Financial development is a multifaceted concept that cannot be captured by standard indicators such as the ratio of broad money (M2) to GDP or credit on private sector to GDP²⁴. Also, several studies highlight the role of institutional development (Schleifer and Vishny (1997), Levine (1997, 98), La Porta et al. (1998)) and financial liberalization (McKinon and Shaw (1973), Menzie and Hiro (2002), Klein and Olivei (2008)) in the financial sector development. To respond to our central research question, we, first, build a composite index of financial development by aggregating five subindices representing five facets of the financial sector: (1) monetary sector development, (2) banking sector development, (3) nonbank financial sector development, (4) financial openness and (5) institutional development. We use a multinomial discrete choice model on panel data of 51 developing countries over the 1996-2007 period. We focus, successively, on “de jure” and “de facto” regime classifications in order to detect potential differences between actual and official monetary authority decisions. Significant and robust results are found that financial development favors the choice of a floating regime. In a second stage, we try to shed light on the most important aspects of the financial sector for the exchange rate regime choice, by replacing the financial development index by the five sector indices. Results reveal that all financial sector development components favor the official choice of a floating regime. But, only banking sector and financial openness, affect actual floating regime choice. This paper contributes to the existing literature on exchange rate regime choice on several aspects. First, it introduces a more representative measure of financial development that covers the multifaceted financial system. It fills gaps on measuring financial development in previous literature. Second, it studies the effect of each sector index on the choice of exchange rate regime. This

²⁴ These measures are criticized by several authors (Pill and Pradhan (1995), Beck et al. (2000), Rajan and Zingales (2003)), see Creane et al. (2007) for an overview.

is, to our knowledge, the first contribution that uses aggregated measures of institutional development or nonbank financial intermediaries. It contributes to specify the financial system characteristics of a country adopting a floating exchange rate regime, compared to those of a country adopting a fixed or an intermediate regime. Third, this paper proceeds to several robustness checks of the results, which is a scarce practice in this area previous empirical literature. The remainder of the paper is organized as follows. Section 1 presents the rationale behind a financial development index construction. Section 2 develops the index creation with components of each subindex, methodology and main findings. In section 3, we address a brief overview on the relation between financial development and exchange rate regime choice. Our empirical work is presented in section 4 by focusing on exchange regime choices and determinants, model specification, a brief descriptive analyses and estimation results. Section 5 offers our concluding remarks.

1. Rationale behind financial development index construction

Measuring the development of the financial system is to assess the ability of its actors to fulfill their roles. But there is no consensus on the proper measure of financial development. Recent literature recognizes the difficulty in measuring financial development and the limits of using conventional measures. For instance, Pill and Pradham (1995) assert that conventional measures, such as the level of real interest rates, the ratio of broad money to GDP and the ratio of private sector credit to GDP, overlook important factors, such as the financial openness of the country, the competitiveness of the banking sector or the importance of capital markets in financing the economy. They may give misleading indicators about the size and efficiency of the financial sector as a whole.

Most studies use monetary aggregates because they are easily available and amenable to cross-country and intertemporal comparisons²⁵. A set of other statistical indicators is also used to measure financial development²⁶. However these measures can be criticized for many reasons. First, the ratio of money to GDP is closely related to monetary policy and money demand; it fluctuates for reasons that are unrelated to financial development. Second, a high ratio (M2/GDP) is generally associated with more financial depth. But this ratio may fall, if the financial system progress by the expansion of less liquid instruments. Third, measures of private sector credit are contaminated by credit to public enterprises. Fourth, the use of real interest rate in early literature on financial development reflects financial repression. But, this is just one aspect of financial development²⁷.

Moreover, another factor has been overlooked until recently. Legal and institutional environment, that protects the rights of creditors and investors, enforces contracts and establishes credible and transparent regulatory and supervisory system, contribute to financial development²⁸. Similarly, political instability is negatively correlated with financial development (Bordo and Rousseau, 2006). Recent studies have proposed more representative measures of financial development. The first contribution was that of Beck, Demirgüç-Kunt and Levine (2000) (BDL thereafter). The authors have proposed a database of financial indicators that covers measures of size, activity and efficiency of banking and non-banking financial intermediaries, central bank and markets. Nevertheless, these indicators overlook financial openness and legal environment.

Furthermore, two interesting works attempted to build a global measure of financial system development, by aggregating measures relating to several aspects of the financial sector. First, Gelbard and Leite (1999) used measures of financial products, financial liberalization, market structure, institutional environment, financial openness and monetary policy to construct a comprehensive index for 38 sub-Saharan African countries for 1987 and 1997. Second, Creane and al. (2007) created a comprehensive index for 20 MENA countries for 2000-01 and 2002-03 using a 48-question survey that covered six themes: monetary sector, banking sector, nonbank financial sector, regulation and supervision, financial openness and institutional environment. Following a similar approach, we construct a composite index by the aggregation of five indices covering: banking sector, nonbank intermediaries and markets, financial openness, monetary sector and institutional environment. Our index improves the measure of financial development from the two previous indices at several levels. First, we retain more precise measures than yes/no questions. For instance, ratings on interest rate liberalization or foreign banks' importance in the banking sector are more informative than questions like are interest rates liberalized or not? Or, are there foreign banks? Second, we use precise measures of legal, political and institutional environment. Third, our index covers a large sample of developing countries from several regions over a period of twelve years from 1996 to 2007.

2. A composite financial development index creation

In an overview of financial system development, we considered five areas: (1) banking sector, (2) nonbank financial sector, (3) financial openness, (4) monetary sector, and (5) institutional environment. Each of these areas is represented by a number of attributes or items, totalizing 33 attributes. The attributes constituting each area, their measures and sources of data are summarized in table (1) appendix (A).

2.1. Components of sector indices

The selection of attributes was based on empirical literature revealing their pertinence in financial system development.

The *banking sector* area includes measures of size, activity and efficiency of deposit money banks. A key measure of banking system efficacy is its size. The greater the size of the banking system, the bigger the amount of resources channeled from savers to investors. But measures of size overlook the efficiency of the banking activity. So, indicators of net interest margin and importance of overhead are also considered. Otherwise, banks operating in a competitive environment, with the presence of foreign banks, low state intervention and low

²⁵ For guidance: King and Levine, 1993 (M1/PIB, M2/PIB, M3/PIB); Levine, 1997 (M2/PIB); Kpodar, 2005 (M3/PIB).

²⁶ These indicators include: credit to the private sector to GDP, bank deposits/GDP, real interest rate, credit to the private sector to total domestic credit....

²⁷ Gelbard and Leite (1999).

²⁸ La Porta and al. (1997, 1998) have shown that such legal environment is associated with more developed and efficient financial system.

concentration are more efficient. Thus, ratings measuring the presence of foreign banks in the sector, the degree of concentration and the importance of public banks, are retained²⁹.

The *nonbank financial sector* area includes, together, attributes related to nonbank financial intermediaries and markets. Importance of nonbank financial intermediaries, considered as competitors and substitutes of banks, is captured by measures of size and activity. Insurance sector (life and nonlife) activity is also captured³⁰. Concerning financial markets, economic theory suggest that they stimulate long term growth by encouraging specialization, acquisition and dissemination of information and efficient mobilization of savings. Empirical studies validate a positive effect of liquid financial markets on capital accumulation and economic growth³¹. Moreover, measures of public and private bond markets are included to capture diversity of financing means³².

The *financial openness* area considers capital account liberalization by ratings reflecting the importance of restrictions on foreign currency detention, capital movement and access to international capital market. The importance of parallel exchange rate market is, also, included. Restrictions on capital account, as well as multiplicity of exchange rates or misalignment of the official exchange rate, deprive an open economy to enjoy foreign capital inflows, and a domestic investor to take advantage of international investment opportunities³³.

It must be noted, however, that literature on financial liberalization and financial crises stresses the fact that, unexpectedly and not accompanied by regulation and supervision measures, openness of capital account, increases the risk of financial system meltdown³⁴. The *monetary sector and monetary policy* area is represented by measures of relative and absolute size of the central bank, conductor of monetary policy and playing an important role in regulation and supervision of the financial system. It also considers the provision of liquidity services by the financial system by introducing an indicator of financial intermediation (M2/GDP). In addition, we examine liberalization of interest rates that reflects the use of indirect monetary policy instruments by the government, as opposed to direct controls. The *institutional environment* area includes measures related to judiciary, institutional and political environments. Judicial system influences the performance of the financial sector. Sound legal environment should reduce information and transaction costs in the financial system (Levine, 1997)³⁵. So we considered ratings of the ease of loan recovery through the judicial system, property rights, rules of law, and legal system origin. We tried, also, to evaluate the quality of institutions involved in financial transactions by measures of bureaucratic quality, corruption and regulation quality³⁶. Furthermore, political stability reassures investors. It is why some countries, and not others, develop and insure proper functioning of institutions that protect investors' rights³⁷.

2.2. Methodology

The approach used is to compute separate indices to measure each area identified above, as well as a global index of financial development. All indices are measured on a 0-100 scale in ascending order of financial development. All attributes are quantitative measures, except legal system origin. A trichotomous variable was introduced to capture if legal system origin is Islamic charia, common law or civil law. The sample contains a number of Arab and Muslim countries that legal system is based on the Islamic charia. Such a system restricts financial transactions. Thus, legal system origin variable takes the value 0 if it is Islamic charia, 50 if it is common law and 100 if it is civil law³⁸. All other attributes are converted into the 0-100 scale, according to the following formula of interpolation between maximum and minimum values:

$$d_{ij} = [(k_{ij} - \min_{i=1, \dots, n} k_{ij}) / (\max_{i=1, \dots, n} k_{ij} - \min_{i=1, \dots, n} k_{ij})] * 100$$

where i indicates the n countries for which information is available, j indicates the m attributes measured, k_{ij} is the value of attribute j for country i , and d_{ij} is the measure within the 0-100 scale of that attribute.

Each index is subsequently constructed as a simple average of the values associated to its attributes:

$$Index_i = [\sum_{j=1, \dots, m} d_{ij}] / m$$

For the particular case of institutional environment area, the index is:

$$Index_i = [\sum_{j=1, \dots, m} d_{ij} + e_i] / m$$

²⁹ La Porta, Lopez-de-Silanes and Shleifer (2002) show that countries with high share of public banks in the banking system have lower subsequent growth. Foreign banks presence reflects an investment and competitive climate in the country (Adrianova et al. 2008). Levine (2003) found that restrictions on foreign bank entry lead to higher interest margins. Beck et al (2003) found that non-concentrated banking system is less prone to systemic crises. Highly concentrated banking sector hinders growth of other sectors (Cetorelli and Gambera, 2001).

³⁰ Insurance companies provide wide coverage of commitments, create liquidity, allow economies of scale in investments and help to mobilize illiquid saving, which positively influences growth (Lin, 2007)

³¹ Among these studies: Levine and Zervos (1998), Demirgüç-Kunt and Levine (2001) and Levine (2001).

³² Fink and al. (2003), controlling for other factors, found that bond market development results in economic growth.

³³ Calvo and Reinhart (2000)

³⁴ Among financial liberalization literature: Klein and Olivei (2008) et Menzie and Hiro (2002). Among financial crises literature: Aizenman (1999), Calvo and Reinhart (2000), Mishkin (2001)

³⁵ La Porta and al. (1998) find that legal system origin influences the effectiveness of laws governing relations between debtors and creditors. Levine, Loayza and Beck (2000) find that countries with protecting rights of creditor's legal system and international standards of auditing, accountability and information dissemination are more financially developed.

³⁶ Djankov and al. (2005) examine measures of business environment regulation, including investor's right protection, and conclude for their positive and significant impact on growth.

³⁷ Outreville (1999) validate empirically, on a sample of 57 developing countries, the negative impact of political instability on financial development.

³⁸ According to Bordo and Rousseau (2006), civil law countries are more financially developed than common law ones.

Where ei is the value associated to the response of the legal system origin question of the country i . The overall financial development index is computed, for each country, as the average of the five indices previously calculated. The indices were compiled on a sample of 51 developing countries over the period 1996-2007 on an annual frequency. Starting from all developing countries, we have been constrained to retain only these, because of the lack of data for all attributes. The period was, also, limited, notably because calculating of almost all ratings of institutional environment started at 1996 for the countries considered. The list of countries is reported in Appendix A.

2.3. Findings

One of the main findings from the indices compiled is that significant disparities exist between countries and in their financial progress over time. Though, annual changes are insignificant. Thus, we discuss here results relative to 1996 and 2007 in order to observe tendency over a decade and show cross-country and regional differences. An insignificant financial development (4%) took place in the 1996-2007 period over the whole sample. The five sector indices didn't contribute in the same way to this small increase. As seen in table (1), only institutional environment development index declined, on average, of 12%. One can explain this by the absence of new reforms of judicial loan recovery and property right protection over the period; in addition to the decline of ratings relative to political stability and corruption. Among progressing indices, the first place goes to financial openness (12%) confirming growing financial integration of the developing world. Also, the development of the monetary sector index is explained by an almost general tendency of interest rate total liberalization. Banking and nonbank sectors progressed, on average, slightly.

Table (1). Sample means and progression in the 1996-2007 period

<i>Index</i>	<i>1996</i>	<i>2007</i>	<i>% Change</i>
Financial development	43	45	4
Banking sector development	44	46	5
Nonbank financial sector development	14	15	7
Financial openness	61	69	12
Monetary sector development	43	47	10
Institutional development	55	48	-12

Source: Authors calculations

Behind this low average evolution, sample countries have heterogeneous financial performances. As shown in figure (1) Appendix A, countries, such as Algeria, Brazil Jordan, Israel and Nigeria, experienced a spectacular progress of their financial system (Nigeria, at the first place 105%). The main sources of this development were financial openness and nonfinancial sector by developing financial markets. While, counties like Argentina, Ecuador, Lithuania, Malaysia, Thailand and Philippines regressed, on average by 11%. Their financial sector falling-in was caused by, primarily, financial crises that deteriorate banking sectors and financial markets. Also, their institutional environment indicators felled. Another group of countries include "stagnant" countries (Colombia, Kenya, Pakistan, Bahrain, Barbados and Venezuela). Their financial development was insignificant. All their sector indices progressed poorly except institutional environment index which declined. In order to detect regional tendencies and international financial system trends, we have grouped sample countries by region according to the regional distribution of the World Bank.

Table (2). Mean financial development index by region

<i>Regions</i>	<i>1996</i>	<i>2007</i>	<i>% change</i>
East Asia and Pacific	50,37	46,10	-8%
Europe and Central Asia	43,44	46,87	8%
Latin America and Caribbean	45,27	44,91	-1%
Middle East and North Africa	40,64	47,48	17%
South Asia	34,06	36,15	6%
Sub-Saharan Africa	38,93	44,23	14%

Source: Authors calculations

Table (2) reveals the best initial level of financial development in East Asian countries and the worst one in South Asian countries. But, over the sampling period, East Asian countries regressed by 8%. These countries still suffer from the negative impact of the financial crises of 1997. Contrariwise, MENA region performed considerable progress over the period, with as leaders in the field, Bahrain, Israel and

Jordan. In 2007, South Asian countries persist in the last place despite progress. Figure (2) Appendix A shows sectors responsible of disparities between regions in terms of evolution. European and central Asian countries progressed, considerably, in the monetary area over the period. Several countries in this group are newly members of EU. This membership requires, inter alia, complete liberalization of interest rates. MENA region countries performed substantial financial openness, Sub-Saharan African countries too. But, East Asian countries regressed in the financial openness area because of loss of international investors' confidence and the return of restrictions on foreign currency accounts detention by residents. South Asian countries have made considerable progress on nonbank financial sector development, especially through financial markets. This region is the only progressing region in the institutional development area by improving corruption perception.

2.4. Reliability and robustness check of the financial development index

The financial development index reliability is tested using the Cronbach coefficient α . It gives the proportion of "truth" relative to measurement error in the index and verifies the unidimensional aspect of each sub index. Table (2) appendix (A) reflects α computed for the financial development index and the five sector indices³⁹. The financial development index reliability is satisfactory ($\alpha=0.85$), i.e. 85% of the information reflecting financial development is included in the items selected. The sector indices have a good reliability, too.

For robustness check, we compare the country ranking given by our financial development index with the ranking given by the financial development index, calculated using the same methodology, by the World Economic Forum. Unfortunately, these two indices converge only on 23 countries and the comparison is done only for 2007⁴⁰. Table (3) appendix (A) shows results using two nonparametric tests (Spearman rank test and Kendall rank test) to test correlation between the two ranking series. The two tests reject the null hypotheses (the two series are independent). The ranking on the basis of our financial development index corroborates largely the World Economic Forum financial development ranking.

3. Financial development and exchange rate regime choice: An overview.

Conventional theory of exchange rate regime choice has not been successful in predicting exchange rate regime choices in practice, notably in developing countries. It calls for countercyclical monetary policy. Céspedes, Chang and Velasco (2004) address skeptical arguments about the applicability of countercyclical exchange rate policy in offsetting real shocks in a weak financial system country. If domestic producers are financed by a small and imperfect credit market, any depreciation of the real exchange rate because of an external shock exaggerates these imperfections; because of its effect on the value of collateral. It leads to a contraction of credit and investment. Also, foreign currency debt that characterizes many countries unable to borrow in domestic currency may counteract the expansionary effect of devaluation because of balance sheet effects. In addition, connection between banking crises and currency crises (Kamensky and Reinhart, 2003; Domag and Peria, 2003) implies a profound rethinking of the exchange rate choice theory in which financial structure should matter (Chang and Velasco, 2000). Cartapanis and Dropsy (2005) suggest that understanding exchange regime choices in a high capital mobility world requires new macro-financial criteria. Traditional criteria based on optimum currency areas (Mundell, 1961), the incidence of macroeconomic shocks (Mundell-Fleming) and discretionary monetary policies (Barro and Gordon, 1983) have not been sufficient in the new international financial environment. Two interesting works (Bordo, 2003) and (Bordo and Flandreau, 2003) point that the main difference between developed and developing countries is financial maturity. It is also the driving force of the international financial system evolution. Developed countries have adopted fixed regimes in the early twentieth century through the gold standard and floating regimes a century later. During both periods, developing countries have tried to emulate them with limited success. This idea is, later, formalized by Aghion et al. (2009). The authors use a simple monetary growth model to show that exchange rate volatility exacerbates the negative investment effect of domestic credit market constraints. Large variations in firms' profits caused by exchange rate volatility reduce firms' external financing capability in a constrained credit market, which depress their investment (especially in R&D) and, eventually curtail the country's productivity growth. They conclude that when financial development is limited, flexible regime would reduce productivity growth.

Empirically, variables related to financial liberalization, financial markets depth and other financial sector performance measures are often ignored in studies about exchange rate regime choice. Nevertheless, some recent empirical studies have integrated financial determinants in models of optimal exchange rate regime choice: Liquid liabilities (Von Hagen and Zhou, 2007; Markeiwicz, 2005); the ratio of domestic credit to the private sector on GDP (Calderon and Schmidt-Hebbel, 2008; Lin et al, 2011); capital account controls (Markeiwicz, 2005; Carmignani et al, 2008); quasi money over money (Levy-Yeyati et al, 2010). Unfortunately, econometric results are not stable and robust.

4. Empirical Validations

In this section, we first present the three categories of exchange rate regime choices and the "de jure" and "de facto" classifications used. We then specify the multinomial logit model used. In the third subsection we analyze a few descriptive statistics. Finally, we discuss and interpret estimation results.

4.1. Exchange rate regime choices and determinants

³⁹ The calculated α is between 0 and 1. The nearer α to 1, the more homogenous the items of each index and the more reliable the index. 0.7 is conventionally considered as a threshold (Nunnally, 1978).

⁴⁰ The World Economic Forum published its first financial development report on 2008, based on data of 2007.

For exchange rate regime choices, we have selected three categories (fixed, intermediate and floating). Dichotomous classification fixed versus flexible is not relevant here. The regimes adopted by the sample countries cover a wide range of alternatives, some of which do not fall neatly into the fixed/flexible dichotomy. Moreover, several previous studies have highlighted the relevance of considering three exchange rate regime categories (Masson (2001), Juhn and Marou (2002), Papaïouanou (2003), Von Hagen and Zhou (2007)). Intermediate regimes seem to have their own determinants. Descriptive statistics presented later support this observation. But classifying exchange rate regimes by itself is a controversial task. Discrepancies between declared exchange rate regimes and actual exchange rate policies exist and are well documented as a research topic. Previous works have developed “de facto” classifications based on the actual behavior of exchange rate and reserves⁴¹. Official “de jure” classification is annually published by the International monetary Fund (IMF) based on country reports. Previous work using these two classifications did not agree on the superiority of one another⁴². In this paper, we focus on the two classifications of exchange rate regimes “de jure” and “de facto”. Official exchange rate regime classification “de jure” is based on the regime announced by the monetary authorities. The announcement itself reflects the view of the authority that this regime is the most suitable for the country. Thus, it can influence the monetary policy and the market expectations about the exchange rate behavior. As for the “de facto” classification, it allows us to understand why some countries deviate, in practice from their official claims, while others do not. Furthermore, comparison between the two classifications helps us to realize if official choices and actual behavior of monetary policies are conducted by the same determinants or not. Data for the “de jure” classification are collected from the *Annual Report on Exchange Arrangements and Exchange Restrictions* of the IMF. We aggregate the eight categories specified by the fund on three categories depending on their degree of flexibility (absent, moderate or total)⁴³. Data for the “de facto” classification is obtained from Levy-Yeyati and Sturzenegger database that covers 18 countries over a long period of time and updated until 2007. The database provides a classification in three categories (fixed, intermediate, and floating) that we retain. Two other “de facto” classifications are also used for robustness checks⁴⁴. Recall that we are studying the role of financial development in exchange rate regime choices. Our main variable of interest is the level of financial development that we have measured by the composite financial development index (FDI thereafter) computed in the previous section. Another measure of financial development used in the standard literature, liquid liabilities over GDP, is also introduced for robustness check of the results. In a second stage, we study the effect of each aspect of financial development taken separately. We replace the FDI by the five sector indices relative to the five facets of the financial system development considered: (1) Banking sector development (BSD), (2) Nonbank financial sector development (NFSD), (3) Financial Openness (FO), (4) Monetary sector development (MSD), (5) Institutional development (ID). Drawing on theoretical approaches and empirical findings, we consider control variables based on OCA fundamentals, stabilization and credibility considerations, impossible trinity, “fear of floating” and currency crises prevention. For OCA fundamentals, we select economic size (SIZE), level of economic development (ECODEV), economic openness (OPEN) and inflation level (INF). To reflect stabilization strategies, we consider nominal shocks by domestic monetary shocks (MONSHK) and real shocks by relative price shocks (RPSHK). To apprehend credibility considerations, we consider an index measuring the supervision authority independence namely the central bank (CBI). We proxy “fear of floating” by a measure of liability dollarization (LD). To measure the impossible trinity effect, we consider de facto capital account openness (CAO). Finally, to proxy the risk of currency crises, we include international reserves adequacy (RESAD). The measures of these variables and the data sources are detailed in table (1) appendix (B).

Variables such as inflation and international reserves raise the problem of reverse causality with exchange rate regimes. Fixed exchange rate is unsustainable with high inflation. But fixed regime is widely used in a strategy of reducing inflation. Similarly, a country adopting a floating regime does not need high levels of international reserves. But low reserves levels lead a country to choose a floating regime⁴⁵. Moreover, contemporaneous interactions between economic fundamentals and exchange rate regime strategies raise an endogeneity problem. To overcome these estimation problems, lagged, by one year, explanatory variables are introduced in the model.

4.2. Model specification

The dependent variable Y_{it} denotes the exchange rate regime choice of county i in year t . It is a discrete variable such as $Y_{it} = 0, 1, 2$ for fixed, intermediate and flexible regimes respectively. Countries choose the exchange rate regime that maximizes their utility. This implies that:

$$Pr(Y_{it} = j) = Pr(U_{itj} > U_{itk}) \quad j, k = 0, 1, 2 \text{ et } k \neq j.$$

j is considered as optimal, since the utility given by the regime j to the country i is greater than the utility given by any other regime k .

U_{itj} denotes the unobserved utility that country i derives in year t from the exchange rate regime j . It is assumed to depend of a linear vector of explanatory variables V_{itj} and a random error ε_{ij} . V_{itj} depends on the characteristics of the county i in the year t X_{it} .

$$U_{itj} = V_{itj} + \varepsilon_{ij}$$

⁴¹ Bubula and Otker-Robe(2002), Reinhart and Roggof (2004), Levy-Yeyati et Sturzenegger (2005).

⁴² Husain et .al (2004), Genberg and Swoboda (2005), Grauwe and Schnabl (2008).

⁴³ No separate legal tender regimes such as dollarization and currency union, currency boards and hard pegs are classified as fixed regimes. Conventional fixed pegs, horizontal bands, crawling pegs, crawling bands and managed floating are grouped under the category of intermediate regimes. Independently floating is the lone regime in the floating category.

⁴⁴ We use Bubula and Otker-Robe(2002) and Reinhart and Roggof (2004) classifications.

⁴⁵ Among studies that discuss reverse causality: Juhn and Mauro, 2002 ; Calvo and Mishkin, 2003 ; Hussain et al., 2005.

$$Vitj = \beta_j X_{it}$$

β_j is a vector of coefficients which depends only the possible choices of exchange rate regime. ε_{ij} is independently and identically distributed (i.i.d) across, countries, years and regimes.

Since we can observe only $Vitj$, we estimate the probability that country i chooses exchange rate regime j using a multinomial logit model on panel data of 51 developing countries over 1996-2007 period.

A multinomial logit specification of the model implies that:

$$\Pr(y_{it} = j) = \frac{\exp(\beta_j x_{it})}{\sum_{k=0}^2 \exp(\beta_k x_{it})}, j = 0, 1, 2$$

With $\beta_0 = 0$, for normalization. We assume fixed regime as base category. The probability related to the base category is:

$$\Pr(y_{it} = j) = \frac{1}{\sum_{k=0}^m \exp(\beta_k x_{it})} = \frac{1}{1 + \sum_{k=1}^m \exp(\beta_k x_{it})}$$

So,

$$\Pr(y_{it} = j) = \frac{\exp(\beta_j x_{it})}{1 + \sum_{k=1}^m \exp(\beta_k x_{it})}$$

The β coefficients are interpreted relatively to the base category.

The model is estimated using the maximum likelihood estimator. The log-likelihood function for the whole sample is given by:

$$1 + \sum_{k=1}^m \exp(\beta_k x_{it})$$

It should be noted that a multinomial logit model is conditioned by the restrictive hypothesis IIA (Independence of Irrelevant Alternatives). We verify this hypothesis using the Hausman test.

4.3. Descriptive Analyze

Table (3). Means and standard deviations of regime determinants

	Full sample		Mean "de jure"			Mean "de facto"		
	Mean	S.D	Float	Inter	Fix	Float	Inter	Fix
FDI	44.159	8.423	45.916	43.046	44.492	44.530	43.434	44.355
SIZE	10.494	1.5345	11,229	10,712	9,5975	11,279	10,536	9,875
ECODEV	7.953	0.993	7,656	7,990	8,125	7,943	7,810	8,059
INF	0.092	0.138	0.097	0.106	0.065	0.105	0.111	0.068
CAO	0.195	0.546	0,095	0,132	0,367	0,105	0,138	0,303
RESAD	0.336	0.228	0,273	0,368	0,337	0,306	0,409	0,307
OPEN	86.562	48.340	67,196	86,480	101,641	70,852	89,029	96,654
LD	52.775	40.488	47,708	47,578	64,537	51,183	47,820	57,580
RPSHK	17.738	24.014	11,918	16,889	23,514	14,627	11,258	24,733
MONSHK	0.063	0.095	0,057	0,055	0,079	0,055	0,050	0,078

Table (3) reports the means and standard deviations of regime determinants over the full sample and the means of each variable across the three regime categories for the two classifications selected. A rough impression is that on average the two regime classifications give slightly different means. For the two classifications, the three regimes differ significantly on some dimensions including current account and capital account openness, relative price shocks and inflation. In sum, confirming theoretical suggestions, floating regime countries are the largest ones and the less open. But, contrary to the theory, they are the least exposed to relative price shocks and the least economically developed. Fixed regime countries have the lowest inflation and the biggest openness, but they have the highest levels of liability dollarization in the sample. Intermediate regime countries are characterized by high inflation and reserves accumulation. Moreover, the mean values of most variables grow not monotonically when the flexibility of the exchange rate regime rises. This suggests that explanatory variables have qualitatively different impacts on intermediate and floating regimes, both relative to fixed ones. This supports our choice of a non-ordered multinomial model rather than a binary or an ordered choice model.

Table (4): Means of regime determinants by country group

	Emerging countries			Developing countries		
	Float	Inter	Fix	Float	Inter	Fix
FDI	45,46	46,75	44,48	46,85	39,67	44,49
SIZE	11,844	10,904	11,679	9,926	10,54	9,355
ECODEV	7,746	8,150	8,343	7,464	7,853	8,100
INF	0.078	0.118	0.077	0.138	0.094	0.064
CAO	0.093	0.158	0.159	0.099	0.108	0.391
RESAD	0.267	0.343	0.398	0.287	0.391	0.330
OPEN	64,221	103,384	58,172	73,502	71,213	106,685
LD	41,137	51,558	39,640	61,639	44,059	67,425
RPSHK	11,015	13,617	27,670	13,830	19,950	23,032
MONSHK	0,049	0,059	0,058	0,074	0,053	0,081

Table (4) reveals opposite patterns for emerging and developing countries on several aspects, specially, financial development. For emerging countries, the best financial performance is achieved by intermediate regime countries. These have the worst performance in the other developing countries. Intermediate regime emerging countries have, also, a double-digit inflation and are highly open and indebted in foreign currency. Nevertheless, fixed regime developing countries better reflect the model, advocated by the literature, of a fixed regime country. They are small sized, low inflation, high open, liability dollarized and exposed to monetary chocks. Finally, we check the correlation among the explanatory variables (see correlation matrix appendix (B)). The highest correlation in absolute value is 0.38, and most of the correlations are below 0.30. The correlation matrix does not reveal any serious multicollinearity.

4.4. Estimation Results

We estimate the model for both “de jure” and “de facto” classifications. For each classification, we estimate the model on the full sample, then on the two country groups separately. Tables (5) and (6) report the first stage estimation results of the multinomial logit model, focusing on FDI as interest variable, and using the “de jure” and “de facto” classifications, respectively. Tables (7) and (8) report the second stage estimation results where we replace FDI by the five subindices discussed earlier. In the two first columns of each estimation column, we consider fixed regime as base category. The coefficients reported in these columns indicate the qualitative impact of the explanatory variables on the net utility associated with a floating and an intermediate regime, respectively, relative to a fixed one. A positive (negative) coefficient means that an increase in the explanatory variable, raises (reduces) the probability of the related regime to be adopted, relative to a fixed regime. In the third column, we consider intermediate regime as base category.

Table (5): First stage estimation results: Multinomial logit model with « de jure » classification

	<i>Full sample</i>			<i>Emerging countries</i>			<i>Developing countries</i>		
	Float/fix	Inter/fix	Float/inter	Float/fix	Inter/fix	Float/inter	Float/fix	Inter/fix	float/inter
FDI	0.203***	0.014	0.188***	0.131**	0.565**	0.075**	0.394***	-0.017	0.411***
SIZE	1.075***	0.635***	0.439***	0.258	-0.049	0.308	0.815***	0.562***	0.252
ECODEV	-1.694***	-0.204	-1.489***	-1.103**	-0.148**	-0.955***	-2.833***	-0.198	-2.635***
INF	-0.002	-7.51E-06	-0.002	0.026	4.70E-02	-0.021*	-6.58E-06	-6.38E-06	-2.04E-07
CAO	-2.294	-1.496**	-0.798	-2.802	-2.242	-0.559	-2.351	-1.073	-1.277
RESAD	-0.963	0.074	-1.038	-1.825	-0.927	-0.898	0.551	1.174*	-0.623
OPEN	-0.013***	0.006**	-0.019***	-0.001	0.011**	-0.012***	-0.052***	-0.024***	-0.028**
LD	0.004	-0.006**	0.011**	0.022	0.033*	-0.01	0.017*	-0.007**	0.025***
RPSHK	-0.02**	-0.003	-0.016*	-0.038*	-0.027	-0.011	-0.01	0.018***	-0.028
MONSHK	-0.745	-1.972*	1.227	0.168	0.459	-0.291	-0.321	-1.094	0.773
CBI	-1.057***	-0.431***	-0.627***	-0.912**	-0.881***	-0.724***	-1.879***	-1.33***	-0.548
Observations	612			251			360		
Loglikelihood	-484.003			-174.789			-208.385		
Pseudo R2	0.2529			0.2253			0.4058		
AIC	1.660			1.584			1.291		

TABLE (6): First stage estimation results: Multinomial logit model with « de facto » classification

	<i>Full sample</i>			<i>Emerging countries</i>			<i>Developing countries</i>		
	Float/fix	Inter/fix	Float/inter	Float/fix	Inter/fix	Float/inter	Float/fix	Inter/fix	Flottant/inter
FDI	0.063***	0.014	0.048***	0.166***	0.116*	0.104***	-0.004	0.013	-0.018
SIZE	0.649***	0.337***	0.311***	-0.146	-0.187	0.041	0.274	0.145	0.129
ECODEV	-0.364**	-0.137	-0.226	-0.871**	-0.612*	-0.258	0.008	-0.065	0.073
INF	-7.26E-06	-7.61E-06	3.52E-07	-0.005	-0.019	0.013	-7.82E-06	-7.51E-06	-3.09E-07
CAO	-0.694	-1.134*	0.448	3.11	4.509*	-1.398	-0.162	-2.657	2.495
RESAD	-0.334	1.77***	-1.435**	-1.053	1.612	-2.665**	-2.181***	2.584***	-0.402**
OPEN	-0.005*	0.003	-0.009***	-0.013***	-0.001	-0.013***	-0.0515***	-0.029***	-0.022**
LD	0.008***	-0.005	0.014***	0.005	-0.01	0.015*	0.008***	-0.004	0.012
RPSHK	-0.018***	-0.033***	0.015*	-0.041**	-0.045***	0.003	-0.004	-0.022**	0.017
MONSHK	-1.681	-2.123	0.442	-2.902	-2.649	-0.253	0.426	-1.711	2.138
CBI	-0.829***	-0.26*	-0.568***	-2.393***	-1.533***	-0.86***	-0.44	-0.155	-0.284
Observations	612			251			360		
Loglikelihood	-545.758			-198.732			-270.021		
Pseudo R2	0.1787			0.2395			0.2354		
AIC	1.862			1.775			1.633		

Dealing with the first stage estimation results, based on “de jure” classification (table 5), the FDI has a highly significant effect on the choice of a floating exchange rate regime. An increase in a country’s financial performance raises the probability of choosing a floating

regime relative to fixed and intermediate ones⁴⁶. This pattern fits developing countries subsample but not emerging countries. In the emerging country group, financial development favors exchange rate regime flexibility. It raises the probability of choosing floating and intermediate regimes relative to fixed one. As financial system grows gradually, emerging countries, more integrated to international capital markets, should evolve to more flexible exchange rate regime solutions⁴⁷. Among control variables, SIZE, OPEN and CBI have expected signs. Countries with large economic sizes tend to choose flexible regimes because of their reluctance to give up monetary autonomy. But, ECODEV and RPSHK, though significant, have opposite signs to our previous expectations. An economic development and terms of trade shocks favor monetary control on exchange rate fluctuations. This result is at odds with the existing literature. However, it is consistent with the view that developing countries are very concerned by their competitiveness in foreign markets. So, currency fluctuations accompanying a floating regime affect country's external competitiveness and slow down growth. Another implication is that rich countries tend to prefer fixed regimes and poor ones have flexible regimes.

Otherwise, intermediate regime choice is negatively and significantly affected by an increase in CAO, LD and MONSHK. Large domestic monetary shocks point to the direction of fixed regimes. It is interesting to note that LD has opposite effects on floating and intermediate regimes. A foreign currency debt increase leads monetary authorities to maintain a tight peg relative to an intermediate regime in order to preserve banking sector from balance sheet effect, or to float to lead domestic borrowers to reduce currency mismatches or cover their external positions. This is consistent with the "hollowing out" view that intermediate regimes are not viable. Finally, INF and RESAD seem to be not important for the exchange rate regime official choice, as their coefficients are insignificant. For "de facto" classification (table 6), financial development effect, which is the same for the full sample and emerging countries as "de jure" classification, disappears for developing countries, as well as CBI and ECODEV. It seems that actual behavior of monetary authorities in developing countries is not affected by financial sector development which affects official decisions, mainly in countries aiming floating regime. Monetary authority actual choices are, rather, influenced by trade openness and international reserves adequacy. Among control variables, SIZE and OPEN are robust to classification change for the full sample. But, RESAD, which is not significant for "de jure" classification, seems to be a significant determinant for actual exchange rate regime decisions. An increase in foreign reserves accumulation facilitates monetary authority intervention on currency market to maintain a peg.

TABLE (7): Second stage estimation results with « de jure » classification

	<i>Full sample</i>			<i>Emerging countries</i>			<i>Developing countries</i>		
	Float/fix	Inter/fix	Float/inter	Float/fix	Inter/fix	Float/inter	Float/fix	Inter/fix	Float/inter
SIZE	1.255***	0.787***	0.468***				-0.171	0.942***	1.113**
ECODEV	-2.371***	-0.537***	-1.833***	-1.686***	-0.461	-1.225***	-2.841***	-0.535*	-2.306***
RESAD							1.251	1.404*	-0.153
OPEN	-0.016***	0.004*	-0.021***	-0.006	0.015	-0.022***	-0.075***	-0.035***	-0.045***
LD	0.005	-0.007**	0.009*	0.013	0.041**	-0.027***	0.008	-0.009**	0.018*
PRSHK	-0.016*	-0.003	-0.013	-0.051**	-0.029	-0.022*	0.006	0.023***	-0.017
CBI	-1.297***	-0.598***	-0.699***	-1.268**	0.043	-1.311***	-2.360***	-1.499***	-0.86
MSD	0.0375***	0.017*	0.051*	0.049*	0.003	0.046	0.118***	0.003	0.114***
NFSD	0.052***	0.001	0.019***	-0.036	-0.051*	0.015***	0.143***	-0.025	0.168***
BSD	0.104***	0.036**	0.067***	0.015	-0.026	0.042*	0.089*	0.075**	0.014
FO	0.042***	-0.011**	0.054***	0.028	-0.019	0.047***	0.551***	-0.016**	0.067***
ID	0.028*	0.006	0.022	0.066*	0.109***	0.043**	0.046	0.008	0.038
Observations	600			250			349		
Loglikelihood	-470.224			-159.965			-192.379		
Pseudo R2	0.26			0.2880			0.4370		
AIC	1.641			1.488			1.451		

⁴⁶ This result support the idea advanced by Bailliu(2003)that financial development is a prerequisite to a successful choice of floating exchange rate regime.

⁴⁷ This result draws theoretical support from the « impossible trinity » arguments of Mundell-Fleming.

TABLE (8): Second stage estimation results with “de facto” classification

	<i>Full sample</i>			<i>Emerging countries</i>			<i>Developing countries</i>		
	Float/fix	Inter/fix	Float/inter	Float/fix	Inter/fix	Float/inter	Float/fix	Inter/fix	Float/inter
SIZE	0.942***	0.775***	0.174						
ECODEV	-0.681***	-0.401**	-0.297	-1.194***	-0.733**	-0.46*			
CAO				5.424*	4.258	1.165			
RESAD							1.582*	1.945***	-0.362
OPEN	-0.005	0.006**	-0.01	-0.012***	-0.005	-0.012***	-0.064***	-0.035***	-0.029***
LD	0.00	0.011***	0.014				0.003	-0.006	0.009**
PRSHK	-0.012*	-0.024***	0.012	-0.049***	-0.043***	-0.006	0.004	-0.019**	0.024**
CBI	-0.824***	-0.195	-0.634	-2.24***	-1.29***	-0.951***			
MSD	-0.008	-0.008	0.042	0.006	0.014	-0.007	-0.051***	-0.025	-0.026
NFSD	-0.011	-0.053***	-0.006	0.027*	-0.033*	0.061***	0.007	-0.014	0.021
BSD	0.052***	0.052***	0.052	0.031	0.064**	-0.032	-0.019	-0.034	0.015
FO	0.014**	0.006	0.009	0.033***	0.006	0.027***	0.006	0.009	-0.003
ID	0.018	0.003	0.015	0.075***	0.024	0.05**	-0.03	-0.004	-0.026
Observations		600			250			349	
Loglikelihood		-513.094			-193.546			-255.956	
Pseudo R2		0.214			0.2572			0.2586	

Turning to the second stage estimation results, the FDI is replaced by the five subindices representing five facets of the financial sector development. We keep only significant control variables. Concerning “de jure” classification (table 7), all coefficients of sector indices, to a lesser extend ID, are significant and have expected signs. They raise the probability of choosing a flexible exchange rate regime. An exception deserves to be highlighted. FO decreases to probability of choosing an intermediate regime. This view is consistent with the idea that intermediate regimes are more vulnerable to currency crises than extreme regimes, and is supported by the impossible trinity.

Large differences appear between the two country groups. For emerging counties, ID seems to be crucial for exchange rate regime official choices, but it loses all significance in developing countries. Otherwise, an emerging country choice of a floating regime relative to an intermediate one is favored by a progress in NFSD, BSD and FO. Intermediate regime choice is, also, discouraged by NFSD. MSD favors, only, the choice of a floating regime relative to a fixed one. A floating developing country needs to achieve a progress in all facets of the financial sector, except ID. An intermediate regime developing country is specially concerned by banking sector development and controlling financial openness. Sequential financial sector development begins with banking sector development then focus on the other financial intermediaries and financial markets⁴⁸. So, NFSD index progress help achieving financial maturity, a precondition to the choice of a floating regime.

Comparing to “de jure” classification, “de facto” results reflect that financial subsector indices lose some of their relevance. ID and MSD do not have any explanatory power on actual monetary authority decisions for the full sample. Institutional variables are fairly stable over time; actual exchange rate regime policy is, rather, affected by moving conditions. A progress in BSD raises the probability of choosing a flexible regime relative to a fixed one. But FO favors, only, the choice of a floating regime relative to a fixed one. International financial integration is the last step in a process of financial liberalization and allows financial maturity. This helps monetary authorities adopting successfully a floating regime⁴⁹. Contrary to what is expected, NFSD coefficient has a negative sign by all, but it is only significant for the choice of an intermediate regime relative to a fixed one. Distinction between emerging and the other developing countries shows more striking differences compared to “de jure” classification. For developing country group, no sector index has a significant effect on actual monetary authority decisions. This result is consistent with the first stage estimation results. It is worth to note an exception concerning MSD. It has a significant effect on the probability of choosing a floating regime relative to a fixed one, but with a negative sign. Monetary sector consolidation enhances monetary authority credibility, necessary to conduct successfully a pegged regime, mainly in developing countries suffering from discretionary policies and weak monetary authorities. Nevertheless, emerging countries actual exchange rate regime policies are conditioned by financial aspects. NFSD index increase raises the probability of choosing a floating regime relative to fixed and intermediate ones. But it reduces the probability of choosing an intermediate regime relative to a fixed one. Though, the banking sector has an opposite effect. BSD favors the choice of an intermediate regime but do not affect a floating regime choice. These results suggest that effective exchange regime choices depend on the financial sector structure. Market-based financial sector countries are more likely to choose a floating regime. However, bank-based financial sector countries seem to prefer intermediate regimes that allow monetary authority intervention to rescue banking sector in case of money devaluation or capital flows sudden-stop. Otherwise, FO and ID have a high explanatory power on the actual floating regime choice. MSD seems to be not relevant for emerging countries effective policies.

⁴⁸ According to Hildebrand (1864), Sombart (1927) and Chick (1993), among others, financial development follows an evolving process on three steps: in the first step, a rudimentary banking system acts as an intermediary between savers and investors. In the second step, banking system becomes currency creator. In the third step, banking relations are largely securitized and other financial intermediaries and financial markets contribute to drain saving and finance the economy.

⁴⁹ According to the optimal process of liberalization of McKinnon (1981, 1993).

As robustness check, we estimate our model using, successively, two other “de facto” classifications, the natural classification of Reinhart and Rogoff (2004)⁵⁰ (RR thereafter) and the classification of Bubula and Otker-Robe (2002)⁵¹ (BOR thereafter). In order to make these classifications comparable with the Levy-Yeyati and Sturzenegger classification used earlier, we group the 13 categories of BOR and 14 categories of RR in three categories (fixed, intermediate and floating). Estimation results summarized in table (3) appendix (B), show that FDI is robust to classification change. It keeps a positive effect on the likelihood of choosing a floating regime relative to fixed and intermediate ones. Among control variables, SIZE and OPEN are, also, robust to classification change. They maintain their signs and significance. This confirms the high explanatory power of exchange rate regime choice of OCA determinants. Also, we check of the sensitivity of the results to a change in the measure of financial development. For this, we use liquid liabilities/GDP (M2/GDP) as an alternative measure of financial development⁵². Unfortunately, coefficients of (M2/GDP) are not significant for all specifications and have opposite signs to our central hypothesis. These results corroborate the problem raised by several authors (Juhn and Mauro, 2002, Calderon and Schmidt-Hebbel, 2008) of the sensitivity of empirical results to sample, classification, estimation method and measures of explanatory variables used. This is why; it is difficult to generalize inferences on determinants of optimal exchange rate regime choice.

5. Conclusions

This paper focuses on the impact of financial development on the optimal exchange rate regime choice in developing countries. Before dealing with this central objective, we propose the creation of a more representative measure of the multifaceted aspect of the financial sector development. We construct a composite index of financial development by the aggregation of five subindices: (1) Banking sector development, (2) Nonbank financial sector development, (3) Financial Openness, (4) Monetary sector development and (5) Institutional development. Calculations are done, yearly, on a sample of 51 developing countries over the period 1996-2007. Then, we return to the effect of financial development on exchange rate regime choice. We use a trichotomous choice structure with fixed, intermediate and floating as three regime options, according to “de jure” regime classification of the IMF and “de facto” classification of Levy-Yeyati and Sturzenegger. We choose a non-ordered multinomial framework as descriptive results of explanatory variables reveal a non-monotonic relationship between exchange rate regime determinants and flexibility. Besides financial development (measured by the financial development index), we consider control variables from regime determinants the most used in the empirical literature. They include OCA fundamentals, stabilization and credibility considerations, impossible trinity, fear of floating features and currency crises risks. Our estimation results confirm the central hypothesis, to so extend. Financial development favors the choice of a floating regime, but does not affect an intermediate regime choice. This result is consistent with the view advocated by Bailliu (2003), that financial sector development is a prerequisite for a floating regime choice. Among control variables, OCA fundamentals and credibility considerations have high explanatory power of exchange rate regime choices. It seems that official regime choices of monetary authorities and their actual behavior are driven by different determinants.

Moreover, distinction between emerging and developing countries in the sample is relevant; it improves the quality of the model. Indeed, each country group has its own determinants of the choice of exchange rate regime. Particularly, financial development, relevant for emerging countries, does not affect developing countries actual choices. Real monetary authority choices of developing countries, less financially developed, are conditioned by foreign dependence considerations (liability dollarization, current account and capital account openness and foreign reserves adequacy) rather than financial development. In a second stage, we replace the financial development index by the five subindices. This allows as focusing on the most important aspects of the financial sector development for the choice of an exchange rate regime. The estimation results show that all financial sector development components favor the official choice of a floating regime. But, only banking sector performance and financial openness, affect actual floating regime choice. Emerging countries targeting exchange rate regime flexibility are, particularly, concerned by institutional improvements. Also, choosing actually a floating regime is conditioned by financial openness and a development of financial markets and other financial intermediaries. For developing countries, large discrepancies appear between official and actual financial determinants. Official behavior follows that of the full sample. By cons, monetary sector development is the only determinant of a floating regime actual choice. Floating regime seems to be an optimal exchange rate regime choice for financially developed countries. The monetary policy implications of such a choice in developing countries are not obvious. Monetary authorities need to adopt another nominal anchor that replaces the exchange rate anchor and provides the necessary credibility to the monetary policy. Such an anchor could be an inflation targeting. We hope to address this issue in future research.

⁵⁰ Updated by Ilzetzki, Reinhart and Rogoff (2008)

⁵¹ These two classifications cover the sample countries, but the BOR classification stops in 2001. For this classification, the estimation period is 1996-2001.

⁵² This measure of financial development is widely used in the empirical literature, in particular, as a determinant of exchange rate regime choice (Von Hagen and Zhou, 2007; Marceiwicz, 2005). But these studies give controversial results.

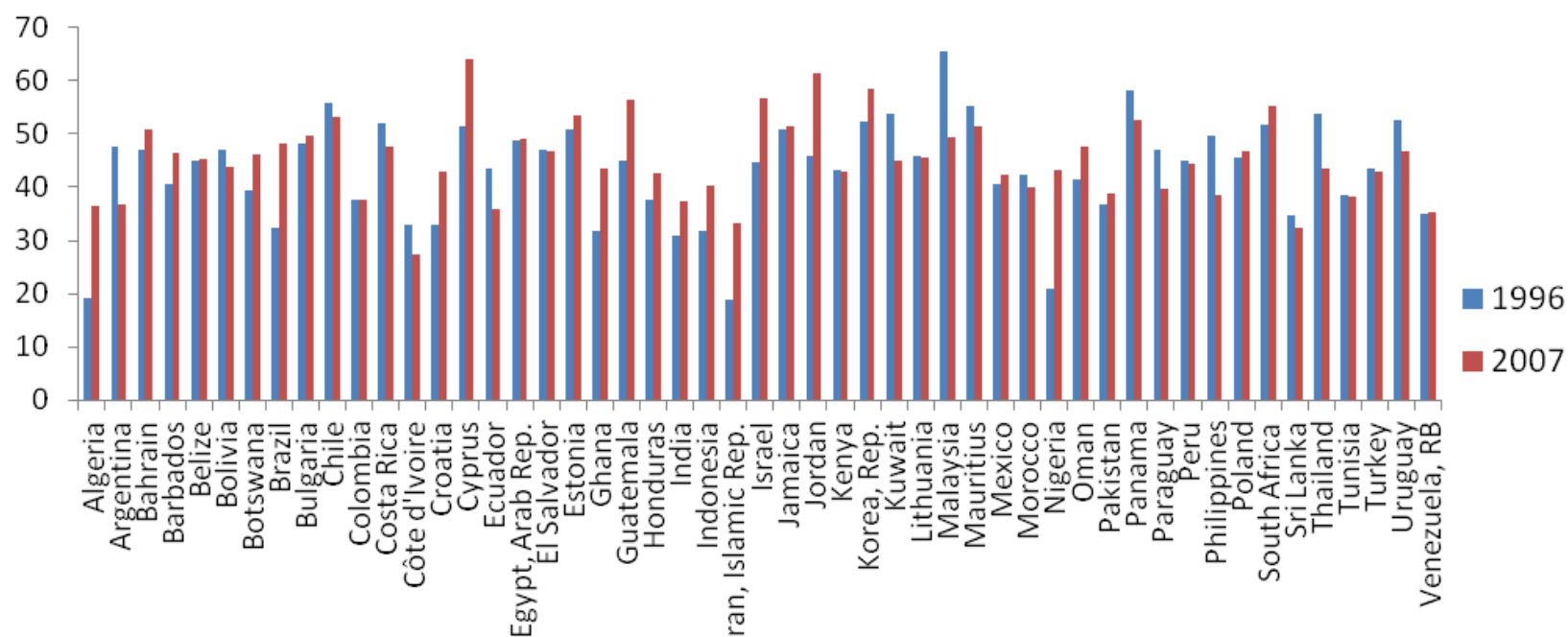
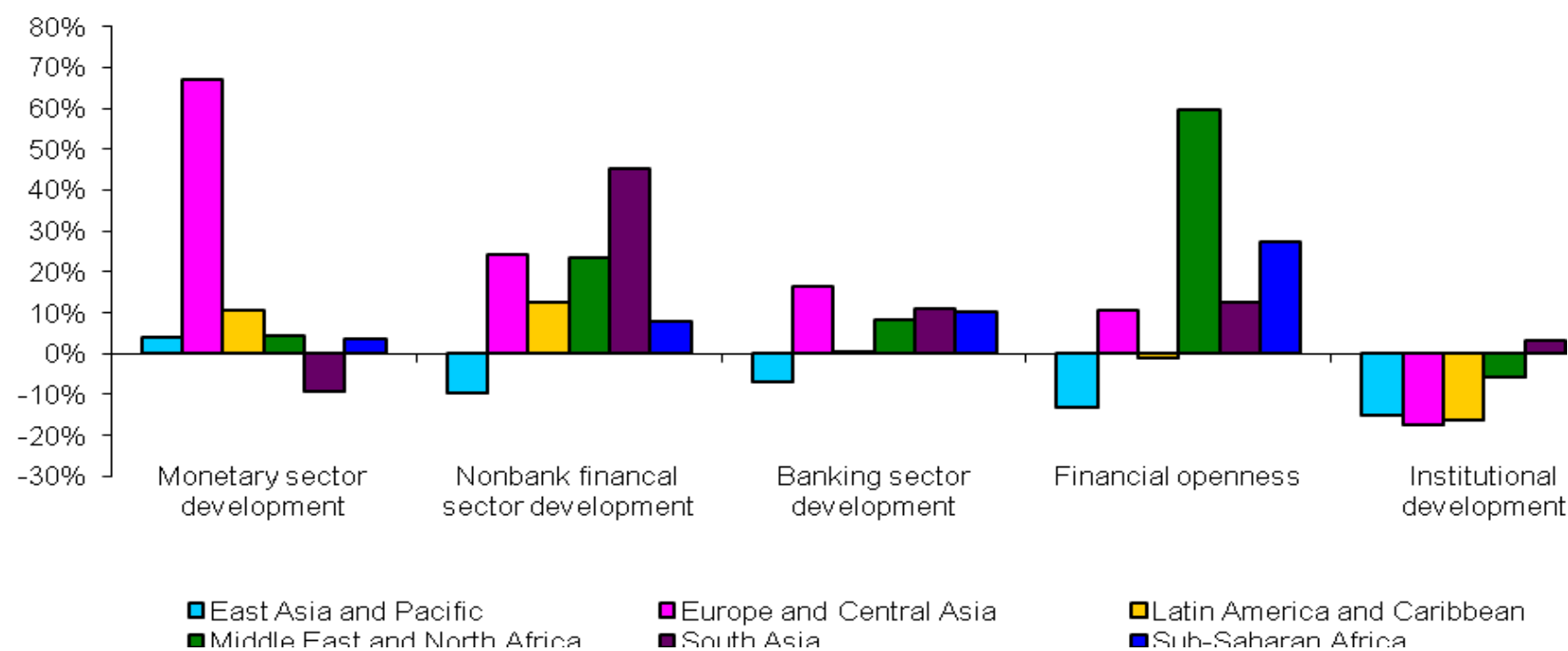
APPENDIX A Table (1): Sector indices components, measures and data sources

<i>Sector indices</i>	<i>Components</i>	<i>Measures</i>	<i>Data sources</i>
Banking sector development	Deposit money banks relative size	Deposit money banks assets/total financial assets	Financial structure dataset Beck et al (2010), the World Bank
	Deposit money banks absolute size	Deposit money banks assets/GDP	
	Deposit money banks activity	Private credit by deposit money banks/ GDP	
	Net interest margin	Accounting value of a bank's net interest revenue/ total assets	
	Overhead cost	Accounting value of a bank's overhead costs/total assets	
	Banking sector concentration	Three largest banks' assets/ total banking sector assets	
	Foreign bank share	Rating based on foreign bank license denial rate and foreign bank assets.	"Economic freedom" database
	Private bank share	Rating based on percentage of deposits held in privately owned banks	
Nonbank financial sector development	Other financial institutions relative size	Other financial institutions assets/total financial assets	Financial structure dataset Beck et al (2010), the World Bank
	Other financial institutions absolute size	Other financial institutions assets/GDP	
	Other financial institutions activity	Private credit by Other financial institutions / GDP	
	Life insurance penetration	Premiums/GDP	
	No-life insurance penetration	Premiums of other insurance classes/GDP	
	Stock market size	Stock market capitalisation/GDP	
	Stock market activity	Stock market total value traded/GDP	
	Stock market turnover	Value of total shares traded/ market capitalisation	
	Private bond market size	Private bond market capitalization/GDP	
	Public bond market size	Public bond market capitalization/GDP	
Financial openness	Foreign ownership restrictions	Rating based on restrictions of foreign currency accounts domestically and abroad	"Economic freedom" database
	Black market exchange rate premium	Rating based on differential between official market and black market exchange rates	
	Capital controls	Rating based on number of controls according to the IMF	
	Access to international capital markets	Rating based on restrictions on financial transactions with abroad and on investments in international capital markets	
Monetary sector development	Central bank relative size	Central bank assets/ total financial assets	Financial structure dataset Beck et al (2010), the World Bank
	Central bank absolute size	Central bank assets/GDP	
	Financial intermediation indicator	Liquid liabilities/ GDP	"Economic freedom" database
	Interest rate controls	Rating based on interest rate liberalization and positive/negative real rates.	
Institutional development	Investors protection index	Index calculated by the average of 3 indices: disclosure index, director liability index, shareholder suits index	« Doing business » World Bank
	Enforcing contracts	Index based on number of procedures, time and cost of recovery of debts from judiciary system	
	Rules of law	Rating based on trust and submission of the public to rules	"Aggregate Governance Indicators" World Bank
	Regulation quality	Rating based on the perception of the ability of the government to implement regulation and supervision rules.	
	Political stability	Rating based on the perceived probability of government collapse because of violence or terrorism	
	Bureaucratic quality	index	ICRG
	Corruption	Corruption perception index	Transparency international
	Legal system origin	0: Islamic chariaa 50: common law 100: civil law	CIA Fact book

List of countries

Emerging countries : Argentina, Brazil, Chili, Colombia, Egypt, India, Indonesia, Israel, Jordan, Malaysia, Mexico, Morocco, Pakistan, Peru, Philippines, Poland, South Africa, South Korea, Thailand, Turkey and Venezuela.

The other developing countries : Algeria, Bahrain, Barbados, Belize, Bolivia, Botswana, Bulgaria, Costa Rica, Ivory coast, Croatia, Cyprus, Ecuador, El Salvador, Estonia, Ghana, Guatemala, Honduras, Iran, Jamaica, Kenya, Kuwait, Lithuania, Mauritius, Nigeria, Oman, Panama, Paraguay, Sri Lanka, Tunisia, Uruguay.

Figure (1): Financial development index of sample countries on 1996 and 2007**Figure (2): Evolution of regional sector indices over 1996-2007****Table (2): Reliability check (α of Cronbach)**

INDEX	α of Cronbach
Financial development	0.850
Banking sector development	0.723
Nonbank financial sector development	0.914
Financial openness	0.872
Monetary sector development	0.785
Institutional development	0.812

Table (3): Robustness check

Spearman rank test	Kendall rank test
ρ of Spearman: 0.7213 prob > t = 0.0001	τ de Kendall: 0.5494 prob > z = 0.0003

APPENDIX B

TABLE (1): list of control variables, measures and data sources

Determinants	measures	Data sources
Economic size (SIZE)	GDP in logarithm	IFS
Level of economic development (ECODEV)	Per capita GDP in logarithm	
International reserves adequacy (RESAD)	Reserves minus gold/M2	
Capital account openness (CAO)	Absolute value of capital inflows and outflows / GDP	
External real shocks (RPSHK)	Volatility of real effective exchange rates	
Trade openness (OPEN)	(Import+Export)/GDP	WDI
Inflation (INF)	Log (1+inflation rate)	
Domestic monetary shocks (MONSHK)	Volatility of broad money growth rates	
Liability dollarization (LD)	External debt stocks/ GNI	BIS
Central bank independence (CBI)	Rating build by Barth et al.(2001)	Barth, Caprio and Levine (2007) database, the World Bank

Table (2): Correlation matrix

	1	2	3	4	5	6	7	8	9	10
SIZE	1,00									
ECODEV	0,09	1,00								
INF	0,06	-0,18	1,00							
CAO	-0,13	0,28	-0,09	1,00						
RESAD	0,00	-0,07	0,06	-0,03	1,00					
OPEN	-0,38	0,20	-0,14	0,23	0,02	1,00				
LD	-0,26	-0,21	0,11	-0,03	0,10	0,18	1,00			
RPSHK	-0,01	0,22	0,01	-0,01	0,12	0,03	0,20	1,00		
MONSHK	-0,03	0,19	-0,19	0,00	-0,03	0,02	0,06	0,22	1,00	
FDI	-0,08	0,35	-0,20	0,18	-0,21	0,37	-0,08	-0,01	0,16	1,00

Table (3): Estimation results with alternative “de facto” classifications

	RR Classification		BOR Classification	
	Float/fixed	Inter/fixed	Float/fixed	Inter/fixed
FDI	0.077**	-0.177***	0.085**	-0.004
SIZE	1.175***	0.094	1.222***	0.407***
ECODEV	-0.708	-0.172	-0.356	-0.123
INF	3.299**	1.361	0.906	1.583*
CAO	-12.757**	-6.441**	-4.307	-2.030
RESAD	-5.075*	0.957	0.388	2.572***
OPEN	-0.002*	0.009**	-0.003*	0.002
LD	0.009	-0.033***	0.009	-0.007
RPSHK	-0.021	-0.022**	-0.044***	-0.050***
MONSHK	-11.797	-7.632**		
CBI	-0.642	-1.375***	-0.310	0.1966
Observations	282		306	
Loglikelihood	-132.178		-215.823	
Pseudo R ²	0.4632		0.2829	

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THE STUDY OF ECONOMIC SECURITY'S EFFECT ON ECONOMIC GROWTH IN SELECTED COUNTRIES IN 1995 -2009

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ABSTRACT

Much ink has been spilt over how to measure a nation's economic security. As each country is uniquely endowed with their own level of economic development, a capacity for risk management, a national culture and its position in the international environment, each will invariably perceive economic security differently. The main objective of this paper is to study, the impact of economic security on economic growth for selected countries in the period of 1995 – 2009. The relationship between variables is investigated by neoclassical growth model and after offering an index for economic security using Morris index, we present an economic model using Panel Data approach in econometric software Eviews7. Findings show that economic security as the main studied variable in this paper has positive impact on economic growth. Providing a basic level of economic security can ease transitions and help to avoid policy responses. But policy makers must seek the right balance, recognizing that both the form and the amount of economic security can affect economic growth.

Keywords: **Economic Security, Economic Growth, Panel Data, Morris Index**

1. INTRODUCTION

Interest in the study of economic growth has experienced remarkable ups and downs in the history of economics. It was central in Classical political economy from Adam Smith to David Ricardo, and then in its critique by Karl Marx, but moved to the periphery during the so-called 'marginal revolution'. John von Neumann's growth model and Roy Harrod's attempt to generalize Keynes's principle of effective demand to the long run re-ignited interest in growth theory. Following the publication of papers by Robert Solow and Nicholas Kaldor in the mid-1950s, growth theory became one of the central topics of the economics profession until the early 1970s. After a decade of dormancy, since the mid-1980s, economic growth has once again become a central topic in economic theorizing. The recent theory is called 'endogenous growth theory', since according to it the growth rate is determined from within the model and is not given as an exogenous variable. Now it is hold the view that there is a theory that may, for good reasons, be called 'Classical' economics as distinct from other kinds of economics, in particular 'Neoclassical' economics and 'Keynesian' economics. Moreover, an author might be classified in one group regarding some aspects, regarding others he or she might be classified in another group [1].

Much ink has been spilt over how to measure a nation's economic security. As each country is uniquely endowed with their own level of economic development, a capacity for risk management, a national culture and its position in the international environment, each will invariably perceive economic security differently. For developing countries, economic security is best defined as the ability to provide a steady increase in the standard of living for the whole population through national economic development while maintaining economic independence [2]. In other words, there are two sides to the economic security 'coin': competitiveness and independent economic sovereignty. Economic competitiveness is vital not only to stimulate national economic growth, but also to penetrate the international market. In an era of globalization, the two are inextricably linked as no country can close itself off to challenges from the outside. Furthermore, the two are mutually reinforcing as competition through comparable advantage in the world market is the basis for domestic sustained economic growth, and growth, in turn, gives a country an edge in a globalized economy. Without growth and competition there is no economic security. Economic sovereignty includes 1) what can be termed 'non-distributive' economic authority, which is inherent and cannot be shared with other nations, 2) 'distributive' economic power, which can be shared with others [3].

Many policy makers and analysts have been trained to believe that providing more security must come at the expense of economic performance, and thus that these two goals are contradictory objectives. Especially over the long term, however, this traditional view miss three key points: First, a basic level of security frees people to take the risks— such as starting a business, investing in their own education, or trying an unconventional career—that lead to economic growth. With inadequate protection against downside risk, people tend to be overcautious, —fearing to venture out into the rapids where real achievement is possible,□ as Robert Shiller of Yale has argued. —Brilliant careers go untried because of the fear of economic setback. Second, if hardship does occur, some degree of assistance can provide the resources to help a country thrive again. Countries with access to some form of financial assistance, international and trade opportunities are less likely to be permanently harmed by the temporary setbacks that are an inevitable part of a dynamic economy [4]. For countries experiencing short-term difficulties, a safety net can be a springboard to a better future and higher performance. Finally, and perhaps most importantly, a basic level of economic security can lessen political demands for growth-impairing policies such as protectionism. The benefits of new technology and competition tend to be spread widely across the economy, but are often highly disruptive to some specific industries or jobs. Individuals in the affected sectors may naturally resist the adverse effects on their own jobs associated with such overall progress; others may fear that they will be adversely affected, and resist the dynamic process that is associated with such risks [5].

Providing a basic level of economic security can ease transitions and help to avoid policy responses that may hamper overall economic growth. To be sure, providing too much security can harm economic growth by excessively blunting incentives to work, innovate, and invest, and some developed nations have gotten the balance wrong in this way. But any such adverse effects on growth can be as much a matter of how economic security is provided-and, in particular, whether policy design pays careful attention to incentives-as how much

security is provided. Policy makers, therefore, must seek the right balance, recognizing that both the form and the amount of economic security can affect economic growth and individual well-being [6].

This paper examines the effect of economic security on economic growth using Panel Data. First we define a compound index for economic security using Morris imbalance Index and then to show the impact of economic security on economic growth we offer an empirical model.

2. LITRETURE REVIEW

Low economic growth rate, growing unemployment and intensifying poverty culminating in a vicious cycle of low income, low savings and low investment have led a country to a low level of equilibrium. Low savings, resulting in over-dependence on foreign capital for investment, has in fact been a limitation for a country's sustainable development. Further, inefficiencies in resource management, resulting in high capital-output ratio, have led to a high cost economy and retarded the country's relative market competitiveness. Deteriorating performance of the agriculture sector, in spite of the highest priority laid on it, has been the major factor hindering economic growth and well being of more than three-quarters of the population. Several empirical studies have shown that the economic security have powered the economic performance of countries over the last decades [7].

2.1 What Is Economic Security?

Economic security is the ability to protect or to advance economic interests in the face of events, developments, or actions that may threaten or block these interests. These challenges or obstacles may be foreign or domestic in origin, international or accidental, and the consequences of human or of natural forces. Further, economic security depends on the country's ability to shape the international economic environment to its liking-for example, by playing a major role in establishing the rules that govern international economic relations and by using economic means to influence the policies(economic and others) of other countries. Economic security also requires possessing the material recourses to fend off noneconomic challenges. Among other things, one must have the economic wherewithal to support an adequate military [8]. Certainly, economic prosperity as usually defined-economic growth, full employment, low inflation, high levels of investment, improvements in productivity, ext- will contribute to economic security. But economic security requires more than just maximizing current economic prosperity. The objective of economic security is to reduce uncertainty about continued economic well-being. Sometimes it will be wise to sacrifice some current prosperity to make that of the future more stable, more certain, or less subject to loss [9]. There are two sides to the economic security _coin': competitiveness and independent economic sovereignty. Competition generates healthy development while a degree of autonomy guards against undue external influence on the economy. Economic competitiveness is vital not only to stimulate national economic growth, but also to penetrate the international market. In an era of globalization, the two are inextricably linked as no country can close itself off to challenges from the outside. Furthermore, the two are mutually reinforcing as competition through comparable advantage in the world market is the basis for domestic sustained economic growth, and growth, in turn, gives a country an edge in a globalized economy. Without growth and competition there is no economic security. The other side of the proverbial coin is economic sovereignty, which should be seen as a measure of the control a country has over its own economic development and their abilities to resist outside intervention. In the economy, sovereignty is reflected in a country's control over its domestic market and the government's control over key industries and enterprises. The _non-distributive' economic authority entails aspects such as a nation's strategic decision-making power over its economic system and ownership over natural resources. The _distributive' economic power roughly includes economic and industrial policies and the devising non-essential economic institutions. The boundaries between non-distributive sovereignty and distributive powers under sovereignty differ in each country, depending on national economic strength and economic development. Under the current international order – shaped by the developed nations and designed to maintain their economic position – the powerful competitive forces of developed nations lead them to encroach on the sovereignty of other countries. Foreign multinational companies are acquiring Chinese enterprises one by one and even gaining control of industries. If industries are controlled, the notion of autonomous economic integrity is a moot point. Although the majority of developing countries are gaining substantial economic interests by opening up their economies to the international market, their economic sovereignty is being increasingly violated [3]

2.2 A Bbroder View of Economic Security

The economic security will require more than just making sure that the country economy is bigger, more robust, or faster growing than other economies; more than just assuring that country firms are dominant in important world markets; more than maintaining military forces that are superior to those of any potential challengers. In addition to trying to keep the country economy □Number 1□ and doing what we can to limit our vulnerability to negative external developments, we should also seek ways to minimize international instability of the sort that will generate undesirable developments in the first place. Country economic security can be enhanced by enhancing international economic security. In particular, country economic security should aim to achieve the following objectives. The other side of the proverbial coin is economic sovereignty, which should be seen as a measure of the control a country has over its own economic development and their abilities to resist outside intervention. Economic sovereignty includes 1) what can be termed _non-distributive' economic authority, which is inherent and cannot be shared with other nations, 2) _distributive' economic power, which can be shared with others. Sovereignty itself, like a country's identity, is not transferable to others. In the economy, sovereignty is reflected in a country's control over its domestic market and the government's control over key industries and enterprises. The _non-distributive' economic authority entails aspects such as a nation's strategic decision-making power over its economic system and ownership over natural

resources. The ‘_distributive’ economic power roughly includes economic and industrial policies and the devising non-essential economic institutions [10].

3. DATA AND METHODOLOGY

The objective of the present study is to examine the sources of growth in selected countries, and subject to data availability, explore the empirical relationship between economic growth, capital accumulation, labor force and economic security.

The growth accounting exercise is normally conducted in terms of labor share and capital share in the output and the growth rates of these factors of production function. The output growth not explained by these variables is treated as the contribution of economic security. Empirical studies assume the labor share and capital share in output to be two-thirds and one third respectively. For the empirical purpose, the Cobb-Douglas production function of the following type is estimated:

$$Y = AK^{\alpha}L^{1-\alpha} \quad (1)$$

Where, Y: real GDP, A: constant term, L: labor force, K: real capital.

Data on output, labor force, capital stock are the data published annually in the World Bank Development Indexes (WDI). However, there are cross-country variations in the labor share and capital share in output. Therefore, it would be more realistic to estimate the factor shares through the regression of the Cobb-Douglas production function, and economic security is derived from the Morris Index explained in the next session. Thus, the present study has estimated the economic growth through the regression of the real GDP on the inputs. Because of missing some data in some countries they were predicted.

4. EMPIRICAL RESULTS

This section describes a basic economic model of the study. We use panel data to estimate our model for selected countries in period 1995-2009. Using panel data in econometrics analysis has, often, several advantages over cross-sectional or time-series data. Panel data blend the inter-individual differences and intra-individual dynamics. It is frequently argued that ignoring the effects of certain variables in model specification leads to inefficiency of econometric estimates. Therefore, panel data containing information on both the inter-temporal dynamics and the individuality of the entities allow to control the effects of missing or unobserved variables better than cross-sectional data which may be viewed as a panel with T=1, or time series data which is a panel with N=1. Areas of application of panel data modeling have only been increasing over the past years and there is no doubt that the range is going to expand further [11].

The aim of this paper is to study the effect economic security on economic growth for eight selected countries (Saudi Arabia, Turkey, Yemen, Pakistan, Iran, Kuwait, Malaysia and Bahrain) in 1995-2009. The investigated model is:

$$\ln GDP = \alpha + \beta_1 es + \beta_2 \ln gcf + \beta_3 \ln lf \quad (2)$$

Where: $\ln GDP$ = economic growth index (gross domestic product logarithm), es = economic security Index (a compound index of five component), $\ln gcf$ = capital stock (gross capital formation logarithm), $\ln lf$ = labor force logarithm.

4.1 Economic Security Index

In this study we used a compound index for economic security. This index is a combination of five economic components including: inflation rate, liquidity growth, foreign direct investment, current account balance, economic openness. To give an index of these five components, we used Morris imbalance Index. This imbalanced index is represented as Eq. (2)

$$Y_{ij} = \frac{x_{ij} - (min)}{xi(max) - xi(min)} \quad (3)$$

Y_{ij} : Morris imbalance index for component “I” in country “j”

x_{ij} : The amount of component “I” in country “j”

$xi(min)$: Minimum amount of component “I”

$xi(max)$: Maximum amount of component “I”

To study the issue, all five components are used in this formula and then to find economic security index for every year, the following relation is used:

$$D_{ij} = \frac{Y_{ij}}{n}$$

D_{ij} : is our economic security in year I and n is the number of components.

Table (1) shows the calculated index for selected countries in years, 1995, 1999, 2009.

Table 1: Economic security index for years, 1995, 1999, 2009

PAK	SAU	TUR	YMN	KWT	IRN	MYS	BHR	Country year
0.36844	0.22552	0.263977	0.397883	0.24861	0.35264	0.26429	0.24434	1995
0.24159	0.20892	0.293973	0.340835	0.24778	0.34623	0.23048	0.22597	1999
0.34868	0.22520	0.261850	0.436669	0.43431	0.35953	0.23864	0.26334	2009
0.35857	0.22536	0.26291	0.273	0.34145	0.34608	0.25147	0.25384	Ave(1995- 2009)

As seen all countries considered a fall in 1999 except Turkey. Because in this year and 2000, 2001 disciplined fiscal and monetary policies have produced a stable macroeconomic environment (sharp reductions in inflation and the government debt ratio) which in turn has facilitated brisk growth, stronger bank balance sheets, and surging [11].

4.2 Unit Root Test

To test the variables stationary we used Augmented Dickey-Fuller (ADF) test. The result shows that all variables are stationary. That is integrated of order one I (1). Table (2) shows the test result.

Table 2: ADF Unit Root Test on Variables

Variable	ADF Statistic I(0)	ADF Statistic I(1)	Result
$\ln GDP$	23.2575	38.2020	I(1)
es	22.9787	68.5556	I(1)
$\ln gcf$	12.9455	53.3417	I(1)
$\ln lf$	17.3465	43.7763	I(1)

5. ESTIMATION RESULT

The estimation method is OLS using Panel Data in eight countries during 1995-2009: Table (3) shows the estimation result.

First to choose panel or pooling method, we used F-Limber test. This statistic's null hypothesis represents choosing pooling method and its priority to panel method.

Table 3: Model Estimation Results

Variables	Coefficient	Std. Error	t-Statistic	P-Value
<i>intercept</i>	0.036688	0.005370	6.831841	0.0000
es	0.133240	0.050441	2.641515	0.0095
$\ln gcf$	0.112043	0.012927	8.667412	0.0000
$\ln lf$	- 0.117693	0.127563	-0.922632	0.3583
F test = 1.784919 observations = 112 Housman test= 0.742711				

Considering f- test in this study that is 1.784919, H0 is not accepted and panel method is chosen. Also to choose fixed or random effects methods, Housman test is calculated. Null hypothesis in this test, is to choose random effect method. Here this ratio has been 0.742711 random effect method is selected.

According to the results, economic security has positive impact on economic growth at the 99 percent significance level. A one percent increase in economic security contributes to 0.13 percent of economic growth.

Gross capital formation has positive and significant impact at the 99 percent significance level and any increase in gcf contributes to 0.11 percent of economic growth.

But labor force has a negative impact on economic growth at the 0.64 percent significance level means any increase in labor force contributes to 0.18 percent decrease of economic growth.

6. SUMMARY AND CONCLUSIONS

The aim of this paper is to examine the effect of economic security on economic growth in selected countries. The empirical analysis was conducted for the sample period, namely 1995-2009.

Economic security as the main studied variable has positive impact on economic growth. Discovering a positive relationship between economic growth and security is a strategic guideline for the mitigation of security components in order to increase it by policymakers.

Many policy makers and analysts have been trained to believe that providing more security must come at the expense of economic performance. Also providing too much security can harm economic growth by excessively blunting incentives to work, innovate, and invest, and some developed nations have gotten the balance wrong in this way. But any such adverse effects on growth can be as much a matter of how economic security is provided - and, in particular, whether policy design pays careful attention to incentives - as how much security is provided. Policy makers, therefore, must seek the right balance, recognizing that both the form and the amount of economic security can affect economic growth.

Labor force has negative impact on economic growth. This is not surprising, because in the first ten years of this period some of selected countries like Malaysia experienced a serious shortage of workers. Given, the economy was relatively small compared to the other regional economies; Malaysia was not a cost effective center for labor intensive- sectors.

Finally according to economic theories and findings gross capital formation has positive impact on economic growth.

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ANALYTIC NETWORK PROCESS APPROACH FOR PORTFOLIO SELECTION PROBLEM

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ABSTRACT

Portfolio selection may be defined as determining portfolio which minimizes the risk under a specific rate of return or which maximizes the rate of return under a specific risk. Portfolio selection falls into the class of multi-criteria and complex decision making problems as it includes many quantitative and qualitative criteria related to stocks and investor behaviors as well. In this study the Analytic Network Process (ANP) approach has been employed for determining the optimal portfolio in an aim to solve such a decision making problem. The aim was to create the optimal portfolio in the light of data obtained from shares within GT30 of ISE (Istanbul Stock Exchange). As a result of the study, we concluded that optimal portfolio selection attained by means of using the Analytic Network Process (ANP) approach is useful in investor decisions.

Keywords: Analytic Network Process, Portfolio selection problem, GT30 of ISE.

JEL Classification Codes: C61, G11, M10

1. INTRODUCTION

The fact that the investors commenced evaluating their current savings in capital markets in order to maintain the value of their savings and also to gain interest from them provided grounds for discussing and researching portfolio and portfolio management.

Portfolio is an investment pack that investors build up for specific purposes belonging to a certain person or a group, comprising of such securities as equities, bonds, and treasury bills, and having uniquely measurable qualities [9]. Although numerous portfolios can be formed by various combinations of securities, the optimal portfolios are the ones that have a certain expected return level, with the lowest risk or that are under a certain risk with the highest the expected return. Investors generally wish the risk to be the lowest and the expected return to be the highest. Risk and expected return targets are two purposes conversely affecting the creation of portfolio [6].

Two significant approaches in the selection of portfolio in portfolio management are Traditional Portfolio Theory and Modern Portfolio Theory. Traditional Portfolio Theory claims that a lower risk-taking is possible on the same return level by portfolio diversification; in other words, it assumes that the portfolio risk would be reduced by increasing the number of varieties, and by selecting securities with higher expected return, the portfolio return would be increased. Known as the father of Modern Portfolio Theory, Harry Markowitz drew the attention to the concept of portfolio in 1952 and suggested that the risk cannot be reduced just by increasing the assets within a portfolio but that the relation among the securities also need to be taken into consideration. This new approach by Markowitz also created the grounds for the Modern Portfolio Theory. Saaty [27] solved more complex portfolio selection problems by using AHP. Tanaka and Guo [33] generated portfolio selection models by quadratic programming. Xia et al. [38] proposed a new model for portfolio selection using genetic algorithms. Inuiguchi and Ramik [17] reviewed some fuzzy linear programming methods compared fuzzy mathematical programming approaches with those of stochastic programming. Tanaka et al. [34] proposed two portfolio selection models based on fuzzy probabilities and possibility distributions. Inuiguchi and Tanino [18] proposed a new possibilistic programming approach for portfolio optimization. Parra et al. [25] generated a fuzzy goal programming taking into account three criteria: return, risk and liquidity. Ong et al. [23] proposed a method which incorporates the grey and possibilistic regression models in formulating a novel portfolio selection model. Chang et al [11] considered 6 financial product by using criteria such as liquidity, safety of principle, profit stability, capital growth, tax advantage, inflation amount and selected the best measures using fuzzy AHP. Best et al. [7] considered transaction cost at portfolio optimization process and used quadratic planning. Lacagnina and Pecorella [21] developed a multi-stage stochastic fuzzy program in order to capture both uncertainty and imprecision and used the program to solve a portfolio management problem. Huang et al. [16] revised the conventional mean–variance method to determine the optimal portfolio selection under the conditions of the uncertainty. Giove et al. [14] considered a portfolio selection problem in which the prices of the securities are treated as interval variables. Zhang et al. [40] proposed two kinds of portfolio selection models. Tiryaki and Ahlatcioglu [35] used the fuzzy AHP method to the problem of portfolio selection in Istanbul stock exchange. Anagnostopoulos and Mamanis [5] formulated the problem of portfolio selection as a three objective optimization problem in order to find tradeoffs between risk, return and the number of securities in the portfolio. Gao and Chu [13] focus on the

constrained portfolio selection problem, which is an extension to the standard Markowitz model, and developed an improved particle swarm optimization (IPSO) algorithm to solve it. Amiri et al. [4] have used eigenvector-DEA-TOPSIS methodology for portfolio risk evaluation in the FOREX market. Janani et al. [19] have introduced a new eigenvector –TOPSIS method to determine the weights of criteria for evaluation of portfolio and to rank the companies in Tehran Stock Exchange.

Ahari, et al. [1] applied two fuzzy analytic hierarchy process methods to solve a real stock portfolio selection problem. Panahian [24] studied weekly risk and return at Tehran Stock Exchange of ten company from each industry. There are many fuzzy AHP applications for portfolio selection. Van Laarhoven and Pedrycz [37], Buckley [8], Ruoning and Xiaoyan [26], Chang [10], Mikhailov [22], Enea and Piazza [12] used this methods.

In portfolio management in which gathering securities so as to obtain the highest return with the lowest risk based on the preferences and needs of investors in accordance with the portfolio objectives, the decision of what the portfolio type suitable for the investor would be and from which securities this portfolio would be comprised of in to what degree cause the portfolio selection issue to arise.

The portfolio selection issue is defined as the decision for which securities the portfolio would be created and to what degree, and as a complicated problem made up of numerous criteria. In this regard, this study will first discuss the Analytical Network Process (ANP) in the following section bearing in mind that the Analytical Network Process effectively used in the solution of especially complicated and multiple-criteria decision problems in this regard would be beneficial to investors in decision-making processes. Then, the objective is to create the most appropriate stock portfolio by ANP following the identification of seven stocks with the lowest correlation among them in accordance with the GT30 index of Istanbul Stock Exchange (ISE).

2. ANALYTICAL NETWORK PROCESS (ANP)

Suggested by Thomas L. Saaty in 1996, Analytical Network Process (ANP) is a multiple-criterion decision-making method that takes into consideration the qualitative values as much as quantitative values, models the problem in a hierarchical structure and considers the correlations and interactions between the criteria that comprise the model [30-3].

Every single measure in the decision-making is tackled as a set and the factors that make up the control criteria are handled as individual components of these sets. Mutual relations between them are identified by mutual interactions and feedbacks between the sets and components. Since hierarchical definitions are not sufficient when relations between components in a problem are not unidirectional but mutual, they demonstrate differences from the hierarchical structure in Analytical Hierarch Process (AHP).

The difference of Analytical Hierarchy Process (AHP) that comprises the grounds of ANP and tackles the unidirectional modeling in the hierarchical structure from ANP is that it tackles interactions, internal-external dependences and feedbacks without taking note of the level between decision-making criterion, sub-criteria, and options in hierarchical structure instead of unidirectional relation. Figure 1 shows the structural differences between a hierarchy and a network structure [20].

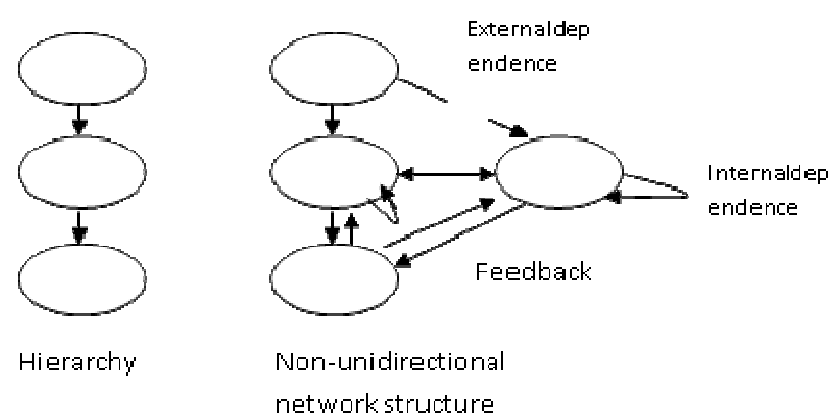


Figure 1: Difference between Hierarchy and Network structure

In ANP, whether the relations are unidirectional or bidirectional are decided after the possible relationships between the entire components of the problem are identified. Then, the superiorities in effect are analyzed by making pairwise comparisons for all other components that affect a single component. Since bidirectional interactions are taken into consideration, interactions and internal dependences on directly related invisible elements within the entire system are paid attention. Therefore, the method permits feedback.

As it is the case in AHP, ANP also relies on pairwise comparison and 1-9 scale developed by Saaty [27] is used in forming these pairwise comparison matrices or super matrices and in identifying relative importance weights. The importance scale values of this scale are given in Table 1 [27].

Table 1: Basic Scale used in Analytical Hierarchy Method

Degree of Importance	Definition
1	Equal importance
3	One moderately more important than the other
5	Strongly more important
7	Quite strongly important
9	Absolutely important
2,4,6,8	Mean values (values fall within two consecutive judgment angle in order to use when compromise is needed)

Analyses are carried out in ANP by using three matrices: unweighted matrix (UM), weighted matrix (WM), and limit matrix (LM). Unweighted super matrix provides relative importance vector of each component as a result of pairwise comparisons. Weighted matrix gives the values obtained as a result of multiplying these values with the weight of set to which the relevant component belongs. Raising the weighted supermatrix to powers result in transformation of it into the limit supermatrix and allows convergence of the matrix. The resulting matrix, the limit supermatrix, yields limit priorities capturing all of the direct and indirect influences of each element on every other element. The resulting values of the decision problem is read from this matrix. In ANP, that the evaluations are conducted by experts, presence of a consistency test, and especially, that the entire components and relations affecting a problem are possible to be examined thoroughly increase the reliability of the obtained results [36].

The application process and steps of ANP method can be outlined as below (Figure 2) [28-15].

Step 1. Definition of the Decision Problem and Construction of the Model: At the initial stage, the decision problem is defined and purpose, criteria, sub-criteria, and alternatives are clearly expressed.

Step 2. Identification of relationships: Interactions between the criteria and sub-criteria are determined. Internal and external dependences, and if any, feedbacks are related.

Step 3. Pairwise Comparisons between the criteria and Obtain of Priority Vectors: The expert group conducts pairwise comparisons by using scale values under one matrix roof. Pairwise comparisons local priority vector are defined by eigenvector obtained by solving $Aw = \lambda_{\max} w$ equation. Here, A is pairwise comparison matrix, w is eigenvector, and $\lambda_{\max}$ is the highest eigenvalue of comparison matrix. Saaty [32] suggested normalizing algorithm for the approximate solution of w.

Step 4. Consistency Analyses of Comparison Matrices: In order to determine whether the conducted comparisons are consistent, Consistency Ratio (CR) is calculated for each matrix after structuring comparison matrices. CR is obtained by dividing Consistency Index (CI) to Random Consistency Index (RI). If CR value is less than 0.10, pairwise comparisons can be said to be consistent. If the values are higher than 0.10, there is some inconsistency in comparisons. In that case, the decision-maker and expert group should revise the comparisons.

Step 5. Formation of the Super Matrix: In order to obtain global priorities in a system with dependent effects, local priority vectors are written on the columns of the matrix known as the super matrix. Super matrix is a partitioned matrix, and each segment represents a relationship between two factors within a system. The long-term relative effects of criteria on each other are determined by identifying the force of super matrix. In order to provide an equalization of importance weights at a certain point, the force of super matrix is identified $(2n+1)$, where n is a randomly selected high number and the obtained new matrix is named as limit super matrix.

Step 6. Selection of the Best Alternative: Through the obtained limit super matrix, importance weights related to alternatives and/or the compared criteria are determined. However, the alternative with the highest importance weight in the selection problem is the best alternative, and the criterion with the highest importance weight in weighting problem is the most important criterion that influences the decision-making process.

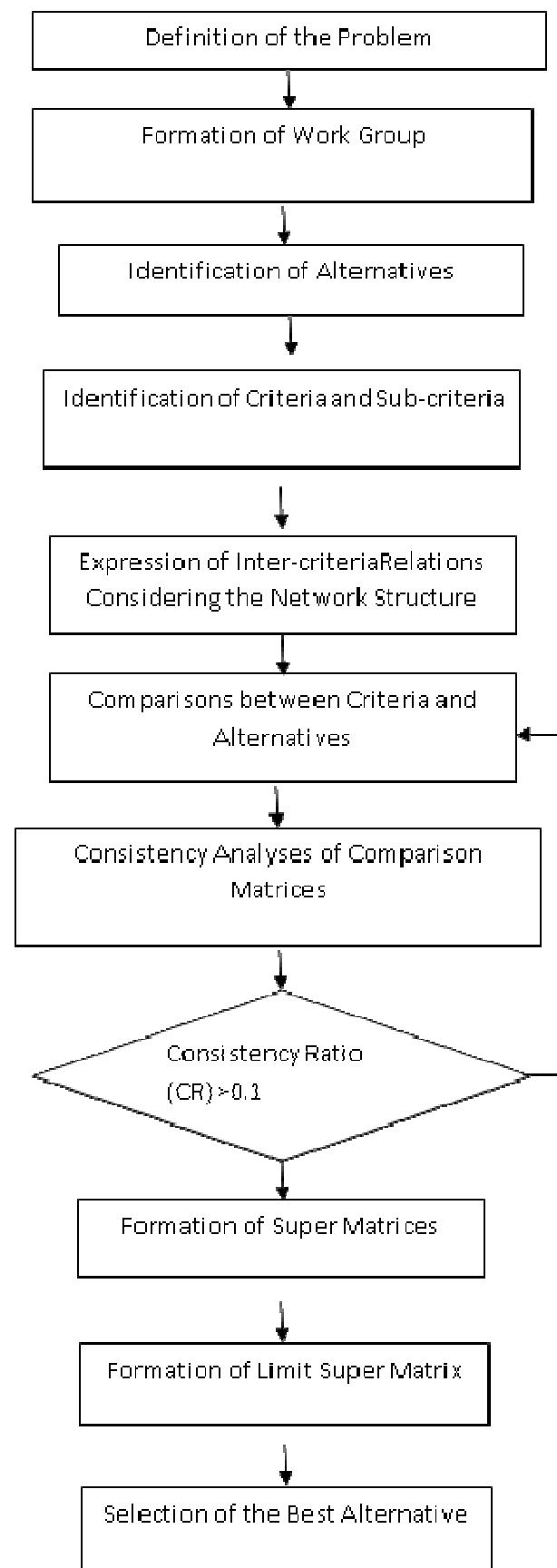


Figure 2. Steps of the ANP Method

3. CREATION OF THE MOST SUITABLE SHARE PORTFOLIO BY ANALYTICAL NETWORK PROCESS

Criteria that influence share prices and that interact with each other affect the suitable share selection of investors in creating optimal portfolios. As a matter of fact, that there are numerous qualitative and quantitative criteria, each having different share influence degrees, and in some cases, that these criteria contradict with each other makes the selection process of investors complicated. Thus, the portfolio selection problem, in other words, selection of suitable shares and making the decision as to at which rates these shares will create the portfolio is a complicated and multiple-criteria decision-making problem. For these reasons, our study aimed to determine at which rates the alternative shares chosen from GT30 of ISE would be contributing to the portfolio was tried to be determined by ANP method bearing in mind the entire criteria and degrees of influence (of sub-criteria and alternatives) (that is their interaction and relations with each other) in shares portfolio selection (creation) that have a multiple-criteria structure.

The problem of creating the best portfolio comprised of shares was investigated by establishing an ANP model and following ANP steps.

3.1. Defining Decision-Making Problem and Establishing the Model

Within the scope of the study, it is a decision-making problem as to which shares will be included in the portfolio at which rates in order to create the most suitable shares portfolio.

3.2. Establishing the Work Group

Opinions of academics that are expert in the field of finance and also experts in bank investments were benefited from, and to this end, a questionnaire was organized. Questionnaires were sent to 15 people. Among the answered questionnaires, the ones with inaccurate and missing information were eliminated and the questionnaires of 10 experts that were suitable were accepted for evaluation.

3.3. Determining the Alternatives

This study took into account the correlations between shares moving from the study of Markowitz in defining alternative shares from the hierarchical structure established in ANP method. The selection of alternative shares in ANP was conducted depending on technical analysis, and the selection of criteria was carried out by basic analysis in line with the opinions of experts. Use of two separate analyses techniques in portfolio selection is another element that makes the study different. Mean-variance model of Markowitz was utilized to determine alternative shares in the study. Monthly return rates of shares in GT30 index of ISE between 31.01.2007 and 30.09.2011 were analyzed; shares with the lowest correlation were identified with the help of SPSS 16 software, and these identified shares constituted our selection (alternatives) in ANP structure. The correlation matrix of the alternative shares is given in Table 2. These shares are BİM, Dogan Holding, Ereğli Iron and Steel Works Co., Petkim, Turkcell, THY (Turkish Airlines), and Turk Traktor. This way risk factor that was the main purpose in creating a portfolio by identifying shares to be included in the analysis was minimized, and in this regard, it is believed that such a study would bear importance for investments and investors.

Table 2: The Correlation Matrix of Alternative Share

	BİM	DOĞAN HOLDİNG	EREĞLİ IRON AND STEELCo.	PETKİM	TURKCELL	THY	TÜRK TRAKTOR
BİM	1,000	0,050	0,070	0,220	0,466	0,189	0,439
DOĞAN HOLDİNG	0,050	1,000	0,396	0,172	0,243	0,022	0,342
EREĞLİ IRON AND STEELCo.	0,070	0,396	1,000	0,062	0,080	0,131	0,460
PETKİM	0,220	0,172	0,062	1,000	0,191	-0,012	0,095
TURKCELL	0,466	0,243	0,080	0,191	1,000	0,257	0,383
THY	0,189	0,022	0,131	-0,012	0,257	1,000	0,233
TÜRK TRAKTOR	0,439	0,342	0,460	0,095	0,383	0,233	1,000

3.4. Identification of Criteria and Sub-criteria

At this stage of the study, criteria and sub-criteria that affect shares selection in creating portfolios in line with the determination of studies found in literature and recommendations of expert decision-making group were identified. Criteria and sub-criteria concerning the established model are given in Table 3.

Table 3: Criteria and Sub-criteria Affecting Portfolio Selection

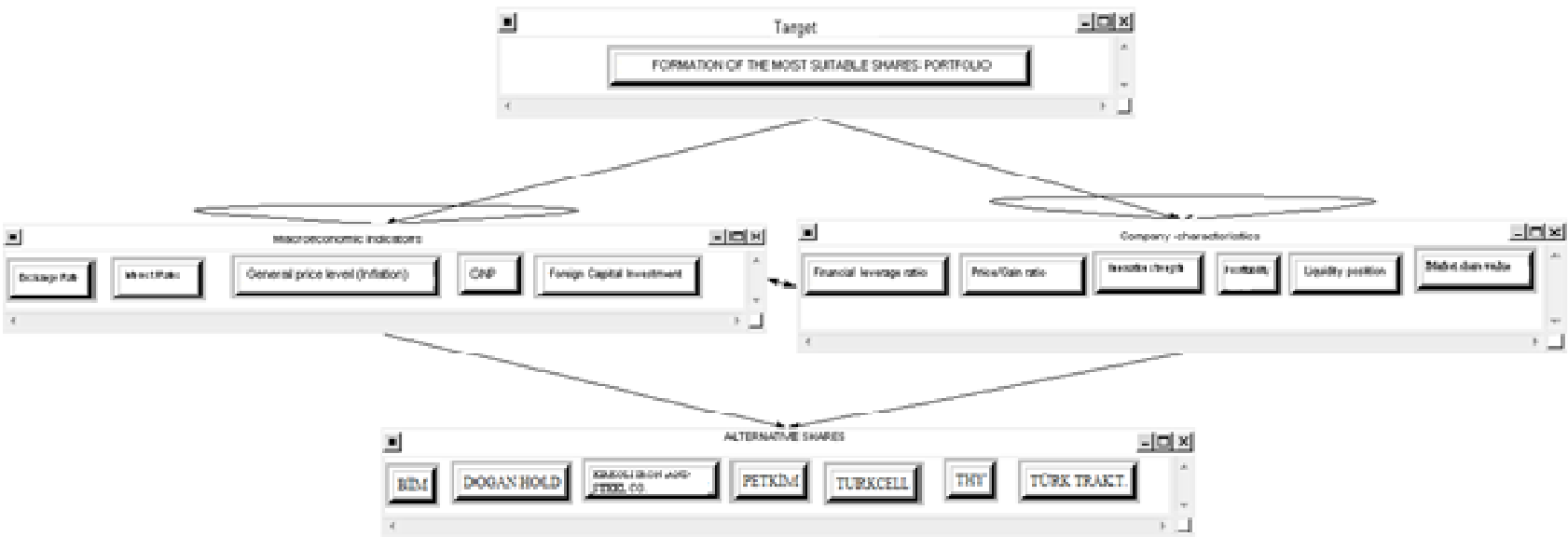
A	Macro-Economic Indicators
A1	Exchange Rate
A2	Interest Rates
A3	Inflation
A4	GNP
A5	Foreign Capital Investments
B	Company Characteristics
B1	Financial Leverage Ratio
B2	Price/Gain Ratio
B3	Innovation Power
B4	Profitability
B5	Liquidity Position
B6	Market Share

3.5. Expression of Inter-criteria Relations

Criteria and sub-criteria affecting shares selection in establishing portfolios by analyzing studies found in literature and benefiting from expert opinions and relations between these criteria were tried to be formed in the network that is the most important part ANP (Figure 3).

Numerous criteria affecting ANP share prices and interactions between them were tackled in a network and thus the complicated structure is rendered more orderly and comprehensible. Such a structure provides with the investor an opportunity to observe the problem as a whole, and the fact that the problem becomes more comprehensible facilitates the portfolio selection process. When establishing a network structure in the study, criteria and sub-criteria affecting share prices were determined by obtaining opinions of experts (academics expert in finance and bank investment experts), conducting a literature review, and also depending on the basic analysis used in share assessment. In the study, Super Decisions software was used in establishing network structure and relations, and in calculations.

Figure 3: Criteria Affecting Portfolio Establishment and Network Structure



1.1. Comparison between Criteria and Alternatives

In targeting the establishment of the most suitable shares portfolio, ANP model was found, relations between criteria, sub-criteria, and alternatives were completed, and expert opinions were obtained for the necessary pairwise comparisons. Geometric averages of pairwise comparisons in replies to questionnaires from experts were estimated and gathered together. For instance, the comparisons gave the below-mentioned marking in a questionnaire from an expert who believes “macroeconomic indicators” are 6 times more important and effective in selecting the most suitable shares in portfolio establishment compared to “company characteristics”.

Macro- Economic Indicators			7														Company Characteristics
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1.2. Consistency Analyses

Consistency analyses of the entire comparison matrices were conducted and consistency ratios (CR) were calculated. In all the matrices, ANP requirement was provided by the consistency ratio being below 0.10, which is an acceptable ratio, by conducting some corrections. This way the comparisons were checked to see if they were carried out in a consistent way.

1.3. Limit Super Matrix Formation

The initial super matrix was formed by using priority vectors obtained as a result of pairwise comparisons. And limit super matrix was then established by obtaining the power of this said matrix (2n+1). With the obtained limit super matrix, importance weights of alternatives and compared decision criteria were determined.

1.4. Analysis of Alternative Shares Results and Expression of Important Portfolio Selection

Moving from the criteria weights estimated by Super Decisions software developed of ANP applications, priority values for alternatives were obtained (Table 4)

Table 4: Super Decisions Software Results of Shares Options Evaluations

Shares	Priority Values	
	Normal Value	Limit Value
BİM	0.104	0.064
DOĞAN HOLDİNG	0.088	0.054
EREGLİ IRON AND STEEL CO.	0.069	0.043
PETKİM	0.152	0.093
THY	0.207	0.128
TURKCELL	0.206	0.126
TURK TRAKTOR	0.174	0.107

While THY shares were the first shares to be in the portfolio with its 20.7% priority value, TURKCELL, quite close to THY, had a priority value of 20.6%. Of the rest of the shares, Dogan Holding and Eregli Iron and Steel Co. were observed as the shares with the lowest percentages in the portfolio with 8.8% and 6.9%, respectively.

ANP technique can provide us with not only the selection of best alternatives as decision alternatives but also with priority values of criteria used in decision alternatives analysis. This way within the scope of the model in which a supplier selection was conducted, which criteria are important can be revealed. Identifying important criterion or criteria could provide convenience to authorized individuals in decision-making process [15].

When analyzed the results obtained on sub-criteria of the macroeconomic indicators criteria, the order of importance is Foreign Capital Investment, GNP, Inflation, Interest Rates, and Exchange Rates (Table 5).

Table 5: Super Decisions Software results of macroeconomic indicators sub-criteria

Macro-Economic Indicators	Priority Values	
	Normal Value	Limit Value
Exchange Rate	0.101	0.012
Interest Rates	0.119	0.014
Inflation	0.167	0.020
GNP	0.224	0.026
Foreign Capital Investment	0.389	0.046

When analyzed the sub-criteria of company characteristics criteria, it was observed that the lowest sub-criteria that affects the shares selection was financial leverage ratio with a percentage of 8.2, however, the sub-criteria that affected the most was market share of the company (23.9%). These results are given in Table 6.

Table 6: Super Decisions software results on the sub-criteria of company characteristics

Company Characteristics	Priority Values
Financial Leverage Ratio	0.082
Price/Gain Ratio	0.131
Innovation Strength	0.175
Profitability	0.189
Liquidity Position	0.184
Market Share	0.239

4.CONCLUSION

Although, in literature, there are many studies on portfolio selection, not many studies exist on portfolio selection by ANP method. The ANP method has an individual significance in that it provides an opportunity to use basic and technical analysis in unison in portfolio selection. In addition, despite the fact that the degree of effect of such qualitative factors as market share and innovation strength on shares is quite difficult, they are mostly ignored by investors in portfolio selection process. Even though the viewpoints on these factors differ from individual to individual, increasing the number of experts in pairwise comparison process would provide a result that is closer to common judgment in financial markets. In conducting a suitable shares selection and weighting by taking into consideration both price movements of shares in the past and factors affecting the shares, ANP is believed to be quite an effective method in creating portfolios.

In ANP, a flexible method, criteria and alternatives can differ from person to person, and the number of tackled criteria and alternatives can also change. The efficiency of the portfolio can be increased by having more experts in ANP.

In further studies, it may be considered a portfolio problem in which there will be higher number of decision-makers or experts, and within a more detailed network structure scope, a fuzzy set theory included in the model in addition to ANP in evaluating the personal judgments.

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HOW ASYMMETRIC ARE STOCK MARKET RETURNS IN THE BRICS?

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ABSTRACT

The asymmetric reaction of conditional volatility to past returns shocks is well documented at the firm and index levels. Most of the evidence for the “leverage effect” concerns developed stock markets, yet some observers note a relationship between the degree of asymmetry and the level of maturity of the market. This paper contributes to this debate by estimating asymmetry in the largest emerging markets by region – Brazil, Russia, China, India and South Africa (BRICS) – using the APARCH model which allows comparisons between the nested GARCH, GJR-GARCH and TGARCH models. A brief survey of asymmetric ARCH models is provided prior to the estimations. Findings reveal a level of asymmetry comparable to that in developed markets for the South African and Brazilian stock markets, and an absence of asymmetry in the Russian market. These results highlight the heterogeneity in market characteristics amongst emerging markets and suggest a positive relation between market maturity and asymmetry.

Keywords: stock market volatility, asymmetry, leverage effect, GARCH model, APARCH model, emerging markets

Introduction

The modeling of the conditional variance of time series was pioneered by Engle (1982) with the autoregressive conditional heteroskedasticity (ARCH) model, and Bollerslev (1986) with the generalization of this model (GARCH). As the name implies, the principal assumption of conventional econometric models that is put into question here is that of homoskedasticity, or constant variance. Indeed, while time series sampled at high frequencies have uncorrelated observations, they show dependence in higher moments such as the variance. ARCH models were developed in an attempt to capture this “clustering” of volatility over time. This has important implications for financial theory, because if a stock’s volatility is time-varying, the pricing of that stock should take this into account.

The importance and usefulness of GARCH models for risk managers is hard to underestimate, and research continues to improve the specification of volatility in order to provide parsimonious tools for a globalised financial sphere. Within this approach, some important extensions to the basic GARCH model have been proposed, including a large class of asymmetric models which is presented in this paper. Furthermore, there is a growing literature on multivariate GARCH models [see Silvennoinen and Terasvirta (2008) for a survey] in which volatility of one series is estimated conditional on that of other series. This is particularly practical in finance due to the need to model portfolios of assets jointly, and is also an appealing framework in which to study phenomena related to increased financial interdependence such as “spillovers” and “contagion” between markets and industries during crises.

It is useful at this point to present the basic GARCH model which can be described by a mean equation and a conditional variance equation.

$$y_t = \mu + \epsilon_t \sigma_t \quad \text{where } \epsilon_t \sim N(0, \sigma_t) \quad (1.1)$$

$$\sigma_t^2 = \omega + \sum_{i=1}^q \alpha_i \epsilon_{t-i}^2 + \sum_{j=1}^p \beta_j \sigma_{t-j}^2 \quad (1.2)$$

Maintaining the context of a financial returns series, the first equation describes a series of returns which is explained by a constant long-term mean and an error term. While it is possible to construct a more sophisticated representation of the return equation, including for example, autoregressive terms, we have introduced an unconditional mean term and error term for simplicity. It is also common to describe directly the error process as a normally-distributed series multiplied by the conditional variance, when the error process is observed. Again, for simplicity, it is assumed that the error term is normally distributed with zero mean and unit variance. The second equation describes the conditional variance of the error term as a weighted function of: a constant, unconditional variance ω , the sum over q lags of the squared past error (the difference between past forecast variance and actual variance) weighted by a parameter α and the sum over p lags of the past squared variances weighted by a parameter β .

The parameters α and β measure the degree of volatility persistence, that is, the speed at which the variance reverts to its unconditional variance following a shock in returns. Bigger values of α imply more rapid, short-lived changes in volatility following shocks, and bigger values of β imply a slower ‘amortizing’ of the impact on volatility of returns shocks. The advantage that this generalized model has over its immediate predecessor, the ARCH model, is that shocks decay more slowly albeit still exponentially with a decay factor of $\alpha_1 + \beta_1$. Non-negativity of the parameters and unconditional variance is sufficient to ensure that the conditional variance is always non-negative and the GARCH model is identified. These conditions, originally put forward in Bollerslev (1986), are arguably too restrictive given that negative

unconditional volatility estimates as well as negative parameters have been found in practice [see Nelson and Cao, (1992)]. Furthermore, to ensure a non-explosive process, the sum of the persistence parameters must be smaller than unity.

The technique used to estimate GARCH models is maximum likelihood (ML), or quasi maximum likelihood (QML), which requires an assumption to be made about the distribution of the innovation process in equation (1.1). The log-likelihood of error realizations drawn from the standard normal distribution is given by:

$$L = -\frac{1}{2} \sum_{t=1}^T [\log(2\pi) + \log(\sigma_t^2) + \epsilon_t^2]$$

Where T is the number of observations.

While the normal distribution is popular in research and practice, it is well known that the distribution of financial stock market returns and other series exhibit excess kurtosis, that is, the third moment of the distribution often has a value greater than three. This implies that there are more observations that lie in the tails of the distribution than implied by the normal distribution – ‘fat tail’ events occurring several standard deviations from the mean are ‘abnormally’ frequent in financial time series. The Student-*t* and Skewed Student-*t* distributions allow this feature to be taken into account.

There are several shortcomings of the basic GARCH model. Firstly, the estimated coefficients of α and β often violate the non-negativity constraints imposed by the model. These constraints restrict the dynamics of the conditional variance process. Furthermore, financial time series often display shocks that decay more slowly than implied by the GARCH model. Importantly, as remarked above, market observers note a negative relationship between returns at time *t* and returns volatility at time *t+1* in many stock markets. Indeed, financial returns that surprise on the downside generate more subsequent volatility than returns that surprise on the upside (positive return surprises can also decrease subsequent volatility); however, the standard GARCH model treats positive and negative returns shocks symmetrically.

This survey will focus on the latter criticism: by construction, the effect on today’s volatility of both positive and negative past innovations is identical in the GARCH model. The conditional distribution of the variance is symmetric in the past values, thus excluding the possibility of negative correlation between the two. In the GARCH model, the conditional variance is only affected by the magnitude of lagged returns, not by the sign (positivity or negativity) of previous returns. However, asymmetric reactions to past returns of financial time series is a widely documented stylized fact dubbed the “leverage effect”. The theory underlying the leverage effect hypothesis is that a change in the market’s valuation of a firm’s equity affects the degree of leverage (debt to equity ratio) in the capital structure of the firm. The empirical evidence of this effect in index-level data is, however, inconclusive, leading researchers to investigate other sources of asymmetry. This will be discussed in further sections.

Main asymmetric ARCH models

The Exponential ARCH model (Nelson, 1991) is one attempt to remedy the above-mentioned problem of asymmetric conditional volatility. In addition, the model guarantees the positivity of the conditional variance by using the natural logarithm of the variance which is linear in time and lagged innovations. The log of the conditional variance is written as follows:

$$\ln(\sigma_t^2) = \alpha_t + \sum_{k=1}^{\infty} \beta_k g(z_{t-k}), \quad \beta_1 \equiv 1, \quad z_t \text{ is a zero-mean i.i.d process}$$

$$g(z_t) \equiv \theta z_t + \gamma [|z_t| - E|z_t|]$$

The second equation allows an asymmetric relation between stock returns and volatility by making $g(z_t)$ a function of both the magnitude and sign of z_t , that is, it is linear in both z_t and the absolute value of z_t . For example, a negative value for θ will imply a positive innovation in the conditional variance when the return surprise is negative. A positive value for γ will imply a positive innovation in the conditional variance when the size of z_t is greater than its expected value. The conditional variance is thus allowed to respond asymmetrically to rises and falls in prices.

The exponential ARCH model also responds to the second criticism in that no inequality constraints are imposed, allowing greater freedom of the volatility dynamic with the β_k terms being negative or positive. The exponential ARCH model has the additional advantages of easily-verifiable stationarity, covariance stationarity and ergodicity.

The generalized version of Nelson’s model is given as follows:

$$\log \sigma_t^2 = \omega + \sum_{i=1}^p (\alpha_i |z_{t-i}| + \gamma_i z_{t-i}) + \sum_{i=1}^q \beta_i \log \sigma_{t-i}^2 \quad (1.3)$$

Where ϵ_t and ϵ is the error term.

The EGARCH(1,1) model is thus written as:

$$\log \sigma_t^2 = \omega + \alpha |z_{t-1}| + \gamma_1 z_{t-1} + \beta_1 \log \sigma_{t-1}^2$$

For example, for a negative returns shock $(z_{t-1} < 0)$ we write:

$$\log \sigma_t^2 = \omega + (\alpha - \gamma_i) z_{t-1} + \beta_1 \log \sigma_{t-1}^2$$

The “leverage effect” is thus tested by the hypothesis that $\gamma_i = 0$, and the impact is asymmetric if $\gamma_i \neq 0$. The β coefficient measures the persistence of volatility shocks. The EGARCH model uses standardized errors $(z_t = \frac{\varepsilon_t}{\sigma_t})$ which allows for a more natural interpretation of the size and persistence of shocks as it is a unit-free measure. While these attributes make the EGARCH model an attractive choice compared to the standard GARCH model, forecasting conditional volatility with EGARCH is more complicated.

A further model that captures asymmetries in volatility while maintaining the tractability of the GARCH model specification is proposed by Zakoian (1994). The Threshold ARCH (TARCH) model thus has the same central feature of the EGARCH model, but presents some important differences. The model can be described as follows:

$$\varepsilon_t = \sigma_t Z_t,$$

$$\sigma_t = \alpha_0 + \sum_{i=1}^q \alpha_i^+ \varepsilon_{t-i}^+ - \alpha_i^- \varepsilon_{t-i}^- + \sum_{j=1}^p \beta_j \sigma_{t-j} \quad (1.4)$$

Where (Z_t) is a zero mean, unit variance i.i.d process,

ε_t^+ and ε_t^- are the positive and negative components of ε_t respectively

α_i^+, α_i^- and β_j are real, positive scalars

The conditional standard deviation here is a linear combination of past innovations and standard deviations. Since the conditional standard deviation is not positive by assumption, the model does require positivity constraints on the parameters: $\alpha_i^+, \alpha_i^-, \beta_j \geq 0$ and $\alpha_0 \geq 0$ and The symmetric model is a case in which $\alpha_i^+ = \alpha_i^- = \alpha_i$. As in the EGARCH model, the TARCH model allows for different reactions of present volatility according to the sign and the size of past shocks. Indeed, the authors argue that the relationship between returns and volatility is non-linear: for example, small positive shocks could have a higher impact on volatility than small negative ones of equal size, whereas the opposite could be true for very large shocks. There is a ‘threshold’ – occurring by default at $\varepsilon_{t-1} = 0$ such that shocks larger than the threshold level have different impacts than shocks smaller than the threshold.

Further differences between the two models are, firstly, that the TARCH models volatility as a function of non-normalized innovations; secondly, that while the EGARCH assumes a constant structure at all lags, the TARCH allows lags to contribute differently with asymmetry, for example, $\alpha_1^+ \alpha_1^- > 0$ while $\alpha_2^+ \alpha_2^- < 0$

In the same vein, Glosten, Jagannathan and Runkle (1993) suggested the GJR-GARCH model which is based on the central hypothesis that if expected future cash flows and the riskiness thereof does not change proportionally when investors revise their expectations, then unanticipated changes in stock prices and returns will be negatively related to unanticipated changes in future volatility. We can write the GJR-GARCH model for a series of excess stock returns as follows:

$$x_t = \alpha_0 + \alpha_1 v_{t-1} + \varepsilon_t$$

$$v_{t-1} = b_0 + b_1 v_{t-2} + g_1 \varepsilon_{t-1}^2 + g_2 \varepsilon_{t-1}^2 I_{t-1}$$

The last term I_{t-1} is an indicator or dummy variable. The impact of ε_{t-1}^2 on conditional variance v_{t-1} is different when ε_{t-1} is positive ($I_{t-1} = 1$) than when ε_{t-1} is negative ($I_{t-1} = 0$). Given the empirical evidence for a negative relation between innovations and volatility, the authors expect the coefficients g_1 and g_2 to be negative. A generalized version of the model can be written as follows, where S_{t-1} is a dummy variable that takes the value 1 when γ_t is negative and zero when it is positive:

$$\sigma_t^2 = \omega + \sum_{i=1}^q (\alpha_i \varepsilon_{t-i}^2 + \gamma_i S_{t-i} \varepsilon_{t-i}^2) + \sum_{j=1}^p \beta_j \sigma_{t-j}^2 \quad (1.5)$$

The GJR-GARCH is clearly akin to Zakoian’s TARCH model, but has the important difference in that it models the conditional variance instead of the conditional standard deviation. This specification can be attractive for equity markets in which the standard deviation is more pertinent than the variance, yet it is likely that the variance exponent is between unity and two rather than exactly equal to these boundary values. In further sections we shall review models which allow the exponent to be estimated.

In addition to the vast body of symmetric ARCH models tweaked in various ways to reproduce empirical phenomena, the academic literature offers myriad asymmetric ARCH models [see Bollerslev (2008) for a comprehensive glossary]. Following this wave of ARCH models starting in the 1980s, there were some attempts to devise a unifying framework in which a general specification of an ARCH model could be reduced to special cases of the principal ARCH models used in the financial time series literature. Howard (2012) provides an overview of the three general models proposed by Hentschel (1995), Duan (1997) and Terasvirta and He (1999) respectively.

For the purposes of this paper, we review the APARCH (Asymmetric Power ARCH) model of Ding, Granger and Engle (1993). A tractable model that nests, among others, the symmetric GARCH model of Bollerslev as well as the GJR-GARCH, Threshold GARCH and Nonlinear GARCH models, the APARCH(p,q) model can be written as:

$$\sigma_t^\delta = \omega + \sum_{i=1}^q \alpha_i (|\varepsilon_{t-i}| - \gamma_i \varepsilon_{t-i})^\delta + \sum_{j=1}^p \beta_j \sigma_{t-j}^\delta \quad (2.4)$$

Where $\delta > 0$ and $-1 < \gamma_i < 1$ ($i = 1, \dots, q$)

Clearly, the power parameter δ governs the transformation of the variance and the asymmetry parameter γ_i permits the leverage effect to

$\delta = 2$

be measured. It is easy to see that when $\delta = 1$, the APARCH becomes the GJR-GARCH model, and when $\delta = 1$ we have Zakoian's TGARCH. In addition, the APARCH nests five symmetric ARCH models.

This type of encompassing models facilitates comparison across several models. The use of asymmetric models has become widespread, both in the univariate context and in multivariate specifications where asymmetry is a significant factor in phenomena such as regional financial contagion and volatility during in times of crisis. The following sections examine some empirical results from the literature on developed and, in particular, emerging financial markets where asymmetry is equally a characteristic of stock market volatility.

Empirical studies

The above overview of the theoretical models has not discussed the economic rationale underlying the hypothesis of asymmetric volatility. While it appears clear that volatility models with asymmetry parameters are better specified than basic GARCH models, the drivers of this asymmetry remain a subject of debate in the academic literature. The first explanations of asymmetry in volatility come from Black (1976) and Christie (1982) who studied the effects on volatility of negative return shocks on firm-level data. They posited that negative return shocks increased the financial leverage ratio of the firm, hence making the stock riskier and increasing its volatility. Since then, several competing theories have been proposed, and it is likely that the observed volatility asymmetry cannot be explained by one factor alone [see Wu (2001)].

Bekaert and Wu (2000) argue that the causality implied by the leverage hypothesis – returns shocks cause changes in conditional volatility – is the opposite of that implied by the time-varying risk premium hypothesis, that is, that changes in volatility cause return shocks because volatility is priced. The latter argument, also known as the volatility feedback hypothesis, is presented in Poterba and Summers (1986) and Campbell and Hentschel (1992). Mele (2007) makes a significant contribution to the debate on the reasons why volatility is asymmetric across the business cycle. According to Mele's rational expectations framework, risk premia must increase more in bad times than they decrease in good times in order to induce countercyclical volatility in stock returns. Specifically, investors do not change their discount factors during good times, causing the latter to fluctuate less than in bad times when investors are more sensitive to economic conditions. Thus, countercyclical volatility is produced endogenously through the rational asymmetric fluctuations of dividend-price ratios across the business cycle. Trading practices such as short selling and margin calls could also produce a negative relation between returns and conditional volatility [Sentana and Wadhvani (1992) and Jayasuriya et al (2005)].

Departing from mainstream financial theory, insights from behavioural finance can provide explanations which relax the assumption of perfectly rational investors. For example, if investors are averse to losses, their reaction to negative return shocks is plausibly stronger than to positive return shocks. Hibbert et al (2008) make a rare contribution to the literature in this respect, focusing on the three behavioural biases of traders on the S&P 500 index: investors view high return and low risk stocks to be a "representation" of a good investment, which develops into an "affect" or emotional association. These form the rules of thumb, or heuristics, of quick and easy decision-making on the markets thereby reinforcing loss aversion. Furthermore, the extrapolation bias, that is believing that future events will look or behave like recent events, could aggravate asymmetry as investors believe past negative returns will be representative of future returns.

These behavioural biases form the perception of volatility and are self-reinforcing. Hibbert et al (2008) find that the behavioural approach lends support to the negative relation between returns and volatility when using daily and intraday data. The leverage effect and volatility feedback hypothesis are, it is argued, more likely present at longer lags. In the same vein, Park (2011) proposes a continuous beliefs system with asymmetry in herding and finds further evidence for asymmetry in the foreign exchange market for four currency pairs.

Faced with the evidence of these competing theories, is it likely that certain hypotheses have greater explanatory power for some asset classes or markets than for others. The relative contributions of the leverage effect, volatility feedback effect and behavioural effect to asymmetry are also likely to vary over time and with the degree of global stock market integration and stock market development.

Given the data problems typically encountered with stock market returns for emerging market countries, the literature documenting asymmetric time-varying volatility is relatively scarce. However, it is natural to ask if the leverage effect is present in emerging markets, and to what extent. This investigation could provide insight into the level of development of stock markets, their microstructure and, in a multivariate framework, their level of integration into world markets. It is well known that the distributions of emerging stock market returns exhibit the same features of mature markets, that is, excess kurtosis and skewness, although the extent of these deviations from normality varies greatly among emerging markets.

Some evidence for emerging markets is provided by Rockinger and Crouhy (1997), who construct a further asymmetric model, the ATGARCH model. The authors extend this general model to a hysteresis GARCH (HGARCH) model which is particularly adapted to take into account the psychological factors at play on the markets as higher order lags are allowed. Daily data for 21 stock indices - including some emerging markets such as Mexico, Singapore, Hong Kong and Malaysia - between 1986 and 1995 are tested. The authors find generally higher volatility in emerging Asia and in Mexico. However, countries with low persistence tend to be situated in the Asia-Australia region which is explained by their relative underdevelopment and tendency to be dominated by current news rather than past volatility. Furthermore, volatility asymmetry appears to be stronger in younger stock markets. The threshold effect is clearly evident in this study too, with negative returns shocks being common across the sample, but only producing higher volatility below a certain level. News

above this level, as well as positive news, has a negligible effect on volatility. Interestingly, the threshold level does not appear to differ according to market age and depth.

Contrary to these results, Tasepp and Rieger (2010) find that developed countries tend to have a higher level of volatility asymmetry. The authors test the APARCH(1,1) model with a skewed Student-*t* distribution on 49 stock markets each having at least seven years of daily data over the period 1980-2007. According to this comprehensive study, there appears to be a negative correlation between stock market efficiency and volatility asymmetry, with the US having the highest degree of asymmetry. Furthermore, the authors examine the time-varying nature of this asymmetry using a rolling window estimation of the APARCH model and find that asymmetry is heavily influenced by market trends, lending credence to the possibility of behavioural factors at play during bull and bear markets. Volatility asymmetry trends upwards for 36 countries and downwards for 8 countries, thus discrediting the hypothesis that asymmetry is an anomaly that should dissipate over time. Volatility asymmetry is heightened during turbulent times, a finding that confirms previous empirical evidence.

Several explicative factors are examined as causes of asymmetry. Firstly, the authors find a positive relation between the level of a country's private debt to GDP and asymmetry, but an insignificant relation between average debt to equity ratios for companies and asymmetry. There is thus no conclusive evidence for the leverage effect. Secondly, the volatility feedback effect, or time-varying risk premium effect, is tested using S&P country ratings as a proxy for risk premia. Surprisingly, the authors find a significant negative correlation between the risk premium and volatility asymmetry at a cross-country level; however, this result is likely to be dominated by the generally negative relationship between stock market development and country risk, and by the use of cross-country analysis rather than within-country analysis.

Furthermore, economic development, proxied by GDP per capita, is shown to have a positive effect on volatility asymmetry. Asymmetry is also affected by the possibility of short-selling: using a dummy variable for the possibility of shorting the stock market, the authors find a positive relationship between short-selling and asymmetry in bear markets. Electronic or algorithmic trading does not appear to have an effect on volatility. The authors also take into account the psychology of private investors: it can be expected that markets with a higher proportion of private investors – more prone to bias than institutional investors – will manifest more volatility asymmetry, particularly in bear market times. Using two proxies, market capitalization to GDP and percentage of households owning stocks, the authors find support for a positive significant effect on volatility asymmetry. Lastly, the role of analyst coverage is also a non-negligible factor affecting asymmetry as it is a prime source of information to private investors. The results show a significant positive correlation relationship between the two.

The evidence above is corroborated by Brooks (2007) who also employs an APARCH specification to model 26 emerging equity markets over the period 1995-2005. Daily data were used. Key findings are that emerging markets have a wide range of values for the power term in the APARCH model, and lesser developed markets in Africa and the Middle East appear to have lower volatility asymmetry than those in Latin America. The authors also examine the correlations between asymmetry and institutional features such as anti-director rights, thin trading and stock market development (market capitalisation), but find inconclusive evidence across regions.

Empirical evidence for China is furnished by Wang (2010) who examines the relationship between stock market volatility and macroeconomic variables' volatility over the period 1992 - 2008. An EGARCH framework is used to estimate the volatility of the stock market and macroeconomic variables, and a lag-augmented vector autoregression (LA-VAR) model is employed to examine the causal relationship between the two. Monthly values of the Shanghai composite stock price index are used. Concerning the macroeconomic variables, domestic activity is proxied with gross domestic product (quarterly real GDP deflated by the CPI), and inflation (CPI) and short term interest rate (one-year bank loan rate) are included as they exert a strong influence on economic activity and the stock market. Monthly observations for GDP are constructed using monthly value-added industry weights and adjusting the quarterly GDP to monthly data (the method is not specified by the author). All variables are taken in logarithmic form.

The conditional variances of each variable are described by EGARCH(2,2) for GDP, EGARCH(2,1) for CPI, EGARCH(1,2) for the interest rate and EGARCH(1,1) for the stock returns (it is not clear how lags are selected). Interestingly, the author finds that the asymmetric parameter is not statistically significant for the stock returns, a result which backs up previous evidence of low asymmetry in young markets. The persistence parameters, however, are statistically significant and high for all variables. The Granger causality tests performed with the LA-VAR model suggest no causal relationship between GDP volatility and stock returns volatility in China. In effect, the authors reason that there is no fundamental link between China's young stock market and its economic growth. China's stock market is delinked from long-term company performance because small scale traders are motivated by short-run gains as the high percentage of shares held by the government means that the latter is the main market-mover. However, there does appear to be a causal link from inflation volatility to stock market volatility, and a unidirectional causal relationship between interest rate volatility and stock market volatility.

By and large, the above empirical results point to a generally positive relation between stock market development and volatility asymmetry. The relative participation levels of private and institutional investors in emerging markets are different, trading volumes are generally thinner, and the stock market infrastructure and process of buying and selling shares is often less sophisticated. These differences could impact the strength of the supposed negative relation between unexpected returns and conditional volatility. For instance, it is possible that asymmetric responses to return shocks are amplified in markets with high proportions of private or non-institutional investors that are more prone to behavioural biases, "short termist" or noise trading strategies. It follows that emerging markets, if dominated by institutional investors, might have a lesser degree of asymmetry. On the other hand, the frequency and gravity of stock market crashes in emerging markets are historically higher than in mature markets, perhaps resulting in investors in emerging markets being more loss-averse thereby amplifying and prolonging responses to negative return shocks. One might also expect to observe a change in the asymmetry coefficient for emerging stock markets over the period of capital market liberalization. While asymmetric contagion and spillovers are a natural extension of this univariate analysis and are covered in, for example, Bhar and Nikolova (2010), they are beyond the scope of this survey.

Application to emerging stock markets

The present section provides a practical application of the APARCH model and three nested symmetric and asymmetric models to the BRICS countries (Brazil, Russia, India, China and South Africa). The choice of countries is motivated largely by the popular view that these countries are the largest in their respective regions in economic and financial terms, having witnessed sustained high growth in production over the last decade. Each of these countries underwent financial liberalization during the 1980s and has progressively integrated with the global economy. This period has been punctuated with several financial crises emanating from the BRICS, their neighbouring countries, or developed markets. In the spirit of the theoretical and empirical studies documented in previous sections, we test whether these asymmetric models offer a satisfactory description of conditional volatility and, importantly, if they improve on the standard GARCH model.

Data

For each country, the benchmark stock index daily prices were sourced from Datastream and cover the period 4 September 1995 - 1 December 2011, excluding weekends. This yields a total of 4239 observations for each country; however, we note 305 missing values for China, 222 for Brazil, 231 for India, 260 for Russia and 180 for South Africa. These correspond to public holidays on which trading does not take place, and can include several consecutive days (for example, over the Chinese New Year). Evidently, there is no observed volatility on these days, yet market actors continue adjusting their views based on new information which is in theory expressed in the next trading day. These days and periods are not homogenous over time for a single country, so we cannot make blanket adjustments. Furthermore, liquidity is often reduced over holiday periods while market actors are on leave, exacerbating volatility.

Down-weighting the observations succeeding the holiday periods is a coarse treatment, relying on arbitrary weights and ad-hoc number of days. Linear interpolation across week-long holidays is equally arbitrary, particularly over extended periods. A possibly more neutral and simple option is to attribute zeros to the missing values and consider the potential estimation bias of conditional volatility based on the percentage of missing values in the whole sample. These percentages are 7% for China, 5% for Brazil and India, 6% for Russia and 4% for South Africa. In addition, each series contains statistical outliers which shape the sample distribution and provide important information about market behavior during crises.

The underlying dynamic of the conditional variance is not significantly affected by the presence of outliers when we compare regressions with and without dummy variables at outlier dates. However, assuming that these large one-day movements, associated with financial crises, arise from the data-generating process, we explicitly take into account the non-normality of the observed financial series with non-Gaussian distributions. We are aware, however, that “black swan” events are by definition unable to be approximated in even extreme-value fat-tailed distributions.

For the South African market we use daily data for the JSE/FTSE All Share Index (hereafter referred to as the JSE), a broad index with market capitalization-based weightings for member stocks. The Indian market has been proxied with the Bombay Stock Exchange’s Sensitive Index (hereafter referred to as the SENSEX) which is the benchmark index with market capitalization-based weightings. For the Russian market we choose the dollar-denominated Russian Trading System (hereafter referred to as the RTS) benchmark index, while the Brazilian market is represented by the benchmark BOVESPA index. Lastly, for the Chinese market, we use the Shanghai Composite stock exchange which comprises A and B shares sold to both local and foreign investors and has a higher market capitalization than the alternative Shenzhen market.

For most emerging markets, the late 1980s and early 1990s heralded a new era of financial liberalization: equity markets were opened to international investors, currencies moved towards floating regimes and capital flowed more freely between countries. This has undeniably had consequences for the dynamic of volatility in emerging financial markets, as exposure to global markets has added complexity to local markets. Indeed, it is likely that while more flexible economies have reduced vulnerability to local and global shocks, greater global economic integration has at the same time increased the possibility of contagion as well as the severity of crashes.

Figure 1 shows the price level of each index: the series are clearly non-stationary, with a constant upward trend starting at mid-sample, in 2004/5. While the dotcom bubble and crash of 2001 are visible for the JSE and SENSEX, the Russian crisis of 1998 was clearly more devastating for the Russian market. The RTS also suffered more heavily during the 2007/8 global crisis, due to its disproportionate exposure to the oil price which tumbled during the recession. In general, the BRICS with the exception of China have more or less regained their pre-crisis index levels although volatility remains high.

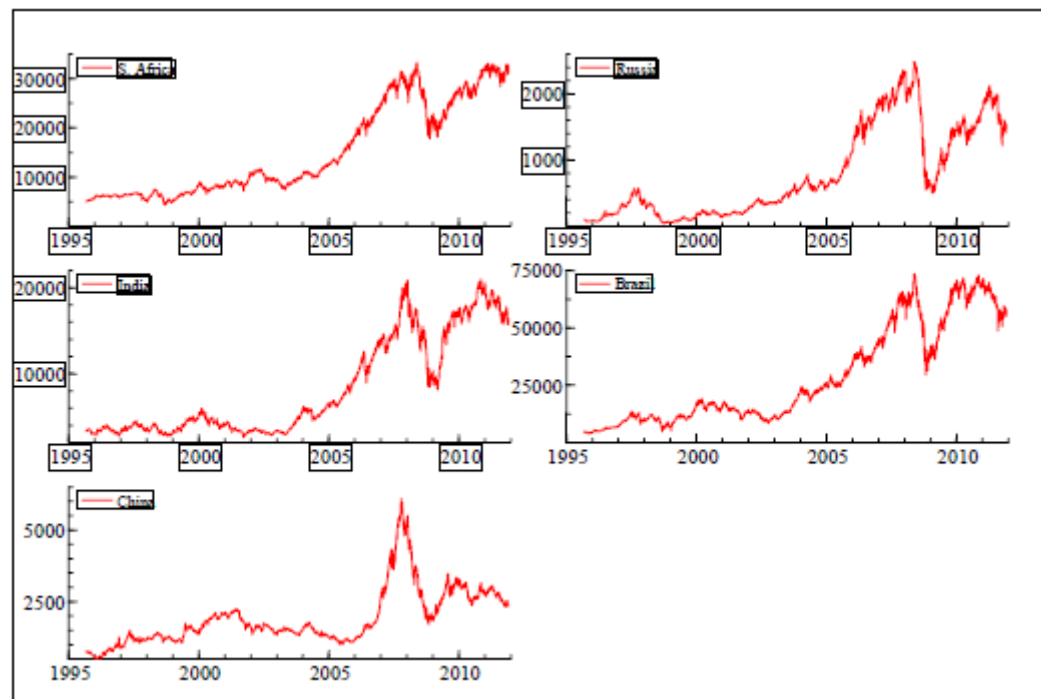


Figure 1. Index levels for the BRICS benchmark indices

Diagnostic tests

Figure 2 illustrates the log returns of each series, calculated as:

$$R_t = \ln \left(\frac{s_{t-1}}{s_t} \right) \text{ where } s_t \text{ is the index price level.}$$

The clustering of volatility is highly apparent in the returns, with periods of low and high volatility becoming more distinguished in the latter half of the sample period, reflecting the simultaneous increase of international stock market correlation and volatility. To test if the returns have a unit root, we use the Augmented Dickey-Fuller test with no trend or intercept and 2 lags. The null hypothesis of a unit root is rejected at the 1% level for all series.

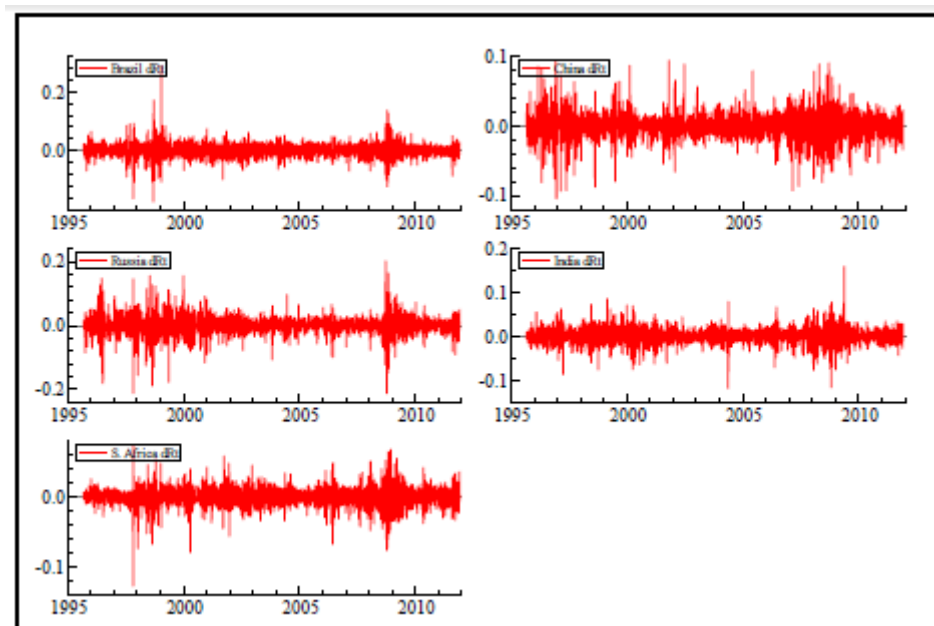


Figure 2. Log returns series for BRICS indices

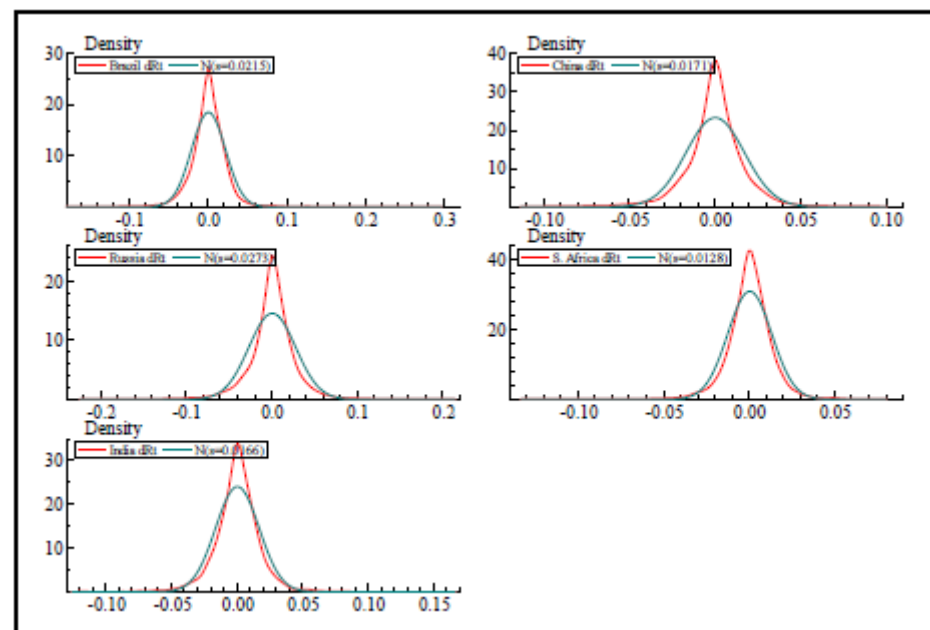


Figure 3. Distributions for the BRICS indices with Gaussian distribution reference

Summary statistics and normality tests for the returns series are provided in Table 1. All returns series show significant deviations from the normal distribution, witness the negative skewness and excess kurtosis statistics. The Jarque-Bera normality test statistic leads us to reject the null hypothesis of a normal density. Note, however, that the skewness is less pronounced in Russia than in the other markets, indicating that the large daily movements occur both on the upside and the downside, and at similar frequencies. To test if the returns have a unit root, we use the Augmented Dickey-Fuller test with no trend or intercept and 2 lags. The null hypothesis of a unit root is rejected at the 1% level for all series.

Table 1. Summary statistics for BRICS returns indices

	Min	Mean	Max	Std Dev	Skewness	Kurtosis	Jarque-Bera	ADF t stat
China	-0,1044	0,0003	0,0940	0,0171	-0,23	5,0	4474	-35,3
Brazil	-0,1723	0,0006	0,2882	0,0215	0,29	13,3	31317	-39,4
India	-0,1181	0,0004	0,1599	0,0166	-0,07	5,5	5429	-37,3
Russia	-0,2120	0,0006	0,2020	0,0273	-0,45	7,8	10814	-35,3
S Africa	-0,1269	0,0004	0,0742	0,0128	-0,47	6,2	6846	-38,0

Note: All statistics are significant at the 1% level, except India skewness (significant at 10% level)

Figure 3 contrasts the empirical distribution with that of the normal distribution. The curve is bell-shaped for all indices, although the fatter tails and asymmetry suggest that a skewed Student- t distribution might better portray the returns. Autocorrelation functions (Appendix I, figures 4a – 4e) of the simple returns show a significant positive autocorrelation at the first lag, and an oscillating decay thereafter; however the volatility clustering is illustrated in the ACF of the squared returns which show clear autocorrelation through numerous lags and a very slow decay. Indeed, positive autocorrelation is still apparent at the long end of the lag sample: all indices show positive autocorrelation up to 80 lags, with some lags being above the bar at 90 lags. While persistence in Russia appears to decrease consistently from lag 1 to 100, this is not the case in South Africa, Brazil, China and India which show spikes in positive autocorrelation at mid and late-sample lags. The ACFs thus suggest that autoregressive models are appropriate.

Diagnostic tests can provide further evidence of autocorrelation. We run Engle's Lagrange Multiplier test (Engle, 1982) which regresses the squared series on a chosen number of its own lags. We test each series at 2, 5, and 10 lags (see Table 3a) and find that we reject the null hypothesis of no ARCH effects at the 5% level up to lag 10 for all markets. The Box-Pierce statistics (Table 3b) are performed on raw and squared data under the null hypothesis of no serial correlation. The latter is rejected for all countries at the 1% level at lag 5, 10, 20 and 50 (note that this test has not been corrected for heteroskedasticity).

Table 3a. LM tests for BRICS daily returns

Lagrange-Multiplier test					
Lags	China	Brazil	India	Russia	S Africa
2	153.24	137.83	93.964	170.12	242.86
5	74.321	76.224	58.956	88.808	125.27
10	43.074	43.468	37.137	59.953	69.477

Note: All statistics are significant at the 1% level, except Brazil at lag 2 (significant at 5% level)

Table 3b. Box-Pierce tests for BRICS daily returns

Box-Pierce Q statistic					
Lags	China	Brazil	India	Russia	S Africa
5	25.0238	12.7917	19.1638	72.2021	38.0523
10	33.4369	41.4206	57.8862	84.5710	45.0425
20	77.1084	58.9000	78.8983	123.825	61.3496
50	146.011	99.5532	146.953	184.984	128.869
Squared data					
5	547.881	573.364	431.874	682.033	978.160
10	738.679	822.618	716.823	1231.72	1378.02
20	979.729	1091.68	994.588	2077.79	1885.80
50	1401.16	1391.35	1292.16	3060.14	2586.63

Note: All statistics for squared data are significant at the 1% level

Model

The above diagnostic tests strongly point to the use of autoregressive heteroskedasticity models. Moreover, the particular objective of this section is to test the relationship between unexpected returns (positive or negative) and conditional volatility. For these purposes, we choose the encompassing Asymmetric Power ARCH (APARCH) model of Ding, Engle and Granger (1993) which, under certain parameter restrictions, allows us to test and compare the fit of the standard GARCH model as well as the TARCH and GJR-GARCH asymmetric models in the sample.

We construct the following general APARCH(p,q) model:

$$y_t = \mu + \varepsilon_t \quad \text{where } \varepsilon_t \sim N(0, \sigma_t)$$

$$\sigma_t^\delta = \omega + \sum_{i=1}^q \alpha_i (|\varepsilon_{t-i}| - \gamma_i \varepsilon_{t-i})^\delta + \sum_{j=1}^p \beta_j \sigma_{t-j}^\delta$$

Where $\delta > 0$, $-1 < \gamma_i < 1$ ($i = 1, \dots, q$).

The final model selection of APARCH(1,1) is preceded by various alternative model checks. Firstly, we verify whether very large positive and negative returns significantly impact conditional variance. To do this, dummy variables for outliers are linked to the large one-day movements briefly overviewed above and included in the variance equation for each country. Since the results of these regressions do not differ significantly from the regressions without dummies, we maintain the outliers. APARCH(1,1), APARCH(2,1), APARCH(1,2) and APARCH(2,2) models are tested for each market. Convergence is not achieved in several higher-order models for many countries, and the parameter coefficients of the extra terms are almost never statistically significant. Where models converge, we use the Akaike criterium to select the model with the lowest probability of information loss. In all cases, the AIC selects the APARCH(1,1) model. Furthermore, we test models that include autoregressive terms in the conditional mean equation, but the lack of significance of the additional terms leads us to exclude them.

As mentioned above, the APARCH model can be constrained to obtain the standard GARCH model, with $\gamma_i = 0$ and $\delta = 2$. We also test the GJR-GARCH model by constraining δ to be 2, and the Threshold-GARCH model by constraining δ to be 1. The APARCH model thus has the advantage of allowing direct comparisons of model fit.

Estimation results

Following the model specification tests, we estimate the APARCH(1,1) and its nested models on the five emerging markets stock indices. In a first battery of estimations, we impose a Gaussian distribution on the innovation process. Results of this model are presented in Table 4a (see Appendix II). Standard errors are calculated using the heteroskedasticity-robust Sandwich method. The TGARCH nested model is excluded from the results as it did not converge in all countries. A cursory examination of the residuals from the APARCH model (see Appendix), as well as the significant Jarque-Bera normality statistics, indicate that the assumption of a Gaussian innovation process is perhaps an inferior choice for these datasets. The APARCH asymmetry parameter, gamma, is significant and positive in Brazil, India and South Africa, indicating that negative returns impact volatility more strongly than positive returns in these countries. Interestingly, the leverage effect does not present in China or Russia, and the asymmetric GARCH model log-likelihoods are not markedly greater than the symmetric GARCH model. These results also hold in the GJR-GARCH nested model.

Suspecting that the Gaussian assumption is inadequate, we estimate the APARCH(1,1) and nested models imposing, this time, a skewed Student-t innovation process. These results are presented in Table 4b below. Overall, all models are convergent for all markets and are non-explosive (stationarity constraint verified), and the constraints for positive conditional variance are satisfied. At first glance, we remark a high degree of heterogeneity between the BRICS group of countries: while the log-likelihood figures indicate that the APARCH model is the best fit for all markets, the improvement over the simpler GJR-GARCH model is marginal for the SENSEX, RTS and the Shanghai SE to a lesser extent. Once again, the TGARCH model only converged in one country; hence we exclude this nested model from the results. The APARCH model appears to be a particularly superior model for the JSE.

Recalling that mature markets tend to have low values for alpha and high values for beta, we remark that, for the APARCH model, Brazil and South Africa have the lowest alpha, while Russia has the highest followed by China. The beta coefficients are a similar size for all

markets, between 0.8 and 0.9, indicating persistence, or long memory, of past variance. The asymmetry coefficient (γ_i) is significant for all markets in all model variants, except for Russia which has insignificant coefficients in the GJR and APARCH models. While the variance exponent in the APARCH model suggests that it is more appropriate to model the conditional standard deviation in South Africa, this is not the case for the other markets for which delta is closer to 1.5 or 2. This is coherent with the above-mentioned observation that mature market volatility is dominated more by past volatility than current news.

Clearly, the standard GARCH model is an inferior choice for all BRICS with the exception of Russia, confirmed by the evidence of an asymmetric reaction to news in all but the Russian market. The highest degree of asymmetry estimated by the APARCH model is the Brazilian market, at 0.49, followed by South Africa at 0.39 and India at 0.34. The ‘leverage effect’ is also present in China albeit to a lesser degree, at 0.16. Given the relative lack of investor base diversity and liquidity in China and Russia, these findings would appear to conform to the hypothesis that the more mature the market, the higher degree of asymmetry in high frequency returns. Nevertheless, these are preliminary results and further research should be done to ascertain the validity of this argument within the BRICS group.

Table 4b. APARCH (1,1) Skewed t Distribution

Coefficients/ Nested model	China			Brazil			India			Russia			South Africa		
	GAARCH	GJR	APARCH	GAARCH	GJR	APARCH	GAARCH	GJR	APARCH	GAARCH	GJR	APARCH	GAARCH	GJR	APARCH
μ (Est mean)	0.0001	0.0000	0.0000	0.0010	0.0007	0.0007	0.0009	0.0007	0.0007	0.0006	0.0016	0.0016	0.0007	0.0006	0.0006
	0.41	0.14	0.20	3.98	2.78	2.70	4.06	3.16	3.11	5.79	5.52	5.53	4.77	3.77	3.97
ω (Est $\sigma^2 10^{-4}$)	0.0867	0.1032	1.0549.09	0.0793	0.1160	0.1421.24	0.0624	0.0806	0.3319.68	0.0828	0.0859	0.1301.43	0.0234	0.0258	1.1829.65
	2.95	2.92	1.056	3.64	3.60	1.126	4.72	5.11	1.371	3.08	3.10	1.065	3.63	3.86	1.073
α_1	0.1387	0.1521	0.1625	0.0878	0.0720	0.0795	0.1088	0.1032	0.1090	0.1409	0.1406	0.1456	0.1030	0.0893	0.0849
	4.64	4.60	4.54	6.84	6.01	6.56	8.36	8.82	9.53	6.28	6.30	6.25	7.23	6.69	5.60
β_1	0.8603	0.8406	0.8538	0.8934	0.8831	0.8886	0.8720	0.8933	0.8672	0.8656	0.8646	0.8665	0.8858	0.8906	0.9164
	30.04	25.89	26.07	56.65	43.52	48.30	60.62	56.85	57.31	44.89	44.41	45.81	57.75	58.13	54.83
γ	0.0000	0.1381	0.1605	0.0000	0.4086	0.4681	0.0000	0.3059	0.3382	0.0000	0.0387	0.0476	0.0000	0.2229	0.3804
		3.20	3.01		6.09	5.53		6.45	5.93		1.25	1.29		4.93	35.0
δ	2.00	2.00	1.44	2.00	2.00	1.65	2.00	2.00	1.66	2.00	2.00	1.82	2.00	2.00	1.12
			7.55			8.32			9.92			8.46			4.96
ξ	-0.0483	-0.0489	-0.0469	-0.0717	-0.0739	-0.0743	-0.0405	-0.0393	-0.0385	-0.0327	-0.0316	-0.0303	-0.0707	-0.0683	-0.0638
	-2.996	-2.97	-2.78	-3.614	-3.73	-3.73	-2.026	-1.94	-1.89	-1.778	-1.73	-1.65	-3.287	-3.19	-2.91
ν	3.4085	3.4330	3.3990	7.2343	8.1818	8.1946	6.2042	6.4129	6.4200	4.3645	4.3679	4.3482	7.4060	7.9728	7.7879
	15.15	14.98	14.60	8.97	8.02	8.03	10.20	9.78	9.84	13.52	13.52	13.57	88.2	8.20	85.6
Log-likelihood	11970	11976	11980	11030	11064	11065	11969	11996	11997	10828	10829	10329	13159	13175	13185
Barque-Bera test	156.38			429			1656			2099					
LM test 5 lags	0.5486			3.475**			0.1430			0.3620					
Neg. Sign Bias test	1.1390			1.4800			1.1730			1.0200					

Note: Robust t-statistics are provided below coefficients (Sandwich method)

** Indicates significance at the 5% level

Misspecification tests

Following the regression analysis, we check for residual ARCH effects in each market using the LM test at 5 lags. Clearly, there is no significant autocorrelation present in all markets except Brazil. Furthermore, we investigate misspecification of the conditional variance with the negative sign bias test. The results indicate that the residuals cannot be predicted by negative returns shocks in any markets, thus, the leverage effect asymmetry has been purged.

For each market, figures 5a-5e (Appendix I) illustrate the standardized residuals series along with the conditional variance as modeled by the APARCH model, and finally the density of the standardized residuals compared with that of the estimated skewed Student-t distribution. The standardized residuals resemble more or less white noise processes, although outliers are still visible. This is expected, as the non-normal distributions cannot account for some very extreme values. The APARCH model has succeeded in capturing volatility clusters, as can be seen in the graph of the conditional variance. High volatility is witnessed at the beginning and end of the sample period, reflecting the Asian and Russian crises and of course, the 2008 global financial crisis. With the exception of India, which has a spike in volatility in 2004, the inter-crisis period appears relatively calm and clusters are tighter and less pronounced. Finally, the choice of distribution in the model appears to be a better ‘fit’ than the Gaussian distribution, confirmed by the significance of most asymmetry and tail coefficients.

Forecasts

We use the APARCH model to estimate 10-step-ahead out-of-sample forecasts of the conditional variance. Figures 6a-6e (see Appendix) provide graphic illustrations of the predicted conditional mean and variance values. Conditional variance rises for all stock markets in the out-of-sample period. For the JSE we note that as the predicted returns dip into negative territory in the out-of-sample period, the predicted volatility rises.

Low frequency estimations

To assess the presence and extent of this asymmetry at lower frequencies, we construct weekly and monthly returns series from the daily series. Weekly and monthly returns are calculated from the daily returns series using the midpoint aggregation method, that is, taking the daily value located in the middle of each week and each month. This avoids the bias associated with averaging daily returns, and yields a total number of 848 weekly observations and 196 monthly observations for each country (missing values take zeros). The time series properties of both weekly and monthly series can be found in Appendices I and II. Several differences from the daily data are apparent: firstly, we remark that there is no significant correlation at the first lag in the simple returns, and that the squared returns decay after fewer lags than in the daily data. There are spikes at later lags for Russia and South Africa. Concerning the monthly returns, the ACF and PACF graphs do not suggest the use of autoregressive models, with both the simple and squared returns being close to zero at all lags.

The results of the APARCH(1,1) model with skewed Student t distribution (provided in Appendix III) indicate lower volatility persistence than in the daily data. In the case of the SENSEX, neither alpha nor beta coefficients are significant. Importantly, there is no evidence of the leverage effect at this slower frequency - the gamma coefficients are not significant for any country. This result would appear to support the hypothesis that, at the stock price level at high frequencies, asymmetric volatility is driven by investor behavior rather than firm leverage ratios. This effect fades at slower frequencies, at least in the BRICS markets.

At the monthly frequency, we have similar results (see Appendix III): persistence of past volatility is lower, alpha coefficients are insignificant, and asymmetric volatility is not present in any markets. In fact, the APARCH model does not converge for India or South Africa at this frequency. It is unlikely that any autoregressive model, symmetric or asymmetric, is a pertinent choice for emerging stock returns at a monthly frequency.

Conclusion

This study has outlined the principal models that take into account asymmetric reactions of conditional variance to returns shocks, and provided an overview of the reasons thought to be behind this empirical characteristic of stock returns. While it is clear that asymmetric GARCH models can improve on the standard generalized autoregressive model, in developed as well as emerging stock markets, its impact is likely to be heterogeneous across large country samples and varying over time. This study estimated asymmetry across the entire sample, although it would be interesting to split the sample into pre- and post-liberalisation periods, as well as crisis and non-crisis periods. We can hypothesize that asymmetry rises during the post-liberalisation period, and is significantly higher during bear markets. The cross-sectional heterogeneity between BRICS countries might result from different degrees of stock market development and liquidity, integration into global markets, time-varying perception of risk, coverage of local stocks by analysts, relative weight of institutional investors versus individual traders and foreign investor participation.

The dynamic of asymmetry can be further explored through the testing of several ‘pain’ thresholds in each market: what amplitude of a shock sets off the volatility feedback loop? An investigation of asymmetry in emerging market large caps and small caps would also shed light on firm-level leverage effects. At the index level, a natural continuation of this study would be to examine the time-varying nature of the third conditional moment and its economic and micro-structural determinants. Such analysis must also take into account the possibility of asymmetric spillovers between markets using multivariate volatility analysis. This could provide crucial insight into the links between the macroeconomic and financial spheres, as well as the process of stock market development in emerging markets.

Appendices
Appendix I

Figure 4a. Autocorrelation function for Shanghai Comp SE Index daily returns and squared returns.

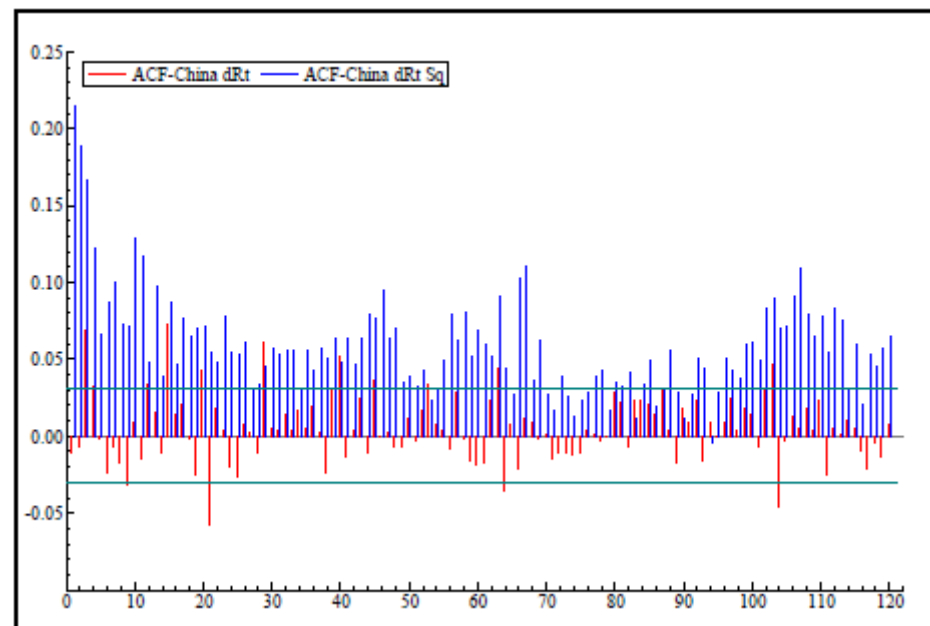


Figure 4b. Autocorrelation function for BOVESPA Index daily returns and squared returns.

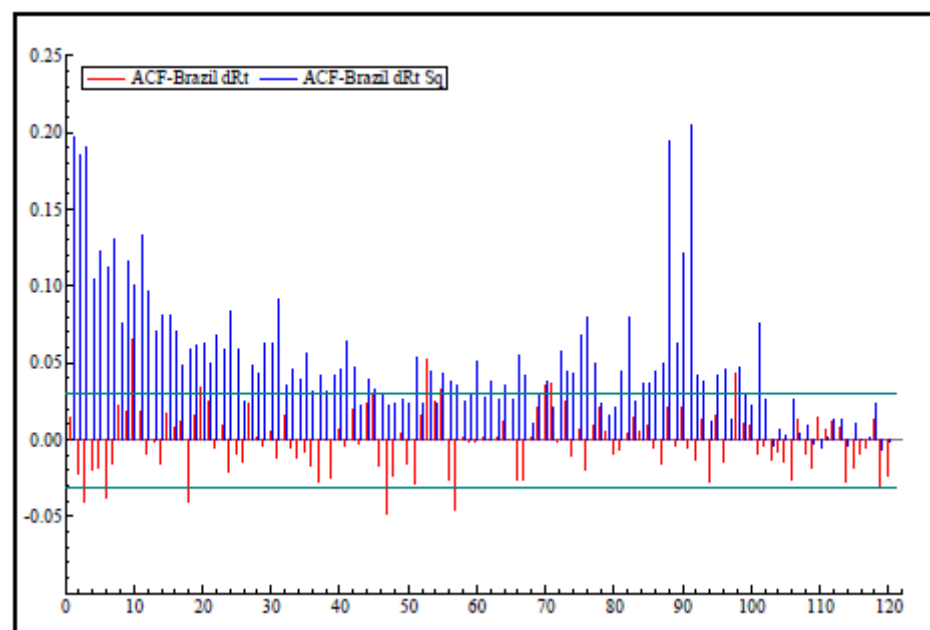


Figure 4c. Autocorrelation function for SENSEX Index daily returns and squared returns

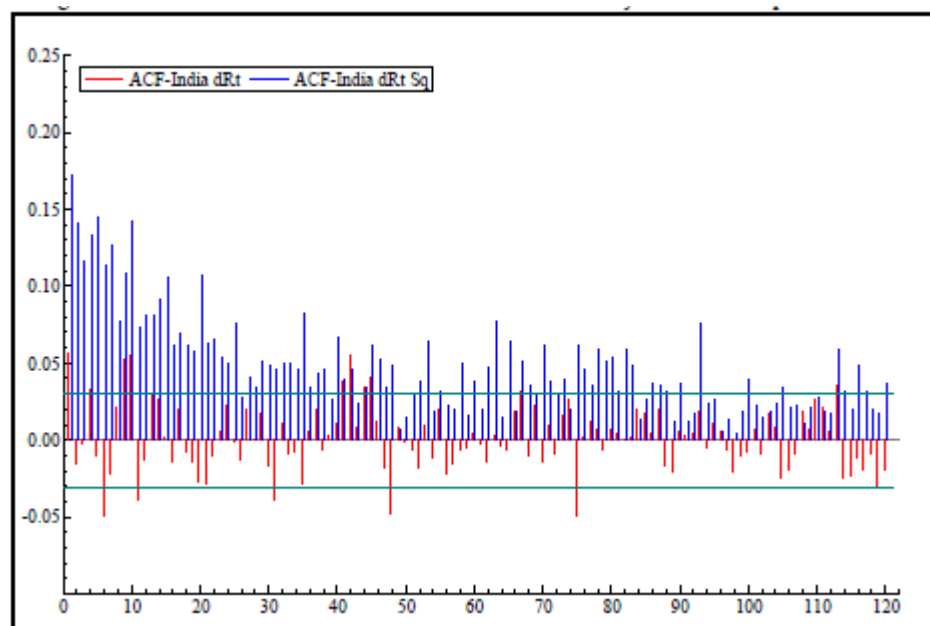
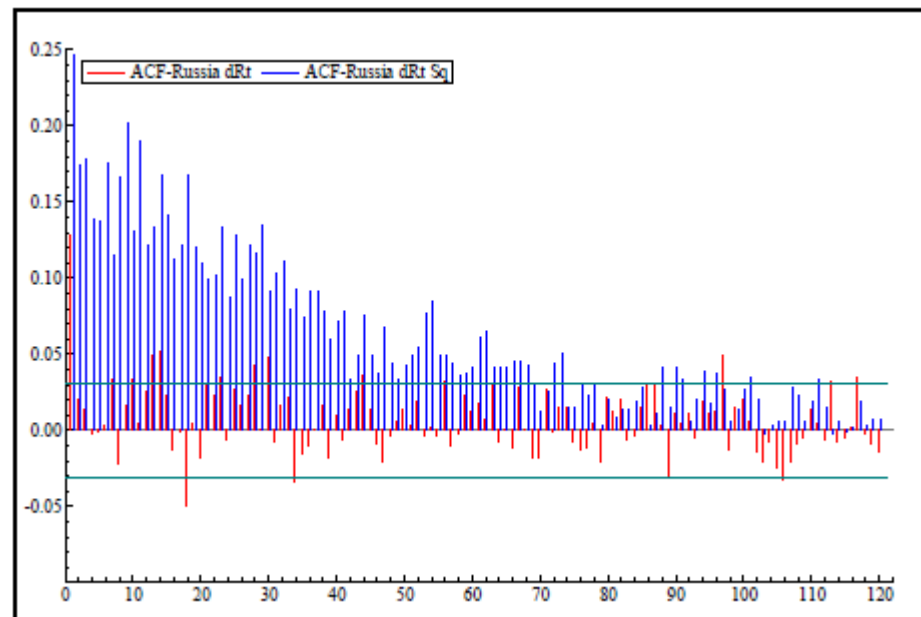
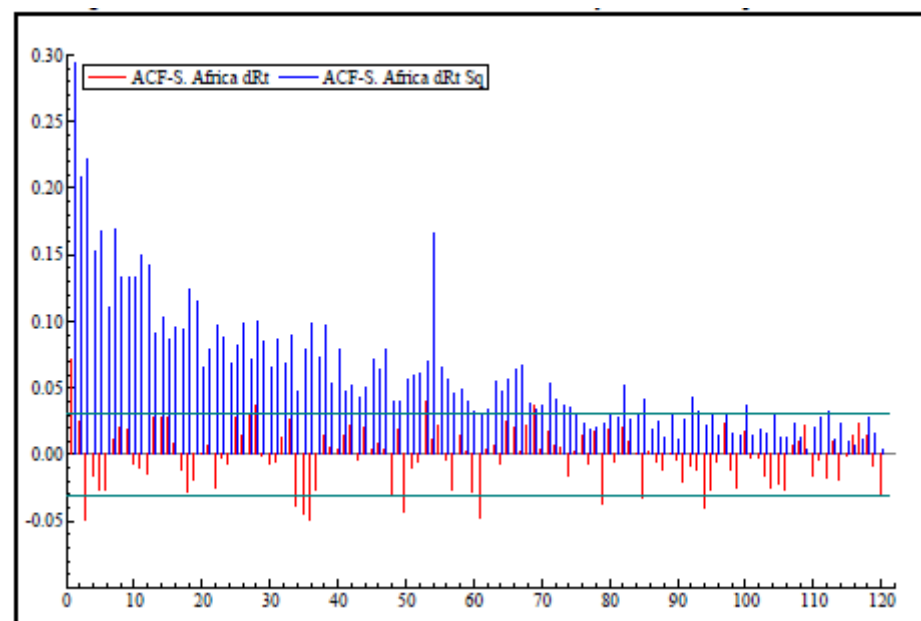


Figure 4d. Autocorrelation function for RTS Index daily returns and squared returns.**Figure 4e. Autocorrelation function for JSE Index daily returns and squared returns.**

Estimation results using APARCH(1,1) model with Gaussian distribution

Coefficient/ Nested model	China			Brazil			India			Russia			South Africa		
	GARCH	GJR	APARCH	GARCH	GJR	APARCH	GARCH	GJR	APARCH	GARCH	GJR	APARCH	GARCH	GJR	APARCH
μ (G-mean)	0.0002	0.0001	0.0001	0.0002	0.0007	0.0006	0.0000	0.0007	0.0007	0.0008	0.0016	0.0005	0.0009	0.0006	0.0006
	0.90	0.39	0.41	4.51	2.57	2.50	4.52	3.25	3.12	6.06	5.29	5.25	5.52	3.87	3.92
ω ($\times 10^{-4}$)	0.0300	0.0301	0.0510	0.1011	0.1418	0.4001	0.0552	0.0703	0.3465	0.1289	0.1335	0.0381	0.0275	0.0299	0.3385
α_1	2.06	2.11	1.03	3.05	3.40	1.04	3.18	3.32	2.18	3.15	3.20	0.79	2.29	2.55	0.90
	0.0622	0.0612	0.0628	0.1028	0.0731	0.0795	0.1088	0.1040	0.1302	0.1273	0.1250	0.1343	0.1088	0.0915	0.0977
β_1	2.06	4.39	4.22	3.05	5.30	5.67	3.18	6.50	6.69	3.15	5.46	5.00	2.29	4.17	4.61
	0.9294	0.9297	0.9820	0.8747	0.8714	0.8759	0.8774	0.8672	0.8735	0.8598	0.8585	0.8476	0.8774	0.8840	0.8988
γ	50.13	52.28	56.06	36.32	35.37	37.06	41.53	41.96	40.60	34.73	35.12	29.79	31.50	31.76	34.86
	0.00	0.09	0.09	0.00	0.48	0.52	0.00	0.23	0.77	0.00	0.07	0.05	0.00	0.26	0.34
	1.85	1.80	1.87	5.48	5.23	5.23	3.68	3.76	3.76	1.99	1.47	1.47	4.94	3.68	3.68
δ	2.00	2.00	1.87	2.00	2.00	1.74	2.00	2.00	1.68	2.00	2.00	2.40	2.00	2.00	1.48
	10.07			7.22			8.55					7.62			5.74
Log-likelihood	11686	11690	11691	10987	10992	10993	11842	11867	11870	10130	10134	10137	13064	13096	13100
Jarque-Bera test			2791.9***			407.3***			1523.3***			1292.6***			669.6***
LM test 1-5 lag			241.46*			3.2887**			0.1227			0.4611			3.4077**
Sign Bias test			0.7052			0.8124			2.353*			3.7384			0.2006

Note: Robust t-statistics are provided below coefficients (Sandwich method). *Significant at 10% level; **Significant at 5% level; ***Significant at 1% level.

Figure 5a. Shanghai Composite SE index APARCH residuals and conditional variance

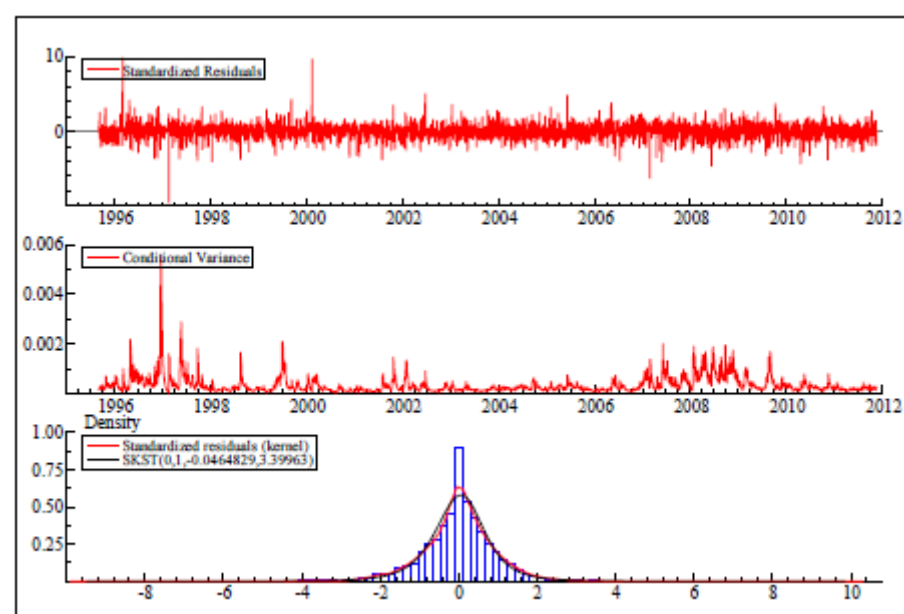


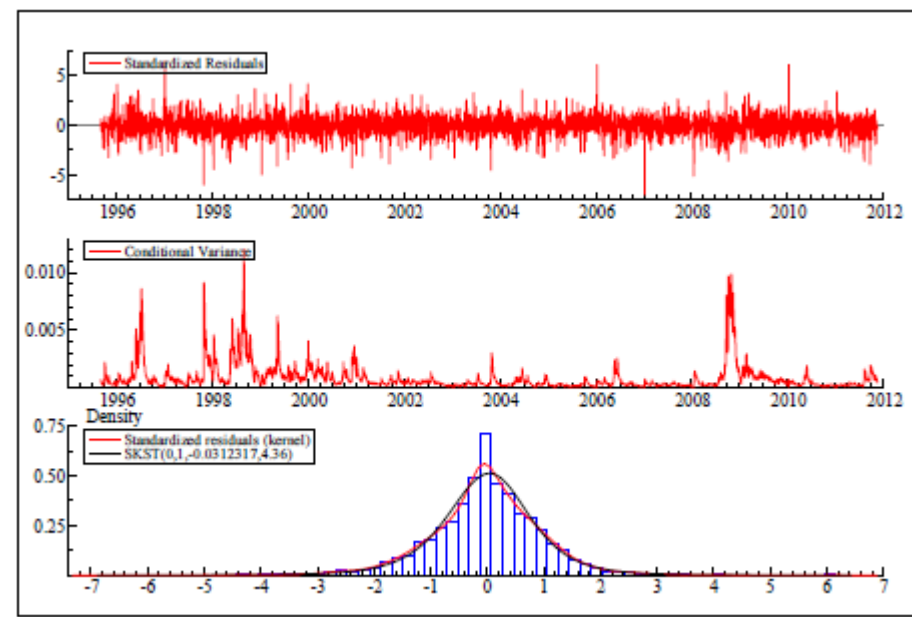
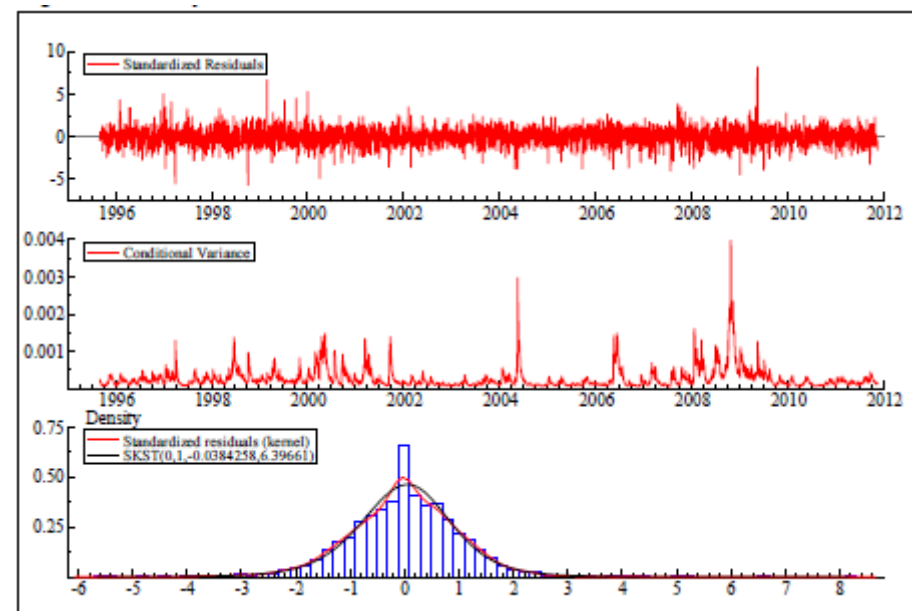
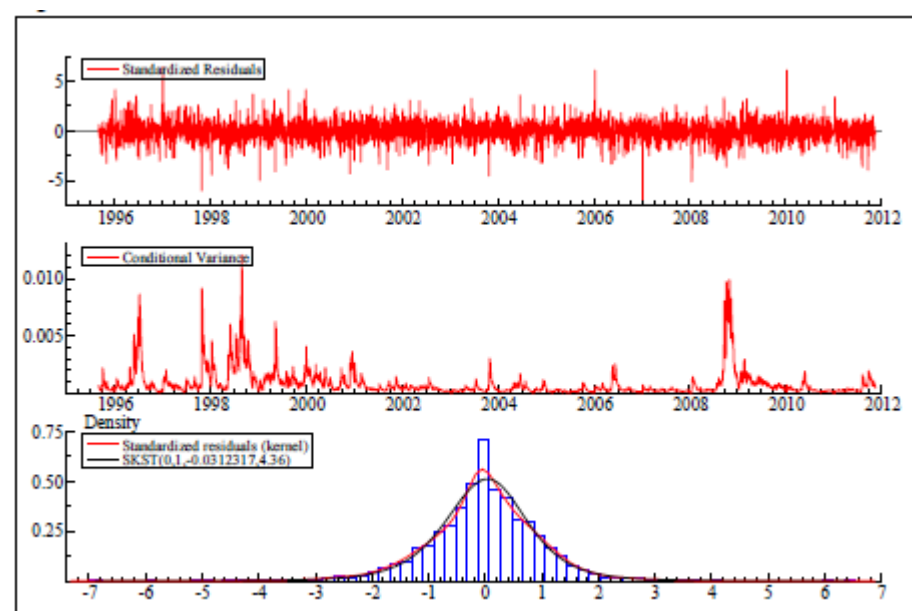
Figure 5b. Brazil BOVESPA index APARCH residuals and conditional variance**Figure 5c. Bombay SENSEX index APARCH residuals and conditional variance****Figure 5d. Russian RTS index APARCH residuals and conditional variance**

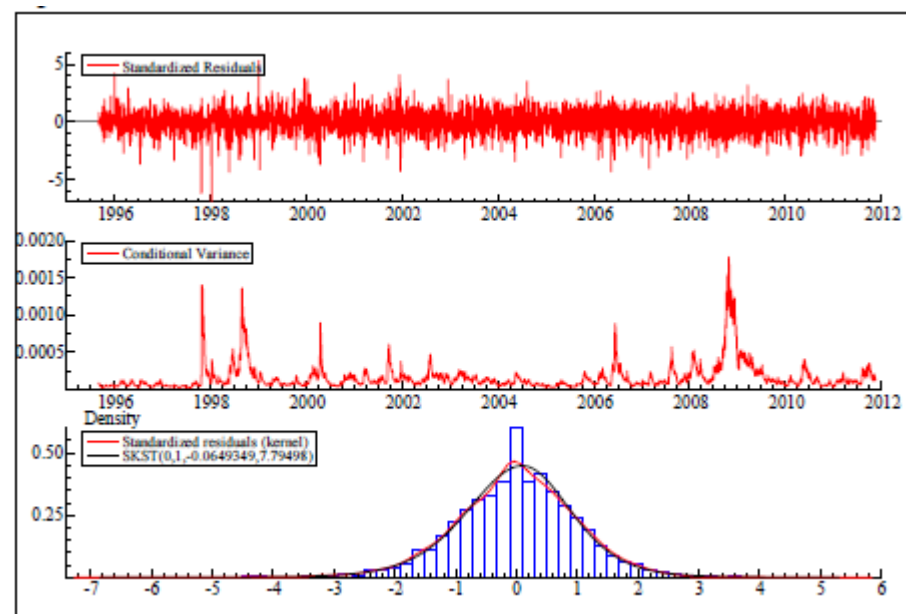
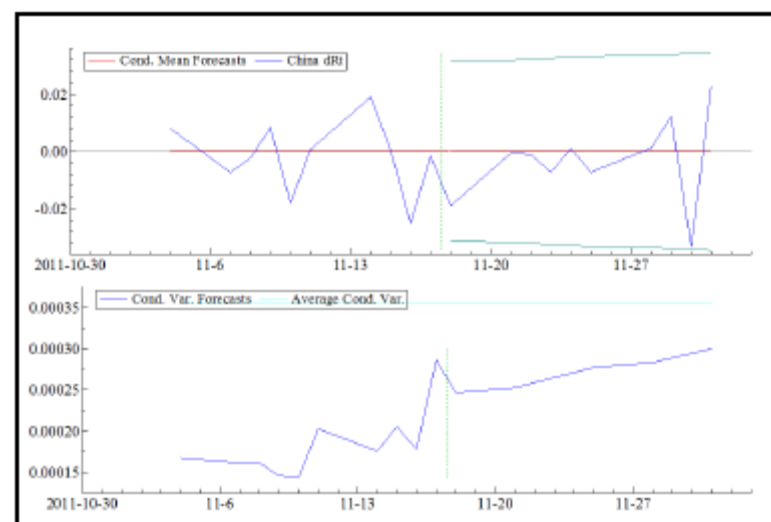
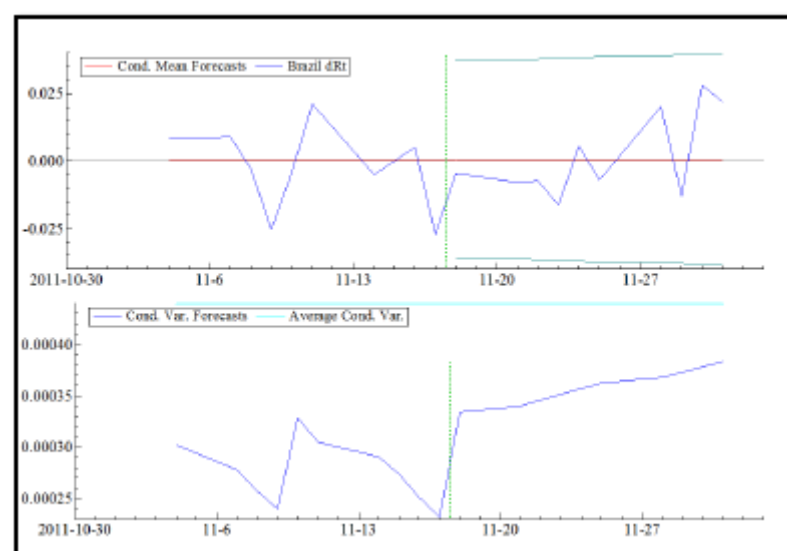
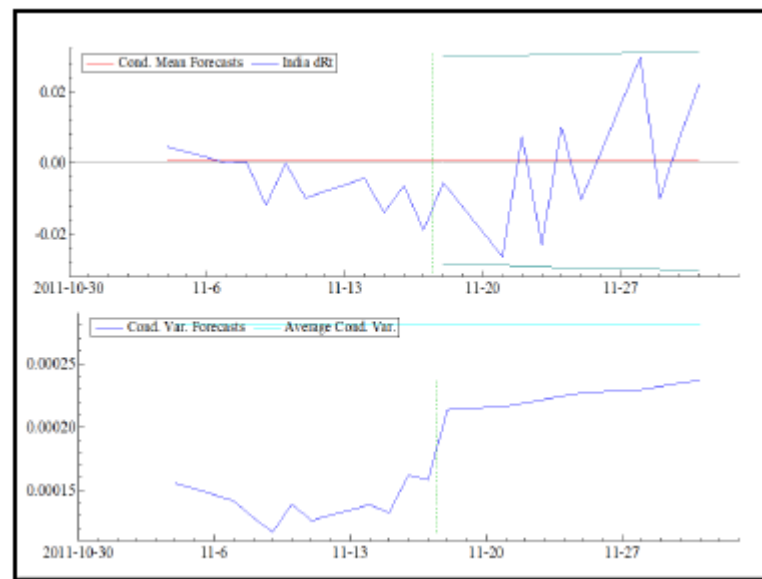
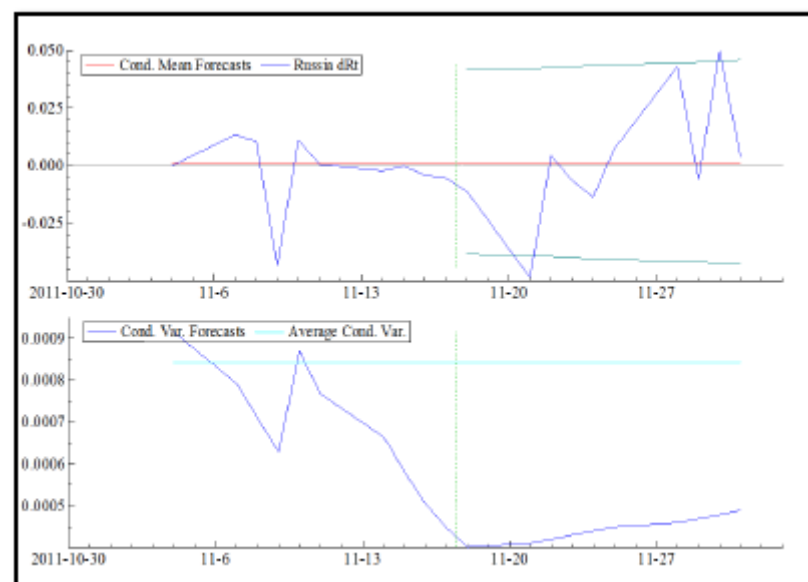
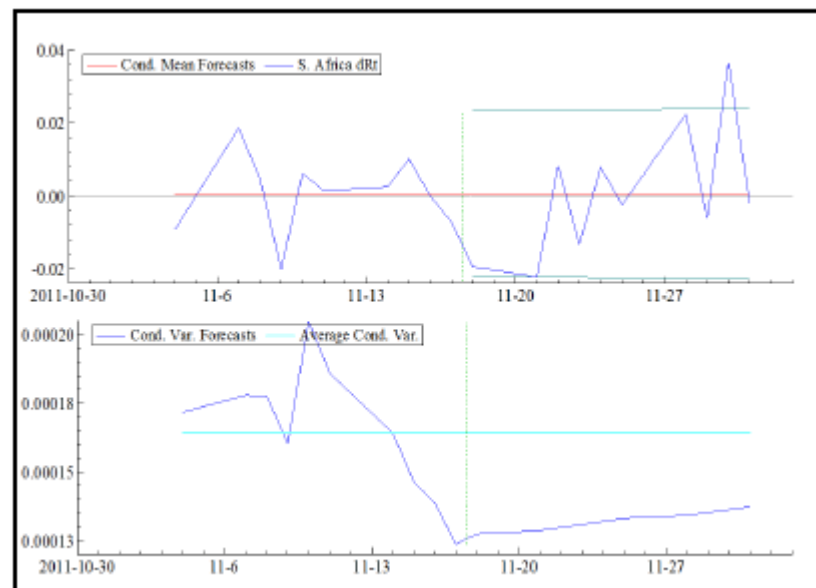
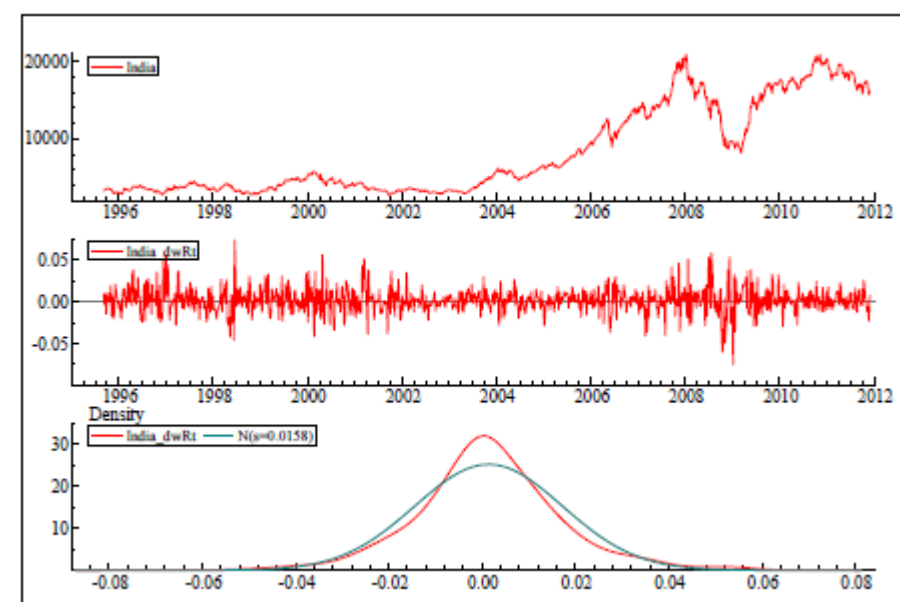
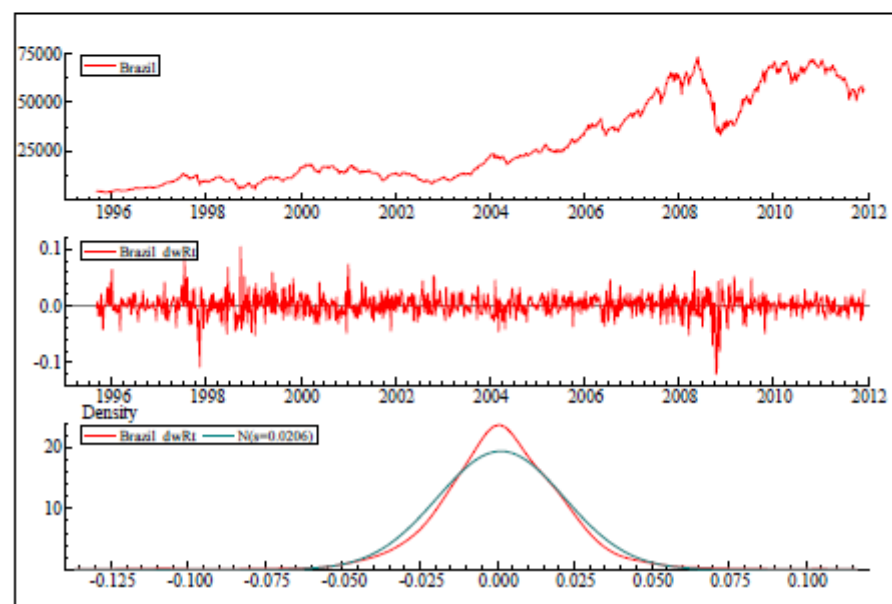
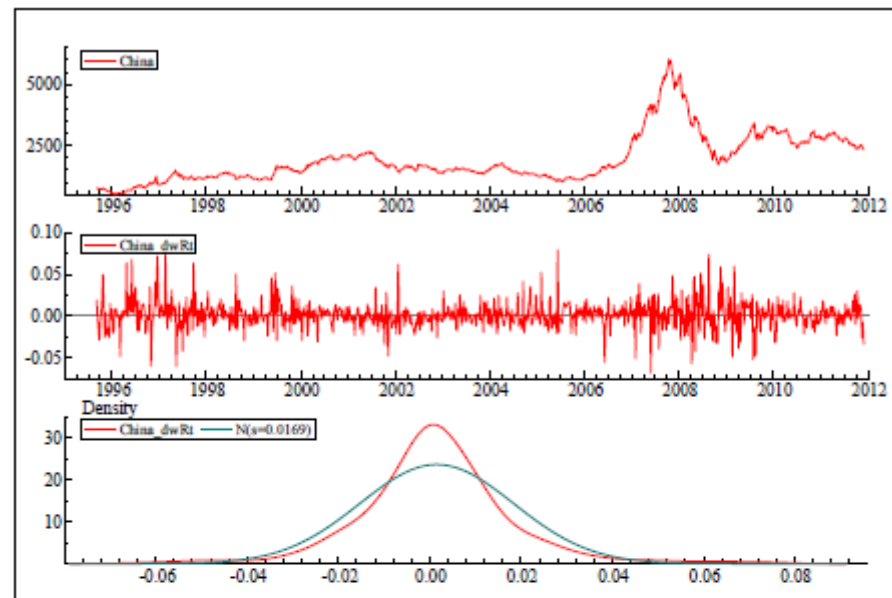
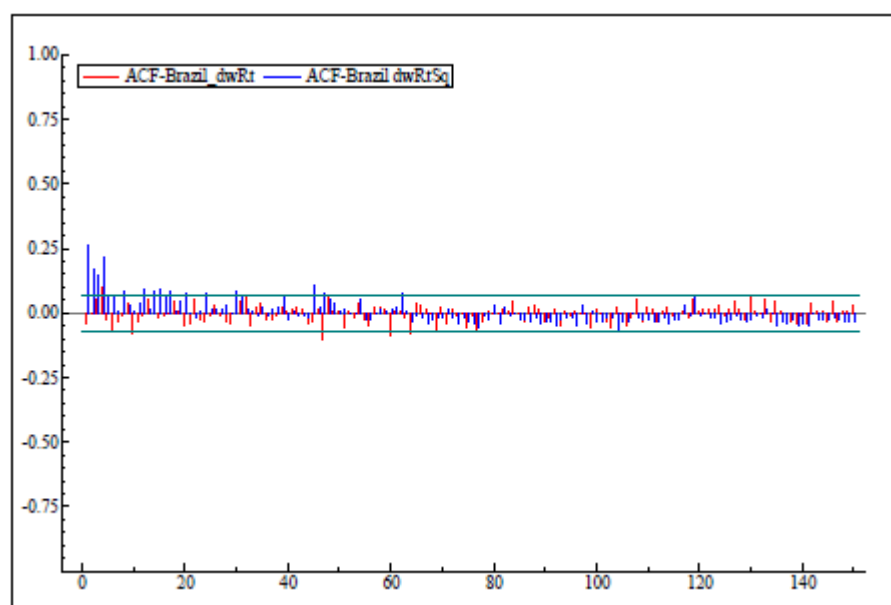
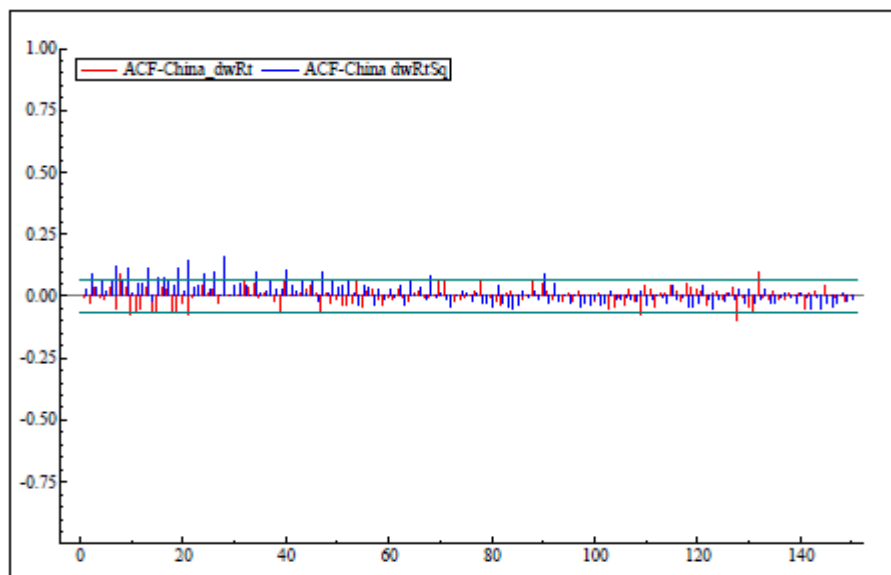
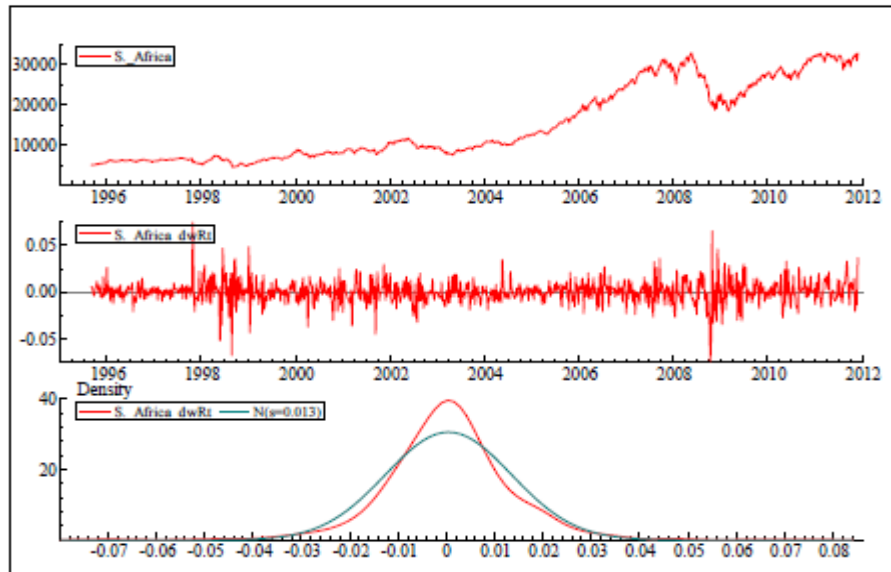
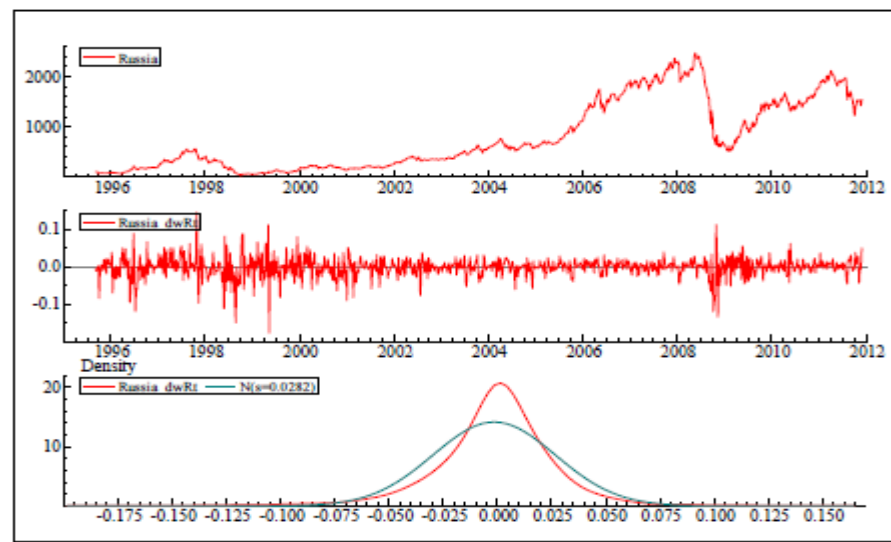
Figure 5e. Russian RTS index APARCH residuals and conditional variance**Appendix II****Figure 6a. Shanghai Composite SE APARCH forecasts****Figure 6b. Brazil BOVESPA APARCH forecasts**

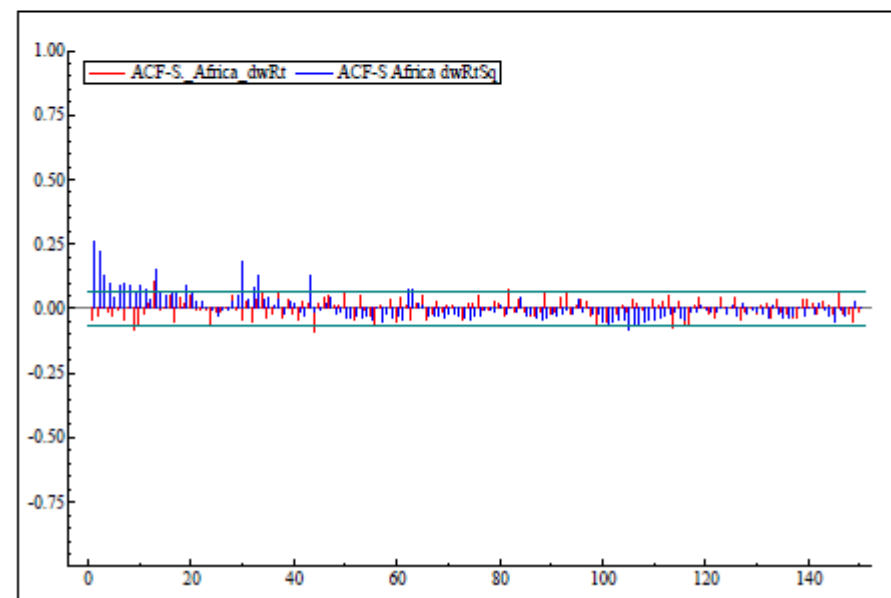
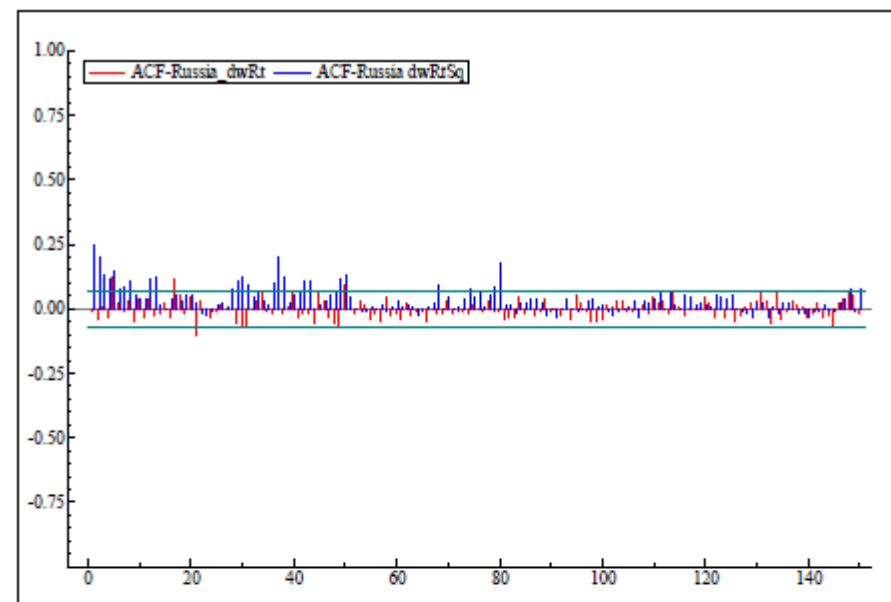
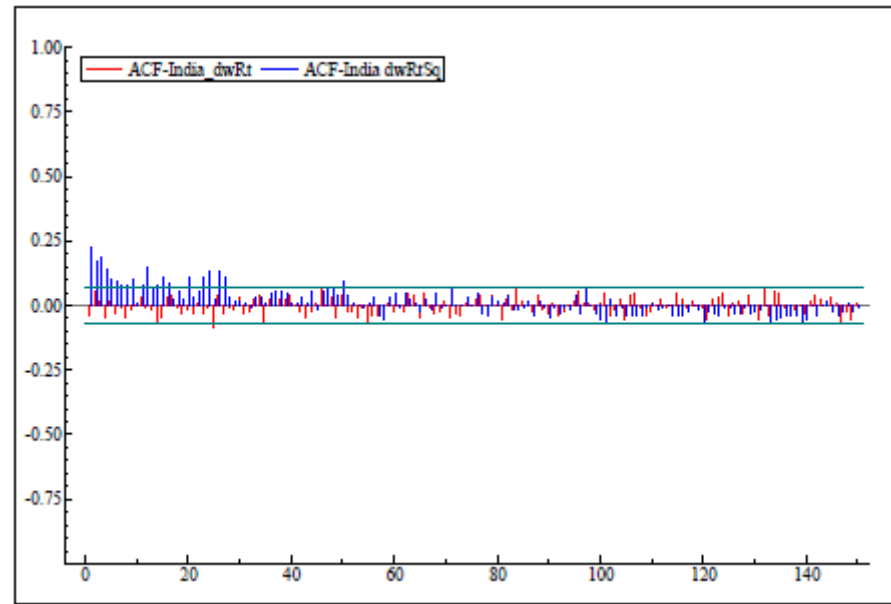
Figure 6c. India SENSEX APARCH forecasts**Figure 6d. Russia RTS APARCH forecasts****Figure 6e. South Africa JSE All Share APARCH forecasts**

Appendix IIIa

Weekly returns series – distributional and time series characteristics

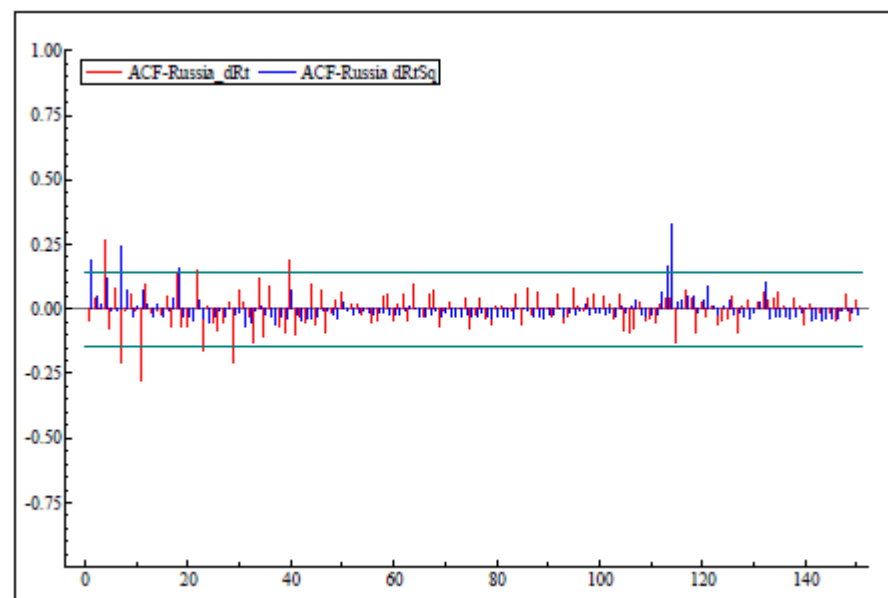
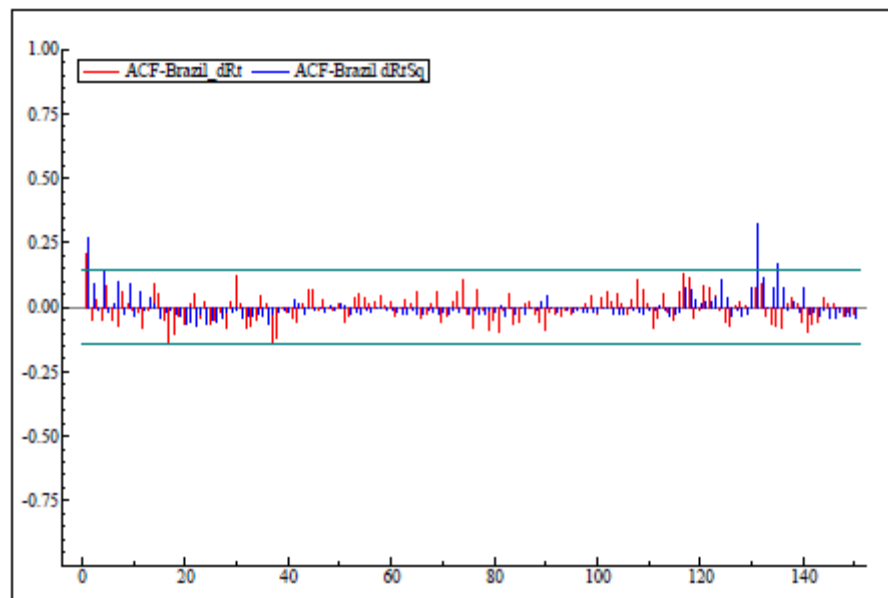
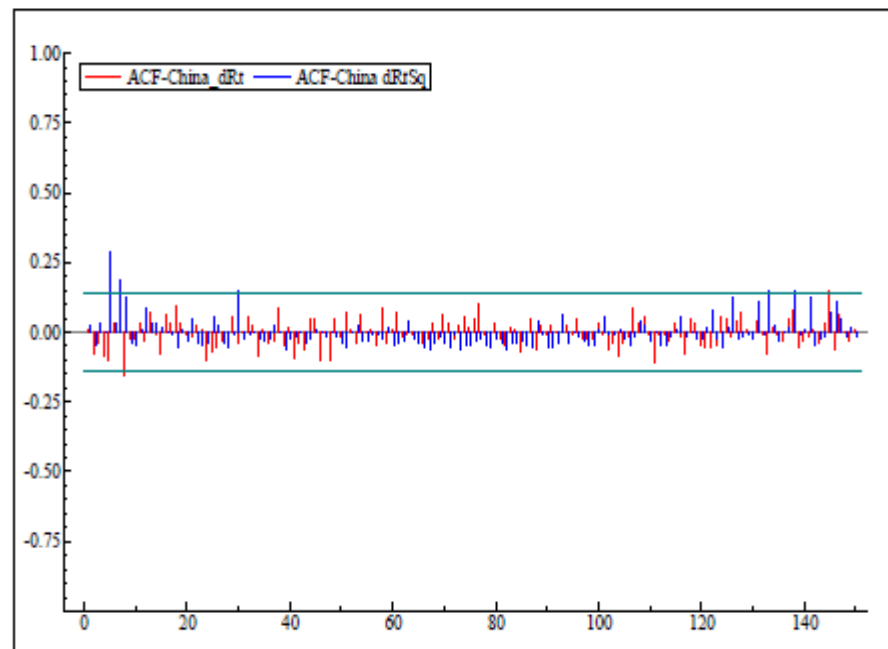


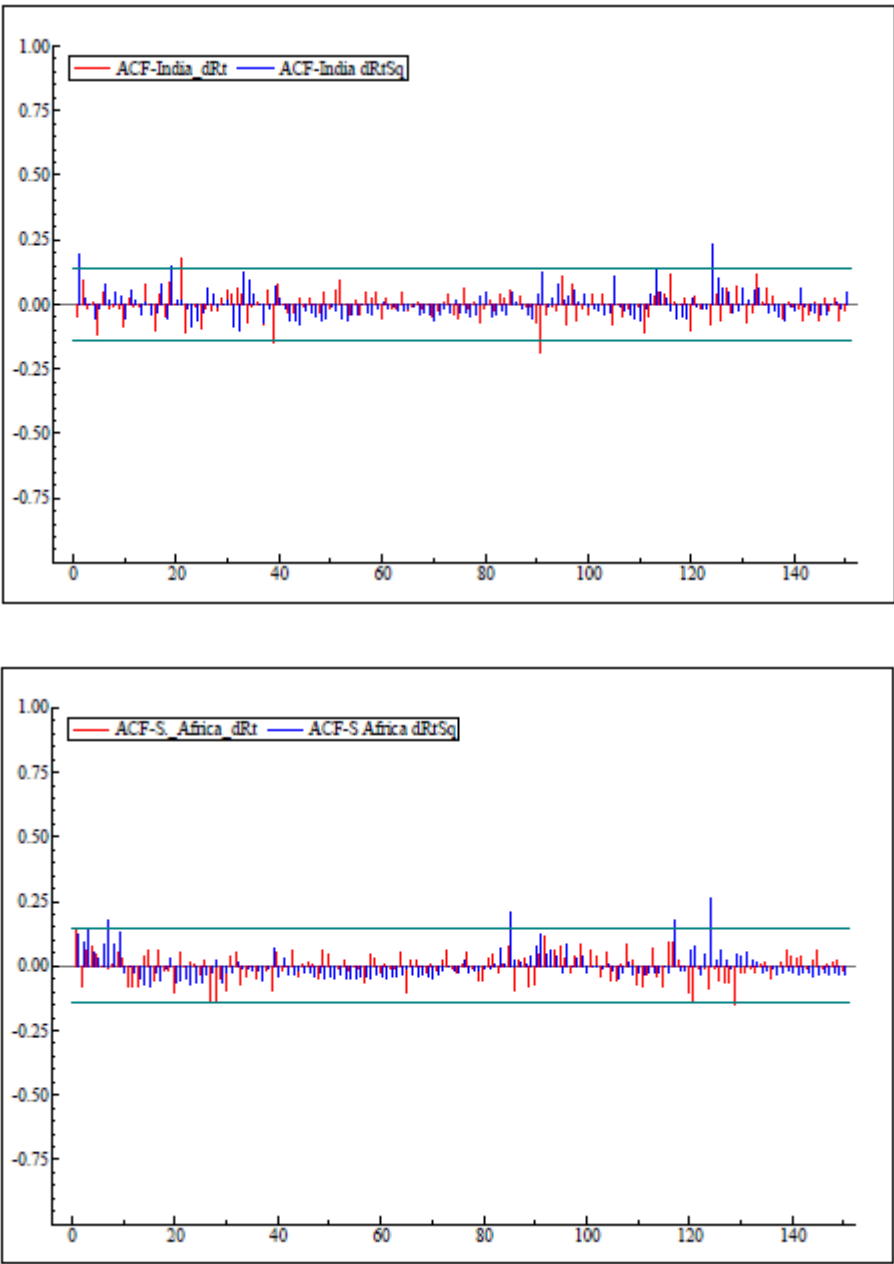




Appendix IIIb

Monthly returns series – descriptive and time series characteristics





Appendix IV
Results of low frequency estimations

Table 6a. APARCH (1,1) Skewed t Distribution (aggregated weekly data)

	China	Brazil	India	Russia	South Africa
Coefficients	APARCH	APARCH	APARCH	APARCH	APARCH
μ (Cst mean)	0,0009	0,0014	0,0012	0,0004	0,0002
	1,77	2,29	2,49	0,47	0,71
ω (Cst*10 ⁴)	0,1300	4,4635	0,0232	5,0006	4,8928
	0,46	0,65	0,09	0,47	0,56
α_1	0,0699	0,0805	0,2276	0,2270	0,1606
	3,00	3,05	1,58	3,30	4,30
β_1	0,9243	0,8955	0,5727	0,7655	0,8365
	51,62	16,14	0,81	9,58	16,94
γ	-0,1607	0,2575	0,0746	0,0388	0,2624
	-0,56	1,20	0,96	0,28	1,96
δ	1,82	1,16	2,68	1,37	1,04
	3,336	2,331	0,8500	2,619	2,832
ξ	-0,1607	0,2575	0,0746	0,0388	0,2624
	-0,5575	1,196	0,9615	0,2812	1,964
ν	1,8153	1,1579	2,6836	1,3664	1,0384
	3,34	2,33	0,85	2,62	2,83
Log-likelihood	2373	2169	2393	1993	2598
Observations	848	848	848	848	848

Note: Robust t-statistics are provided below coefficients (Sandwich method)

Table 6b. APARCH (1,1) Skewed t Distribution (aggregated monthly data)					
	China	Brazil	India	Russia	S. Africa
Coefficients	APARCH	APARCH	APARCH	APARCH	APARCH
μ (Cst mean)	0,0016	0,0027		-0,0016	
	1,30	1,53		-0,73	
ω (Cst*10 ⁴)	0,0191	1,4979		1,4401	
	0,15	0,19		0,04	
$\alpha 1$	0,0681	0,2133		0,1315	
	0,86	1,33		2,00	
$\beta 1$	0,8143	0,7430		0,8503	
	8,32	6,66		7,03	
γ	-0,5799	-0,1593		0,2256	
	0,29	0,53		0,94	
δ	-0,58	-0,16		0,23	
	-1,052	-0,6275		0,08029	
ξ	0,1468	-0,0547		-0,2614	
	1,217	-0,4578		-1,953	
ν	4,3322	4,3051		3,3428	
	3,12	2,14		2,39	
Log-likelihood	546	492	n.c	442	n.c
Observations	196	196		196	

Note: Robust t-statistics are provided below coefficients (Sandwich method)

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EVALUATION OF THE CHANGES IN TURKISH INSURANCE SECTOR

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ABSTRACT

Insurance activities are important particularly with respect to their contribution to the countries' economic development and growth as well as in terms of the impact of their functions on socioeconomic life.

A brief survey into global development of the insurance sector reveals that in rapidly developing countries, insurance-related production enjoys rapid increase and functionality of the insurance sector is improved and miraculous socio-economic developments are enjoyed.

This study discusses the changes the Turkish insurance sectors has undergone as part of the efforts to improve it since the Ottoman era, assessing the impact of these changes on the production level. It also offers a concrete discussion of whether such efforts have achieved their goals in the light of multifaceted academic findings.

Keywords: Insurance, Turkish Insurance Sector,

1. INTRODUCTION

It is thought-provoking to see that despite long lasting efforts, the direct premium production of the Turkish insurance sector could not be improved to favorable levels and the sector could not get rid of the vicious cycle that has been impairing it and rigor mortis could not be avoided. This study aims to discuss the underlying reasons on a more concrete basis using the findings obtained. To this end, the developments the Turkish insurance sector has gone through since the Ottoman times were examined with a scientific method and the findings were discussed for reevaluation by researchers.

2. HISTORICAL DEVELOPMENT OF TURKISH INSURANCE SECTOR

A study of the problems related to the Turkish insurance sector's failure to boost its production will naturally entail a survey of the development of social, cultural, political, institutional, legal, and time-related factors as well as an examination of the effect of these factors on the sector's effectiveness. The emergence of the first insurance activities in these lands occurred during the Ottoman era. Accordingly, as survey of the development of the sector should include an assessment of the insurance organizations and companies which are not only risk management organizations, but also financial organizations, within the framework of the economic activities starting from the Ottoman era.

2.1. Insurance Sector In The Ottoman Era

The insurance activities started in the Ottoman Empire first in the wake of the Treaty of Balta Limanı which the Ottoman Empire made with Britain in 1838. Under this treaty, Britain made it obligatory for commercial shipments to be insured against risks, which urged British insurance companies to establish representation offices in the Ottoman territories. Over time, insurance companies from other European countries opened branches in İstanbul, in other cities booming with commercial activities and in port cities as well as in other cities across the country. Several fires that occurred in Beyoğlu district of İstanbul made foreigners living in the city to get their buildings, goods and properties insured against fire risks (Kahya; 2010, p.49-71).

Starting from the 17th century, European countries that were aware of the contribution the insurance sector could make to socioeconomic life and that had greater experience in the sector could easily maximize their profits from insurance activities in the Ottoman territories because the Ottoman Empire lacked an awareness, legal and technical infrastructure for insurance activities.

Ottoman religious scholars were not warm to the ideas of Muslims' getting involved in insurance activities and they used various restrictive clauses in their fatwas (juristic ruling in Islamic law), thereby indirectly helping foreign insurance companies maintain their monopoly over the sector in the Ottoman territories (Kazgan vd.; p.57).. These foreign insurance companies tended to send all of their revenues from these activities excluding the agency commission to their homeland. Thus, Muslim locals couldn't learn insurance business and they couldn't get involved in insurance production nor could they benefit from its functions (Baskıcı, p.29).

Traumatized with the problems in the financial status as well as due to wars and chaos that followed fragmentation and collapse, the Ottoman Empire was unable to pursue its interests in the insurance sector. The lack of legal infrastructure for the activities of insurance activities and their representatives for more than 200 years led to various cases of fraud and corruption by the insured as well as by insurers. Indeed, the Ottoman legal system did not have single provision about insurance until Article 29 of the Law on Trade dated 1850 introduce the first legal arrangement concerning maritime insurance (Kazgan vd.; p.35). The Law on Maritime Trade dated 1864 introduced additional provisions about maritime insurance (Baskıcı; s.5), and in 1883, insurance agencies were required to obtain licenses for their activities (Kazgan vd; p.39); Although there were other attempts to tame the sector by introducing additional legal arrangements in 1887, 1906 and 1914, these legal provisions could not be effectively implemented due to the socioeconomic and political predicaments haunting the country and the world (Gün, p.III).

The first insurance company was established under the name of Ottoman Public Insurance Company. Still, foreign companies continued to maintain their monopoly over the production in the Turkish insurance sector until 1940 (Gün, p.VII).

Insurance companies excluding the Ottoman Public Insurance Company would draft insurance policies in their own languages and using the Latin script and they would empower foreign courts for disputes arising from these policies.

2.2. Insurance Activities in The Turkish Republic

The insurance activities in the Turkish Republic era will be examined under three headings. The first section will deal with the period between 1923 and the introduction of autonomous tariff system in 1990. The second section will be about the insurance activities in the years between 1990 and 2000. Finally, the state of the sector in the period between 2000 when information technologies (IT) made inroads into the sector and today.

2.2.1. Between 1923 And 1990

After the Turkish republic abolished capitulations, foreign insurance companies could not find any lucrative environment for their business in Turkey, and the number of foreign insurance companies --which was several hundred in the Ottoman era-- started to dwindle. In 1930, out of 50 insurance companies active in Turkey, 40 were foreign, 9 with foreign-financed, and 1 was domestic. However, due to lack of human resources who were experienced in insurance, executives of all insurance companies including the domestic one were foreign (Erederi, p.116).

In 1923, the Italian insurance company RAS established Şark Sigorta and in 1925, Anadolu Sigorta T.A.Ş. was founded, which were later followed by other companies (Erederi, p.85).

In 1927, the Law on Inspection and Supervision of Insurance and Insurance Companies numbered 1149 was passed; in 1929, Milli Reasürans T.A.Ş. (Milli Re) was established with a Law on Reassurance Monopoly with a view to preventing majority of the premiums collected from sending outside the country via reinsurance (www.millire.com.tr).

Between 1968 and 1984, Turkey did not allow new insurance companies to be established in the country although there was no legal prohibition to this effect. Although the sector suffered from technical, financial and legal challenges and uncertainties due to the overwhelming majority of foreign insurance companies' leaving the country, the sector could be labeled truly as "Turkish" as the local insurance companies could dominate the sector starting from 1970s.

In 1939, the Law numbered 3392 inserted some provisions needed by the sector into the Law numbered 1149. The Insurance Supervision Law numbered 7397 (www.alomaliye.com) and dated 30/12/1959 was passed to replace this law that was falling short of meeting expectations (Kender, p.22-24). However, this new law, too, failed to serve the needs of the sector well, and extensive efforts were invested in preparing a new draft bill for the sector during 40 years from 1960s to 2007, and during this time, the decree-laws issued created much trouble for the sector.

Thus, although the Ministry of Industry and Trade had been given jurisdiction over the insurance sector under the Law numbered 7397, its powers and duties were transferred to the Prime Ministry with the decree-law numbered 303 and dated 18/12/1987 and later to the Ministry of State in Charge of Economy and finally to the Undersecretariat of Treasury and Foreign Trade (SEGEM, p.42).

At that time, there were 35 insurance companies operating in the sector --21 local and 13 foreign (SFHR, 1987).

2.2.2. Between 1990 And 2000

The year 1990 was a milestone for the insurance sector as the country made the transition to the autonomous tariff system in tandem with economic liberalization policies. Until that date, the country employed state-regulated or state-approved monopolistic tariffs for 37 years. In other words, the state used to specify the price of the risk management by an insurance company. Therefore, insurance companies did not feel the urge to compile statistical data or make actuarial calculations. And they tended to be financially weak. There was not sufficient legal structure to force them to strengthen their financial structures. Starting from 1990, the authorities focused on building infrastructure that would allow insurance companies to boost their capitals and strengthen their financial positions.

The establishment of the General Directorate of Insurance as a main service department within the Undersecretariat of Treasury with the Law on Organization of the Undersecretariat of Treasury numbered 4059 and dated 09/12/1994 proved to be a major development that boosted the dynamism of the insurance sector. The Insurance Supervisory Board's was included into the central inspection units of the Undersecretariat of Treasury (SEGEM, s.42). After 1994, the rate by which new insurance companies were established increased, bringing dynamism to the sector, but this failed to be accompanied by a production increase that would alter indicators. Inflation, problems related to collection of premiums, offering security for risk for extremely low price mistaking the autonomous tariff system with freedom to price cutting and other problems have lowered the efficiency of the sector's production, effectively undermining life assurance. Actually, these problems were among the basic issues of the Republican era (Yazıcı, B.; p.167- 197).

In 1994, the decree-law numbered 539 was introduced. However, it triggered a number of legal problems due to its unconstitutionality. These problems continued until the Insurance Law numbered 5684 was passed in 2007.

In 1996, four insurance companies established websites. The introduction of information technologies that started in this year would later result in the development of systems that would be praised worldwide. In 1999, 11 insurance companies established websites as well. In early 2000s, all insurance companies have put their websites in place, establishing online links with their agencies until 2005 (Yazıcı, S. – Yanık, S.; p.100 – 105).

In this period, the insurance companies focused on health insurance that did not exist in the country until date, and they started to produce this product.

Following socioeconomic destruction caused by the earthquakes of 1999, the authorities established the Natural Disaster Insurance Institution (DASK) and introduced the compulsory earthquake insurance (www.dask.gov.tr).

2.2.3. Between 2000 And 2012: Modernization & Globalization

The major development in the Turkish insurance sector in 2000s was that insurance companies started to make use of information technologies in their infrastructures and established online connections with their agencies. Although the sector was a bit late in adopting IT innovations compared to other countries, they have successfully developed exemplary insurance technologies such as the DASK, the Traffic Insurance Information and Supervision Center (TRAMER) and the Agricultural Insurance Pool (TARSİM) (www.sbm.org.tr ; www.tarsim.org.tr).

The speeding up of the work to ensure greater integration with the European Union (EU) as well as guaranteeing greater harmonization with the EU directives in legal infrastructure and measurement and assessment efforts provided the sector with international discipline.

The introduction of the private pension plans, known as the BES, in 2011 can be considered a major development for the saving and investment system of the country (www.bireyselemeklilik.gov.tr).

In 2007, the Insurance Law numbered 5684 entered into force, abolishing the Insurance Supervision Law numbered 7397, which had caused much confusion in the sector for many years (www.tsrşb.org.com).

In 2008, the Insurance Information and Supervision Center (SBM) was established as an information and document management system, and the Traffic Insurance Information and Supervision Center (TRAMER), Insurance Claim Monitoring and Supervision Center (HATMER), the Life Insurance Information and Supervision Center (HAYMER), and the Health Insurance Information and Supervision Center (SAGMER) were established later and incorporated into the SBM as sub-systems(www.sbm.org.tr). Information and document management as well as statistic data are of crucial importance to insurance activities and this development is certainly a major step forward in making principles of measurement and assessment and inspection function in technical transactions such as risk management, pricing, job acceptance, and reinsurance (Uralcan, 2011, p.313 - 315).

With increased use of information technologies in the sector such as the Pension Monitoring Center (EGM) (2003), the Insurance Monitoring System (SGM) (2007-2011), the e-private pension plans brokers examination (e-beas), the customer relationship management (CRM), and the Insurance Fraud Information System (SİSBİS), the sector was able to boost transparency and minimize the number of transactions and reduce paperwork and ensured efficiency in archiving and secured an infrastructure that empowered the sector for competition in the information age. In 2007, the Insurance Arbitration Commission was set up under Article 30 of the Insurance Law numbered 5684 (www.tsrşb.org.tr).

2.2.4. New Production Areas & New Institutions

The following new branches were added to the Turkish insurance sector's repertoire of typical branches such as insurance against fires, accident, shipment risk, etc.:

- More widespread offering of health insurances and incorporating the dangerous diseases clause into life insurances,
- Inclusion of credit insurances in the system,
- Introduction of new insurance products such as income insurance and insurance against risk of loss of profit,
- Providing assurance for legal protection,
- Offering insurance against risks associated with railway transportation and sea vessels,
- Inclusion of various liability insurances in the system.

Developing new insurance production may lead to production increases. Moreover, the DASK, the TARSİM and the BES are the new institutions that are capable of bringing about direct premium production increase with their respective productions in their specific areas.

2.2.5. Operation Results & Various Comparisons

According to the statistics obtained from the introduction section of the Insurance Supervisory Board's (SDK) 2010 report titled "Insurance and BES Activities", the premium production of the Turkish insurance sector decreased in real terms in 2008 and 2009. In 2010, it grew by 6.79% with a premium production of TL 14.1 billion.

Although there was more than a threefold increase in the number of insurance policies during last ten years --it rose to 48.7 million in 2010 from 15 million in 2000-- this increase implies that the number of per capita insurance policies was already very small, given the country's population of 70 million.

In 2010, the sum of assurance provided by insurance companies was TL 30.7 trillion. This figure is about 28 times higher than the Gross Domestic Product (GDP). Nevertheless, the fact that the share of the sum of direct premium produced in the GDP is still around 1% implies the existence of a severe price competition in the sector.

Although the rate of contracts concluded under the BES is 15% and the sum of the funds accumulated in the BES is around 32%, the rate of 1.5% in Turkey is hardly satisfying, considering the European countries' premium/GDP averages.

According to the above-mentioned report, there were 57 insurance companies operating in the fields of insurance, reinsurance and private pension in 2010. Of these, 33 were operating in non-life branches and 13 in life and pension branches and 10 only in life branches.

Thanks to a number of freshly introduced legal arrangements, the Turkish insurance has acquired a legal infrastructure that is compatible with the EU legislation. (SFHR, 2010, Introduction).

The most important benchmark used in insurance-related comparisons between countries is the share of the direct premium production in the GDP and in the Gross National Product (GNP). The yearly trends in the change of this ratio provide a good indicator. This ratio, known as the income elasticity of premium, is more flexible in rapidly developing countries. This means that the increase in the direct

premium production is higher than the increase in the GDP. In the light of the developments in the post-Second World War period, it is clear that the income elasticity of premium in rapidly developing countries, particularly in Japan, is increasing at a high rate.

World 2010 Direct Premium/GDP ratios: World Average 6.9%; Europe Average 7.5%; Asia Average 6.2%. Taiwan ranks the first with 18.4% while Turkey ranks the 77th with 1.3%. In Japan, the premium/GDP ratio was 1.5% in 1950, but exceeded 15% in some years while ranked:

31st among 33 countries in 1960 with 0.5%; 44th among 45 countries in 1970 with 0.4%; 52nd among 52 countries in 1980 with 0.3%; 52nd among 52 countries in 1991 with 0.9%; 76th among 88 countries in 2009 with 1.3%; 77th among 88 countries in 2010 with 1.3%.

Given the fact that the per capita premium consumption is directly proportional to the per capita income, the position of Turkey in the rating related to this ratio among the countries across the world was as follows (Duman, p.49-58; Uralcan, 2009, p. 154-167)

31st among 31 countries in 1960; 39th among 40 countries in 1970;
42nd among 42 countries in 1977; 49th among 50 countries in 1985.

In 2010, the top slot in the rating related to the per capita premium went to Switzerland with \$6,633.7. With its per capita income above \$10,000, Turkey ranks the 66th among the world countries in the per capita premium consumption with \$121.6.

These figures suggest that Turkish economy is unable to benefit sufficiently from the production in the insurance sector as a major source of savings; that Turkish economy cannot be sufficiently protected against risks; that Turkey, as a developing country, cannot create finance opportunities to meet its capital requirements; that the insurance sector does not positively contribute to the lowering of the unemployment rate in the country; and that entrepreneurs cannot benefit sufficiently from insurance functions.

Attending the Third Industrial Congress, held in country in October 2004, Martin Wolf, the chief economy columnist of Financial Times, had said: "One of the major problems for the Turkey's self-financing is the low savings rate among the major countries of the world. We can show how this is a disadvantage as follows: the savings rate was 39% of the GDP in Eastern while it was 17% in Turkey in 2002 -- though it was a very bad year. This is one of the reasons why the current account deficit skyrockets whenever Turkey starts to grow. Turkey should boost its savings rates considerably." (ISO, October 2001, p.37)

3. CONCLUSION

Risk management is the most important matter for socioeconomic life. The role of risk management, particularly via insurance, in ensuring a peaceful socioeconomic life and a high level of welfare as well as economic and political stability cannot be denied. Protection from risks and having the culture to protect assets help to protect the entire universe. Insurance is the most economical type of risk management for a global organization that has to comply with the law of large numbers. It is also the most effective risk management type as the system's discipline is safeguarded by laws. It is a principal finance organization that creates funds for investments. Its effectiveness in the capital accumulation is visible in all of macroeconomic indicators. It is a standard for a man to live in a dignified manner. It prevents socioeconomic collapses. It encourages entrepreneurs, boosting their credibility, influencing their decisions, decreasing their capital costs and adding dynamism to their capitals.

In addition, the world is rapidly changing. Globalization is underway at full steam. The information age and globalization are accompanied by new risks. These risks have the potential to make an impact on the whole world with a domino effect. The risks related to environmental pollution are on the rise. Therefore, new forms of insurance make inroads at the socioeconomic life. It is crucially important for Turkey to benefit from the insurance sector's productions in combating its economic losses and fostering sources of savings channelized for investment.

In the light of the foregoing information and findings, we can conclude that the production levels of the Turkish insurance sector have not developed at the same rate with other countries since the Ottoman era and the efforts to foster development have failed to be effective or bring dynamism to the sector. The improvements implemented via the traditional methods are not strong enough to boost the production levels in the insurance sector. Failure to increase the direct premium production as well as to make the functions of the sector come true is adversely affecting economic indicators. Lack of an awareness for protecting the society's assets and being protected against risks results in economic losses, collapses and damages. This in turn leads to increase economic and political stability in the country. As Oscar Wilde put it, "We can exist without insurance but we cannot live without it."

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FACTORS AFFECTING A DEMAND FOR AN AGRICULTURE INDEX INSURANCE IN POLAND

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ABSTRACT

The growing number of catastrophic occurrences causes more and more insurance companies to refrain from offering traditional insurance products. The purpose of this study is to examine the factors affecting the Polish farmers' acceptance towards a completely new proposition on the Polish market - index based insurance against drought. It was identified on the basis of a two-stage direct survey, first covering the opinion about the new structure of insurance product and then the purchasing decision. A correlation between the area of residence and the level of interest in the new product was detected thanks to a multinomial logit model. On the other hand, the survey indicates hardly any correlation between farmers' decisions and numerous particular variables – thus suggesting that their approach to drought is very individualistic. Acceptance for the index structure was much higher than the willingness to purchase it. The government's engagement in index insurance in the form of a premium subsidy seems therefore indispensable.

Keywords: drought, insurance in Poland, index based insurance, contingent valuation, willingness to buy.

1. INTRODUCTION

Recently, Polish farmers' expectations regarding crops insurance have been rising due to hard-to-accept changeability of weather conditions (water shortages on the one hand, too high humidity on the other). More and more common are demands for a well-structured insurance against drought. At the same time, as the insurance companies are facing new risks they ask for higher insurance premium. The other factor affecting the increase of premium are difficulties in claims settlements. Proper calculation of compensation depends on when the drought occurred, whether it was drought that solely affected the yield or what yield should be considered for a particular crop as expected in a given year [Kaczala, Lyskawa 2008].

Therefore, due to numerous possible complications, index-based insurance is becoming an increasingly popular option considered in many countries, including Poland.[Pres 2008]

What must be emphasized is that many types of agricultural insurance result in insurance companies' tremendous losses in particular years. The last three years in Poland are a very good example. The number of damages claimed every year exceeded 20-30 thousand cases and the total amount of payments was much higher than the level of the collected premium. What made things worse was that in Poland loss calculation and payment must occur within 30 days of the claim.

Aligned with Common Agricultural Policy (CAP), both Polish and other European governments have invented a range of various instruments to support and subsidise farmers. [Berg, Kramer 2008] There are direct subsidies based on the number of arable hectares as well as other instruments which allow farmers to consciously manage risk [OECD 2011].

Since 2006 the government has been subsidising 50% of the premium paid by farmers, which resulted in a dramatic rise in the number of farmers ready to buy insurance. To illustrate this it is enough to mention that in 2001 there were 45 thousand crop insurance contracts while after the introduction of subsidised insurance this number increased to as many as 145 thousand in 2009. The subsidy is applied, however, only if the premium level does not exceed 6% of the crop value. In the case of drought insurance, insurers offer as much as 10% of the crop value, which is often far beyond the farmers' purses. [Szelangowska 2010]

In 2008 there was catastrophic drought in Poland. According to the estimates of Institute of Soil Science and Plant Cultivation (IUNG) in Pulawy, in one of the six-decade periods for which climatic water balance index is calculated, 58% of spring crops area and 42% of winter crops area was threatened with drought. The time between 11th May and 10th July when plants' demand for water is the highest, was extremely difficult. In many regions plants did not propagate properly or could not develop spikes. Farms located on weak soils suffered the greatest losses.

This is why it is necessary to look for solutions which will make it possible to establish a kind of insurance enabling farmers to consciously manage risk in their farms. At the same time, the new insurance should allow insurers to function in the long-term perspective on the crop insurance market with suitable profitability.

What makes drought insurance difficult is the fact that due to climatic change there is no longer a risk of drought occurrence in some regions of Poland. Instead, there is a certainty. According to the IUNG analyses, in some parts of Poland where the soil quality is poor, drought is due to occur every two years. Therefore insurance can only be an effective protecting instrument if the crop loss is too large to be dealt with by the farmer alone. Otherwise insurance companies will not offer any insurance at all or the premium will be too high for farmers to accept.

Index-based insurance system provides a plausible tool to solve the problem of drought insurance or insurance of animal and plant production. Some countries [Hazell, Skees 2005], e.g. Austria, Mongolia, or Mexico have already implemented such a system. The first thing to do is always to define the parameters which will serve as a basis for compensation payment. These are usually determined by various external bodies, such as offices or scientific institutes. In the case of drought the parameters might be for instance the actual amount

of rainfall over a period of time, air temperature over a given period or, like in Poland, the value of climatic water balance. When the indicator falls below a determined level, it results in crop losses and accordingly leads to a payment of the benefit flat rate which unfortunately may not cover the whole of the loss.

Index-based insurance, above all, has quite a few undeniable advantages. Underwriting and administrative costs are lower due to the fact that individual farms do not have to be inspected. Also, there is no need for profit or crop loss liquidation because it is enough to measure the index. Another merit is that the interested customers range from farmers to suppliers, banks or consumers; in other words, all parties whose profit is related to the amount of rainfall. As a result, index-based insurance may cover so far uninsurable occurrences or minimise the insurance price.

The key element for proper index-based insurance system to be established is to obtain detailed historical data concerning an examined phenomenon. In the course of building the model and calculation of the assumed crop loss it is crucial to consider both global and local climatic and weather trends as well as seasonal phenomena.

The main problem connected with the use of index-based insurance is the so called basis risk, which denotes the discrepancy between product basis and the genuine risk parameters that a particular entity is to be protected from. [Golden, Wang, Yang 2007] In this article product basis is the climatic water balance index calculated by IUNG since 2006.

2. THE CLIMATIC WATER BALANCE AND DESCRIPTION OF DATA COLLECTION

Climatic Water Balance (CWB) index is the main drought monitoring tool in Poland, additionally including water retention soil qualities. CWB index meets the requirements of index-based insurance systems because it defines the potential yield losses against the average conditions. Soil conditions also must be considered, because Poland is strongly diversified especially regarding water retention soil qualities. Consequently, identical rainfall deficit and growth of plants can vary dramatically depending on the soil category [Kozyra and oth. 2009].

CWB expresses the difference between the precipitation and potential evapotranspiration.

$$\text{CWB} = \text{P} - \text{ETP} \quad (1)$$

Where:

CWB - Climatic Water Balance

$$\text{P} - \text{precipitation in a given period} \quad (2)$$

$$\text{ETP} - \text{Penman evapotranspiration in a given period} \quad (3)$$

Meteorological stations measure precipitation while the value of potential evapotranspiration (expressed as approximate capacity of the evaporation of the water from living short grass is calculated by means of the Penman method. This value can also be precisely evaluated by the use of simplified models, which include meteorological elements that are normally measured by the meteorological stations in Poland.

In order to classify agricultural drought, the entire complex of weather and soil conditions is taken into consideration.

According to the definition specified in the Act, drought is defined by damage caused by the occurrence of a climatic water balance (CWB) below a defined value for an individual species or groups of cultivated plants as well as the soil category in any (60 day) period from 1 April to 30 September of that year.[IUNG 2011]

Drought index product has been set up on the basis of CWB indications, thus meeting the following requirements:

$$\text{Threshold} = \text{CWB reaches the defined value, which causes a damage exceeding 50\% of the 10 year average yield for a given crop in a province} \quad (1)$$

$$\text{Claim payment per 1 ha} = 10 \text{ year average price for 1 t of a given crop in a province} \times \text{claim payment rate} \quad (2)$$

$$\text{Claim payment rate} = \begin{cases} 1 & \text{for wheat} \\ 10 & \text{for sugar beets} \\ 0,75 & \text{for rapeseed} \end{cases} \quad (3)$$

This is what was presented for the farmers to evaluate. Primary data was gathered on the basis of a survey conducted in March 2012 by means of CATI method, using the structured questionnaire schedule, on a focus group of 750 farmers across Poland who cultivate plants. The representative sample was selected on the basis of location and farm size. There were three stages of the level of product acceptance: firstly, overall acceptance of index insurance concept was examined (OA), secondly, the acceptance when the price is given (OAP) and

finally, the farmers willingness to buy the product (WTB). The sample product offered to farmers for acceptance was adapted to their primary crop.

The main problem concerning identification of factors affecting respondents' answers as well as relevance of these factors' influence, resulted from their qualitative character. It was due to the fact that both answer variants and respondents' profiles were expressed by means of different qualitative variables: binary variables, polynomial variables – both nominal and also ordinal ones.

3. METHODOLOGY

3.1 Dependent variables

According to the purpose of the study, dependent variable was defined as the level of acceptance of the new product. Acceptance was surveyed as overall acceptance of index insurance concept, acceptance when the price is given and finally the farmers' willingness to buy the product at the given price. The measurement of the dependent variables are presented in table 1.

Table 1: Description of dependent variables

Dependent variables	Explanation	Measurement
Overall Acceptance (OA)	Acceptance of a new index-based insurance product concept	0- I don't like it at all or I like it a little 1 – I quite like it, I like it, I like it very much, I extremely like it
Overall acceptance when the price is given (OAP)	Acceptance of the new concept of index-based crop insurance when the price is given for this insurance	0- I don't like it at all or I like it a little 1 – I quite like it, I like it, I like it very much, I extremely like it, I like it
Willingness to buy (WTB)	Willingness to buy the product for the farmer's dominant crop	1-I will definitely not buy it or would rather not buy it 2 - I am not sure if I will buy it or not 3 – I might buy it or I will definitely buy it

3.2 Explanatory variables

Based on the literature [McCarthy 2003, GlobalAgRisk 2011] and our own experience twelve factors influencing OA, OAP and WTB were selected. A detailed list of these variables, their measurement and the hypothesized relationship with the dependent variables are shown in the table 2.

Table 2: Description of independent variables and hypothesized relationship

Variables	Explanation	Measurement	Hypothesized Relationship
Geographical location LOCATION P_DOLN P_KUJ_P P_LUBEL P_LUBUS P_LODZ P_MALOP P_MAZOW P_OPOL P_PODKARP P_PODLAS P_POMOR P_SLAS P_SWIET P_WAR_MAZ P_WLKP P_ZACHPO	Farm location (16 provinces): Lower Silesia, Kujawy-Pomerania, Lublin, Lubuskie, Łódź, Małopolska, Mazovia, Opole , Podkarpacie, Podlasie, Pomerania, Silesia, Świętokrzyskie , Warmia-Masuria, Wielkopolska, West Pomerania	1– if a farm is located in a given province 0 – otherwise	Location of a farm in one of the nine provinces: Lower Silesia , Kujawy-Pomerania, Lubuskie, Łódź, Mazovia, Podlasie, Świętokrzyskie, Wielkopolska, West Pomerania increases OA, OAP and WTB levels
Farm size FARM_SIZE	Number of hectares owned	1- 1ha-7 ha 2- 7,1 ha-20 ha 3- above 20 ha	The larger the farm size, the higher the OA, OAP and WTB levels
Acceptable level of yield loss against	The level of yield loss that the farmer	0 – I do not accept any loss 1 – up to 10% of yield less	The lower the level of yield loss

the target ACCEPT_LOSS	considers as unthreatening to the farm's operations	2 – 11%- 30% of yield less 3 – 31%-50% of yield less 4 – over 50% of yield less	acceptance, the higher OA, OAP and WTB levels
The level of yield loss leading to bankruptcy NACCEPT_LOSS	The level of yield loss that the farmer considers to be the reason for bankruptcy of the farm	0 – I do not accept any loss 1 – up to 10% of yield less 2 – 11%- 30% of yield less 3 – 31%-50% of yield less 4 – over 50% of yield less	The lower the level of loss absorbable by the farm, the higher the OA, OAP and WTB levels
Core production SPECIALIZ SPEC_PLANT SPEC_MILK SPEC_LIVEST	Farm specialization: plant, milk or livestock	1 – if a farm is specialized 0 – otherwise	Farm specialization in at least one area increases the OA, OAP and WTB levels
	Core production of the farm: plants, milk, livestock, no dominant production	1–if a farm is specialized in a given area 0 – otherwise	Plant specialization increases the OA, OAP and WTB levels
Age of farmer AGE	Age of the farmer	1- <40 2- 41-50 3- 51-60 4- > 61	The lower the age, the higher OA, OAP and WTB levels
Level of education EDU_LEV	Farmer's educational background	1 – secondary or tertiary 2 – vocational 3 – lower secondary or none	Higher education level increases OA, OAP and WTB levels
Forming loss experience N_PLANT_DIS N_DROUGHT N_FLOOD N_HAIL N_SPRING_FR N_WINTER_KILL N_STORM N_FIRE	How many times the following types crop damage occurred in the farm in the last 10 years: plant diseases, pest, drought, flood, hail, spring frost, winterkill, storm, fire	A discrete quantitative measure	The larger the number of flood-related damages, the lower OA, OAP and WTB levels. The larger the number of other events, the higher OA, OAP and WTB levels.
Potential area of drought DROUGHT_AREA	Farm location in the drought prone area in Poland, i.e. in certain municipalities	1 – if a farm is located in a drought area 0 – otherwise	Location of a farm in the drought prone area increases OA, OAP and WTB levels
Insurer's experience ANY_INSUR INSUR_DROU INSUR_HAIL INSUR_WK INSUR_SFROST INSUR_FIRE INSUR_FLOOD	Crop insurance in the previous year	1– if the farmer insured the crops in the previous year 0 – otherwise	Having traditional crop insurance increases OA, OAP and WTB levels
	Types of perils insured drought, hail, winterkill, spring frost, fire, flood	1 – if insurance covered the peril 0 – otherwise	Having drought and spring frost insurance increases OA, OAP and WTB levels
Type of crop: RAPE WHEAT W_BARLEY TRITICA RYE OATS S_BARLEY MAIZE S_BEETS	Range of cultivated crops, i.e. rapeseed, winter wheat, winter barley, winter triticale, rye, oats, spring barley, maize, sugar beets in the last two years	1=if the farmer cultivated a given crop 0 = otherwise	Cultivation of rapeseed, winter wheat or sugar beets increases OA, OAP and WTB levels
Sources of living SOURCE_LIV	Amount of farming income within the total income of the farm	A continuous quantitative measure of <0, 100> range	The higher the amount of farming income in the total income, the higher OA, OAP and WTB levels

3.3 Research procedure and methodology

The research was carried out in two stages. The aim of the first one was to verify the initially proposed hypotheses about existence of factors influencing:

As for all the potential qualitative variables measured either on the nominal or ordinal scales test of independence was applied, χ^2 z (K1-1)*(K2-1) where K1 and K2 mean the number of possible qualitative variables' variants, whose correlation is examined. Hence it was possible to show which characteristics of respondents (including their farms) affect their opinion about the insurance product.

Whenever qualitative variables were either nominal or ordinal, the chi-squared test for independence was applied (where test statistic is χ^2 with (K1-1)*(K2-1) degrees of freedom, and K1 and K2 mean the number of possible qualitative variables' variants). Hence it was possible to show which characteristics of respondents (including their farms) have significant influence on their opinion about the insurance product.

The strength of this correlation was established on the basis of Cramer's coefficient which relies on empirical value of χ^2 –statistics [Cramer 1958] and [Bishop, Fienberg i Holland 1975].

When the dependence between opinion about the product and the quantitative variables (e.g. the number of losses for different reasons, the amount of income obtained from farming) applied methods depended on the number of possible opinion variants. When there were two variants of opinion (whether they liked the notion or not – in OA and OAP case)) the parametric t-test for equality of means was applied to decide about the relevance of relationship between the opinion about the product and the value of quantitative variable. As the distribution of quantitative variable was unknown (and might not be normal), nonparametric Mann-Whitney's U-test was additionally applied.

If there were three variants of opinion (won't buy / don't know / will buy – as it was with WTB) ANOVA analysis, based on F statistics, was applied to decide about the significance of the influence of a given variable on a customer's (ANOVA provides a statistical test of whether or not the means of several groups are all equal, and therefore generalizes t-test to more than two groups) [Amir D. Aczel 2000]. And similarly, a non-parametric equivalent of ANOVA, Kruskal-Wallis test, was used as supplementary to parametric tests.

In all cases the direction of correlation was established either on the basis of empirical numbers against hypothetical numbers (when chi-squared test was applied) or on basis of the average values of a feature (when one variable was qualitative).

The choice of the method in the second stage of the research (creating the tool for farmers classification) was strictly related to the fact that explanatory variables were not normally distributed (most of the factors were ultimately described by means of qualitative variables, incl. dummy and binary ones). Thus the choice of the classifying tool was rather limited. Especially the application of linear discriminant analysis had to be given up, and the selection was made of such classification methods, which do not require a specific distribution of variables describing the classified objects. A decision was made to use probability model, specifically: binomial logit model (for OA and OAP) and polynomial logit model for ordinal categories (in the case of WTB) – with awareness that it was also possible to obtain similar results using the probit model. Models were estimated with use of maximum-likelihood method in GRETL and variable selection was based on backward stepwise variable selection procedure, where the 10% - level of significance was assumed. Evaluation of model quality was made on the basis of the hit ratio (HR) in the training set. In each case it was verified whether the calculated hit ratio is higher than what you could achieve by chance - for this purpose the t-statistic was properly calculated and marked as t_{HR} .

Besides, there are numerous examples of research where application of these models resulted in accurate classifications (Hacker, Tockle (1993), DeFond, Park (1999), Blanchflower, Levine, Zimmerman (2003)).

4. EMPIRICAL RESULTS

The results obtained to verify the influence of the first seven factors on the level of product acceptance are presented below. (Table 3) In the course of this data analysis it should be remembered that wherever the p-value level is low (and the trust level equals 1-(p-value)) one can conclude that a given factor does have an influence on the opinion about the insurance product. It is noticed that 46,7% of all farmers in this research accepted this concept of index insurance (OA). After the price information, the acceptance rate fell to 43,7% (OAP). However, the willingness to buy the product declared only 6,7% of farmers.

Table 3: P-values for chi-squared test for independence between product acceptance and particular variables

Study variant	LOCATION		Variable											
			FARM_SIZE		ACCEPT_LOSS		NACCEPT_LOSS		SPECIALIZ		AGE		EDU_LEV	
	p-Value	Cramer's coefficient	p-Value	Cramer's coefficient	p-Value	Cramer's coefficient	p-Value	Cramer's coefficient	p-Value	Cramer's coefficient	p-Value	Cramer's coefficient	p-Value	Cramer's coefficient
OA	0.003	0.214	0.711	0.030	0.392	0.076	0.142	0.085	0.488	0.068	0.022	0.123	0.004	0.133
OAP	0.152	0.166	0.367	0.052	0.371	0.078	0.026	0.111	0.034	0.118	0.709	0.054	0.005	0.132
WTB	0.217	0.154	0.110	0.070	0.194	0.089	0.993	0.022	0.186	0.087	0.198	0.086	0.527	0.058

First of all, the connection between the farm's location and the opinion about the new construction of insurance product turned out to be statistically relevant, but not highly relevant (based on Cramer's V coefficient). At the same time, the more information was given to the respondents, the less important the studied correlation turned out to be. Ultimately, there was no influence of farm location on the purchasing decision. On the basis of detailed analysis of the number of positive opinions against all opinions (not included in the article due to volume requirements) it could be asserted that differentiation of opinions in various provinces mainly was due to seven out of the sixteen provinces, six of which were located on the drought area. This is where the evaluation of the concept itself was definitely well above the average.

Secondly, one can state that the farm size was of no statistical relevance to the level of product acceptance. A low p-value level was gained only in the case of WTB, which may lead to a conclusion on its correlation with 90% level of trust. It has to be said, too, that the percentage of "I'll buy" answers was the highest in the largest farms (18%), and the lowest in the smallest ones (9%).

Thirdly, there was no notice of statistically relevant correlation between the opinion about the product and the level of yield loss considered as safe by the farmer. However, the level of unacceptable losses in crops which leads to a farm's bankruptcy does have an effect on the acceptance of the index-based product. Detailed analysis of the data (also not included) allows to assert that the highest number of positive opinions about the concept (with and without the price) was noticed in farms where the level of unacceptable loss in yield was 31%-50% and not above 50%. A similar correlation could be noticed in willingness to purchase the product.

Further analysis of the table leads to a observation that a large influence on level of acceptance is exerted by specialization of the farm, and a smaller one on the willingness to buy the product. Consequently, detailed analysis (not included in the article) points out that focusing on plant production or milk clearly increases the chance for the product along with the price given to be accepted, while lack of specialization evidently reduces it. Willingness to buy the product is affected by a similar correlation.

It turns out that the factors characterizing the respondent are also of significant importance (not only the information about the farm). Firstly, concept acceptance and (to a smaller extent) willingness to buy an index-based product is related to the respondent's age. It is the highest with the under 40 group, and the lowest with people over 61 years of age. Secondly, a better educational background is clearly conducive to the product acceptance. Unfortunately, it does not affect the willingness to buy the product, which might be caused by the fact that in general very few respondents expressed willingness to buy the product in its present form, even though it is accepted by half of them. So, it can be inferred that it is mainly the financial factors that are of primary importance here.

Table 4 presents (among other data) the results of examining the correlation between the opinion about the product and the farm's experience in terms of various occurrences. Based on that it can be said that the opinion about the product is affected by (in the order of strength of the influence): frequency of drought, winterkill, spring frosts, hail and flood. Frequent occurrences of the first four events are conducive to positive opinions, while flood is more likely to entail a negative opinion. If the product price was given, however, it was only drought and flood frequency that mattered.

Table 5, in turn, presents the results of tests aimed at evaluation of the influence of the frequency of particular occurrences on the willingness to buy the product. Both parametric and non-parametric tests corroborate the high relevance of drought occurring in a farm. Also, hail and hurricane are mentioned among the events that present some importance. In all the cases, the higher was the frequency of occurrence the greater the willingness to buy the product appeared. Interestingly, only in the case of flood the correlation was the opposite: a higher number of positive answers was connected with a lower frequency of flood occurrence and vice versa, which in fact is statistically irrelevant.

Table 4: The results of tests for equality of means of different loss experience –OA and OAP case

Frequency of occurrence	Average value of the feature in the case of "I don't like it"		Average value of the feature in the case of "I like it"		t-Student empirical value		p-value		p-value for U-test (Manna-Whitney)	
	OA	OAP	OA	OAP	OA	OAP	OA	OAP	OA	OAP
N_PLANT_DIS	4.108	3.911	3.905	4.093	0.762	-	0.446	0.496	0.775	0.145
N_DROUGHT	2.663	2.723	3.168	3.100	3.160	2.349	0.002	0.019	0.003	0.006
N_FLOOD	0.951	1.019	0.747	0.689	1.764	2.853	0.078	0.004	0.036	0.000
N_HAIL	0.733	0.806	0.931	0.859	2.177	0.575	0.030	0.566	0.193	0.988
N_SPRING_FR	3.809	3.244	3.533	3.370	2.663	0.741	0.008	0.459	0.001	0.075
N_WINTER_KILL	2.563	2.720	3.061	2.902	3.062	1.114	0.002	0.265	0.001	0.042
N_STORM	0.385	0.396	0.317	0.308	0.899	1.144	0.369	0.253	0.742	0.633
N_FIRE	0.026	0.030	0.040	0.036	0.786	0.343	0.432	0.731	0.393	0.471

Table 5: The results of tests for equality of means of loss experience – WTB case

Frequency of occurrence	ANOVA p-value for F statistic	Kruskal-Wallis test p-value for H statistic
N_PLANT_DIS	0.161	0.137
N_DROUGHT	0.000	0.000
N_FLOOD	0.285	0.557
N_HAIL	0.044	0.109
N_SPRING_FR	0.497	0.540
N_WINTER_KILL	0.487	0.237
N_STORM	0.723	0.046
N_FIRE	0.078	0.150

Table 6 presents the correlation of opinion about the product and the willingness to buy it and the farm's location on the drought area as well as the insurance experience of the farm in terms of various adverse events. It can be concluded that the farm's location has a definite influence on the acceptance and willingness to buy the index-based product. Detailed data analysis (not included here) suggests that the farm's location on the drought area is definitely conducive to acceptance and willingness to buy the product.

It was also the interdependence between owning a traditional crop insurance (regardless of the cover) and the evaluation of the new insurance concept that was of statistical importance, and even more so, with regard to willingness to buy the index-based product. 17% of those who had bought some crop insurance were ready to buy the product, as opposed to 8% of the farmers who hadn't been insured. Experience with traditional drought and spring frost insurance was of primary importance here, so 71% of those who had been insured against drought stated that they liked the concept as opposed to 49% of those who had never been insured against this peril.

Table 6: P-values for chi-squared test for independence between opinion about the product and drought area and insurance experience.

Research variant	DROUGHT AREA	INSUR_EXPER						
		ANY_INSUR	INSUR_DROUGHT	INSUR_HAIL	INSUR_WK	INSUR_FROST	INSUR_FIRE	INSUR_FLOOD
OA	0.003	0.00047	0.0024	0.629	0.065	0.007	0.032	0.1369
OAP	0.00013	0.0001	0.0149	0.428	0.349	0.288	0.727	0.317
WTB	0.00002	0.0009	0.129	0.209	0.996	0.0003	0.972	0.708

Table 7 presents p-values for independence test between product acceptance and the willingness to buy it and the type of crop.

Table 7: P-values for chi-squared test for independence between product acceptance and the type of crop

Research variant	Crop								
	RAPE	WHEAT	W_BARLEY	TRITICA	RYE	OATS	BARLEY	MAIZE	S_BEETS
OA	0.273	0.619	0.406	0.543	0.697	0.844	0.727	0.798	0.190
OAP	0.277	0.317	0.535	0.232	0.323	0.363	0.507	0.088	0.680
WTB	0.002	0.184	0.579	0.206	0.035	0.574	0.089	0.566	0.099

Cultivation of rape and sugar beets evidently increases overall acceptance for the idea of index insurance. Cultivation of maize increases the acceptance of the concept when the price is given. Cultivation of rape, beets and barley clearly raises the willingness to buy the index-based product, but cultivation of rye has the opposite effect.

From the data presented in Table 8 one can infer that acceptance level of an index-based concept including the situation when the price was given were not affected by income structure of the farm. The only result of statistical relevance was that regarding willingness to buy the product (WTB). In the ANOVA analysis p-value for F statistics amounted to 0.026, while in the case of Kruskal-Wallis test p-value for H statistics was 0.034. The lowest average amount of income from farming in the whole of the farm's income was noticed in the "will not buy" group, while the highest income was found in the "I do not know" group. Thus, direction of the influence is ambiguous.

Table 8: Collective results of tests for equality of means of SOURCE__LIV variable – OA and OAP case

Frequency of occurrence	Average feature value in the case of „I do not like it” opinion		Average feature value in the case of “I like it” opinion		t-Student empirical value		p-value		p-value for U-test (Manna-Whitney)	
	OA	OAP	OA	OAP	OA	OAP	OA	OAP	OA	OAP
SOURCE__LIV	68.663	66.584	67.219	69.185	0.615	-1.107	0.539	0.269	0.401	0.344

Summing up, one can say that a number of factors have been identified which have a statistically relevant influence on the acceptance level and willingness to buy the product. In the OA case, hypotheses regarding the influence and its direction of the following variables was corroborated: LOCATION, P_DOLN, P_KUJ_P, P_LUBUS, P_LODZ, P_PODLAS, P_ZACHPO, AGE, EDU_LEV, N_DROUGHT, N_FLOOD, N_HAILE, N_SPRING_FR, N_WINTER_KILL, DROUGHT_AREA, ANY_INSUR, INSUR_DROU, INSUR_SFROST, RAPE, SUG_BEETS) and NACCEPT_LOSS (lacking a single direction). Regarding OAP, the hypotheses were corroborated as for the influence and its direction of the following variables: SPECIALIZ, SPEC_PLANTS, EDU_LEV, N_DROUGHT, N_FLOOD, DROUGHT_AREA, ANY_INSUR, INSUR_DROU, as well as NACCEPT_LOSS (lacking a single direction). As for WTB, the influence and its direction was corroborated regarding the following variables: SPECIALIZ, SPEC_PLANTS, AGE, N_DROUGHT, N_HAILE, N_STORM, DROUGHT_AREA, ANY_INSUR, INSUR_DROU, INSUR_SFROST, RAPE, SUG_BEETS, a także SOURCE__LIV (lacking a single direction). It has to be made clear, though, that despite its statistical relevance Cramer’s coefficients were not very high (as much as 0.2), so it makes it possible to infer that accurate predictions concerning a farmer’s opinion about the product and his willingness to buy couldn’t be made based on one variable only. The information collected in particular variables in a single model would have to be aggregated, which would make it possible to forecast a qualitative variable i.e. the customer’s opinion.

In order to establish the character of the customer’s opinion about the product, the qualitative variable should be expressed as a Bernoulli variable within a probability model: $Y_i=1$ if the i -respondent’s opinion is positive, $Y_i=0$ if otherwise. The relevant independent variables and their parameters for the probability model regarding overall acceptance of the product are presented in Table 9.

Table 9: The estimates of Logit model parameters – OA case

LP	Variable	Coeff.	Std. Dev.	LP	Variable	Coeff.	Std. Dev.
1	Const.	-0.744	0.583	11	INSUR_HAIL	-0.637	0.305
2	DROUGHT_AREA	0.777	0.227	12	AGE	-0.149	0.084
3	ACCEPT_LOSS	0.345	0.136	13	EDU_LEV	0.349	0.112
4	NACCEPT_LOSS	-0.21	0.121	14	SOURCE__LIV	-0.006	0.003
5	N_PLANT DISEASES	-0.057	0.023	15	P_LUBEL	0.652	0.361
6	N_DROUGHT	0.123	0.048	16	P_LODZ	-0.968	0.242
7	N_WINTERKILL	0.090	0.038	17	P_PODLAS	0.864	0.422
8	N_STORM	-0.155	0.079	18	P_WAR_MAZ	1.308	0.697
9	ANY_INSUR	0.542	0.279	19	P_WLKP	-0.526	0.250
10	INSUR_DROU	0.782	0.329				
Chi-square(18) = 95,2046 [0,0000]							

If acceptance probability was above 0.5 so the farmer was assigned to the accepting group, the hit rate was assumed to be about 65%. However, from a practical point of view, the cost of misclassification could be rather high. Therefore it was decided to set the level of acceptance probability as a minimum of 0.75, and if the probability was 0.25 or below, the farmer was classified as “not accepting” the product. Hence, assuming the range between 0.25 and 0.75 as uncertain, the following classification matrix was obtained: (Table 10)

Table 10: OA classification table

Actual affiliation	Classification		WT (%)
	Like it	Don’t like it	
Like it	56	8	88%
Don’t like it	14	40	74%
t -Stud _{WT}	6.98 (0,000)	WT>>50%	81%

In the logit model, the relevant descriptive variables regarding the probability of acceptance of a product if the price is given (OAP) are presented in table 11 along with evaluation of these parameters.

Table 11 The estimates of Logit model parameters – OAP case

LP	Variable	Coeff.	Std. Dev.	LP	Variable	Coeff.	Std. Dev.
1	Const.	-1.1636	0.3140	7	INSUR_SFROST	0.4580	0.2597
2	DROUGHT_AREA	0.9801	0.1958	8	EDU_LEV	0.3758	0.1061
3	OWIES	0.3577	0.1596	9	P_LODZ	-0.6546	0.2282
4	N_FLOOD	-0.1221	0.0495	10	P_WLKP	-0.7622	0.2389
5	INSUR_DROU	0.6152	0.2951	11	SPECIALIZ	-0.3723	0.1805
6	INSUR_HAIL	-0.7154	0.2565				
Chi-square(10) = 66,9775 [0,0000]							

Assuming the uncertainty range as 0.3-0.7 a following matrix was built:

Tabela 12: OAP classification table

Actual affiliation	Classification		WT (%)
	Like it	Don't like it	
Like it	73	3	96%
Don't like it	22	44	67%
$t\text{-Stud}_{WT}$	7,72 (p = 0,000)	WT>>50%	82%

After the estimation of the polynomial logit model along with ordinal categories, it turned out that one of the cut points was irrelevant. Therefore the number of classes was reduced. Two classes remained: “will not buy” (1) and “I’m not sure /I’ll buy”(2). The relevant descriptive variables and their parameters can be seen in Table 13.

Tabela 13: The estimates of Logit model parameters – WTB case

LP	Variable	Coeff.	Std. Dev.	LP	Variable	Coeff.	Std. Dev.
1	Const.	-0.0955	0.3781	5	N_DROUGHT	0.1923	0.0368
2	SPECIALIZ	-0.3126	0.1778	6	N_FIRE	1.0601	0.4679
3	ACCEPT_LOSS	0.3060	0.1304	7	SUG_BEETS	0.7243	0.3392
4	NACCEPT_LOSS	-0.2541	0.1169				
Chi-square(6) = 48.4784 [0.0000]							

Assuming the uncertainty range as 0.3-0.7 a following matrix was built:

Tabela 14: WTB classification table

Actual affiliation	Classification		WT (%)
	Like it	Don't like it	
Like it	37	3	93%
Don't like it	14	7	33%
$t\text{-Stud}_{WT}$	5,27 (p = 0,000)	WT>>50%	72%

Verification of the hypothesis that the resulting hit ratio is equal to the random classification ratio (against alternative hypothesis that it is much higher) was carried out by means of t-Student statistics [Hair, Anderson, Tatham, Black 1995].

5. CONCLUSIONS

Solving the drought problem in Poland is a crucial issue for three groups of entities: the government, insurance companies and farmers. This article focused on the results of research referring to factors affecting levels of new product acceptance – index-based drought insurance.

According to the findings of the research, rather high interest in the new product was noticed (OA,OAP) as well as willingness to buy the product (WTB) on particular areas – either suffering from drought in the past years or particular districts (overlapping the drought areas or neighbouring them). What might be surprising is the lack of correlation between the type of crop and willingness to buy the product (WTB) despite the fact that some types of plants are particularly susceptible to drought in Poland. (wheat, beets)

It would make sense to explain why farmers differentiate between overall acceptance for the product and acceptance when the price has been given. They might mean that the way in which they perceive the peril of drought is very individualistic [Arnoldi, 2009], lack of acceptance for the offered price or possibly a varied approach to the problem of financing the consequences (it is unnecessary to purchase the index-based product because the farmer expects a different form of assistance – e.g. a compensation from the state budget).

Rejecting the concept of index insurance by more than half of the respondents means that the so-called "principle of completeness" still plays a key role. In the former socialist countries the expectations for the agricultural insurance are historically established. Since fullness of compensation in the area of agriculture was in fact a common practice, farmers are still used to this, that the compensation paid by the company should fully correspond to the loss (e.g., paid compensation for hail damaged corn should correspond to the values for which the seed could be sold by the farmer).

However, one can say that a prevailing acceptance of the concept has been seen, so this might open the door to its possible implementation within a government-based catastrophe-assistance programme. The research also enables us to mark any farmer with 80% accuracy as possibly or certainly interested in the index concept. The main task for insurance companies would be to arrive at the final product shape depending on various factors (price, level of compensation, CWB level activating the payment). To do this, another conjoint method research [Heenkenda 2011] will have to be conducted, and indeed this is what the authors intend to do in the weeks to come.

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PRINCIPAL FACTORS AFFECTING CHINA ACTUAL ENVIRONMENTAL RISK (CAER) Advice from Behavior and Area Angle Given to the Financial Institutions, Enterprises and Governments Performing Environment-related Operations

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ABSTRACT

Studies on principal factors affecting China Actual Environmental Risk (CAER) from behavior and area angle are seldom found, so we studied the theme above in this thesis. By analysis, we have known that principal behaviors can be ordered by contribution as follows: production waste disposal, Government surveillance, living action, and production action, and principal areas as follows: Shaanxi, Gansu, Jiangxi, and Hubei. So our related advice is as follows: first, emphases should be put on protection and improvement of natural environment. Secondly financial institutions should carry out stringent monitoring to manage to select “clean firms”, or raise interest rate for financing for “unclean firms”, or raise insurance premium on “unclean firms” and “unclean projects”, etc. in such behaviors as production action, living action, and production waste disposal, etc., and in such areas as Gansu, Hubei, Shaanxi, and Jiangxi, etc.. Thirdly enterprises and Governments should take the following measures to try to make the firms, behaviors, areas and environment “clean”: the first is strict management including Government surveillance on production of waste from such behaviors as production action, living action, etc.. The second is great encouragement to environment-friendly technological innovations in waste disposal including production waste disposal, etc.. And the third is different emphasis of management in different areas, such as air pollution (e.g. inhalation of pollutants) and water shortage in Gansu, industry pollution and water pollution in Hubei and Jiangxi, and pollution of resources excavation and refinement in Shaanxi, etc.. And fourthly financial institutions, enterprises and Governments should take appropriate measures according to principal factors’ influences and contribution when performing environment-related operations, etc.

Keywords: CAER, Principal factors, Selection, Contribution, Sequence

1 Introduction

Although our actions to improve our lives are usually not intended to create risks to human being and other related subjects, we do generate pollution and accidents do happen. Recent environmental disasters, like the April 2010 Deepwater Horizon explosion in the Gulf of Mexico and other cases in China, promise years of legal entanglements, and of surprising and painful charges against earnings for companies, and for their bankers and insurers [1], so it’s important to study environmental risk (ER).

Environmental risk usually refers to such things as groundwater contamination, soil contamination by hazardous substances, air pollution, or even pollution of lakes or streams, etc.. By result, environmental risk is composed of two related elements: the consequences that are realized if a bad event actually does happen, and the ones that aren’t realized if a bad event doesn’t happen. As to the former, we call it as actual environmental risk (AER), and as to the latter, we call it as zero environmental risk (ZER), so we can get and abbreviate China actual environmental risk as CAER, and China zero environmental risk as CZER. CZER has been studied in my papers [2], so CAER will be our study emphasis in this thesis, and we will especially focus on the principal factors affecting CAER.

Because of our emphasis on principal factors affecting CAER from behavior and area angle in this thesis, we should review the present studies of different environmental risks and their influences. Firstly, current research mainly focuses on the environmental risks of individual behaviors including production, waste disposal, and related management, etc., for example, fertilizer [3], pharmaceuticals [4], waste disposal [5], hazardous waste policy [6], etc., and we found no comprehensive studies on the influence of all the behaviors above. Secondly, Current research mainly focuses on the environmental risks in individual areas or provinces, for example, western China [7], Tianjin port of China [8], Shandong province of China [9], etc., and we found no comprehensive studies on the influence in all the areas or provinces above in China.

So we decide to carry out comprehensive studies in this thesis on China actual environmental risk (CAER) of all the behaviors above (i.e. behavior angle), and on that of all the areas above (i.e. area angle) in China one by one, and study the principal factors affecting CAER from the two angles above one by one, so that we can put general methods and theory into lively and concrete practice, and try to provide appropriate advice to help financial institutions to tailor their financing coverage, to help enterprises find appropriate financing to avoid or reduce direct and indirect liabilities associated with environmental risk, and to help Governments to take appropriate measures to minimize environmental risk.

According to our purpose of study, we will study principal factors affecting CAER from the two angles above one by one, including their selection, sequence and contribution, so the other part of this thesis can be structured as follows: first, variable design and data source, secondly correlations between dependent variables and independent variables, thirdly regression analysis and selection of principal factors, fourthly principal factors’ contribution and their sequence and fifthly conclusion and related advice.

2 Variable Design and Data Source

2.1 Behavior Angle

Definition. As to the study on principal factors affecting CAER from the behavior angle, all the behaviors are classified into human actions, e. g. the oil spill is caused by such human actions as dumping oil barrels into the sea, etc., and natural events, e. g. the oil spill is

caused by such natural causes as an earthquake, etc. [10]. Human actions are further classified into production, living, waste disposal and Government surveillance, etc.. So we can design variables as follows.

Dependent Variable. China actual environmental risk. Let CAER be China actual environmental risk.

Independent Variables. Natural cause: let hnc1 be natural cause, production action: let hp2 be production action, living action: let hl3 be living action, production waste disposal: let hprd4 be production waste disposal, living waste disposal: let hlrd5 be living waste disposal, Government surveillance: let gg6 be Government surveillance.

2.2 Area Angle

Definition. As to the study on principal factors affecting CAER from the area angle, all the thirty-four provincial or quasi-provincial districts in China are included and given serial number one by one, so we can design variables as follows.

Dependent Variable. China actual environmental risk. Let CAER be China actual environmental risk.

Independent Variables. Jiangsu: Let js1 be Jiangsu, Beijing: Let bj2 be Beijing, Chongqing: Let cq3 be Chongqing, Qinghai: Let qh4 be Qinghai, Fujian: Let fj5 be Fujian, Gansu: Let gs6 be Gansu, Guangdong: Let gd7 be Guangdong, Guangxi: Let gx8 be Guangxi, Guizhou: Let gz9 be Guizhou, Hainan: Let hain10 be Hainan, Hebei: Let heb11 be Hebei, Heilongjiang: Let hlj12 be Heilongjiang, Henan: Let henan13 be Henan, Hubei: Let hub14 be Hubei, Neimenggu: Let nmg15 be Neimenggu, Jilin: Let jl16 be Jilin, Liaoning: Let ln17 be Liaoning, Ningxia: Let nx18 be Ningxia, Shaanxi: Let shaanx19 be Shaanxi, Shandong: Let sd20 be Shandong, Shanghai: Let shh21 be Shanghai, Shanxi: Let shanx22 be Shanxi, Sichuan: Let sc23 be Sichuan, Tianjin: Let tj24 be Tianjin, Xizang: Let xz25 be Xizang, Xinjiang: Let xj26 be Xinjiang, Yunnan: Let yn27 be Yunnan, Zhejiang: Let zj28 be Zhejiang, Taiwan: Let tw29 be Taiwan, Aomen: Let aom30 be Aomen, Xianggang: Let xg31 be Xianggang, Hunan: Let hunan32 be Hunan, Anhui: Let anh33 be Anhui, and Jiangxi: Let jx34 be Jiangxi.

2.3 Data Source and Variables’ Scores

Data are collected by case studies mainly through Southern Weekend from May 12, 2011 to December 31, 2011. And the period above are further classified into four study periods with two months as one study period. To reflect the actual happening of CAER, we let CAER equal to 1 for every period. To reflect the influence of each variable, we let it equal to 1 if it’s in operation, otherwise we let it equal to 0.

3 Correlations between Dependent Variables and Independent Variables

3.1 Behavior Angle

According to Table 1, China actual environmental risk is positively correlated with all the behaviors

Table 1 Correlations for Behaviors

	Behaviors	hnc1	hp2	hl3	hprd4	hlrd5	gg6
CAER	Pearson Correlation	0.735	0.724	0.401	0.468	0.375	0.911 ^a
	Sig. (2-tailed)	0.157	0.167	0.503	0.427	0.534	0.032

a. Correlation is significant at the 0.05 level (2-tailed).

3.2 Area Angle

According to Table 2, China actual environmental risk is positively correlated with all the areas.

Table 2 Correlations for Areas

	CAER	
Areas *	Pearson Correlation	Sig. (2-tailed)
js1	0.678	0.208

bj2	0.658	0.202
cq3	0.250	0.685
qh4	0.375	0.534
ff5	0.535	0.353
gs6	0.408	0.495
gd7	0.816	0.092
gx8	0.612	0.272
gz9	0.250	0.685
hain10	0.408	0.495
heb11	0.784	0.116
hlj12	0.514	0.375
henan13	0.468	0.427
hub14	0.590	0.295
nmg15	0.375	0.534
j116	0.250	0.685
ln17	0.395	0.510
shaanx19	0.343	0.572
sd20	0.686	0.201
shh21	0.535	0.353
shanx22	0.250	0.685
sc23	0.343	0.572
tj24	0.250	0.685
xj26	0.375	0.534
yn27	0.791	0.111
zj28	0.494	0.398
tw29	0.250	0.685
xg31	0.408	0.495
hunan32	0.377	0.531
anh33	0.535	0.353
jx34	0.514	0.375

4 Regression Analysis and Selection of Principal Factors

4.1 Basic Regression Models

$$CAER = \beta + \beta_1 \times hnc1 + \beta_2 \times hp2 + \beta_3 \times hl3 + \beta_4 \times hprd4 + \beta_5 \times hlrd5 + \beta_6 \times gg6 + \varepsilon. (1)$$

$$CAER = \gamma + \gamma_1 \times js1 + \gamma_2 \times bj2 + \gamma_3 \times cq3 + \gamma_4 \times qh4 + \gamma_5 \times ff5 + \gamma_6 \times gs6 + \gamma_7 \times gd7 + \gamma_8 \times gx8 + \gamma_9 \times gz9 + \gamma_{10} \times hain10 + \gamma_{11} \times heb11 + \gamma_{12} \times hlj12 + \gamma_{13} \times henan13 + \gamma_{14} \times hub14 + \gamma_{15} \times nmg15 + \gamma_{16} \times j116 + \gamma_{17} \times ln17 + \gamma_{18} \times nx18 + \gamma_{19} \times shaanx19 + \gamma_{20} \times sd20 + \gamma_{21} \times shh21 + \gamma_{22} \times shanx22 + \gamma_{23} \times sc23 + \gamma_{24} \times tj24 + \gamma_{25} \times xz25 + \gamma_{26} \times xj26 + \gamma_{27} \times yn27 + \gamma_{28} \times zj28 + \gamma_{29} \times tw29 + \gamma_{30} \times aom30 + \gamma_{31} \times xg31 + \gamma_{32} \times hunan32 + \gamma_{33} \times anh33 + \gamma_{34} \times jx34 + \zeta. (2)$$

Note in Eqs. (1, 2), β is constant, β_j are regression coefficients, and ε are residual term for the model of behaviors, and γ is constant, γ_i are regression coefficients, and ζ is residual term for the model of areas.

4.2 Result of Regression for Behaviors

4.2.1 The factors entering the model

According to Table 3, the factors entered are production action (hp2), living action (hl3), production waste disposal (hprd4), and Government surveillance (gg6).

Table 3 Variables Entered/Removed for Behaviors

Model ^b	Variables Entered	Variables Removed	Method
1	gg6 hl3 hprd4 hp2 ^a		Enter

a. Tolerance = .000 limits reached. b. Dependent Variable: CAER.

4.2.2 The model with the entered factors

According to Table 4, the model with the entered factors for behaviors is as follows:

$$CAER = 9.813E^{-17} + 0.003 \times hp2 + 0.107 \times hl3 + 0.148 \times hprd4 + 0.037 \times gg6. (3)$$

Table 4 Coefficients for Behaviors

Model ^a		Unstandardised Coefficients		Standardised Coefficients
		B	Std. Error	Beta
1	Constant	9.813E ⁻¹⁷	0.000	
	hp2	0.003	0.000	0.145
	hl3	0.107	0.000	0.467
	hprd4	0.148	0.000	0.556
	gg6	0.037	0.000	0.492

a. Dependent Variable: CAER

Note in Eq. (3), China actual environmental risk is positively correlated with all the behaviors, including production action, living action, production waste disposal, and Government surveillance.

4.3 Result of Regression for Areas

4.3.1 The factors entering the model.

According to Table 5, the factors entered are Gansu (gs6), Hubei (hub14), Shaanxi (shaanx19), and Jiangxi (jx34).

Table 5 Variables Entered/Removed for Areas

Model ^b	Variables Entered	Variables Removed	Method
1	jx34 gs6 shaanx19 hub14 ^a		Enter

Tolerance = .000 limits reached. b. Dependent Variable: CAER.

4.3.2 The model with the entered factors

According to Table 6, the model with the entered factors for areas is as follows:

$$CAER = 1.981E^{-16} + 0.125 \times gs6 + 0.172 \times hub14 + 0.234 \times shaanx19 + 0.156 \times jx34. \quad (4)$$

Table 6 Coefficients for Areas

Model ^a		Unstandardised Coefficients		Standardised Coefficients
		B	Std. Error	Beta
1	Constant	1.981E ⁻¹⁶	0.000	
	gs6	0.125	0.000	0.459
	hub14	0.172	0.000	0.583
	shaanx19	0.234	0.000	0.683
	jx34	0.156	0.000	0.456

Dependent Variable: CAER.

Note in Eq. (4), China actual environmental risk is positively correlated with all the areas including Gansu, Hubei, Shaanxi, and Jiangxi.

4.4 Selection and Analysis of Principal Factors

4.4.1 Selection of Principal Factors

As seen in the two models above, first, such four factors as production action (hp2), living action (hl3), production waste disposal (hprd4), and Government surveillance (gg6) are entered for behaviors. And secondly such four factors as Gansu (gs6), Hubei (hub14), Shaanxi (shaanx19), and Jiangxi (jx34) are entered for areas. What stated above indeed attracts our further attention.

4.4.2 Analysis of Principal Factors' Influences

4.4.2.1 Overview

From the analysis above, we have known that between correlation analysis and regression analysis all the factors' influences are similar, because only the cases leading to the happening of CAER were collected, the positive correlation between them should be without doubt.

4.4.2.2 Detailed Analysis

Government surveillance. It should be positively correlated with CAER because lax management including Government surveillance may lead to CAER happening.

Such three behaviors as production action (hp2), living action (hl3), and production waste disposal (hprd4). They should be positively correlated with CAER because less environment-friendly technological innovations, more production of waste, and less-efficient disposal of waste, etc. may all lead to CAER happening [11].

Such four areas as Gansu (gs6), Hubei (hub14), Shaanxi (shaanx19), and Jiangxi (jx34). They should be positively correlated with CAER, the reason can be stated as follows: less environment-friendly technological innovations, more production of waste, and less-efficient disposal of waste, etc. may all lead to CAER happening [11], or/and lax management including Government surveillance may lead to CAER happening.

5 Principal Factors' Contribution and Sequence

Here we use principal component analysis to find principal factors' contribution and order them in sequence by their contribution.

5.1 Suitability of the Variables for Component Analysis

According to Table 7 and Table 8, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) is bigger than 0.5, so the variables are suitable for principal component analysis.

Table 7 KMO and Bartlett's Test for Behaviors

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.520
Bartlett's Test of Sphericity	Approx. Chi-Square	3.395
	df	6
	Sig.	0.758

Table 8 KMO and Bartlett's Test for Areas

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.608
Bartlett's Test of Sphericity	Approx. Chi-Square	0.620
	df	6
	Sig.	0.996

5.2 Extraction of Principal Components

According to Table 9, the contribution of the first component is 51.803%, the second 36.805%, the third 6.237%, and the fourth 5.155%. All the four components can explain 100% of variance, so we choose these four components to reflect all the variance.

Table 9 Total Variance Explained for Behaviors

Component ^a		1	2	3	4
Initial Eigenvalues	Total	2.072	1.472	0.249	0.206
	% of Variance	51.803	36.805	6.237	5.155
	Cumulative %	51.803	88.608	94.845	100.000
Extraction Sums of Squared Loadings	Total	2.072	1.472	0.249	0.206
	% of Variance	51.803	36.805	6.237	5.155
	Cumulative %	51.803	88.608	94.845	100.000
Rotation Sums of Squared Loadings	Total	1.042	1.016	0.976	0.965
	% of Variance	26.057	25.395	24.411	24.137
	Cumulative %	26.057	51.452	75.863	100.000

Extraction Method: Principal Component Analysis.

According to Table 10, the contribution of the first component is 41.897%, the second 25.532%, the third 18.469%, and the fourth 14.102%. All the four components can explain 100% of variance, so we choose these four components to reflect all the variance.

Table 10 Total Variance Explained for Areas

Component ^a		1	2	3	4
Initial Eigenvalues	Total	1.676	1.021	0.739	0.564
	% of Variance	41.897	25.532	18.469	14.102
	Cumulative %	41.897	67.430	85.898	100.000
Extraction Sums of Squared Loadings	Total	1.676	1.021	0.739	0.564
	% of Variance	41.897	25.532	18.469	14.102
	Cumulative %	41.897	67.430	85.898	100.000
Rotation Sums of Squared Loadings	Total	1.002	1.000	1.000	0.997
	% of Variance	25.061	25.009	25.000	24.930
	Cumulative %	25.061	50.070	75.070	100.000

5.3 Ordering Principal Factors by Their Contributions

Before ordering principal factors by their contributions, we should first analyze Component Matrix and Rotated Component Matrix. Component Matrix can reflect principal factors' initial loadings, and Rotated Component Matrix can make us see the difference between their loadings more easily and clearly.

5.3.1 Behavior Angle

According to Table 11 and Table 12, the first component (i.e. production waste disposal component) including production waste disposal (hprd4) contributes 51.803%. The second component (i.e. management component) including Government surveillance (gg6) contributes 36.805%. The third component (i.e. living action component) including living action (hl3) contributes 6.237%. The fourth component (i.e. production action component) including production action (hp2) contributes 5.155%. And they all contribute 100%.

Table 11 Component Matrix for Behaviors

	Component ^a			
	1	2	3	4
hp2	0.920	0.153	-0.252	0.257
hl3	0.794	-0.487	0.361	0.050
gg6	0.744	0.587	-0.009	-0.321
hprd4	-0.204	0.932	0.236	0.186

Extraction Method: Principal Component Analysis, and 4 components extracted.

Table 12 Rotated Component Matrix for Behaviors

	Component ^a			
	1	2	3	4
hprd4	0.944	0.189	-0.271	-0.020
gg6	0.219	0.898	0.137	0.357
hl3	-0.320	0.149	0.893	0.280
hp2	-0.036	0.390	0.296	0.871

Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser Normalization, Rotation converged in 6 iterations.

Seen from the analysis above, principal factors can be ordered by contribution as follows: production waste disposal (hprd4), Government surveillance (gg6), living action (hl3), and production action (hp2).

5.3.2 Area Angle

According to Table 13 and Table 14, the first component (i.e. Shaanxi component) including Shaanxi (shaanx19) contributes 41.897%. The second component (i.e. Gansu component) including Gansu (gs6) contributes 25.532%. The third component (i.e. Jiangxi component) including Jiangxi (jx34) contributes 18.469%. The fourth component (i.e. Hubei component) including Hubei (hb14) contributes 14.102%. And they all contribute 100%.

Table 13 Component Matrix for Areas

	Component ^a			
	1	2	3	4
hub14	0.794	-0.080	0.254	0.547
jx34	0.764	-0.232	0.326	-0.507
gs6	0.113	0.961	0.245	-0.065
shaanx19	-0.671	-0.196	0.713	0.059

Extraction Method: Principal Component Analysis, and 4 components extracted.

Table 14 Rotated Component Matrix for Areas

	Component ^a			
	1	2	3	4
shaanx19	0.982	-0.048	-0.119	-0.139
gs6	-0.046	0.999	-0.016	0.018
jx34	-0.123	-0.017	0.969	0.212
hub14	-0.145	0.020	0.214	0.966

Extraction Method: Principal Component Analysis, Rotation Method: Varimax with Kaiser Normalization, Rotation converged in 4 iterations.

Seen from the analysis above, principal factors can be ordered by contribution as follows: Shaanxi (shaanx19), Gansu (gs6), Jiangxi (jx34), and Hubei (hb14).

6 Conclusion and Related Advice

From behavior angle, by regression analysis, we have known that such four factors as production action (hp2), living action (hl3), production waste disposal (hprd4), and Government surveillance (gg6) are principal factors influencing CAER. By component analysis, we have known that such four components as production waste disposal component, management component, living action component, and production action component are principal components influencing CAER: production waste disposal component including production waste disposal (hprd4) contributes 51.803%. Management component including Government surveillance (gg6) contributes 36.805%. Living action component including living action (hl3) contributes 6.237%. Production action component including production action (hp2) contributes 5.155%. We have also known that principal factors can be ordered by contribution as follows: production waste disposal (hprd4), Government surveillance (gg6), living action (hl3), and production action (hp2).

From area angle, by regression analysis, we have known that such four factors as Gansu (gs6), Hubei (hub14), Shaanxi (shaanx19), and Jiangxi (jx34) are principal factors influencing CAER. By component analysis, we have known that such four components as Shaanxi component, Gansu component, Jiangxi component, and Hubei component are principal components influencing CAER: Shaanxi component including Shaanxi (shaanx19) contributes 41.897%. Gansu component including Gansu (gs6) contributes 25.532%. Jiangxi

component including Jiangxi (jx34) contributes 18.469%. Hubei component including Hubei (hb14) contributes 14.102%. We have also known that principal factors can be ordered by contribution as follows: Shaanxi (shaanx19), Gansu (gs6), Jiangxi (jx34), and Hubei (hb14).

In one word, CAER has been affected mainly by behavior factors and area factors. And our related advice is as follows: first, emphases should be put on protection and improvement of natural environment, as natural cause (i.e. natural resources deterioration) can lead to CAER. Secondly financial institutions should carry out stringent monitoring to manage to select “clean firms”, or raise interest rate for financing for “unclean firms”, or raise insurance premium on “unclean firms” and “unclean projects”, etc., to try to avoid or reduce CAER in such behaviors as production action (hp2), living action (hl3), and production waste disposal (hprd4), etc., and in such areas as Gansu (gs6), Hubei (hub14), Shaanxi (shaanx19), and Jiangxi (jx34), etc.. Thirdly enterprises and Governments should take the following measures to try to make the firms, behaviors, areas and environment “clean”: the first is strict management including Government surveillance on production of waste from such behaviors as production action (hp2), living action (hl3), etc. [12]. The second is great encouragement to environment-friendly technological innovations in waste disposal including production waste disposal (hprd4) [13], etc.. And the third is different emphasis of management in different areas, such as air pollution (e.g. inhalation of pollutants) and water shortage in Gansu, industry pollution and water pollution in Hubei and Jiangxi, and pollution of resources excavation and refinement in Shaanxi, etc.. And fourthly financial institutions, enterprises and Governments should take appropriate measures according to principal factors’ influences and contribution sequentially and accordingly when performing environment-related operations with the behaviors and areas above, etc. [14].

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THE ROLE OF LATIN ALPHABET IN ECONOMIC INTEGRATION OF TURKIC STATES: NEW TRENDS AND OPPORTUNITIES

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ABSTRACT

As core of Turkic integration the humanitarian component traditionally acts where the general alphabet is the main question. Latin alphabet may be a new integration process between Turkic states in such spheres as cultural-humanitarian and political-economical cooperation.

The present paper presents the problem formation in economic integration of the Turkic states by means of Latin graphics and the author puts forward a number of constructive recommendations on the formation of whole Turkic alphabetic space.

Key words: the Latin alphabet, an economic integration, the Turkic States, the Turkic business council, the customs procedure.

INTRODUCTION

The Turkic world occupies a considerable part of the Eurasian continent. The demographic data testifies that approximately 200 million of people now are of a Turkic origin united by ethnogenesis, mentality, language, history, the literature, spiritual and material culture, life style, traditions, customs and ceremonies of the people.

Turkic peoples are settled at the vast territory from Arctic and Pacific Oceans to Mediterranean Sea and Balkans. All Turkic languages are considered by scientists to be mutually intelligible. It is explained with that in the past Turkic peoples were a single people and then a group of geographically and ethnically close peoples, which later settled in the vast areas of Eurasia.

Spiritual heritage of the Turkic world and its centuries-old subculture are a component of all world civilization. It is quite obvious that this cultural originality which is being kept in all historical periods will define a spiritual essence and a place of Turkic people in an incorporated stream of world intellectual development in XXI century.

The states created by Turkic peoples throughout centuries, the development influenced neighboring countries. And the graphic evidence to it is the use of Turkic words in the most various countries.

The last culturological researches testify that after overthrow of social ideal tendencies of consolidation of cultures on their ethno level have amplified. Similarity or, on the contrary, distinction of mentality and the history of the people became essential argument in their relations. It has led to the proclamation to a new cultural slogans regarding as of paramount importance ethnic, language and historical affinity of the people.

THE ALPHABET AS THE INSTRUMENT OF ECONOMICAL INTEGRATION

It is known that now for cultural development the mass audience is necessary. All modern media and entertainments: journals, literature, cinema, television, computer games, the Internet sites, show business develop under market laws and demand a mass edition or the mass consumer to provide profit of the publisher and the author (or at least to pay expenses on the edition). For language work such circulation can be provided only at a certain population using this language. At number less certain «critical weight» in such language isn't present commercial sense to release books, films, audiodisks, computer games and programs or create of Internet sites. And without it language is doomed on a survival, on gradual dying off and absorption by other stronger languages. Also as at division of kernels of uranium into development of chain reaction the critical mass of uranium is required, for language development (development, instead of existence) is required critical population. What this critical number – a question disputable, but, for certain, is estimated in millions, or even in tens of millions. For example, the Kazakhstan film director Ardak Amirkulov argues that profitable production and hire of films needs about 50 million population. Taking into account that books are read by a smaller part of people, it is possible to the same about the literature.

Thus, in modern conditions progress and development of language are impossible without a certain population. The population of many Turkic minority and even the states much less this critical number. At existing situation absorption of their native language by stronger world languages inevitably in the near future. Disappearance of small languages is a universal tendency. It is known that now in the world each two weeks one small unwritten language disappears. These disappearing languages have no alternative, but small Turkic languages have it. Use of the all-Turkic alphabet on the basis of Latin graphics will allow all Turkic people to avoid economic localization, and on the contrary to develop the international tourism and business. Other important aspect of creation of all-Turkic alphabetic space is the repeated increase in a uniform language field that becomes incentive for cultural development and stimulates political and economic integration.

The problem of development of writing of each nation is one of the major problems in development of its spiritual and intellectual manufacture. Each person, since the childhood communicating with mother and family is bringing up it, masters its language in the oral form. However possession of oral speech is only the first stage on a way of mastering by the written form of language. The mankind has thought up various forms of writing: the pictography-ideographic (verbal) letter, the syllabic letter and the alphabetic letter. The most developed form of writing is the alphabetic system of the letter. It allows to minimize intellectual efforts and time necessary for effective

and high-grade development of the written form of language on the basis of knowledge of the oral speech, a being oral form of this language.

At use of alphabetic system of the writing used in oral speech the grapheme that is a written sign which is considered a written equivalent of a phoneme is compared with each phoneme. In an ideal case there is an isomorphism between system of phonemes and system of graphemes. It allows mastering quickly the alphabet consisting in the majority of languages from approximately thirty-forty graphemes, and on the basis of knowledge of oral speech to master a written language.

Actually in this ideal case studying of a written language is reduced to studying oral speech and the alphabet providing isomorphism of oral and written forms of language. Thus of additional studying and storing of each separate written image of a word in lexical fund it is not required. However in most cases this ideal is not realized, as the significant part of mankind applies hieroglyphic or hieroglyph-syllabic system of the writing, and in many other things written languages at graphic expression of oral speech there are many exceptions to the rules of the alphabetic letter.

One of fundamental problems of practical realization of a principle of development in system of writing of mankind is that the maximum form of development of writing is the alphabetic writing, however the alphabet in many countries is not applied. In them hieroglyphic or syllabic writing is applied. In China with the population more than 1 300 million person is applied hieroglyphic writing. In Japan with the population more than 125 million person and both national states of the Korean nation having an aggregate number of the population more of 65 million the person, is applied the mixed writing -hieroglyphic and syllabic simultaneously. Thus, the fourth part of mankind applies hieroglyphic writing which demands huge expenses of time and not creative intellectual efforts for achievement of isomorphism of oral and written forms of language in intelligence studying language in this or that form.

As the President of the Republic of Kazakhstan Nursultan Nazarbaev has noted the Turkic people, having acted as a unit, can influence geopolitics as the subject equal in rights to participate in cultural peace related not as a passive element, but as the subject equal in rights. It would be desirable to notice, that in the 20th century pressure on global modern calls, such as loss of national identity, subsequently native language loss can reject the Turkic people, is possible through creation general Turkic alphabet on the basis of a Latin drawing.

The negative tendency is that development of Turkic languages has gone and continues to go independent from each other by that in certain degree has affected a distance of Turkic languages from each other.

Here is the numbers of above mentioned languages speakers in the world:

Table 1.

	Language	Number of speakers
1	Chinese dialects	1 136 million
2	Spanish dialects	322-400 million
3	English	309-400 million
4	Arabic dialects	186-422 million
5	Russian	164-170 million
6	Turkic languages	180-185 million

*Source: Wikipedia

If the Turkic people, have created general Turkic alphabet on the basis of a Latin drawing and have introduced it for use in Turkic community this alphabet on the potential could be carried to number of regional prepotent alphabets.

In present time, in connection with absence of the uniform standard alphabet, the Turkic people are divided behind frameworks of interstate sphere into spheres of action of other regional languages – Russian, English, Farsi, Chinese etc. For official mutual dialogue, for example, between the Turkic CIS countries Russian, between Turkey and the Turkic CIS countries is used English, Turkic from Iran and Turkic from Afghanistan most likely will use Farsi for dialogue among themselves and etc.

Here is approximate number of Turkic-speakers settled in regions with certain language domination within region or above national level (particularly in inter-Turkic communication):

Table 2. (Source: Wikipedia)

	Language dominated	Region	Number of Turkic Population	Share in total Turkic Population
1	English	Turkey	≈ 75 million	≈ 41%
2	Russian	CIS	≈ 66 million	≈ 36%
3	Farsi	Iran and Afghanistan	≈ 23 million	≈ 12,5%
4	Chinese	China	≈ 15 million	≈ 8,2%

THE ALPHABETIC REFORM OF THE TURKIC STATES: PAST, PRESENT AND FUTURE

According to British researcher Mark Dickens, Bolsheviks could have created common-Turkic language in USSR in 1920-s in the frame of the policy of merging of peoples. But this contradicted the interests of Bolsheviks to disunite the Turkic community, that's why they carried out policy of not simply creation of separate Turkic languages but emphasizing the differences between them [Dickens, M (1988)].

As a result of alphabetic reforms carried out in 20-40 years of the XX century the Soviet Union there was a division of the Turkic world into more than 30 literary languages. Also it is reform for the first time it was tested in Azerbaijan.

In 1926 at Turkological conference in Baku representatives of the Turkic nations of the world have voluntarily come to the decision that for disposal of lacks of Turkic writing on the basis of the Arabian alphabet and progress achievement in an education system, a science and the culture, expediently agreed and coordinated to pass to the Latin alphabet. The USSR under the guidance of I. Stalin initiated this transition in explicit to not expressing hope of finishing till the end of a partition of Turkic ethnos, through a partition of community of potential carriers of a uniform literary language «Turk » with potential uniform ethnic identity «Turk» on communities of carriers of dialects of this uniform literary language, convinced that they represent separate ethnics with separate literary languages. This transition within several years has been carried out at all Turkic people of the USSR. The sovereign Turkish Republic under the guidance of Mustafa Kamal Atatürk also coordinated has passed to the unified Latin to be modernized and to appear in isolation from the majority of other Turkic people. Chauvinistic, predominant force the error, I. Stalin's crime concerning Turkic languages and their writings and have not been corrected in the totalitarian mode. As a result of chauvinistic activity of the dominating nations of Russian empire, the USSR, China, Iran, Afghanistan, combating against revival, cooperation and rapprochement of the Turkic people and them languages, there was a situation when for 39 phonemes available in Turkic languages it is used about 150 graphemes.

In the end of 20th century historical justice has triumphed - the Turkic people restore the right to solve questions of the development and cooperation without orders from the outside. It has similarly arrived in Azerbaijan, Uzbekistan and Turkmenistan. The Karakalpak and Crimean-Tatar languages also have passed to a Latin. However, unfortunately, return transition from Cyrillic on a Latin, also as well as transition from a Latin on Cyrillic, goes without coordination and unification and consequently the number of graphemes for the same 39 Turkic phonemes more and more increases. It would be expedient to adjust interstate cooperation between sovereign Turkic states, and also the states in which live, not being the title nations, the separate Turkic nations or numerous Turkic groups, concerning perfection of alphabets of the Turkic people» [Karimov, B., Karimova, U. (2006)].

In 1926 in Baku at the first Congress of the Turkic people the decision on transition to the Latin alphabet was made. In compliance with this decision Turkey in 1928 g and the Soviet Turkic republics in 1929 passed to Latin. But, subsequently, in 1939-40, according to Stalin all Turkic republics of the Soviet Union were violently transferred to Cyrillics. After disorder of the USSR at numerous All-Turkic Congresses and specialized symposiums the decision on transition to the Latin alphabet was confirmed. Azerbaijan, Uzbekistan, Turkmenistan began transition to Latin in the first years after independence finding.

In Kazakhstan the question of transition to Latin is roughly discussed in mass media from 1990s. In October 28, 2006, the president of the Republic of Kazakhstan N.A.Nazarbayev in the performance on XII session of Assembly of the people of Kazakhstan having mentioned this problem noted that: «... it is necessary to return to a question of transition to Latin graphics in Kazakh alphabet. Experts within half a year should study a question and make their proposals». The president Nursultan Nazarbayev reminded that now Kazakhs in the different countries use three alphabets. In Kazakhstan, Russia and a number of CIS countries is applied Cyrillics, in Turkey and the European countries – Latin, and in China – the Arab font. In July 19th, 2007 the Committee of Science of the Ministry of Education and Science of the Republic of Kazakhstan published preliminary analytical report in which recommended passing to Latin graphics gradually. In Kazakhstan Cyrillics, still in use, but sooner or later transition to Latin is inevitable.

Now to get good education and the information, representatives of the Turkic people need to learn other regional languages. Creation of general Turkic alphabet on the basis of the Latin drawing, allowing to store the information not one, and all Turkic people, would allow in most degree to manage this language which was besides native for all Turkic.

The affinity of Turkic languages creates huge possibilities which should are used before the Turkic people, but eventually are lost. Creation and introduction general Turkic alphabet on the basis of a Latin drawing, would give to the Turkic people following advantages:

- 1) Expansion of possibility of Interturkic dialogue.
- 2) Storage and using the information of all Turkic people.
- 3) Growth of the importance of each Turkic language.
- 4) This alphabet unlike other regional alphabets would be the most suitable to Turkis.
- 5) Studying of this alphabet would be much easier, than studying of other regional alphabets.
- 6) Achievement of economy of resources, as owing to the decision of communication and information problems, and owing to rather small expenses for studying of the given alphabet.
- 7) Development of cultural-spiritual and political-economical integration in the conditions of globalization.

GEOPOLITICAL AND GEOECONOMIC SITUATION OF THE TURKIC STATES IN THE CONDITIONS OF GLOBALIZATION

In the end of XX-century with the growth of ethnical self-consciousness of the Turkic peoples and with the emergence of independent Turkic states, the idea of necessity of convergence and developing cooperation between Turkic peoples gained a new impulse, though according to the above-mentioned reasons it did not become popular. However the following premises for integration of the Turkic peoples make the integration intensification indispensable and a wider spread of the idea amongst the Turkic public expected:

1. Requirement of joint activity on conservation and development of cultural and spiritual potential of the Turkic world.

2. Demand in consolidation of Turkic region's potentials in terms of regionalization of the whole world.
3. Requirement of centralized vindication of interests of the Turkic world subjects because of its situation in the center of Eurasia in the intersection of interests of the most powerful global actors
4. Community of geo-economic interests which particularly proceed from:
 - 4.1 Location of the most of the Turkic countries inside the continent which is associated with the lack of access to sea and their being closed up on each other which results in necessity of the joint efforts for access to sea and to additional transport routes
 - 4.2 Location of the most of the Turkic countries at the centers of existing and potential routes of commodities and energy resources transportation and necessity of decreasing the barriers at these routes in order to encourage commodities and energy resources transportation at trans-Eurasian itineraries [Khaydarov, M. (2011)].

Basic problem of the Turkic world is also lack of the general borders. If Kazakhstan, Kyrgyzstan, Turkmenistan and Uzbekistan border with each other, from Azerbaijan they are separated by the Caspian Sea. Actually, Azerbaijan has not also bordered with Turkey. On a small site the autonomous republic Nakhichevan borders with a part of Azerbaijan which is however separated from the main territory of the country Armenia. Territorial dissociation of the main centers of the Turkic world stirs implementation of joint economic projects. Export of oil and gas resources with which Central Asia is rich could become their key link. However lack of regulation of legal status of the Caspian Sea and dispute concerning accessory of a number of sea fields between Azerbaijan and Turkmenistan stir implementation of these projects. As a result economic cooperation of the Turkic states obviously revolves. For example, commodity turnover of Kazakhstan with the Turkic countries in 2009 made only 3,7 billion dale or 3,8 % of its total amount.

In recent years the idea of cultural, economic, and subsequently political association of the Turkic people received a new impulse. Turkic congresses and assemblies, the summits of heads of states are carried out, the Turkic Parliamentary Assembly is created, Nazarbayev's proposal on creation of the Union of the Central Asian states is discussed.

On the 3rd of October, 2009 in the city of Nakhichevan of the Republic of Azerbaijan the Turkic council was created. Members of this international organization are Turkey, Azerbaijan, Kazakhstan and Kyrgyzstan. But Uzbekistan and Turkmenistan did not join in this organization. In addition, since 1992 there is an Incorporated organization of Turkic arts and languages TURKSOY, and since 1998 Parliamentary Assembly of the Turkic countries. Both organizations are a part of Turkic council.

It is important to note that Turkic council isn't directed against any third countries and in its own activity it will be completely attached to the purposes and principles of the United Nations, norms of international law, and also the obligations taken within OSCE and other international organizations where Turkic states are presented.

On October 13, 2011 the first meeting of Ministers of economy of Council of cooperation of the Turkic states took place in Astana. During a meeting of Ministers of economy, questions of improvement of investment climate, increase of an economic diversification, development of transport corridors and business were discussed. And on October 21, 2011 in Almaty passed the First summit of Council of cooperation of the Turkic states.

The chairman of the board of cooperation of the Turkic countries Nursultan Nazarbayev began the opening speech with pleasant news and an assignment. He gave to the secretariat a task to be prepared to the accession to the organization of Uzbekistan and Turkmenistan. This fact should increase even more potential of association of the brotherly world which includes about 40 nations and nationalities. Promotion of the general Turkic culture should become the Council stronghold.

One more important direction is, of course, trade-economical cooperation. Today, according to Nazarbayev, the volume of commodity circulation is far from real possibilities. It is necessary to eliminate barriers, to introduce innovations and to develop actively transport and transit potential.

It is known that the Turkic countries cover a considerable biostrategic area and, in principle, are of interest both for regional development of these countries, and for the leading states of the world which have interests in this region. In a certain measure it is connected with stocks of hydrocarbons which our countries have. At this summit the President of Kazakhstan Nursultan Nazarbayev offered, that Turkic council geographically and energetically became a link between the East and the West.

Being the chairman of Turkic Council, Kazakhstan advanced the offers in the economic sphere. The decision on creation of Turkic business council was made. There will be working groups on various economy spheres; their structure will include representatives of a private sector, of the state structures, and also the Secretariat of the Cooperation Council of Turkic Speaking States

Definition of problem points and ways of deliverance the barriers interfering development of the trade and economic relations between the states becomes a task of the working groups. In particular, at the first meeting of a business community of the Turkic countries the Secretary General of Turkic Council Halil Akinci told: «I know that all businessmen complain of customs procedures. So far as concerns trade between our countries, the customs question, and also obtaining documents on transit prevails. We should create the facilitated system for our countries».

Thus one of the main problem disturbing to economic integration of the Turkic peoples, on customs procedure is differences in graphic basis of alphabets. The Turkic people use three different graphic systems of the letter: Latin, Cyrillics and Arabic. Necessity of a uniform graphic basis of alphabets is obvious. Therefore the most actual problem of the Turkic world is creation of the all-Turkic alphabet on the basis of unified Latin graphics.

In May 25, 2010 in Astana President of Kazakhstan Nursultan Nazarbayev and President of Turkey Abdullah Gül opened the new research center – «Turkic academy».

The initiative of creation of Turkic academy which would be engaged in studying and research of language, history and culture of the Turkic people, belongs to the Kazakhstan leader and to them for the first time was stated in October, 2009 at the IX summit of Heads of the Turkic countries in Nakhichevan (Azerbaijan).

Speaking at opening ceremony, the Head of Kazakhstan noted that opening of Turkic academy is really the historical event which value is invaluable in the course of adjustment of cultural and humanitarian communications between the Turkic people.

Turkey thanks to its potential undoubtedly will play a key role in the Turkic world. Turkey's potential has always objectively served for conservation and strengthening of the rest part of the Turkic world, and because of this Turkey deserves gratitude of the whole Turkic world. Along with this Turkism is expedient to be developed not as a strengthening of subject Turkey's influence to object Turkic world but as a motion of subjects of the Turkic world towards each other. This tendency is beginning to dominate as per reinforcement on world arena of positions of Turkic states that gained independence in 1991 and other Turkic regions as well as intensification of their role in the Turkic integration which is especially noticeable by example of Azerbaijan and Kazakhstan. In order to promote this tendency it is required to pursue a policy of geographical and financial distribution amongst the whole Turkic world of the projects having common-Turkic significance.

Civilization proximity of integrating countries is the foundation ensuring facility of the integration and its durability. Despite the historically cultural proximity of Turkic peoples during the last two centuries they were incorporated into different empires often hostile to each other or isolated from each other, and within these empires policy of disuniting Turkic peoples had been pursued, which resulted in civilization split between Turkic peoples.

CONCLUSION

Creation for mutual dialogue, training and information storage of the general Turkic alphabet is vital because by a question that or the Turkic community realizes the not used potential is and will achieve the above-stated advantages, or will continue to lose the most part of the potential caused by affinity of Turkic languages.

Irrespective of, how much successful there will be a project on creation and distribution of the general Turkic alphabet, with a view of use of advantages and potential of affinity of Turkic languages for the Turkic people it is possible to consider a minimum as the program:

1) Transition of all Turkic people on unified (or as much as possible close) to the schedule. This drawing can become only Latin, owing to following reasons:

1. Other two variants of a drawing - Cyrillic and Arabian is a drawing of the countries in which Turkic are subject to the maximum danger of assimilation –

Russia, Iran and Afghanistan. The Latin drawing is means of overcoming of this factor.

2. The Latin drawing is the most widespread in the world and means of the maximum access to world information system.

3. The Latin drawing is a communication facility of Turkic languages with the Turkish language which is most developed and having most extensive sources of the information among Turkic languages.

2) coordination Adjustment in sphere of development of Turkic languages at which the maximum identity of entered terms should be provided, up to cancellation before the entered terms and to transition to the general words.

Each Turkic language is a key to other Turkic languages. Means, that if someone will learn, for example the Tatar language, 2-3 months is required to it only to learn Kazakh etc.

The history has supplied Turkic with rather close languages. A duty of the Turkic people is use of this great possibility. Than Turkic languages to each other are closer:

1. than more possibility to use information resources and the literature, available in one Turkic language other Turkic people.

2. Than more possesses the importance each Turkic language separately. Important that any language is not necessary on a place, all languages are in a development stage. Turkic languages also constantly move in any direction and it is necessary for this process to give a desirable direction, i.e. coordinated to promote their movement in a direction each other.

Regional economic-political integration of Turkic peoples can have either ethnic or not on principle ethnic character, because Turkic regions are related with economic and political ties to non-Turkic regions; in this connection isolationistic approach would result in losses for all interconnected regions. Together with this efforts on integration of all Turkic peoples within a single integration should be condition for such integration but the main condition is appropriate vindication of interests of the Turkic peoples within the integration particularly by means of consolidated vindication of interests of the Turkic peoples [Khaydarov, M. (2011)].

Civilization character of integration is a basis to choose as an object of integration of not the Turkic states but the Turkic community and to intensify civil initiatives in the integration process, i.e. increase the role of non-governmental organizations.

As priority measures of intensification of the Turkic world integration it is recommended to focus the efforts of non-governmental and governmental bodies on the following activities:

1) Organization of cultural-educational satellite TV channels (taking into consideration large-scale involvement and accessibility of television) embracing the whole Turkic world both in terms of broadcasting geography and information constituents.

Organization of such television seems to be the most topical problem of today of integrating the Turkic world because the main problem that requires primary solution is a vacuum of information about the Turkic world in the Turkic world itself as well as beyond the Turkic world.

As long as organization of such television is a matter of much time and efforts coordinated broadcasting of TV channels of Turkic states and regions via single satellite at adjacent frequencies can be a preliminary solution of the problem, as well as organization of broadcasting of TV channels of one Turkic state at the territory of another.

Within the course it is required to stimulate on the Turkic states TV channels the Turkic world subject which is now being represented inadequately.

2) Coordination of Turkic languages development and policy on their mutual approximation.

The languages of Turkic peoples are mutually intelligible and that is the specific and advantage of Turkic peoples as compared to other groups of ethnically close peoples, as well as it is one of the foundations of the Turkic peoples' unity. In this connection it is

necessary to pursue dedicated concerted policy of coordination of Turkic languages development, in order to vector their development not in different but in approximating directions.

3) Joint educational and scientific programs, translations of the heritage of one Turkic people to other Turkic peoples' languages and its popularization amongst them, joint cultural activity.

4) Consultations on unification of norms and standards, on simplification of trade, investment and visa procedures, encouragement of business relations and tourist flows between the Turkic regions.

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CLIMATE DERIVATIVES AND AN EXAMINATION ON WEATHER RISK INSURANCE

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ABSTRACT

Weather derivatives are derivative financial instruments, whose underlying is meteorological data such as temperature, wind, or precipitation. Weather derivatives are a relatively recent innovation. Derivatives have evolved to be one of the most important tools of risk managers across industries and countries. Chicago Mercantile Exchange (CME), are the fastest growing derivative market today. Weather derivatives are gaining popularity in the investment community. Weather risk markets provide new opportunities for developing countries to transfer weather-related loss-risks. We discuss rainfall insurance using financial derivatives. The paper presents an illustrative example that show how to price an option about an unusual weather event, using historical simulation. We gathered rainfall data in Antalya between 1970 to 2011.

Key Words: *Weather Derivatives, Weather Risk Insurance, Weather Derivatives Instruments*

1. INTRODUCTION

Last few years there has been a huge increase in traded volumes on derivatives with no financial underlying assets which are in some aspects different to the traditional commodities. These are derivatives on damages caused by catastrophes and weather derivatives[1].

Weather derivatives are financial instruments created to stabilise volatility in revenues and expenses, caused by unpredictability of weather conditions [2]. Many companies are face to ‘weather risk’. Companies can hedge the risk by trading in weather derivatives. Weather risk markets are among the newest and most innovative of markets for transferring financial risks. The financial instruments traded in weather risk markets are often called weather derivatives. Though there is some variability in the specific characteristics of weather derivatives, most are essentially index options. [3]. Recently a new class of financial instruments -*weather derivatives*- has been introduced to enable business to manage their *volumetric risk* resulting from unfavorable weather patterns. Weather derivatives represent an alternative tool to the usual insurance contract by which firms and individuals can protect themselves against losing out because of unforeseen weather events. Insurance provides protection to extreme, low probability weather events, such as earthquakes, hurricanes and floods, etc.. Instead, derivatives can also be used to protect the holder from all types of risks, included uncertainty in normal conditions that are much more likely to occur [4]. Most derivatives can be used to manage price risk, but weather derivatives can also be used to manage volume risk. The primary difference between insurance and traditional derivatives markets is the fact derivatives are written on underlyings that are broadly traded assets (stocks, commodities), or on variables related to traded assets (rates in bonds), and market participants do not directly influence the prices of the underlying assets[5]. In a weather derivative transaction, variables such as temperature, precipitation, wind or snow are measured and indexed covering a specified amount of time at a specified location. A threshold limit regarding the actionable level of the measured variable is agreed upon by the buyer and seller. If the threshold limit is exceeded during the set timeframe, the buyer receives payment. If the weather variable does not exceed the limit, the seller keeps the premium paid by the buyer[6].

Weather derivatives have several important elements[7]:

(1) The payoffs for weather derivatives do not depend on direct losses suffered by the insured. (2) They give the opportunity to cover a position against the effects of weather volatility that occurs in a very different geographical area than the one in which the owner of the contract is. (3) Weather derivatives provide the owner the possibility of covering against the effects of *volume* volatility. Other derivatives normally cover for *price* fluctuations

Finally, a weather market did not seem so unusual in the 1990s as it would have done in the 1970s, because of the rise of other environmental markets, particularly in air pollutants. The focus on atmospheric pollution and the global climate change debate put climate discourses at

the centre of business attention. The fear of climate change spurred some companies into examining what effect it might have on their profits and operations[8]. Several important issues must be addressed before weather risk management instruments can be used effectively in developing countries. These issues are not necessarily exclusive to developing countries, but they may be more problematic in a developing country context. It is critical that reliable and verifiable weather measurement systems be in place.

More specifically, there must be [9]:

1. accurate, complete, and available historical weather data; and
2. mechanisms in place to insure the security of future weather measurements

2. WEATHER DERIVATES INSTRUMENTS

The list of actual contracts in use is extensive and constantly evolving. Most of the weather derivatives traded up to date have been swaps and put or call options or combinations of these. In recent months, the weather derivatives market is starting to see customized structures for specific needs, such as binary or digital options, which either pay a fixed sum or zero depending on whether the payoff is satisfied, and double-trigger options, which payoff only if two conditions are met [10].

There are five essential elements to every weather contract [11]:

- (1) the underlying weather index,
- (2) the period over which the index accumulates, typically a season or month,
- (3) the weather station that reports daily maximum and minimum temperatures,
- (4) the dollar value attached to each move of the index value,
- (5) the reference or “strike” value of the underlying index

The most common types of weather derivative contracts are weather swaps, weather futures, weather options that is call options (weather caps), put options (weather floors) and weather bonds. [12].

2.1 Weather Futures

Futures contracts traded on the Chicago Mercantile Exchange (CME). The CME offers trading with futures based on the CME Degree Day Index, which is the cumulative sum of daily HDDs or CDDs during a calendar month, as well as options on these futures. The CME Degree Day Index is currently specified for eleven US cities. The HDD/CDD Index futures are agreements to buy or sell the value of the HDD/CDD Index at a specific future date. The notional value of one contract is \$100 times the Degree Day Index, and the contracts are quoted in HDD/CDD Index points. The futures are cash-settled, which means that there is a daily marking-to-market based upon the index, with the gain or loss applied to the customer’s account [13].

2.2 Weather Options

There are two types of weather options : calls and puts. A call option allows a company to protect itself against the high index levels and a put option allows a company to hedge against the low index levels [14].

A generic weather option can be formulated by specifying the following parameters [13]:

- The contract type (call or put)
- The contract period (e.g. January 2001)
- The underlying index (HDD or CDD)
- An official weather station from which the temperature data are obtained
- The tick size
- The maximum payout (if there is any)

2.3 Weather Swaps

In traditional derivatives markets a swap is the agreement to exchange risk (cash flow) in the future according to a prearranged formula. The most well-known swap is probably interest rate swaps where the usual set-up is one side paying a fixed rate while the other side pays a variable rate the swap of these cash flows often involve several swap dates [15]. In this type of derivative there is only one date when the cash flow is swapped, as opposed to interest rate swaps which usually have the swap dates. The swap with only one period is thought to be a forward contract although; the contract period is often a single calendar month. In the case of the Standard HDDs, the parties agree on a given strike of the HDDs for the period and the swapped amount [16].

2.4 . Weather Linked Bonds

Bond represents debt instrument which requires from the issuer to repay the amount borrowed plus interest to the investor In October 1999, weather market developed further by launching new asset class – weather linked bond In this way financial risk has been repackaged and sold into the wider investment community. It is said that weather linked bonds have the same pattern of development as catastrophe bonds [17]. A catastrophe bond (also known as a CAT bond) is a high-yield debt instrument that is used to raise money in anticipation of a catastrophe such as an earthquake or hurricane. These instruments transfer a particular set of risks from the sponsor to the investors. They work like floating-rate corporate bonds whose principal is either deferred or completely forgiven if specified trigger conditions are met. For example, if an insurer has built up a portfolio of risks by insuring homes in California, they might wish to pass on some of the risk in case an earthquake occurs, thus leaving them insolvent. In this case, they could choose to sponsor a CAT bond, which would pass the risk on to investors [18].

3. AN EXAMINATION ON WEATHER DERIVATIVES

A derivative on the rainfall level in Antalya can be used to manage quantity and price risks in power production. In the tourism sector firms can be used to face the power cost or to deal with the occupation level risk in hotels. Our illustrative example is that of a *Daily Rainfall Range 5 call option*. This example applies to the case when a rainfall range of at least range 5 has been forecast. This example adopted from [19].

The Contract details as follows:

Location: Antalya

Type of asset: rainfall

Strike: range 5 (average of year)

Expiry: April 2013

Notional: 1000 TL per rainfall range above range 5

Where:

Rainfall range 0: nil

Rainfall range 1: 0.1 mm to 300 mm

Rainfall range 2: 301 mm to 600 mm

Rainfall range 3: 601mm to 900 mm

Rainfall range 4: 901 mm to 1200 mm

Rainfall range 5: 1201 mm to 1500mm

Rainfall range 6: 1501 mm and above

Payoff Call: $1000 \text{ TL} \times \text{Max}(0, \text{rainfall}_{t/T} - \text{range } 5)$

If, at the expiry of a call option contract, the actual rainfall range is greater than the strike (range 5), the seller of the option pays the buyer ~ 1.000 for each rainfall range it is above range 5. We note that between 1970-2011, there were 15 forecast of at least range 5. See figure 1 [20].

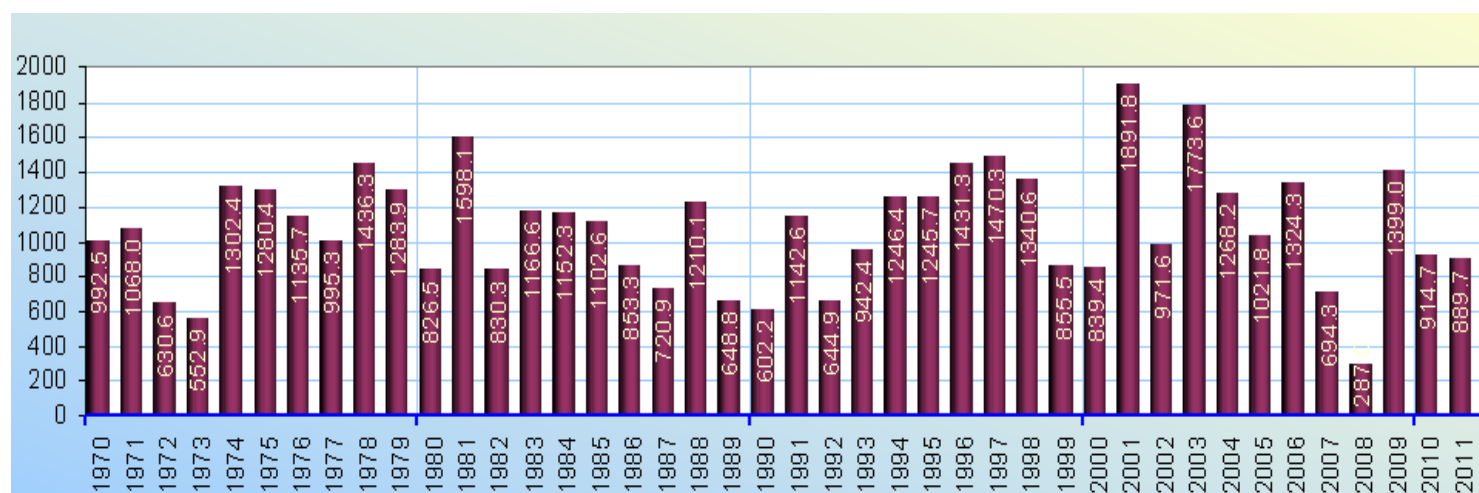


Figure 1: Annual Rainfall in Antalya

From the data presented figure 2, it may be seen that the contribution from historical outcomes to the price of the rainfall range 5 call contract are

$3 \times \text{range } 6 \text{ yields } (6-5) \times 3 \times \sim 1.000 = \sim 3000$

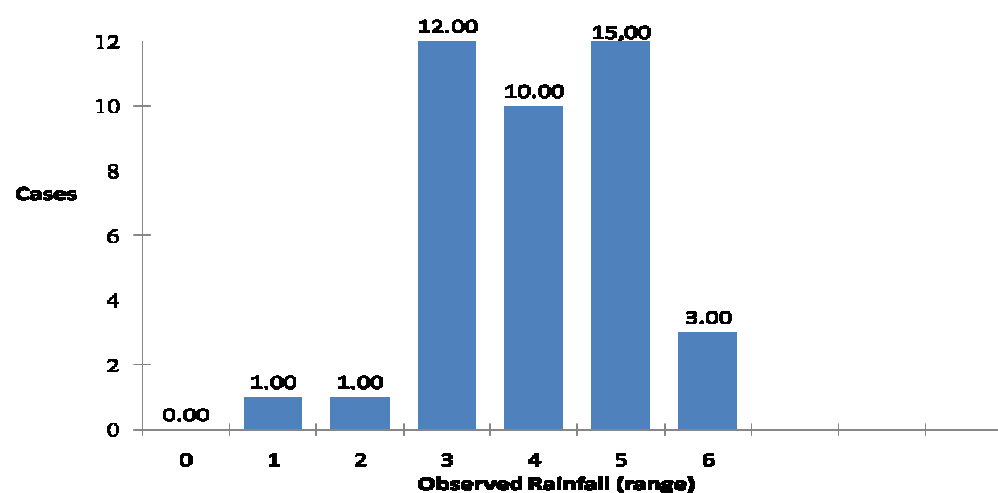


Figure 2: Historical outcomes for a rainfall range 5 call

The other 39 cases (range 5 or below) yield nothing. The average contribution over the 42 cases of 71.5 TL ($\approx 3.000/42$). So ≈ 71.5 is the price of the call option.

1. CONCLUSION

Weather derivatives constitute a comparatively recent type of financial product developed to hedge weather risks, and currently represent the fastest-growing derivative market. Chicago Mercantile Exchange (CME), are the fastest growing derivative market today. Weather derivatives are gaining popularity in the investment community. Weather risk markets provide new opportunities for developing countries to transfer weather-related loss-risks. Weather derivatives allow firms to protect themselves against unexpected weather conditions; hedging with weather contracts significantly reduces the volatility of companies' profits, and weather derivatives can even reduce the risk of bankruptcy, etc.

In this study, we discuss rainfall insurance using financial derivatives. We gathered rainfall data in Antalya between 1970 to 2011. Our study presents an illustrative example that shows how to price an option about an unusual weather event, using historical simulation.

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THE MECHANISMS OF SPECULATION BY FINANCIAL DERIVATIVES, SYNTHETIC ASSETS AND OVERALL PICTURE OF SPECULATION IN EMERGING MARKETS WITH LOCAL PLAYERS*

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Abstract

The short-term character of financial derivatives with high leverage opportunity turned them into powerful speculation and manipulation tools in the 1990s. Although they were developed with the aim of treatment of risks and volatilities, they, themselves, emerged as useful tools in destabilizing the markets by allowing huge leverage opportunity for speculation as “one way bet” resulting with “crisis-driven capital outflow”. In this regard, the main aim of this paper is to analyze and make clear such speculative role of financial derivatives in the emerging markets crises of the 1990s through detailed explanations and figures regarding the technical mechanisms used by derivatives and examine the synthetic assets used by counterparts of the speculators in order to cover the big picture. The main contribution of the paper can be handled as its comprehensive explanations and detailed analyses by using several original figures regarding the technical mechanisms of the speculative role of financial derivatives in the crises. It combines the common parts of the existing literature in order to show the big picture of the speculation mechanisms in the developing countries including the local players using synthetic assets in order to make clear such technical mechanisms.

Key Words: financial crises, financial derivatives, speculation mechanisms, synthetic assets

JEL-classification: F39, G01, G15

1. Introduction

The short-term character of financial derivatives⁵⁴ with high leverage opportunity, which allows taking large positions with small amount of money, turned them into powerful speculation and manipulation tools in the 1990s. Although they were developed with the aim of treatment of some diseases, such as risks and volatilities, ironically, as experienced in the 1990s, they, themselves, emerged as useful tools in destabilizing the markets by allowing huge leverage opportunity for speculation as “one way bet” resulting with “crisis-driven capital outflow” and manipulation against emerging market currencies, creating financial fragilities and information distortions as market failures in the emerging markets and also by being channel of contagion of crisis to other countries due to margin requirements.

LiPuma and Lee (2005) put the linkages of financial derivatives with speculative capital as follows:

“...financial derivatives are part of a socio-structure of circulation that has three interconnected elements. The first of these elements is speculative capital. This is a huge, discretionary, non-production directed and continually expanding pool of mobile, nomadic, opportunistic capital that resides in the hands of major investment banks (e.g. Goldman Sachs), privately owned hedge funds (e.g. LTCM) and the financial divisions of especially the largest corporations (exemplified by GE Capital)...The second element is the financial derivative products and markets. This set of linked institutions participates in global markets in many ways, the most significant of which is increasingly the marketing of these products. This is important because financial derivatives are the principal instrument that speculative capital uses in the global marketplace” (LiPuma and Lee, 2005, p. 407).

The main aim of this paper is to analyze and make clear such speculative role of financial derivative instruments in the emerging markets financial crises of the 1990s through detailed explanations and figures regarding the technical mechanisms used by derivatives and examine the synthetic assets used by counterparts of the speculators in order to cover the big picture. In this regard, after the introduction,

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⁵⁴ Derivative Instruments are the contracts, whose value or price depends on, or is derived from, that of another asset such as a commodity, security, interest rate, index, an event or foreign exchange rate. The term “derivative” is used to stress the fact that the prices or values of these contracts are “derived from” the price of an underlying item such as a commodity, security or the value of interest rate, foreign exchange rate, index or an event (Derivatives Study Centre/Derivatives Glossary). There are four main types of derivative instruments: Forwards, Futures, Options and Swaps. Beside these traditional types, there are some special purposed derivative instruments called “Hybrid Instruments” which are determined by combining these traditional instruments with each other or with the other traditional securities and debt instruments (Derivatives Study Centre/Derivative Instruments). Financial derivative instruments, which constitute the main concern of this paper and will be called “derivatives” in what follows are the subject of financial contracts whose value do not directly depend on the contracts themselves, rather depend on the new values of financial assets, which the mentioned contracts are linked. Such new values of financial assets, which can be exchange rates, stock exchanges and interest rates, emerge according to the developments in the market conditions of financial assets.

in the first part, following a brief literature review the speculation mechanisms used by derivatives are tackled in detail. In the second part, synthetic assets are handled in order to see overall picture of speculation in emerging markets with local players.

2. A Brief Literature Review

Financial derivatives affect the dynamics of the crisis by promoting speculation against the local currency at the beginning of the crisis of developing country, which has mainly imbalanced derivative markets, especially during crisis. In the literature, much has been written about the global financial crises. However, there have been few works on the role of derivatives in the international financial crises through explaining their speculative roles and the synthetic assets that they use within the economics literature (See Kelly, 1995; Garber and Lall, 1996; Garber, 1998; IMF, 1998; Lim, 1998; Garber, 2000; Neftci, 2000; Dodd, 2000; Dodd, 2002a; Dodd, 2002b; Dodd, 2003; Rothig, 2004; Lien and Zhang, 2008).

Among them, Dodd (2000) analyses such speculation “as one way bet” leading to massive capital outflows and the collapse of the currency peg under fixed exchange rate system, whether a hard peg or a soft peg, in the imbalanced derivative markets of developing countries. Similarly Garber (1998) maintains that derivatives can have a “crisis-driven capital outflow” effect under the imbalanced derivatives markets of developing countries especially during a crisis. Dodd (2002a) argues that after taking profitable position on the possible fall in the currency’s value in derivatives market, mounting an attack on the fixed exchange rate points out crisis-driven capital outflows as self-fulfilling crisis (Dodd, 2002a, p. 14). He explains that speculators take positions against the local currency in the derivatives market as short positions, selling currency, which leads to massive capital outflows, due to the synthetic forwards or swaps of the local banks in the developing countries, in order to offset their foreign exchange exposure (Dodd, 2002b, p. 467). He adds the speculation factor as a crisis creator into the abuses of derivatives list.

Garber and Lall (1996) and Garber (1998, 2000) also tackle the “the role of derivatives in crisis-driven capital outflows”. Garber (2000) argues that “...forward contracts are the speculator’s instrument of choice in implementing an attack on a currency, the beginning of a sudden outflow of capital” (Garber, 2000, p. 371), since forward contracts are the cheapest ones for attacking a currency. Garber and Lall (1996) put this issue as “it is well known that speculators use forward and options contracts to short a currency prior to and during a speculative attack” (Garber and Lall, 1996, p. 206). They handle the derivative products as they affect the dynamics of the exchange rate during the crisis and once a crisis begins they contribute to the volatility of the exchange rate. In this regard, Garber (1998) points out that forward sale can also be launched by hedge funds, non-financial corporations, and market makers (Garber, 1998, p. 21). Acknowledging the relatively small size of the “hedge funds” among all the other financial institutions such as banks, pension funds, insurance funds and mutual funds Lim (1998) uses the term “investors” instead of hedge funds. Dodd (2000) also handles the term “investor” as referring to speculators, attackers or hedge fund operators, pointing out that since all these different typed investors cause the same result under such conditions. Dodd (2003) puts it as follows: “The category of ‘misuse’ (of derivatives) covers negative consequences that arise even if derivatives are being used primarily for hedging or risk management pursuits” (Dodd, 2003, p. 8). Garber (1998) also handles this issue in the same way like Dodd as in terms of the international banking system in handling a forward sale of a currency there is no difference between a short sale through which a customer speculates and hedges a long position (Garber, 1998, p. 21). In this regard, Kelly (1995), ironically, describes hedging as “...just a bet which reduces the risk of a bigger bet, and speculation is a bet which, in itself, simply hikes the stake on another bet” (Kelly, 1995, p. 222).

Garber and Lall (1996) also stress another point on the role of derivatives in crisis as “...a wider array of other kinds of products even those in which the ultimate speculator takes a long position in the currency, can play a major role in the dynamics of a currency crisis” (Garber and Lall, 1996, p. 210). Derivatives affecting the dynamics of a crisis, here, is the same with Dodd’s arguments on the role of derivatives. Garber (2000) argues that “...even in countries in which currency forward contracts did not play a role in a sudden reversal in capital flows, other derivative products may be present in sufficient quantities to affect the dynamics of a crisis” (Garber, 2000, 371). In this regard, besides exchange traded derivatives all these also point out the Total Return Swaps (TRS), such as Tesobono swaps and structured notes, which have potential risks in their natures such as creating highly leveraged positions and illiquidity as a result of large margin calls, namely, huge capital outflows; in Garber (2000)’s words “the near-in movements of capital going into and coming out of the devaluation” (Garber, 2000, p. 372). Dodd (2000, 2002a, 2002b, 2003) and Garber (1998, 2000) argue that in weakly regulated, undercapitalized financial systems, derivatives are highly open to be used for harmful purposes such as evading prudential regulations leading to huge risky positions represented by high leverage.

Neftci (2000) handles the derivatives as contributors to open and highly risky positions of banks under a pegged exchange rate regime, Current Account Deficit (CAD) and some kind of deposit insurance as a third possible necessary condition. He argues that within the process going to the crisis, there exists three phases, in which in the first one, one or two big local banks start taking the relevant positions on or off-balance sheet. In the second phase, after two or three years, all the banking system, move towards the risky positions in aggregate, which refer to being short in some foreign currency and long in some high-yielding local asset. This is undertaken in order to gain such huge profits that the first one or two local banks acquired at the beginning. At the last phase, under the highly unstable dynamics new players enter the game in order to gain increased real returns stemming from the increased risk premiums. The unstable dynamics here refer the conditions in which financial system borrows even more USD and increases the domestic currency lending more. Thereby leading to the weakening of the balance sheets of the central bank and making the risks accelerate. In this regard, under this fragile and prone to crisis conditions in which a devaluation will lead to a financial crisis, the central bank, which is assumed to use 25 per cent of its reserves to finance the CAD, has limitations to defend the peg in terms of its reserves. So, any demand by the financial sector to reverse the foreign exchange positions will immediately lead to an insolvency of the financial sector and thus cause a financial crisis.

All these works try to tell how financial derivatives were used for speculative purposes and how synthetic assets were created for such purposes. However, they have limitations in making clear the big picture and analyzing the technical details due to they do this separately and in a narrow manner. In order to fill this gap in the literature and go further one more step, this study combines the common parts of the existing literature in order to show the big picture of the speculation mechanisms in the developing countries including the local players using synthetic assets and tries to make clear such technical mechanisms of speculation in a comprehensive manner through detailed explanations and several original figures.

3. The Mechanisms of Speculation by Financial Derivatives

Derivatives can have a direct crisis effect on economies by creating instability in the fixed exchange rate system and leading to the system to collapse at the beginning of the crisis of developing country, under imbalanced derivative markets, especially during crisis. Under the conditions of imbalanced and poorly structured derivative markets, derivatives are open to be used as a speculative or hedging instrument against the success of government's policy by speculators, attackers or hedge fund operators. Dodd (2002a) asks the right question that "...how and why would they use (derivatives) since there is no market volatility to hedge?" Because of the fact that in a fixed exchange rate system, a risk regarding the exchange rate is "a failure of the fixed exchange rate system that results either a devaluation of the pegged exchange rate or a complete collapse of the regime" speculators using a forward, swap, futures or option to take a profitable position on the possible fall in the currency's value is accepted as "practically a one way bet" as self-fulfilling the expectations of devaluation (Dodd, 2002a, p. 15). This "one way bet" character of hedging and speculation in fixed exchange rate systems make all the short positions in derivatives "a one way bet" as "speculative against the peg" (Dodd, 2002a, p. 15). Rothig (2004) puts it as "The one way bet together with the ability to leverage reinforces self-fulfilling speculation, leads to capital outflows and consequently makes it very difficult for the government to defend the peg" (Rothig, 2004, p. 6).

It can be maintained that in the 1990s, derivatives were mostly used with the aim of speculation as "one way bet", rather than hedging in the crises economies of the 1990s, which point out self-fulfilling crises. Because, in the 1990s, there were mainly fixed exchange rate systems under a rapid financial liberalisation, by especially freeing of capital movements, in the developing countries which especially experienced financial crises. Moreover, the developing countries, which were trying to fill their capital gap by importing capital in relatively lower costs, were taking long positions on their own securities, which were not hedging due to the fact that it did not serve in reducing risk; rather played an important role in taking additional risk by using Over The Counter (OTC) derivatives to speculate (Dodd, 2003, p. 3). Thus, these costs which were reckoned to be relatively low initially caused much more costs to those developing countries at the end together with the whole system.

The direct crisis effect of the derivatives starts with the attack on local currency of the speculators or hedgers taking a position in derivatives market either in the OTC derivatives such as forwards and swaps or exchange traded derivatives such as futures and options suddenly or gradually "in the expectation of an impending devaluation" (Garber, 1998, p. 21). In this regard, Garber (1998) argues that the aims of speculators who bet on the currency and foreign investors, who hedge their investment, do not create any difference in terms of tackling these kinds of short positions on local currency by international banking system (Garber, 1998, p. 21). This kind of hedging is defined as "destabilising hedging" by Rothig (2004) pointing out activities such as hedging the currency risk by short hedge positions at the outbreak of the currency crisis when currency and asset prices begin to fall thus leading to further pressure on prices. Rothig (2004) puts it as "Although hedging generally is said to be a productive and convenient activity for risk management and consequently a stabilizing tool, hedging can be in some cases generate capital outflows and thus contribute to the downward pressure on currencies" (Rothig, 2004, pp. 4-5). Especially so in emerging markets, which have imbalanced and poorly structured derivative markets, where such activities, whether speculative or hedging, are combined with "self-fulfilling features such as herding, contagion and moral hazard" (Rothig, 2004, p. 1).

All these large short positions on local currency in forward markets constitute a forward discount⁵⁵, telling that in the future local currency is expected to be depreciated, namely, price discovery process will indicate a future devaluation. This reflects "the likelihood of government failure or a measure of the lack of confidence in the government's ability to maintain a fixed exchange rate...[the so-called] 'political price'" (Dodd, 2002a, p. 15) by showing that the future value of currency will be below the present pegged spot rate. In this regard, Rothig (2004) puts this as follows: "negative overshooting in futures prices, leading to a negative basis⁵⁶ and thus increasing the pressure on the cash market dramatically" (Rothig, 2004, p. 7). In other words, negative overshooting of futures prices stemming from crisis in spot markets, which lead negative basis, increases the pressure in spot markets dramatically by accelerating the crisis in spot markets, known as "downward cascade" (Rothig, 2004, pp. 2-7). This is parallel to Dodd's arguments since a negative basis is the same with the forward discount (**Forward rate** < **Spot rate** => **Forward Discount** in the case of indirect quotation as unit of foreign currency /unit of local currency). This gives a message that the local currency is expected to depreciate, thus creating the pressure as selling weak local currency on the cash market.

Within the framework of the "one way bet" process, this forward discount will signal to the other market participants as selling weak local currency in exchange of hard currency⁵⁷, US Dollar or Euro, before it is devaluated, since an expectation on leaving the peg system of

⁵⁵It is noted that a currency is at a forward premium if the forward exchange rate quotation for that currency represents an appreciation compared to the spot quotation. On the other hand, a currency is at a forward discount if the forward exchange rate quotation for that currency represents a depreciation compared to the spot quotation (Pilbeam, 2006, p. 21).

⁵⁶The difference between futures and cash prices is called the basis: $b_t = f_t - s_t$ where f_t is the futures price in t and s_t is the spot price in t (Rothig, 2004, p. 6).

⁵⁷Hard currency is defined as "A currency in which investors have confidence, such as that of an economically and politically stable country" (http://www.investorwords.com/2280/hard_currency.html).

government will be established by the forward or swap price. In this regard, Lien and Zhang (2008) maintain that apart from the forward discount stemming from the large short positions on local currency in forward markets in the 1990s, in developing countries the forward rates mostly indicate forward discounts for possibly two reasons: First, there are higher interest rates in developing countries relative to the developed countries. Thus the local currency is expected to depreciate at the same rate as the interest rate differential (Lien and Zhang, 2008, p. 46), which Interest Rate Parity (IRP) points out as $(i - i_f = (F-S)/S)^{58}$. Although, it can be claimed that IRP or efficient market hypothesis (EMH)⁵⁹ does not generally hold in developing countries case due to risk premiums attributed to them. The second reason of why forward discount is expected in developing countries is also the risk premium, itself. If the credit markets in which dealers mostly take synthetic short positions as foreign exchange market makers are not perfectly efficient then dealers require a market risk premium, which is added to interest rate differential, pointing out higher discount in the forward or swap rates (Dodd, 2002b, p. 468).

The following Table 1 indicates the forward rates of some emerging countries. Forward rates were calculated as “Interest Parity Rate” according to the IRP, which indicates the equation of $(i - i_f = (F-S)/S)$. Forward Discounts were also calculated according to this parity.

Table 1: The Spot and Forward Exchange Rate Quotations of Some Emerging Market Countries, 29 October 1997

	BRAZIL	MALAYSIA	S.KOREA	HUNGARY	S.AFRICA	SINGAPORE
SPOT RATE*	0.909091	0.294118	0.001034	0.005128	0.2079	0.632911
FORWARD RATE (ONE MONTH)	0.897579	0.293317	0.001027	0.005066	0.206288	0.631931
FORWARD DISCOUNT (%)**	-1.26634	-0.2722	-0.69778	-1.20241	-0.77544	-0.1549

*Spot rate quotations are in indirect quotation format as \$/Emerging Market Currency.

**Due to the spot rate quotations are in indirect format, negative sign refers to forward discount.

Source: The forward rate quotations are calculated according to data from *The Economist* (1-7 Nov. 1997, pp. 123-124).

All these will create challenges for central banks to maintain the fixed exchange rate since the direct intervention of central banks works in the Foreign Exchange (FX) spot market; however, it does not work in the present derivative markets because of the fact that there is “potentially no end to the effort” since the derivative markets are accepted as more problematic compared to the spot markets. Dodd (2002a) puts this as “While the spot market is large, the potential size of the forward and swap market is infinite” (Dodd, 2002a, p. 16). As it is noted, derivative markets provide high leverage to speculators and “players”, who might trigger an attack on the fixed exchange rate, by empowering that betting against the success of the macroeconomic policy of government through lowering the costs and increasing the gains. As a second tool to defend the exchange rate, the Central Bank can raise the local interest rates. However, as mentioned before, this would increase the interest rate differential, leading to forward discount much more and creating more capital outflows by signalling devaluation⁶⁰. Especially this is a relevant case under the dynamic hedging techniques, which Granville (1999) puts as the ones that “replace human judgement with computerized decision-taking analogous to stop-loss orders on the stock exchange” pointing to their widespread use and rapid implementation through ordering immediate sales of the weak currency during a defence of Central Bank increasing interest rates in a currency attack situation, thus making such defence useless (Granville, 1999, p. 722). All these point out the inefficiency of the regular tools of Central Banks. Instead, Dodd (2002a) argues that under the currency attack conditions, Central Banks can implement capital controls such as banning the local currency transfer to the foreign speculators in order to prevent the realization of forward contracts, besides the policy of increasing interest rates and direct intervention to the forward markets, pointing out the “bear squeeze”⁶¹ process (Dodd, 2002a, pp. 15-16). On the other hand, Lopes (2003) also highlights that even in this case the solution is short-

⁵⁸In the equation, i and i_f represent, respectively, the short-term interest rates of investor’s home country and foreign country, F indicates forward rate, which is called “Interest Parity Rate”, and S shows spot rate in direct quotation.

⁵⁹Efficient market is first defined by Fama (1970) as the market “in which prices always “fully reflect” available information (Fama, 1970, p. 383). In this regard, related to the foreign exchange markets, it is pointed out that for speculators, which make exchange rate forecasting on a similar information set, there cannot be unusual *ex ante* profit, in other words, abnormal profit opportunities. Because, it is argued that in order to have appropriate value of the exchange rate all market participants use all relevant available information, such as information that the forward rate systemically over-or under-predicted the future spot rate. For instance, if the three-month forward rate of the Turkish Lira against the dollar is 2.00TL/\$ and the speculator knows that the forward rate is systemically underpredicts the future rate by 10 per cent, then it means that the future spot exchange rate will be above 2.02 L/\$ in three months’ time pointing out that the speculator buying the forward today will profit when he will sell it in higher price after three months. However, according to the efficient market theory, due to everybody in the market who assumed to have the same knowledge will want to benefit from this abnormal profit, this will lead massive purchases of dollars forward. At the end, this abnormal profits will be eliminated by the increase in the forward rate from 2.00TL/\$ to 2.02 TL/\$. In other words, like the Rational Expectations Hypothesis (REH), EMH assumes that economic agents do not make systematic errors, such as persistently predicting over-or-under the future value of the variable, while making their predictions due to they have a good knowledge of the economic model which they use for predicting such variable as follows: $S_{t+1} = E_{t+1} + u_{t+1}$ where S_{t+1} represents the log of the actual spot exchange rate in one period’s time, E_{t+1} represents the log of the expected exchange rate in one period’s time; u_{t+1} represents a random error term with a normal distribution and mean of zero. In the case of the investors are risk neutral the forward rate equals to the expected future spot exchange rate as follows: $F_t = E_{t+1}$ and so, $S_{t+1} = F_t + u_{t+1}$. This means that as a result of economic agents who have rational expectations in the absence of risk premium in the foreign exchange market, the future spot rate should be equal to the forward rate declared today plus a random error, namely, should not systemically over-or under-predict the future spot rate. However, it is also maintained that the existence of the forward rate, which is systemically over-or under-predicted the future spot rate, cannot be taken as a proof of “inefficient markets” due to this discrepancy can stem from a positive or negative Risk Premium (RP) of the underlying foreign exchange market, which is added to the foreign currency as $S_{t+1} = F_t + RP + u_{t+1}$. It is noted that a positive risk premium which is attached to the foreign currency refers to the negative risk premium which is attached to the domestic currency, *vice-versa* (Pilbeam, 2006, pp. 204-211).

⁶⁰The fact that increasing the interest rate can worsen the situation, already suffered from the relatively high interest rate, which is noted as the forward and swap rates will indicate a greater rate of depreciation if a market risk premium is also added to the interest rate differential, which is already high (Dodd, 2000, p. 468).

⁶¹Lall (1997) puts it as follows “...with the presence of a large banking system willing to supply credit in the domestic market, it would be near impossible for the central bank to mount an effective bear squeeze to quell speculation and drive the price of the domestic currency upwards” (Lall, 1997, p. 28). He puts the conditions of a successful bear squeeze as follows: “The Central Bank should be able to sell a large volume of forward contracts promising to deliver dollars for its domestic currency, and therefore allow commercial banks to sell a large number of contracts to speculators...this requires central banks to have large non-borrowed foreign

term due to the experienced lesson as “a fixed exchange rate will not survive if there is a free derivative market of sufficient liquidity in a somehow connected financial asset” (Lopes, 2003, p. 48). In any case, it can be said that there are much harder conditions for central banks. Savona *et al.* (2000) put the fact as follows: “The free reserves of banks are partly substituted by synthetic reserves based on derivatives instruments. This confirms the impossibility of deciding the best monetary policy without taking into consideration derivatives...Derivatives can be both an instrument and an obstacle for the central bank’s policy” (Savona *et al.*, 2000, pp. 157-158).

The mechanism of the direct crisis effect of derivatives can be shown in three different versions of which the first one is as below:

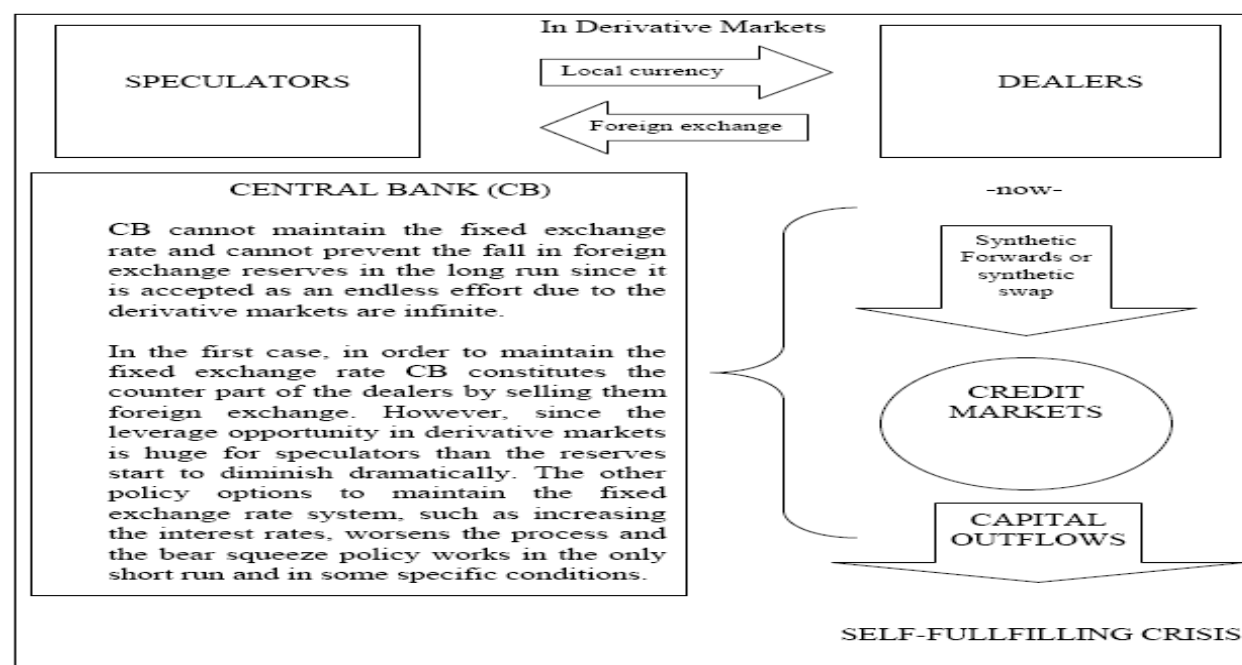


Figure 1: The Crisis-Driven Capital Outflow Effect: The First Version

Source: Author

The following explanations describe the process shown in Figure 1:

1-Speculators take large positions against pegged exchange rate as short in local currency in derivatives market either forward, swap, futures or put option. In Figure 1, it is a forward contract telling that at the maturity in the future, speculator will buy foreign currency in the exchange of local currency at a forward discount rate. This forward discount can stem from the IRP conditions, namely the interest rate differential between the interest rates of home country, here, developing country, and of foreign country, which indicates an expectation of forward discount in terms developing country currency. If the RP issue of developing countries is added to this then the forward discount is more than expected. 2-This position creates a liability for dealers in terms of foreign exchange in the future. Since almost everybody in the weak currency derivatives market is short in local currency, pointing out imbalanced derivatives markets issue they had to create synthetic forwards or swaps to offset this exposure. 3-Within the framework of synthetic short positions in the credit market, the dealers borrow in the local currency now (time t_0) and create local currency liability for the future (time t_1). For this they use local credit markets as shown in Figure 1. 4-They buy foreign exchange with the local currency at the spot market, namely, from the Central Bank, at the fixed exchange rate systems. 5-They invest this amount of foreign exchange in foreign exchange assets for the maturity of initial forward. 6-This process creates massive capital outflows now (time t_0). In a short time, after this speculative attack to the pegged exchange rate by using derivatives, forward rates start to constitute a signal for devaluation then everybody starts to be in short for local currency. At last, the exchange rate system collapses as creating self-fulfilling expectations and thus, self-fulfilling crisis (Dodd, 2002b, p. 16). Dodd (2002a) puts this as follows: (in order) “to complete the market for instance derivative dealers will have to engage in the action of creating synthetic short positions in order to lay-off their long-side risks. The result is capital outflows and as the short interest rate grows in the derivative markets capital outflows increase” (Dodd, 2002a, p. 15). This “one-way bet” can be called self-fulfilling expectations creating crisis. 7-Since there is huge leverage opportunity sustained by derivatives to speculators, ordinary tools of central banks to maintain the fixed exchange rate system such as selling foreign currency to markets or increasing the interest rates do not work in the long-run. Because, the leverage opportunity of derivatives sustains speculators to take positions against the local currency in huge amounts causes the reserves to diminish dramatically. In this process, as a policy option increasing the interest rate by central banks does not work also, rather it contributes to the sales of the weak currency, if forward discount issue is reconsidered. Moreover, Garber and Lall (1996) put this issue in terms of dynamic hedging techniques⁶² as “A dynamic hedging strategy used by banks to offset put options written by them may create the perverse effect of causing a sell-off of the weak currency as interest rates rise, instead of purchases that a central bank imposing a squeeze hopes to induce” (Garber and Lall, 1996, p. 213). It is argued that dynamic hedging techniques create a “vicious feedback loop that

exchange reserves. The other important condition for a successful bear squeeze is that central banks be able to control the supply of credit to the banking system and the speculators. This requires a switching policy by the central bank, because if credit were controlled outright, then the volume of short positions taken by speculators would be small (given that their ability to balance their currency positions based on expectations of the interest rate is influenced). Thus, central banks would first supply credit at a ceiling interest rate, and then restrict the supply of credit to the banking system altogether (after large positions have been taken against its currency), making it difficult for speculators to deliver on their forward contracts at the future date when the contracts came due” (Lall, 1997, p. 29).

⁶²Dynamic Hedging is defined as “a process which often mandates either the sale of an underlying security when its price falls or its purchase when its price rises” (Kelly, 1995, p. 223).

destabilizes markets, especially if the price moves in one direction over several days” (Arbaeus and Kaziow, 2007, p. 2). Under such circumstances the dynamic hedging strategies ordering massive sales, which cannot be met by the purchasers create imbalances between buy and sell side in exchanges and destabilise the spot markets (Arbaeus and Kaziow, 2007, p. 2).

In any case, derivatives markets in such cases expose central banks to challenging positions in terms of their foreign exchange reserves. The policy options to maintain the fixed exchange rate system work in temporary base since it is recognized that under such defences of central banks reserve losses could put developing countries “in play” for international speculators pointing out the inevitable “one way bet” process in the long-run.

This process is also valid when the speculators use the put options instead of forwards. In this case, a speculator betting on devaluation has a put option instead of a forward contract in the local currency/weak currency leading to the counterparts, namely the dealers/banks, who “sell the option either writing an offsetting option or recreating offsetting security synthetically by acquiring positions in the two currencies and balancing the portfolio as required by the usual option-pricing formula” (Garber and Lall, 1996, pp. 212-213) as done in the forward case. In this regard, Savona *et al.* (2000) handle the challenges that are specific to option contracts as follows:

“Derivatives have a feedback effect on the underlying asset: equity hedged with option can be ‘bad’ in case of crises because the option cannot be exercised. In this way, the underlying asset does not have a ‘normal’ reaction in the market. Its price can be influenced by the derivative’s price and the final effect is uncertain. This has been evident during the last currency crises in Brazil, Russia, Asia, and Mexico” (Savona *et al.*, 2000, p. 164).

It can be said that all this process puts the central banks on the spot exposure. Although here especially fixed exchange rate is considered, it can be either in the case of fixed exchange rate system to maintain the fixed exchange rate or floating exchange rate system to stabilize the economy following a speculative attack or at the financial disruption. Savona *et al.* (2000) put the issue as follows:

“In case of fixed exchange rates, domestic monetary policies lose a large part of their freedom: national central banks have to pay attention to the pressures on the rate, which has to be coherent with other economic indicators. When a speculative attack begins (and experience has shown that speculators base their attacks against a currency on derivatives), losses can be enormous. If the exchange rate is flexible, the central bank is not compelled to defend it, but the effects of exchange-rate movements impact directly on the monetary base. With flexible rates, the central bank surrenders a part of its freedom because an uncontrolled creation of money acts against the stability of the system and a stable economic growth” (Savona *et al.*, 2000, p. 159).

The second version of the mechanism of the direct crisis effect of derivatives can be as follows:

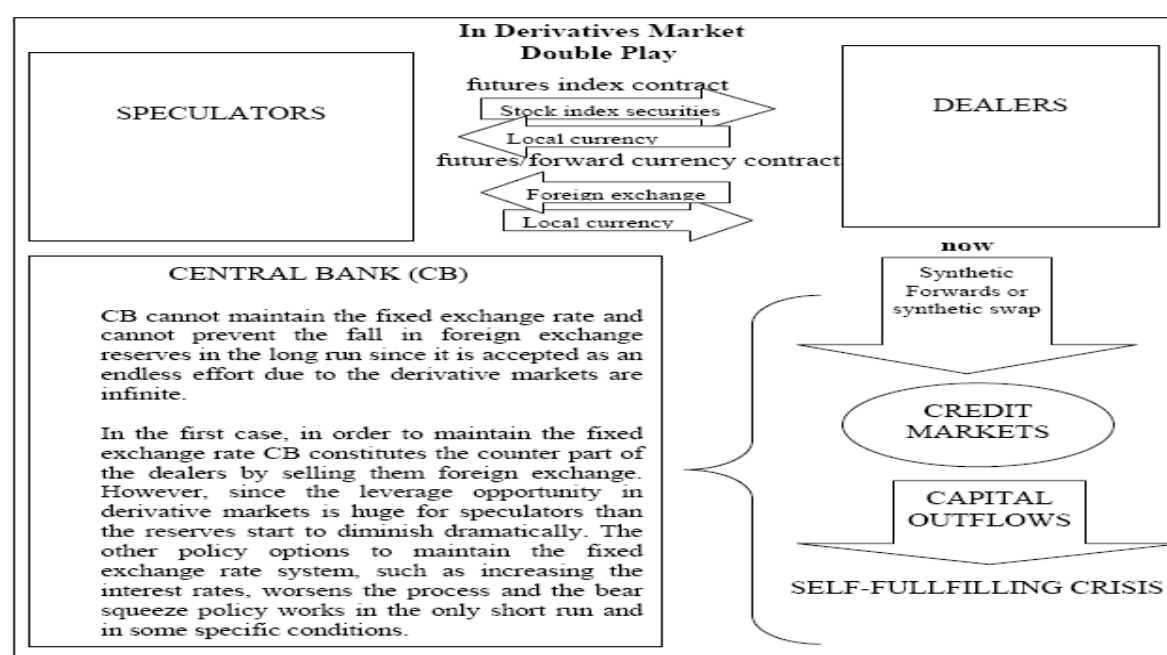


Figure 2: The Crisis-Driven Capital Outflow Effect: The Second Version

Source: Author

The following explanations describe the process shown in Figure 2:

1-In this case, speculators take large positions against pegged exchange rate as short in local currency in a situation called “double play”, which refers to being short in equity markets by using futures stock index contracts and simultaneously short selling the local currency in derivatives market either forward or futures, here, forwards, which were seen in emerging market crises in the 1990s⁶³. In Figure 2, one side of the double play of the speculator is a futures index contract telling that at the maturity in the future they will sell the index in exchange for local currency. So, besides the futures index contract speculators taking long local currency position acquire currency futures contract or currency forward, namely, they make contracts to sell the local currency to drive up interest rates in order to profit from

⁶³IMF (1998) puts the “double play” as follows: “An important point with regard to the logic of a strategy of simultaneously short selling the currency and equity markets that should be noted is that a foreign investor shorting the equity markets needs the put up local currency carry (that represents a long local currency position), which offsets any short foreign exchange position. This effectively lowers the returns and raises the risks from a two-pronged strategy in the event the attack on the currency does turn out to be successful”(IMF, 1998, p. 51).

their short positions in the stock market (Lopes, 2003, p. 48).⁶⁴ 2-This position creates a liability for dealers in terms of foreign exchange in the future within the framework of forwards contracts. Since everybody in the weak currency derivatives market is short in local currency they had to create synthetic forwards or swaps to offset this. On the other hand, in the case of exchange traded derivatives market, for instance, within the framework of currency futures contracts, imbalanced derivatives market situation reflects to the price of the currency, namely, the local currency depreciates, leading to the rise of interest rates in the pegged exchange rate systems in order to maintain the fixed exchange rates. As a result, this causes stock markets to collapse by sustaining huge profits for speculators, who have already taken positions in the futures stock indexes, namely fixed their sale prices. 3-Within the framework of synthetic short positions in the credit market, the dealers borrow in the local currency now (time t_0) and create local currency liability for the future (time t_1). For this they use local credit markets as shown in Figure 2. 4-They buy foreign exchange with the local currency in the spot market, namely, from the Central Bank, at the fixed exchange rate systems. 5-They invest this amount of foreign exchange in foreign exchange assets for the maturity of initial forward. This process creates massive capital outflows now (time t_0). 6-In order to maintain the fixed exchange rates the central banks, which have reserve limitations, sell foreign exchanges to dealers at spot markets, besides using the classical monetary policies as increasing the interest rates in order to prevent the capital outflows and collapsing the exchange rate system. However, increased interest rates worsen the case both signalling the devaluation and contributing to the collapse of the stock index, making the speculators gain huge profits from the falling of prices, since they have already taken their positions in futures market.

In this regard, it is noted that just Hong Kong Monetary Authority (HKMA) could defend the system successfully due to its extraordinary capability as buying all the stocks directly in order to prevent the further declines in the stock market index. Even in such case, Lopes (2003) maintains that they drew severe lessons from the potentially harmful usages of derivatives markets (Lopes, 2003, p. 48)⁶⁵. Within the framework of the Brazilian case, Lopes (2003) tackles the arbitrage operations which the Brazilian local banks held in order to profit from the wide spread between future and spot exchange rate. In this regard, he tells that in an arbitrage operation buying dollars in the spot markets, taking short positions in the futures markets and buying Overnight Inter-bank Interest Rate (CDI) futures in order to afford the interest rate cost of the domestic currency, which was used to buy the spot dollars, constituted the steps which were held by local banks. He pointed out that if there were not any authorized clients of banks who would send dollars abroad to overcome the Brazilian strict exchange market regulations, then the Central Bank would handle their excess dollars with a penalty interest rate. So, the local banks had to take this issue as an opportunity cost in calculating the arbitrage profits, making these arbitrage opportunities leave in a limited amount till the Hong Kong crisis and the worldwide debacle in stock markets. The futures-spot spread widened more and buying spot dollars for arbitrage became profitable. However, this process came under attack since derivatives which speculators use are infinite and are open to highly leveraged positions in which the defence of central bank through the intervention in forward markets and increasing interest rate can only serve in the short-run. In the long-run, this attitude especially with increasing the interest rate made the system more vulnerable to massive attacks leading to the dramatic reserve losses and worsened the case since the banking system was already fragile and the public deficit was high enough (Lopes, 2003, p. 44).

In Figure 3 below, third version of the direct crisis effect of derivatives including the interest rate derivatives, namely fixed income derivatives⁶⁶, is shown:

⁶⁴Lopes (2003) tells that Joseph Yam, the Chief Executive of the HKMA, handled the Hong Kong stock market attack as a “double play” due to in this attack speculators sold the currency to drive up interest rates in order to profit from short positions in the stock market. Lopes (2003) points out that Yam (1988) gives the details of this double play which aimed at playing off the currency board system against the stock and futures markets. Within this double play, in the first place, by swapping US dollars for Hong Kong dollars with multilateral institutions the speculators used the debt market to pre-fund themselves in Hong Kong dollars in order to prevent to be squeezed by high interest rates. At the same time, they took large short positions in the stock index futures market. Within the framework of the double play, by dumping huge amounts of Hong Kong dollars they created extreme conditions in the money market in order to lead a sharp interest rate hike, which in turn would cause the collapse of the stock market. At last, by virtue of this collapse the futures contracts they had taken out made them gain huge profits. The scale of this attack and the vulnerability of Hong Kong’s markets are put in the following figures as more than HK\$30 billion currency borrowings, at an interest cost of around HK\$4 million a day, 80,000 short contracts, in which for every fall of 1,000 points in the Hang Seng index the profit of HK\$4 billion. It is noted that in this double play the timing to sell off their Hong Kong dollars, to squeeze up interest rates and send a shock wave through the stock market was important. So that they chose August since it is noted that “(in August) turnover in the stock market had shrunk to about a third of its normal level; there was bad news as the Government announced that first quarter GDP growth had been negative; and rumors were flying around predicting the devaluation of the Renminbi and the severing of the link between the Hong Kong dollar and the US dollar” (Lopes, 2003, p. 48). IMF (1998) also handles the Hong Kong case as a double play in which a number of large investors, especially, macro hedge funds, took small short positions against the Hong Kong dollar, which is perceived as “attacking it a little”, with the aware of the HKMA’s commitment to the peg, and took much larger short positions in interest rate sensitive instruments, especially, in the equity market, by expecting a sharp increase in interest rates (IMF, 1998, p. 51).

⁶⁵Lopes (2003) puts this issue as “On Thursday, August 13th, 1999, the Hong Kong Hang Seng stock market index fell by 8 per cent, in what seemed to be a speculative attack through the stock market, a rather unconventional route. This forced the HKMA to announce, on the following day, the unprecedented policy of buying stocks directly to avoid further declines in the stock market index. Hong Kong’s very special fiscal position could give this defensive policy a fair chance of success. Basically the HKMA was learning a variant of the same lesson Brazil’s Central Bank had learned in 1997: a fixed exchange rate will not survive if there is a free derivative market of sufficient liquidity in a somehow connected financial asset” (Lopes, 2003, p. 48).

⁶⁶ Mathieson *et al.* (2004) note that “global fixed income derivatives market continued to expand steadily over the past few years, with interest rate swaps (IRS) being the largest and fastest growing market segment...Falling interest rates and increased local bond issuance were the main factors that spurred the expansion of the local currency IRS markets” (Mathieson *et al.*, 2004, pp. 75-76).

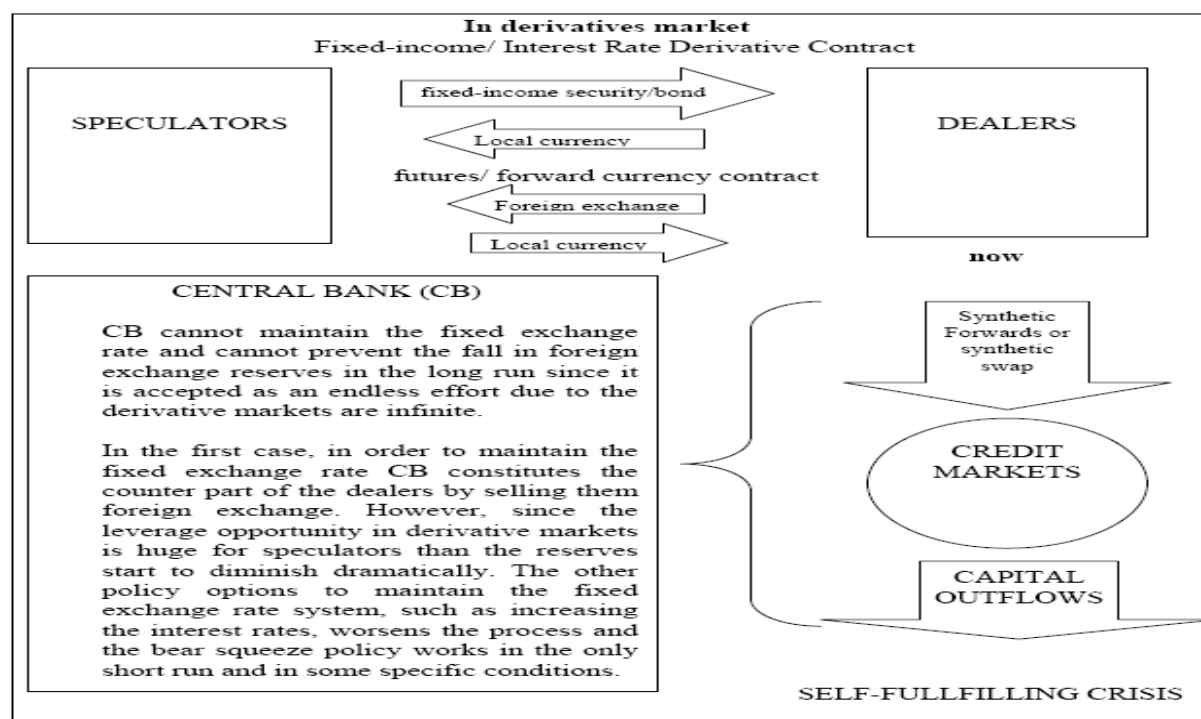


Figure 3: The Crisis-Driven Capital Outflow Effect: The Third Version

Source: Author

The following explanations describe the process shown in Figure 3:

1-In this case, another version of “double play” is seen as speculators take large positions against pegged exchange rate as short in local currency in derivatives market simultaneously being short in fixed income derivatives market by using interest rate futures or swaps, which were seen in emerging market crises in the 1990s. In Figure 3, one side of the “double play” is an interest rate futures contract, namely bond futures, telling that they will sell the bond in exchange for local currency. So, besides the interest rate futures contracts speculators taking long currency position acquire currency futures contract or currency forward, which constitutes the other side of the “double play”, to offset their exposure in taking long local currency position, as the same with the previous “double play” case. The process after this point is the same as the others as follows: 2-This position creates a liability for dealers in terms of foreign exchange in the future within the framework of forwards contracts. Since everybody in the weak currency derivatives market is short in local currency they had to create synthetic forwards or swaps to offset this. On the other hand, in the case of exchange traded derivatives market, for instance, within the framework of currency futures contracts, imbalanced derivatives market situation reflects to the price of the currency. In other words, the local currency depreciates, leading to the rise of interest rates in the pegged exchange rate systems in order to maintain the fixed exchange rates. As a result, this causes the collapse of bond prices, by making the speculators, who have already taken positions in the futures on interest rates/ fixed income futures, namely fixed their sale prices, gain huge profits from the falling of prices via their short positions in the fixed-income derivative contracts. 3-Within the framework of synthetic short positions in the credit market, the dealers borrow in the local currency now (time t_0) and create local currency liability for the future (time t_1). For this they use local credit markets as shown in Figure 3. 4-They buy foreign exchange with the local currency in the spot market, namely, from the Central Bank, at the fixed exchange rate systems. 5-They invest this amount of foreign exchange in foreign exchange assets for the maturity of initial forward. This process creates massive capital outflows now (time t_0). 6-In order to maintain the fixed exchange rates the central banks, which have reserve limitations, sell foreign exchanges to dealers at spot markets, besides using the classical monetary policies as increasing the interest rates in order to prevent the capital outflows and collapsing the exchange rate system. However, increased interest rates worsen the case both signalling the devaluation and contributing to the collapsing of the bond prices, making the speculators gain huge profits from the falling of prices via their short positions in the fixed-income derivative contracts.

4. Synthetic Assets, Swaps or Forwards

Synthetic assets are the ones which counterparts of the derivative contracts use in order to offset their liabilities. In this regard, a dealer, who can be a bank or a financial institution, has two options when constituting the counterpart of a derivative contract shown in the figures above in order to offset its exposure stemming from the long currency position in derivatives market. First, one is to sell the local currency to the other participants in the derivatives market since ideally it is noted that “the dealer faces a market full of participants who are willing to buy and sell in equal amounts⁶⁷” (Dodd, 2002a, p. 9). However, since in developing countries mostly nobody wants to buy local weak currency in exchange for hard currencies in derivative markets, especially in crisis periods, namely, most participants in the derivatives markets of developing countries are short in the local currencies, which is called “one sided or imbalanced market”, it is difficult or expensive for dealers to offset their long positions in this way (Dodd, 2002a, p. 9). In this regard, Dodd (2002b) argues that because of the fact that in order to manage his risk the dealer must find a cheaper way than the sufficiently rise of the forward rate, the dealer creates a synthetic forward or swap contract through the use of local credit markets as a second and most common option in an imbalanced derivatives market. So, it can be said that in imbalanced derivatives markets of developing countries, which is especially the case at the beginning of crisis, derivatives dealer in developing country has two options to offset its short position in foreign currency, namely, long position in local currency in derivatives markets: First one is selling local currency in the local derivative markets, namely, buying foreign

⁶⁷Since a dealer makes a market by quoting bid (the price at which the dealer is willing to buy) and ask/offer (the price at which the dealer is willing to sell) prices and then standing behind them, in the case of a balanced market, the dealer reacts to investors hitting his bid by trying to lay-off the long currency exposure by selling currency to other participants in the market (those who are lifting his offer) (Dodd, 2002, p. 9).

currency in the local derivative markets in unfavourable prices. Second one is creating a synthetic forward or swap in more favourable so preferable terms.

The following Figure 4 indicates the process of a synthetic forward that the dealer in the developing country makes.

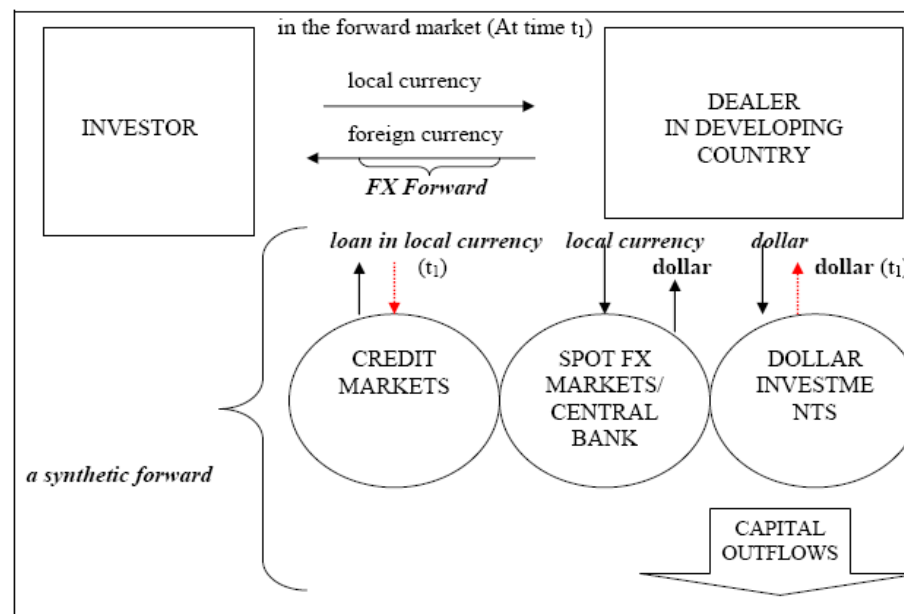


Figure 4: Creating a Synthetic Forward

Source: Author

The following explanations describe the process shown in Figure 4:

1-According to Figure 4, as a counterpart of a speculator, which is taken as “investor” here, a more broad term, in order to cover many types of derivative users, in derivatives market, here, it is a forward market pointing out that in the future investor will buy foreign currency against local currency, the dealer in the developing country makes a synthetic forward. 2-Within the framework of creating a synthetic short forward local currency position against hard currency, *e.g.* dollar, in the first step dealer borrows in the local currency credit market so that he creates a local currency liability for the future (t_1) by borrowing at home. 3-In the second step, the dealer uses local currency, namely loan proceeds, to buy dollars at spot, namely, from the central bank at the fixed exchange rate system, and invest the dollars abroad so that they obtain a dollar asset by lending abroad in the dollar market (Dodd, 2002a, pp. 9-10). 4-Ideally, it is expected to match the maturity of the forward, currency loan, with the dollar investment. In this regard, at the end of the common maturity of these three transactions, which are gaining a specified amount of dollars as the dollar asset repayment, selling these dollars for local currency at a specified exchange rate in settling the forward contract, and repaying the currency debt taken at the beginning with the proceeds, it is expected to gain significant profits. However, all these transactions generate capital outflows as a triggering crisis factor due to dealer borrows at home and lends abroad in the dollar market.

This result is valid also when foreign investors make forward and swap in order to hedge their portfolio investment in local currency or Foreign Direct Investment (FDI) through the transaction of its profit to home country. It is noted that if the foreign investor wants to hedge the full value of the invested principle, then the hedging process can potentially “neutralize or net-out the capital inflow”⁶⁸ (Dodd, 2002a, p. 10).

Dodd (2002a) points out an additional issue which foreign exchange swaps create on capital flows as follows: “Note that the cash flows from such a swap resemble the cash flow from a short-term foreign currency loan. Dollars are received today and are repaid in the future, and the ‘loan’ cost is paid in pesos [local currency] based on dollar interest rates as well as those in pesos” (Dodd, 2002a, p. 10).

Moreover, Neftci (2002) argues that by the synthetic assets the prudential regulations and preventing policies are easily circumvented. He puts this issue as follows:

“We see that policies such as taxing transactions or imposing withholding taxes on interest is not likely to be very effective. It is true that such policies might ‘throw sand’ into the engines of a fast moving market and slow down capital flows. But this is highly unlikely given the rapid globalization of well-functioning financial markets. ..Given that synthetics will often use foreign instruments that are similar in characteristics to the local ones one is trying to recreate, the replication effort will shift resources from the domestic economy to the foreign one” (Neftci, 2002, p. 440).

So, Neftci (2002) handles the synthetic assets as a vehicle to circumvent the regulatory policies, which also point out the vulnerabilities to crisis, as follows: “Suppose for a certain reason (regulatory or credit line problems) a bank has difficulties in borrowing in currency X. Then by forming the following portfolio: {Borrow USD, sell the proceeds spot against X, forward purchase the USD} the bank can create

⁶⁸The crisis effect of the short-term capital inflows, the so called hot money, as leading CAD by appreciating local currency and creating virtual welfare increase is widely examined in the literature. Compared to them FDI are accepted more innocent and beneficial for the host country. However, FDI has been recently started to be criticized in terms of its possible crisis effect through the time inconsistencies of the transfers of its profits, which are from the host country to home country.

the same loan synthetically” (Neftci, 2002, p. 439). The following Figure 5 indicates this issue. In this regard, according to Figure 5, the loan, which is in a certain currency, here, X, and shown on the left side of the figure equals “synthetically” to the actions of banks, which are shown on the right side of the figure as three boxes. According to this, as seen in the first box, the bank gets a loan in another currency, here, dollar, for maturity T now, at t. In the second step, as seen in the second box, the bank converts this dollar to X at t as spot operation. And lastly, as seen in the third box, in order to omit its foreign exchange rate risk in the future the bank makes a forward contract by selling X against dollar for time T. By these three actions the bank would have realized getting loan in currency X, which was actually forbidden directly, by synthetically.

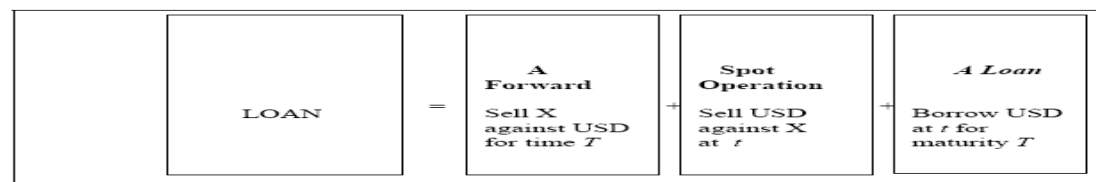


Figure 5: Creating a Synthetic Loan

Source: Neftci (2002, p. 439).

In order to circumvent the tax policy on buying the foreign bond (here USD bond) directly the synthetic assets can be used also. The cash flow diagram is the same with the synthetic loan above. According to Figure 6, if there is tax on buying foreign discounted bond, here, USD bond, which is shown on the left side of the figure then the equivalent action can be done “synthetically” by the actions, which are shown on the right side of the figure as three boxes. According to this, if for instance, this discounted bond, which has a par value of \$100, is sold at a price of \$95, as a first step, \$95 is exchanged to the local currency X by a spot operation, which is shown in the middle box, at the same time two positions are taken. First is depositing X now at t, by, for instance, getting another bond in currency X, which is not taxed, to receive proceeds as much as $X(1+r_x)$ and simultaneously making a forward contract by selling $X(1+r_x)$ against dollar for time T as much as \$100. By these three actions having USD bond, which was actually taxed, would have realized synthetically with no tax payment.

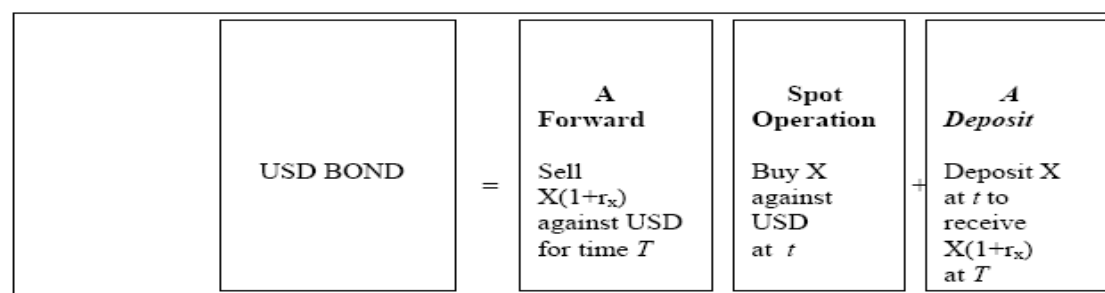


Figure 6: Creating a Synthetic Asset

Source: Neftci (2002, p. 438).

Another type of the synthetic assets can be faced within the framework of an arbitrage operation: Here, in this case, instead of aiming at circumventing the regulations gaining significant profits from the arbitrage mechanism, since the emerging market interest rate is higher than the developed country interest rate ($i > i_f$) under fixed exchange rate regime, is valid through funding a local currency emerging market bond. Figure 7 indicates this use. According to this, as seen in the first box, the local banks in emerging market countries borrow a loan in another currency, here, dollar, for maturity T now, at t. In the second step, as seen in the second box, the bank converts this dollar to X at t by a spot operation. In the third step, as seen in the third box, the bank buys emerging country bond in currency X with the maturity T. And as a last step, as seen in the fourth box, in order to omit its foreign exchange rate risk in the future the bank makes a forward contract by selling X against dollar for time T. Namely, the banks use derivatives (the fourth box) to hedge their risk in funding a local currency emerging market bond by using foreign currency which they borrowed from abroad.

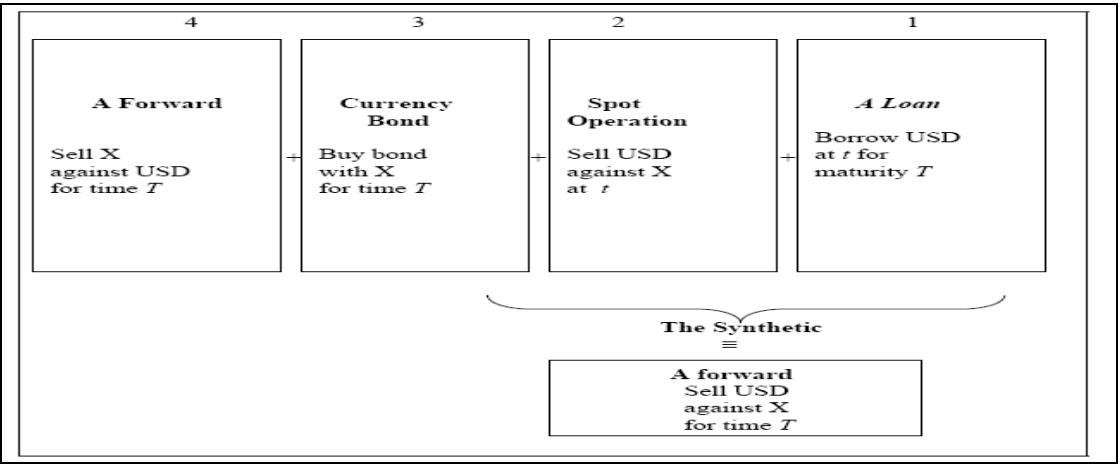


Figure 7: Covered Interest Rate Arbitrage Mechanism

Source: Author

These entire three transactions is equivalent to a forward transaction of selling USD against local currency X for time T in terms of the risks, first the foreign exchange rate risk, taken through of these three transactions (Neftci, 2002, p. 435). Moreover, these three transactions refer to “carry trade”, which is a common strategy of an investor using the funds in certain currency with a relatively low interest rate to purchase a different currency yielding a higher interest rate. In this regard, this carry trade was highly preferred by investors, whether domestic or foreign, in order to fund a local currency emerging market high yielding bonds since the emerging market interest rate has been higher than the developed country interest rate ($i > i_f$) under fixed exchange rate regimes of the 1990s. In this regard, it is noted that “yen carry trade” has been the most used one since the yen has been constituted the low interest yielding currency in the carry trade due to it has been the lowest of the G8 nations, because of the fact that low interest rate policy, which went to zero interest rate, was implemented in order to solve the deflation and recession problem of the Japanese economy in the 1990s.

Table 2 below which stress the interest rates of Japan and some crisis countries over the period 1995-1997 points out wide interest rate differential issue, which is a key determinant of carry trade.

Table 2: Short-Term Interest Rates of Japan and Some Crisis Countries

REPRESENTATIVE SHORT-TERM INTEREST RATES IN SELECTED COUNTRIES, 1995-1997 (Period Average in per cent per annum)						
Country	1995	1996				1997
		First Quarter	Second Quarter	Third Quarter	Fourth Quarter	First Quarter
Japan ^a	1.3	0.7	0.7	0.7	0.5	0.6
Republic of Korea ^b	14.0	11.1	12.7	16.9	14.1	12.6
Malaysia ^c	6.8	7.1	7.2	7.4	7.3	7.4
Thailand ^d	11.5	11.5	10.2	9.3	10.5	12.9
Brazil ^e	38.8	31.0	26.7	25.5	24.1	22.1

Notes: a: For Japan the interest rate is LIBOR on three-month deposits. b: Overnight call money rate. c: Three-month interbank rate. d: One-month interbank rate. e: Overnight interbank rateSource: UNCTAD Trade and Investment Report (1997, p. 35).

The mechanism is as follows:

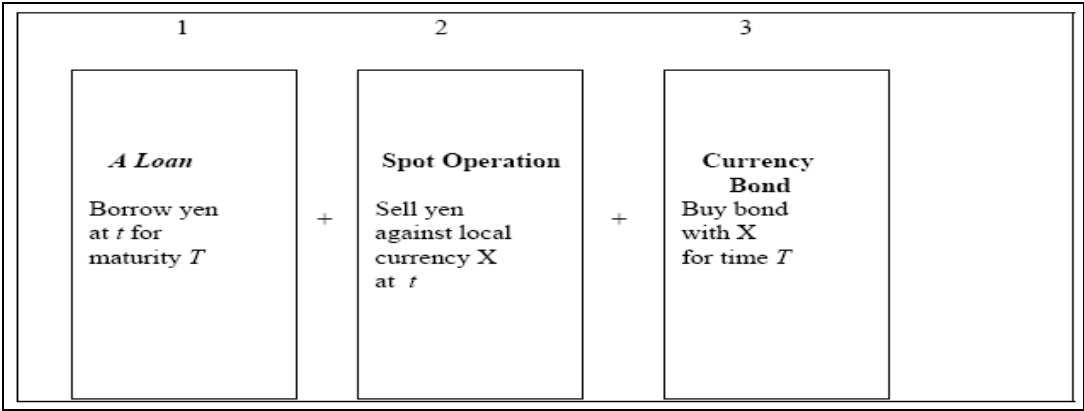


Figure 8: Carry Trade

Source: Author

As seen in Figure 8, in the first place, trader borrows, for instance, 1000 yen from a Japanese bank, and then, second, he converts the funds into local currency of an emerging market in the spot markets. Lastly, he buys a local-currency-denominated money market instrument, such as a bond of the emerging market, for the equivalent amount or as another type, lends on local currency short-term inter-bank market. For example, if the bond pays 5.5 per cent and the Japanese interest rate is set at 1 per cent then it means that investor makes a profit of 4.5 per cent (4.5% - 1%), as long as the exchange rate between the countries does not change, since it is noted that at the end of the loan period, principal and interest are converted back into yen (IMF, 1998, p. 44). In this regard, a further step in carry trade is to have an appropriate position in forward markets to offset the exchange rate risk as having a short position of local currency in forward markets. In this regard, in emerging markets of the 1990s, there were mostly fixed exchange rate systems which made these carry trades more profitable for investors. Thus, in the UNCTAD report of 1997, it is highly criticised that the capital inflows to emerging markets through carry trade operations, which were attracted by the raised short-term domestic interest rates with the aim of stabilizing the economy, made the local currency overvalued in the first step, leading to unproductive investments (UNCTAD, 1997, p. 94).

5. Concluding Remarks

Imbalanced derivative markets make developing country local banks use synthetic assets and make the system experience speculation as “practically a one way bet” against fixed exchange rate system as self-fulfilling the expectations of devaluation. Under such circumstances, speculators take a profitable position in derivatives market on the possible fall in the currency’s value (Dodd, 2002a, p. 15), leading to massive capital outflows and the collapse of the currency peg at last, pointing to the “crisis-driven capital outflow” effect of derivatives.

It can be said that derivatives have the potential to destabilize the economy in general. But at the beginning of the crisis of a developing country under imbalanced derivative markets and fixed exchange rate system, has a further destabilizing role. This happens since derivatives can have a direct crisis effect on economies by creating instability in the fixed exchange rate system and leading to the system to collapse especially during crisis or turbulence. This “one way bet” character makes no difference between hedging and speculation in terms of creating negative consequences in fixed exchange rate systems at the beginning of a crisis. This is due to all commitments, whether hedging or speculation purposes, turn into “a one way bet” as “speculative against the peg” under such circumstances. Moreover, the big picture of emerging derivatives markets including local players using synthetic assets should also be analysed carefully. In the emerging market crises within the framework of the mechanism of the role of derivatives, together with the “one way bet” process of the speculation the main focus should be on the synthetic assets. This is due to such synthetic assets can create huge crisis driven capital outflows during speculative attacks. These assets had to be taken by dealers, such as local banks, who have already been involved in the process as counterparts to benefit the potential arbitrage profits in the imbalanced derivatives markets of emerging market countries. It can be said that there were not just speculators starting the speculative attack, but also the local banks as counterparts, which actually wanted to benefit from the arbitrage opportunities that were sustained by the high interest rate- low exchange rate (appreciated currency) situation. They were using synthetic assets in the imbalanced markets of the developing countries, under highly liberalized financial markets and the contagion factor as a triggering effect of the speculative attack.

Moreover, it can be said that although this analysis of crisis-driven capital outflow effect of derivatives is related mainly to the currency crises of the emerging markets in the 1990s, this analysis also sheds light on the last global financial crisis within the framework of Greece Debt crisis. Regarding the role of Credit Default Swaps (CDSs), mostly the “naked” ones, in the debt crisis, Greece officials maintain that they suffered from the harmful usages of such derivatives. In this regard, it is noted that “Greece’s prime minister argued that speculators were using the swaps to bet against his country’s debt. He said this has escalated Greece’s borrowing costs, making it harder to dig out of its debt crisis” (The Financial Regulation Forum, 2010). In this regard, Marcos and Cinta (2009) put it as follows: “Not being credit ‘originators’, the global shadow banking system institutions mainly assumed the short position in these derivatives, since they could thus ‘synthetically’ reproduce exposure to credit and to their gains” (Marcos and Cinta, 2009, p. 11).

In any case, it seems that we are still suffering from the challenges of the complex era beginning in the 1990s, which LiPuma and Lee (2005) put as follows:

“...with the technologically accelerated mobility of capital (in great measure because so much capital is mobilized to accelerate technology) and development of complex derivatives (which are, in great part, capital’s adjustment to this technology), we appear to be heading into an era where speculative capital, a socio-historically specific concept of risk and derivatives products have become the centre of the financial clockwork that turns the hands of contemporary capitalism” (LiPuma and Lee, 2005, p. 424).

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