African Journal of Business Management Vol. 5(3), pp. 1060-1075, 4 February, 2011
Available online at http://www.academicjournals.org/AJBM
DOI: 10.5897/AJBMx10.018
ISSN 1993-8233 ©2011 Academic Journals

Full length Research paper

Relationship between hot money and economic growth: Tar-cointegration and MS-VAR analysis

Melike Bildirici*, Elçin A. Alp and Fazil Kayikçi

Department of Economics, Yildiz Technical University, Barbaros Bulvari Beşiktaş, Istanbul, Turkey.

Accepted 21 December, 2010

In this study, the effect of hot money on Turkish economy was studied. The relationship between hot money and economic growth was analyzed through MSVAR-VECM and TAR Cointegration methods by using interest rate, budget deficit, net foreign purchases in the IMKB, the current account deficit, exchange rate and industrial production index variables during 1997 and 2010.

Key words: Growth, hot money, MSVAR-VECM, TAR- cointegration.

INTRODUCTION

The effect of hot money on economic growth has been discussed in various studies and many studies have contributed to this topic from different frames. In fact, Osava (2002), Palma (2000) and Adelman (1999) have focused on the effects of hot money on economy. La Porta et al. (2000) and Bekaert and Harvey (2003) have explained that hot money in financial market affects economic performance by lower cost of capital. Laeven (2003), Knill (2004), Beck et al. (2005) have stated that hot money lessens financial limits of a company when entered in local market. According to Wurgler (2000), Love (2003), Rajan and Zingales (1998), free flow of portfolio investments increase economic output while enabling access to finance easier. According to Levine and Zervos (1996), portfolio investments make up deeper and wider markets when we look from financial markets perspective. Patro and Wald (2005) and Kim and Singal (2000) have studied the contributions of portfolio investments at domestic stocks' support of markets by establishing a relationship between portfolio investment and domestic stock. Duasa and Kassim (2008) have discussed the effects of hot money on economic performance for specific investors and countries.

In this study, the effect of hot money on Turkish economy will be studied. The relationship between hot money and economic growth will be analyzed through MSVAR-VECM and TAR cointegration methods by using interest rate, budget deficit, net foreign purchases in the IMKB, current account deficit, exchange rate and Industrial Production Index variables during 1997 and 2010.

HOT MONEY IN TURKISH ECONOMY

The study is aiming at analyzing the effect of hot money on Turkish economy in real and financial sectors separately since impulses and responses of real and financial sectors on hot money are different. Impulses and responses in real sector are observed more lately with the effect of rigid and sticky structure, while they are more rapid in financial sector. The effects of these two sectors on hot money also differ from each other. In this study, first the effect on real sector and then financial sector will be analyzed.

When the effects on the real economy are considered, the developments emerged after the liberalization of capital movements in 1980s should be analyzed. As the liberalization of capital movements is not solely enough to explain the process, the borrowing requirement of government should also be included in the analysis. After the liberalization of capital movements, this period in which the borrowing requirement of government continuously increase, did not remove the hot money movements from the agenda. Hot money has remarkable effects upon economy since 1989 with the borrowing requirement. As a result, there has been a strong relationship between economic growth rate and hot

*Corresponding author. E-mail: melikebildirici@gmail.com. Tel: 90-212-3832527.

money since 1989. When the period of 1989 - 2010 is studied, it can be seen that the growth rate increases through the capital inflows, likewise decreases through the outflows. Turkey has faced with capital outflows in the years 1989, 1991, 1994, 1998 and 2001 which are crises years. Growth rate of GDP decreased to 1.6% in 1989, 0.3% in 1991 and decreased to -6.1% in 1994. The growth rate of 8.3% in 1997 decreased to 3.9% in 1998 through the outflow of capital and depressed to -6.1 % in 1999. With the crises of November 2000, when the effect of capital outflow combined with 2001 crisis, Turkish economy experienced deepest recession as growth rate decreased to -9.5%. After a high liquidity in the world, the recession in the 2008 crisis again decreased the growth rate to -6.3%. While the crises accelerate the capital outflows, outflows lead to crises at the same time. There is a dual relationship between them which deepened the crises. However, there is one more important point such that, the emergence of crises with the capital outflows, and the aggravation of this problem to deepen crises. To put it in other way, growth rate of Turkish economy increased to 9.4 % in 1990 with the entrance of hot money. It increased 6.4% in 1992, 8.1% in 1993, 8% in 1995, 7.1% in 1996 and 8.3% in 1997. When intense hot money entrance started after the crises of 2001, growth rate was 5.9% in 2003, 9.9% in 2004, 7.6% in 2005, 5.9% in 2006, and 1.5% in 2007.

Hot money, beyond its effect upon economic growth, has also started to have a characteristic as a policy tool. Such that, through the effect of this policy, the borrowing requirement of public sector was being financed, additionally as crises were emerging, interest rates were raised and by drawing hot money to the country, an opportunity was being created to get rid of crises relatively faster. Thereby it was a policy tool that used in case of a crisis. When average domestic borrowing rate was 87.6% in 1993, 1994 crisis has occurred and interest rate has increased to 165% and hot money entrance was obtained. Interest rate which was decreased to 108.4% in 1997, increased to 137% after the outflow of hot money with the effect of Asian crisis. Domestic borrowing rate of treasury which decreased to 73% in 1998 July, increased to 115.6% on September after hot money outflow with the effect of Russian crisis, increased further to 121% on October. Interest rate which decreased to 32.2% in 2000, increased to 39% on November during 2000 crisis and while it was 57.7% on January 2001, increased to 125% after February crisis. The interest rates after November 2000 and February 2001 crises reached to three digit numbers again and became 78% on average in 2001. Through the effect of the program applied post 2001 crisis, interest rates were decreased nominally in the environment where inflation degraded to one digit numbers, however, real rates still maintained their high level. Domestic borrowing rate of treasury which decreased up to 13.7% on average in 2005, increased to 23% after fluctuation in 2006 May. And the average domestic borrowing rate of treasury which decreased to 17.5% before 2008 crisis, realized as 20.9% after the crisis (Appendix Figure 1). Bildirici and Ersin (2005; 2007), Bildirici, Ersin and Aykaç (2008) have worked on domestic and external debts in Turkey.

Although, the application of high interest rate policy offered ways to get out of crisis, it has caused to remarkable problems upon economy. First of these was the policy change in banking sector. Through the effect of high interest rate policy, banking sector has changed its borrowing policy. In order to benefit from high interest inside the country, banks were borrowing through low interest from overseas and lending to government by using these funds. Open positions of banks produced 'local origin hot money'. Because banking sector and private sector raised short term foreign loans, which were called as 'local origin hot money', when the government tended to apply to external borrowing instead of domestic borrowing, this policy acted as an intensifier of crisis at the ongoing process. Such that, open positions of banks increased to 3.782 million dollars in 1993, 2.070 million dollars in 1999 and 1.741 million dollars in 2000. Some regulations that are imposed to banks after 2001 crisis changed this process relatively. Although banks were partly hindered from using this channel after 2001 crisis through the banking reformations, it was not possible to extinguish. According to BDDK (banking regulation and supervision agency) 2009 report, banks' foreign currency position gap is in the level of 10 billion 511 million dollars in their balance sheet. Although open positions closed significantly in the first quarter and reduced to 5 billion 730 million dollars at the end of March, it has started to increase in the following months. Open positions which went up to 8 billion 177 million at the end of April and 11 billion 845 million dollars at the end of May, increased till 14 billion 231 million dollars at the end of June. While balance sheet open positions reached its highest level by 14.403 million USD in 08.08.2008 between the period the end of February 2008 and the beginning of March 2009, reached its lowest level by 263 million USD in 13.03.2009 (BDDK: 2009).

The other effect of banking sector was resulting from the shifting of their expectations. When the effect of hot money combined with the shifting of the expectations of banks, the crisis was deepening. A panic atmosphere arouse in banking system with the shifting of expectations and the effects of indicators during and after 1999 recession, 2000, 2001 and 2008 crises, and consideration of the possibility of devaluation have risen. In this panic atmosphere banks have demanded foreign exchange in order to balance their open positions and their request to borrow through TL in interbank market in order to purchase foreign exchange has deepened the crisis.

There was one more result with the effect of hot money, which was highly important in terms of economy. While export growth rate was falling behind import growth rate as a result of high interest-low exchange rate policy,

current account deficit was increasing. At the same time, as being a part of exchange rate policy, as the prices were suppressed in domestic market by cheapening importation, fighting with inflation was supported and remarkable increase was seen in households' income.

The effect upon financial sector appears more rapidly. Through the effect of the application of high interest-low exchange rate policy, while hot money entrance to the country was increasing, foreign investors' purchase in IMKB (Istanbul Stock Exchange) was increasing up to 500%. Investment stock of foreign investors became averagely 20.5 billion dollars between the years 1990 - 2010, and increased from 48.5 billion dollars to 90 billion dollars by rising 85% in January 2005 and September 2010 period. When the data for the period of 1997 - 2010 is studied, total market values of stocks are seen to have risen to the highest level as 90 billion dollars in 2010. Foreigners' shares have reached to 67.05 % at the same time. Although, foreign portfolio share showed a tendency to decrease in the years 2001 and 2002, foreign investors began to increase their portfolio in IMKB again beginning from 2003, however, decreased their shares in volume of total market transactions after October 2008; their shares in volume of total transactions decreased to under 20% between March 2009 and June 2010. When foreign shares in volume of total transactions are studied in the period of 2006 - 2010, it can be seen that it was 30% between May 2008 and July 2008, and 10 - 15% levels in the period of January 2009 - May 2010.

ECONOMETRIC METHODOLOGY

In this study, VAR and VEC transformations of Threshold and Markov from regime switching models were used; Threshold VEC and Markov Switching VAR and VECM (MS-VAR, MS-VECM) models. The logic behind using two different models is the emergence of statistical errors as threshold values of variables become different after 3 variables when Threshold Cointegration model is chosen. In this study, the reason not of to continuing with the analysis for more than 3 variables is that the thresholds of variables other than 3 variables were different. The other point is that analyzing period is relatively short. If the period is short and the amount of variables is increased, identification problem and definition problem in alternative hypothesis might arouse. Because of these reasons, threshold cointegration has not been applied for more than 3 variables. In this respect, MS-VAR and MS-VEC models from regime switching family has been used as they have a much more flexible structure.

TAR cointegration analysis

In this study, Hansen and Seo (2002) model was used. From the arguments of Hansen and Seo (2002) approach, two regimes threshold model can be written as γ threshold parameter,

$$\Delta Y_t = \begin{cases} A_1' Y_{t-1}(\beta) + u_t, & w_{t-1}(\beta) \le \gamma \\ A_2' Y_{t-1}(\beta) + u_t, & w_{t-1}(\beta) > \gamma \end{cases} \quad (1)$$

it can also be written Equation 2 as:

$$\Delta Y_t = A_1' Y_{t-1}(\beta) d_{1t}(\beta,\gamma) + A_2' Y_{t-1}(\beta) d_{2t}(\beta,\gamma) + u_t \quad (2)$$

I(.) as an indicator function,

$$d_{1t}(\beta,\gamma) = I(w_{t-1}(\beta) \le \gamma)$$
$$d_{2t}(\beta,\gamma) = I(w_{t-1}(\beta) > \gamma)$$

There are two regimes defined according to second equation's error term level. A1 and A2 coefficients' matrix are sheltered in these two regime dynamics. Second model provides all parameters to be changed among these two regimes. In the case of only $0 < P(w_{t-1} \le \gamma) < 1$ threshold effect exists, it will turn to linear coentegration in other cases. $\pi_0 > 0$ is being trimming parameter, it is constructed as it is defined in third equation;

$$\pi_0 \le P(w_{t-1} \le \gamma) \le 1 - \pi_0, \quad (3)$$

MS-VECM and MS-VAR Models

MS-VECM analysis

A VECM for the I(1) variables x_t with intercept shifts introduced

$$\Delta Y_t = v(s_t) + \alpha\beta' Y_{t-1} + u_t \qquad u_t | s_t \sim NID(0, \sum) \quad (4)$$

st represents unobservable regime indicator variable $s_t \in \{1,...,M\}$ α *and* β *are* Nxr matrices of rank r, if error covariance matrix is assumed as constant, then

$$v(s_t) = v_{s_t} = \begin{cases} v_1 & if \ s_t = 1 \\ & \\ v_M & if \ s_t = M \end{cases} \quad (5)$$

$v(s_t)$ decomposed then the process can be defined as;

$$\Delta x_t - \beta \perp \delta^*(s_t) = \alpha(\beta' Y_{t-1} - \mu(s_t)) + u_t \qquad u_t | s_t \sim NID(0, \sum) \quad (6)$$

ΔY_t *and* $\beta' Y_{t-1}$ are expressed as deviations about regime and time dependent means, $\beta \perp \delta^*(s_t)$ *and* $\mu(s_t)$. Each regime was accepted to an attractor of the system defined by the equilibrium value of the cointegration vector and the drift. Each regime's disequilibrium is adjusted by the vector equilibrium correction mechanism; because the regimes are generated by stationary, irreducible Markov Chain; error arising from regime shifts are corrected towards the stationary distribution of the regimes (Krolzig and Mizon, 2000).

MS – VAR Analysis

As Tillman (2003) also indicated, impulse and response functions are being derived in order to follow dynamics represented by MS-VAR model and give opportunity for determination of magnitude and persistency of the responses of each variable to the economic shocks. This point is highly important in terms this analysis. Krolzig (2006) allows seeing the response of the system towards shocks applied to variables, and responses towards regime changes in the generalized impulse and response analysis frame. Accordingly, response of the system towards the shocks applied to variables in *h* period is shown in the Equation 7 ∇u represents shock in time t in the equation.

$$ET_{\nabla u}(h) = E\left[y_{t+h} \middle| \xi_t, u_t + \nabla u; Y_{t-1} \right] - E\left[y_{t+h} \middle| \xi_t, u_t; Y_{t-1} \right] \quad (7)$$

Response differs according to the dimension and sign of a shock due to its non-linear structure. While this approach focuses on responses of system towards Gaussian shocks (innovations), the definition of response towards regime changes through generalized impulse response is shown as Equation 8:

$$ET_{\nabla \xi}(h) = E\left[y_{t+h} \middle| \xi_t + \nabla \xi, u_t; Y_{t-1} \right] - E\left[y_{t+h} \middle| \xi_t, u_t; Y_{t-1} \right] \quad (8)$$

Here $\nabla \xi$, represents regime changes in time t and regime changes are assumed to have an economic meaning (Bozoklu, 2010).

DATA AND ECONOMETRIC RESULTS

Data

Monthly data used which encompass the period 1997 - 2010. Data was taken from TCMB (Central Bank Republic of Turkey), TUIK (Turkish Statistical Institute) and IMKB (Istanbul Stock Exchange). In the empirical work, change of foreigners' net positions (foreign purchases and foreign sales) (SE) in IMKB and net portfolio investment variables (PR) has been used as the measurement of hot money entered to the country. Although, many studies emphasize net portfolio investments (PR) as hot money, in this work, analysis of hot money will be made through the usage of SE which reacts faster than PR. Therefore, two variables have been taken both as together and separately in the analysis. In MS-VAR analysis where they are together, SE value were excluded from PR variable. In addition to these variables, variables of current account deficit (CA), exchange rate (EX), real interest rates (RI), industrial production index (IPI) and the budget deficit (BD) were used. As a measurement of economic growth, industrial production index was taken in terms of GDP growth. Although, it is a common application to use GDP as a measurement of growth concerning the works that relates hot money with economic growth, there is a need to take action from industrial production index. There are two reasons for the usage of IPI in economic growth. The first one is that IPI representation can be the measurement of economic growth, because the correlation between IPI and GDP is found as 0.80. The second is that it is aimed at seeing the effect of hot money on industrial production. Firstly, in order to see the effect of hot money on the economy, the study have looked at the effect of SE variable and PR variable separately on IPI by using TAR cointegration analysis. And the relationship between TAR cointegration analysis and IPI, PR and SE variables have been developed to analyze the effect of net foreign purchases in IMKB and portfolio investments on the economy in the same model. MS-VAR and MS-VEC models are going to help to understand the inter-relationship between IPI, SE, CA, EX, RI, PR, and BD variables.

Econometric results

TAR –cointegration and TAR unit-root test results

Before the cointegration analysis, variables should be examined whether they are stationary or not. At some studies, it was seen that this analysis could be made by the usage of traditional unit root tests, however, it was also proved through many studies that the power of traditional unit root tests are lower in non-linear time series. While they showed the deficiency of ADF tests' strength, alternatively they suggested the usage of NG-Perron, ERS-DFGLS tests. As an alternative, Bildirici and Alp (2008) asserted that traditional unit root tests should be supported by non-linear unit root tests. Therefore, beyond ADF unit root test, Caner and Hansen (2001) TAR unit root analysis was also used for searching stationarity of the variables which are used in TAR cointegration analysis.

As can be seen from Table 1, both foreign portfolio investments, growth and net foreign purchase series are integrated of order one. Lag length (numbers in parenthesis) was determined according to the AIC. In case of the existence of non-linear structure in the data, since the traditional root tests' power could be low, it should be tested by Caner and Hansen (2001) TAR traditional unit test that was developed for this kind of situations.

In Table 2 Caner and Hansen (2001) test results can be seen for IPI, SE and PR variables. Lag length in test was determined adherent to the obtained lag length in the ADF test. m was determined in which SSE were minimum according to Caner and Hansen (2001) study. In the first stage of the test series was tested whether they followed TAR process or not. When there are different results in k and m lag lengths, results obtained from m lag length must be taken into account. When m lag length is considered, it has been seen that whole variables follow TAR process. R_1 and R_2 tests determine the general stationarity of the series. These tests also indicate that the series are not stationary. In the second part where each regime was tested separately, results show that none of the regimes are stationary for whole variables.

After deciding that whole of the series are integrated of the same order and they follow TAR process, the next step was TAR cointegration relationship. Numbers in parentheses in the estimated threshold VEC models are Eicker – White standard errors. When the models are examined parameter estimations are seen to be statistically significant.

First, the relationship between IPI and SE was examined, at the second analysis the relationship between IPI and PR was examined, finally the relationship between IPI, SE and PR was examined at the third analysis.

In the first model with IP and SE, scan size was chosen

Table 1. ADF unit root test results.

Variable	Test statistic	1%	5%	10%
IPI (12)	-1.3094	-3.4755	-2.8812	-2.5773
SE (14)	-2.5754	-3.4755	-2.8812	-2.5773
PR (7)	-1.1996	-3.4733	-2.8803	-2.5768
EX (3)	-1.7736	-3.4722	-2.8798	-2.5766
BD(10)	-0.448	-3.4755	-2.8812	-2.5773
CA (17)	-2.8110	-3.4764	-2.8816	-2.5775

Table 2. Caner and Hansen (2001) test results.

	Variable	Wald Statistic	Bootst. p-value	Asimp. p- value		Variable	Wald Statistic	Bootst. p-value	Asimp. p- value
Bootstrap Threshold T est	IPI *(m)*	134.45	0.0	0.0	**Unit Root Test t_1**	IPI *(m)*	2.66	0.99	0.18
	IPI *(k)*	44.91	0.12	0.06		IPI *(k)*	1.77	0.32	0.58
	SE *(m)*	493.41	0.02	0.00		SE *(m)*	2.88	0.16	0.12
	SE *(k)*	45.16	0.32	0.34		SE *(k)*	0.36	0.80	0.95
	PR *(m)*	42.29	0.0	0.0		PR *(m)*	2.06	0.99	0.42
	PR *(k)*	26.83	0.0	0.02		PR *(k)*	0.83	0.6	0.9
Two-Sided Wald Test (R_2)	IPI *(m)*	8.11	0.23	0.28	**Unit Root Test t_2**	IPI *(m)*	1.015	0.48	0.86
	IPI *(k)*	3.16	0.65	0.85		IPI *(k)*	0.13	0.84	0.96
	SE *(m)*	52.24	0.05	0.00		SE *(m)*	6.63	0.90	0.0
	SE *(k)*	2.83	0.69	0.89		SE *(k)*	1.64	0.36	0.57
	PR *(m)*	9.41	0.12	0.19		PR *(m)*	2.27	0.19	0.34
	PR *(k)*	1.14	0.88	0.99		PR *(k)*	0.68	0.62	0.92
One-Sided Wald Test (R_1)	IPI *(m)*	1.03	0.84	0.97					
	IPI *(k)*	3.16	0.60	0.79		Bootstrap replication: 10000.			
	SE *(m)*	8.27	0.30	0.23		IPI: k = 12, m = 1,			
	SE *(k)*	2.69	0.64	0.84		SE: k = 14, m = 1,			
	PR *(m)*	5.15	0.35	0.54		PR: k = 7, m = 2			
	PR *(k)*	1.14	0.85	0.97					

as 300x300 for γ, β parameters and estimated cointegration relation was found as $v_t = IPI_{t-1} - 0,42SE_t$ and estimated threshold value was found as $\hat{\gamma} = -0,46$ according to the minimization of likelihood function. The first regime constitutes 42% of the observations and is called as “extreme regime” or recession. Second regime constitutes 58% of the observations and is called as “typical regime” or expansion. First regime “extreme regime”

$$IPI_t \leq 0,42SE_t - 0,46 \quad (9)$$

Second regime “typical regime”

$$IPI_t > 0,42SE_t - 0,46 \quad (10)$$

$$\Delta IPI_t = \begin{cases} \underset{(0,038)}{0.056} - \underset{(0,148)}{0.050} v_{t-1} - \underset{(0,034)}{0.0504} \Delta SE_{t-1} - \underset{(0,058)}{0.012} \Delta SE_{t-2} - \underset{(0.026)}{0.423} \Delta IPI_{t-1} - \underset{(0.012)}{0.0276} \Delta IPI_{t-2} + u_{1t}, \quad v_{t-1} \le -0,46 \\ \underset{(0,0019)}{0.0016} + \underset{(0,074)}{0.076} v_{t-1} - \underset{(0,023)}{0.048} \Delta SE_{t-1} - \underset{(0,098)}{0.031} \Delta SE_{t-2} - \underset{(0.016)}{0.528} \Delta IPI_{t-1} - \underset{(0.108)}{0.273} \Delta IPI_{t-2} + u_{2t}, \quad v_{t-1} > -0.46 \end{cases} \tag{11}$$

$$\Delta SE_t = \begin{cases} \underset{(0,453)}{-0.688} - \underset{(0,183)}{0.380} v_{t-1} - \underset{(0,016)}{0.172} \Delta SE_{t-1} - \underset{(0,058)}{0.048} \Delta SE_{t-2} - \underset{(0.016)}{1.248} \Delta IPI_{t-1} - \underset{(0.060)}{1.102} \Delta IPI_{t-2} + u_{1t}, \quad v_{t-1} \le -0,46 \\ \underset{(0,120)}{-0.823} - \underset{(0,074)}{0.461} v_{t-1} - \underset{(0,092)}{0.154} \Delta SE_{t-1} - \underset{(0,098)}{0.111} \Delta SE_{t-2} - \underset{(0.097)}{0.962} \Delta IPI_{t-1} - \underset{(0.770)}{0.924} \Delta IPI_{t-2} + u_{2t}, \quad v_{t-1} > -0,46 \end{cases} \tag{12}$$

In the case where the difference between the industrial production index and the net position change in IMKB tends to decrease more than 46%, change of net positions in IMKB affects the industrial production index 42%. Although, 42% value was seen as excessive, when it was thought that foreigners in IMKB were Turkish citizens abroad, there must be high correlation between foreign purchases and IPI.

Change in SE lessens IPI in both regimes; likewise the increase in IPI causes a decrease in SE. Generally this situation shows the trade off in IPI and SE. Starting from the consideration that change in SE can be used as one of the measurements of hot money and IPI as a measurement of economic growth, it can be concluded that there is an inverse relationship between economic growth and hot money.

In the second model with IP and PR, scan size was chosen as 300x300 for γ, β parameters and estimated cointegration relation was found as $v_t = IPI_{t-1} - 0,19PR_t$ and estimated threshold value was found as $\hat{\gamma} = -0,46$ according to the minimization of likelihood function. Numbers in parentheses in the estimated threshold VEC models are Eicker – White standard errors. When the models are examined parameter estimations are seen to be statistically significant. The first regime constitutes 44% of the observations and is called as “extreme regime” or recession. Second regime constitutes 56% of the observations and is called as “typical regime” or expansion.

First regime “extreme regime”

$$IPI_t \le 0,19PR_t - 0,46 \tag{13}$$

Second regime “typical regime”

$$IPI_t > 0,19PR_t - 0,46 \tag{14}$$

$$\Delta IPI_t = \begin{cases} \underset{(0,038)}{0.057} - \underset{(0,003)}{0.019} v_{t-1} + \underset{(0,0009)}{0.001} \Delta PR_{t-1} + \underset{(0,058)}{0.0005} \Delta PR_{t-2} - \underset{(0.0009)}{0.536} \Delta IPI_{t-1} - \underset{(0.012)}{0.080} \Delta IPI_{t-2} + u_{1t}, \quad v_{t-1} \le -0,46 \\ \underset{(0,001)}{0.003} - \underset{(0,001)}{0.096} v_{t-1} + \underset{(0,012)}{0.123} \Delta PR_{t-1} - \underset{(0,012)}{0.001} \Delta PR_{t-2} - \underset{(0.016)}{0.421} \Delta IPI_{t-1} - \underset{(0.010)}{0.325} \Delta IPI_{t-2} + u_{2t}, \quad v_{t-1} > -0.46 \end{cases} \tag{15}$$

$$\Delta PR_t = \begin{cases} \underset{(0,453)}{-0.215} + \underset{(0.058)}{0.506} v_{t-1} - \underset{(0,017)}{0.023} \Delta PR_{t-1} - \underset{(0,012)}{0.069} \Delta PR_{t-2} - \underset{(0.128)}{3.416} \Delta IPI_{t-1} - \underset{(0.061)}{0.904} \Delta IPI_{t-2} + u_{1t}, \quad v_{t-1} \le -0,46 \\ \underset{(0,005)}{-0.123} - \underset{(0,001)}{0.601} v_{t-1} - \underset{(0,017)}{0.228} \Delta PR_{t-1} - \underset{(0,011)}{0.185} \Delta PR_{t-2} - \underset{(0.011)}{0.952} \Delta IPI_{t-1} - \underset{(0.012)}{0.895} \Delta IPI_{t-2} + u_{2t}, \quad v_{t-1} > -0.46 \end{cases} \tag{16}$$

Relationship between IPI and PR was examined in this model. In the case where the difference between IPI and PR tends to decrease more than 46%, change in PR affects IPI 19%. As cointegration vector points to this relationship, when VEC equations are examined it has been seen that a shock occurred in PR loses its effect instantly and turns to equilibrium rapidly, however a shock occurred in IPI turns to equilibrium more slowly as expected. Here, the slowness of adjustment in goods market as a result of viscosity and rigidity was present undoubtedly.

In the third model with IP and PR and SE, scan size

was chosen as 300 × 300 for γ, β parameters and estimated cointegration relation was found as $v_t = IPI_{t-1} - 0,26PR_t - 0,32SE_t$ and estimated threshold value was found as $\hat{\gamma} = -0,46$ according to the minimization of likelihood function. Numbers in parentheses in the estimated threshold VEC models are Eicker – White standard errors. When the models are examined parameter estimations are seen to be statistically significant. The first regime constitutes 44% of the observations and the observations and is called as "extreme regime" or recession. Second regime constitutes 56% of the observations and is called as "typical regime" or expansion. First regime "extreme regime"

$$IPI_t \leq 0,26PR_t + 0,32SE - 0,46 \quad (17)$$

Second regime "typical regime"

$$IPI_t > 0,26PR_t + 0,32SE - 0,46 \quad (18)$$

$$\Delta IPI_t = \begin{cases} \underset{(0,256)}{-0.001} \underset{(0,003)}{-0.006} v_{t-1} \underset{(0,138)}{-0.547} \Delta IPI_{t-1} \underset{(0,058)}{-0.093} \Delta IPI_{t-2} \underset{(0.0009)}{-0.017} \Delta PR_{t-1} \underset{(0.001)}{-0.0007} \Delta PR_{t-2} \underset{(0.0006)}{-0.043} \Delta SE_{t-1} \underset{(0.032)}{-0.006} \Delta SE_{t-2} + u_{1t}, \quad v_{t-1} \leq -0,46 \\ \underset{(0,010)}{0.034} \underset{(0,074)}{+0.084} v_{t-1} \underset{(0,023)}{-0.543} \Delta IPI_{t-1} \underset{(0,110)}{-0.289} \Delta IPI_{t-2} \underset{(0.013)}{+0.002} \Delta PR_{t-1} \underset{(0.108)}{+0.001} \Delta PR_{t-2} \underset{(0.013)}{-0.006} \Delta SE_{t-1} \underset{(0.010)}{-0.011} \Delta SE_{t-2} + u_{2t}, \quad v_{t-1} > -0.46 \end{cases} \quad (19)$$

$$\Delta PR_t = \begin{cases} \underset{(0,256)}{-0.001} \underset{(0,003)}{-0.006} v_{t-1} \underset{(0,079)}{-2.119} \Delta IPI_{t-1} \underset{(0,052)}{-0.959} \Delta IPI_{t-2} \underset{(0.012)}{-0.156} \Delta PR_{t-1} \underset{(0.0006)}{-0.121} \Delta PR_{t-2} \underset{(0.031)}{-1.998} \Delta SE_{t-1} \underset{(0.016)}{-0.574} \Delta SE_{t-2} + u_{1t}, \quad v_{t-1} \leq -0,46 \\ \underset{(0,025)}{0.117} \underset{(0,025)}{+0.014} v_{t-1} \underset{(0,064)}{+1.658} \Delta IPI_{t-1} \underset{(0,020)}{-0.588} \Delta IPI_{t-2} \underset{(0.026)}{-0.008} \Delta PR_{t-1} \underset{(0.010)}{-0.039} \Delta PR_{t-2} \underset{(0.030)}{-1.366} \Delta SE_{t-1} \underset{(0.108)}{-0.839} \Delta SE_{t-2} + u_{2t}, \quad v_{t-1} > -0.46 \end{cases} \quad (20)$$

$$\Delta SE_t = \begin{cases} \underset{(0,453)}{0.012} \underset{(0,183)}{+0.506} v_{t-1} \underset{(0,704)}{-0.350} \Delta IPI_{t-1} \underset{(0,061)}{-0.529} \Delta IPI_{t-2} \underset{(0.004)}{-0.007} \Delta PR_{t-1} \underset{(0.003)}{-0.001} \Delta PR_{t-2} \underset{(0.065)}{-0.344} \Delta SE_{t-1} \underset{(0.165)}{-0.111} \Delta SE_{t-2} + u_{1t}, \quad v_{t-1} \leq -0,46 \\ \underset{(0,257)}{0.014} \underset{(0,074)}{-0.461} v_{t-1} \underset{(0,082)}{-0.961} \Delta IPI_{t-1} \underset{(0,082)}{-1.034} \Delta IPI_{t-2} \underset{(0.078)}{-0.008} \Delta PR_{t-1} \underset{(0.011)}{+0.001} \Delta PR_{t-2} \underset{(0.106)}{-0.625} \Delta SE_{t-1} \underset{(0.005)}{-0.329} \Delta SE_{t-2} + u_{2t}, \quad v_{t-1} > -0.46 \end{cases} \quad (21)$$

In the case where the difference between IPI, SE, and PR variables tends to show decrease more than 46%, change in net positions in IMKB affects the industrial production index 32% and portfolio investments 26%. Similar to the first model, change of net positions in IMKB lessens IPI in both regimes; likewise the increase in IPI causes a decrease in SE. The information obtained through adding PR in the analysis is the indication of difference of the effect of PR on IPI among regimes. In the first regime where the decrease is more than 46% it has seen that the effect of portfolio investments on the industrial production index is negative, nevertheless it becomes positive at the second regime.

MS-VAR and MS-Cointegration Results

As it is indicated above, budget deficits in Turkey are financed through borrowing; this obligation leads to increase in interest rates, the increase in the interest rates makes government securities attractive for banks, banks tend to increase their short term external borrowing in order to lend to the treasury. When local hot money is added to the hot money entered to the country, foreign exchange stock is increasing. With the effect of foreign currency coming through two ways local currency becomes appreciated, which enlarges the foreign trade deficit and current account deficit. As a result of high interest rates and highly appreciated local currency during this process, stock exchange grows artificially and crisis is experienced. In order to test the above arguments, firstly MS-VAR analysis was used. For the MSIH(2)-VAR(4) model specification including EX, SE, CA, IPI, RI and PR variables by the usage of Krolzig's MSVAR software, the results are seen in Table 3 by means of the usage of EM algorithm suggested from Dempsteir, Laird and Rubin (1977) in BHLK (Baum-Lindgren-Hamilton-Kim) filter form.

According to our findings at the end of MS-VAR analysis; while the change of foreigners net position in İMKB (SE) is affected positively from exchange rate (EX), current account deficit (CA), real interest rates (RI), the impact of industrial production index (IPI) is seen to be negative. While exchange rate (EX) is affected positively from the change of foreign net position in IMKB (SE), portfolio investments (PR), the impact of industrial

Table 3. The results for the MSIH (2)-VAR (4) model.

	EX	SE	CA	PR	RI	IPI	BD
Const(Reg.1)	0.126	3.647	-0.147	1.886	0.079	0.025	1.306
Const(Reg.2)	0.151	3.383	0.725	2.106	0.101	0.035	0.783
EX _1	0.917	1.180	3.385	1.156	1.217	-0.248	-1.332
EX _2	0.321	1.313	9.098	6.658	-0.185	0.379	1.9697
EX _3	-0.640	-5.636	-5.351	-12.106	-1.051	-0.303	-1.698
EX _4	0.322	2.917	-5.670	5.033	-0.011	0.150	-4.910
SE _1	-0.318	0.156	0.020	0.024	-0.001	-0.0006	-0.001
SE _2	0.386	0.008	-0.003	0.004	-0.002	0.0001	-0.002
SE _3	0.510	-0.077	0.008	0.003	-0.002	0.0003	-0.0004
SE _4	0.288	0.133	0.001	-0.008	-0.004	0.0003	0.009
CA _1	-1.233	0.180	-0.212	0.017	-0.000	-0.001	-0.033
CA _2	0.644	-0.079	-0.109	-0.031	0.005	0.0004	-0.029
CA _3	-0.265	0.235	0.056	-0.022	0.002	-0.001	0.006
CA _4	0.0006	0.319	-0.039	-0.004	0.005	0.0005	-0.105
PR _1	0.386	0.160	-0.145	0.277	0.029	0.001	-0.210
PR _2	0.715	-0.501	-0.070	0.101	-0.028	-0.0008	-0.177
PR _3	-0.285	-1.230	-0.193	0.212	-0.015	-0.0007	-0.164
PR _4	0.001	1.347	0.368	0.037	0.006	0.002	0.485
RI_1	0.025	2.076	-5.015	1.973	0.369	0.039	-0.128
RI _2	-0.052	1.788	-2.916	0.935	0.627	-0.034	1.050
RI _3	-0.097	2.548	0.193	0.506	0.194	-0.040	0.658
RI _4	0.082	-6.723	1.216	-0.211	-0.212	0.028	1.504
IPI _1	0.198	-4.493	-5.826	-1.170	-4.33	2.108	4.441
IPI _2	-1.025	-4.293	-21.03	-2.105	-0.787	-1.714	-5.333
IPI _3	-0.990	1.982	0.888	3.791	3.272	1.053	-1.281
IPI _4	-0.943	-1.079	22.352	-1.561	0.119	-0.434	2.294
BD_1	0.218	-0.034	-0.167	0.005	-0.001	0.00002	-0.440
BD _2	0.426	0.292	-0.178	-0.015	-0.005	-0.00003	-0.116
BD _3	0.320	0.019	-0.112	0.019	-0.0001	0.0009	-0.043
BD _4	-0.0008	-0.006	-0.042	-0.045	0.0003	-0.0001	0.086
SE (Reg.1)	0.011	2.876	2.230	0.319	0.056	0.005	1.489.
SE (Reg.2)	0.059	1.712	0.696	0.301	0.068	0.018	0.695

AIC criterion:-3.2544, HQ criterion: -1.1264, log-likelihood : 521.8450 , LR linearity test: 428.6826, Chi(35) =[0.0000] ** Chi(37)=[0.0000] **; DAVIES=[0.0000] **, Portmanteau(42): Chi^2(42) = 43.327 [0.4145], Std. Devn. 0.98813, Skewness: 0.20315, Excess Kurtosis; -0.32236, Minimum -2.4323, Maximum 2.6756, Asymptotic test: Chi^2(2) = 1.6476 [0.4388], Normality test: Chi^2(2) = 1.7138 [0.4245], ARCH test for scaled residuals: ARCH coefficients: Lag Coefficient Std. Error 1 0.076057; 0.09727, RSS = 232.844, sigma = 1.48915, Testing for error ARCH from lags 1 to 1 ARCH 1-1 test: F(1,105) = 0.61146 [0.4360].

production index (IPI) and real interest rates (RI) are seen to be negative except the last period. While foreign net positions in IMKB (SE) and real interests (RI) are increasing the current account deficit (CA), budget deficit (BD) and portfolio investments (PR) decrease it. The effects of exchange rate (EX), the change of foreign net position in IMKB (SE), and portfolio investments (PR) on portfolio investments (PR) are positive. The change of foreign net position in IMKB (SE) affects industrial production (IPI) positively but budget deficit (BD) negatively.

Portfolio investment (PR) is affected by DK related with arbitrage effect. First two lags with IPI displays a negative relationship. As a matter of fact, IPI displays an inverse relationship with PR at the first two periods. To have high coefficients is quite important. The effect between PR and RI is in the direction we expected. The effect of PR on CA is as expected after the second period. When BD and RI relationship were looked at; there is an inverse relationship at the first period, but relationships in the 2. 3. and 4. Lags are positive and coefficients are significant. Although, the relationship between BD and SE is negative, the effect is minor and is not significant. The relationship between CA and EX is positive, and coefficients are significant at the first two lags. PR is positive at the first period, RI is negative; this effect can be explained through PR indirectly. While hot money was

Table 4. Contemporaneous correlations.

	Regime 1								Regime 2						
	EX	**SE**	**CA**	**PR**	**RI**	**IPI**	**BD**		**EX**	**SE**	**CA**	**PR**	**RI**	**IPI**	**BD**
EX	1.00							**EX**	1.00						
SE	0.24	1.00						**SE**	0.33	1.00					
CA	-0.50	-0.16	1.00					**CA**	-0,38	0.13	1.00				
PR	0.21	-0.14	-0.14	1.00				**PR**	-0.47	-0.51	0.20	1.00			
RI	0.41	0.61	-0.31	-0.44	1.00			**RI**	0.43	-0.31	-0.17	0.52	1.00		
IPI	0.75	0.50	-0.23	0.04	-0.58	1.00		**IPI**	0.98	0.07	-0.11	-0.43	0.58	1.00	
BD	0.54	0.14	-0.06	0.07	0.02	0.10	1.00	**BD**	-0.16	0.003	0.92	0.76	-0.46	-0.18	1.00

Table 5. Regime probabilities of MSIH(2)-VAR(4) model.

Transition probability			Regime property				Eigenvalue
	Regime 1	**Regime 2**		**nObs**	**Prob.**	**Duration**	
Regime 1	0.7846	0.2154	**Regime 1**	56.2	0.348	4.64	1.000
Regime 2	0.1152	0.8848	**Regime 2**	99.8	0.651	8.68	0.669

boosting economy rapidly, it was rendering it to the crisis sensitive and the effect of interest rate policy was also high for this sensitivity. Such that, through the effect of high interest rate-low exchange rate policy, when current account deficits increase, interest rates were boosting, through the effect of high real interests short term capital inflows in Turkey was increasing highly and TL was appreciating against dollar. The current account deficit was emerging, high interest rates were attracting hot money towards the country, and banks wishing to benefit from high interest rates were changing private sector borrowing policy. While this sensitive atmosphere was increasing the expectation of devaluation, the domestic borrowing requirement related to budget deficits was resulting with crisis. However, high budget deficits and the domestic borrowing requirement were launching crisis process back. As can be seen from Table 4, constants related to the variables are positive in first and second regimes except for CA. The footnotes on Table 3 show the result of diagnostic tests concerning MSIH(2)-VAR(4) model and error terms. Error terms do not have any attribution about autocorrelation and non linearity.

When the correlations are examined together with the result of strong relationship between CA and PR at the first regime, the presence of negative relationship in both regimes can be seen. Between PR and EX variables, a positive relationship at first regime and a negative one at the second regime and that there is a stronger relationship at the second regime can be seen. Strongness of effect is an anticipated situation at the expansion period. When the relationship between PR and RI is examined there is an inverse relationship in the crisis namely in Regime 1. As we have mentioned above, crisis phase is a PR outflow phase. RI is a policy tool used to obtain PR. At the second regime there is a positive and strong relationship between each other. Also between IPI and EX variables, a positive and a strong relationship is seen at both regimes. The impact of exchange rate on export and import is obvious. While a strong and a positive relationship between EX and BD can be seen at the first regime, the strength and the direction of the relationship changes at the second regime. While the relationship of RI and IPI with SE variable is positive and strong at the first regime, it is seen to be weak at the second regime. While BD and PR show a positive relationship at both regimes, PR-CA, PR-BD, IPI-RI variables show differences at regimes in terms of the relationships among each other. Smoothened and filtered regime probabilities obtained by means of EM algorithms of MSIH(2)-VAR(4) model, and the observation number concerning each regime obtained by the usage of matrix of transition probabilities, ergodic probabilities and time properties can be seen in Table 5.

According to the results obtained, both regimes contain persistency. While the probability to stay in Regime 1 is 0.7846 at the period following Regime 1, to stay at Regime 2 at the period following Regime 2 was calculated as 0.8848. Therefore, asymmetry among the mentioned regimes is obtained due to the difference of transition probabilities. High values of persistency probabilities obtained at both regimes show that model fits the economic data well. As can be seen from Table 5, 56.2 observation values are at the first and 99.8 are at the second regime. Length of economy's presence at Regime 1 was calculated averagely as $d_1 = (1 - p_{11})^{-1} = 4.64$ months and at Regime 2 as $d_2 = (1 - p_{22})^{-1} = 8.68$ months. Persistency length of economy at Regime 2 was seen to

be more than the Regime 1. Therefore, asymmetry between expansion and contraction in economy is caught here too. Unconditional or ergodic probability of a selected observation value being in the Regime 1 was found as 0.3483, and was found 0.6517 Regime 2. Besides, as the largest eigenvalue of the matrix of transition probabilities was found as 1 and the other was found less than one, $\lambda = 0.66941$ the assumption of ergodic chain is satisfied.

Accordingly, as the first eigenvalue is equivalent to one and as the other was found as smaller than one, matrix of transition probabilities are ergodic and irreducible. The fact that the matrix of transition probabilities are ergodic, confirms the stationarity of regimes. Ergodic transition probabilities matrix are always stationary (Hamilton, 1994; Bozoklu, 2010; Bildirici and Bozoklu, 2010).

MSIH(2)-VECM(4) model can be written as;

$$\Delta x_t = \delta(s_t) + \alpha(\beta' x_{t-1} - \gamma(t-1)) + \sum_{k=1}^{4} \Gamma_k \Delta x_{t-k} + u_t \qquad u_t | s_t \square NID(0, \sum(s_t))$$

by following Krolzig (1997) and Krolzig and Mizon (2000) method. Equilibrium correction is very important in MS-VEC analysis as in TAR Cointegration analysis, when VEC equations are examined it has been seen that a shock occurred in variables loses its effect instantly and turns to equilibrium rapidly, however a shock occurred in IPI turns to equilibrium more slowly as expected. Here, the slowness of adjustment in goods market as a result of sticky and rigidity process was present as TAR Cointegration result. Appendix Figure 2 and Table 6 shows regime dynamics related to MSIH(2)-VAR(4) model. While the vertical axis shows the probability of being in a particular regime, the horizontal axis shows the time. The first and the second figures in Figure 2 shows the transition probabilities estimated after 75 periods when Regime 1, 2 were given. The rightmost figure shows the probability of staying at the same regime after 75 periods. As the probabilities of staying at the same regime decrease with time, it can be followed from the transition probabilities matrix that it is higher at the second Regime.

The results of impulse response analysis are as expected (Appendix Figures 3 and 4). As it was pointed out by Van Dijk and Franses (2000), the traditional impulse response function is symmetric if the model is linear because that the effect of a negative shock has the reverse of a positive shock effect. Besides, traditional impulse response function is independent from past. These features are not valid for non linear models. Therefore, as it was stated by Van Dijk and Franses (2000) with Krolzig (2006), generalized impulse response analysis is different from classic impulse response analysis due to the usage of conditional information in dynamic analysis (Sign and magnitude of the shock, past values of the variables or process). Both impulse and responses for MS-VAR – MS-VEC can be seen in Figures 3 and 4.

The effect of shock in foreign exchange rate on SE is positive at both regimes; however, a negative impact at first regime and a positive impact at the second regime have been seen on CA. As a result of a shock occurred in current account deficit, while BD is affected positively at the second regime, this impact will not occur at the first regime. As a result of a shock occurred in real interest rate, while SE is affected positively at first regime, it is seen that this impact is not occurred at the second regime, but CA is observed to be impacted negatively at the second regime. When impulse and responses are examined in Appendix Figure 4, CA is observed to response positively at first and then negatively to a shock occurred in EX variable. A shock occurred in RI variable creates a temporary negative impact in CA. As it was expected, a shock occurred in BD creates a positive impact in CA. While a shock occurred in SE is seen to create a negative impact on CA, a shock occurred in FDI and IPI is seen to create a positive impact conversely. SE's reaction to the shock occurred in these two variable (FDI, IPI) is negative.

At Appendix Figure 4 there are impulse and response graphics obtained from VEC equations. In graphics, exchange rates seem to response to portfolio investments negatively in the first place and this response seems to be lessened as the time passes. A shock experienced in real interest rates creates a decrease in exchange rate but a shock experienced in IPI increases it and removes out of equilibrium. A shock in portfolio investments creates a fall in current account, but it turns to the equilibrium later. Similarly, a shock in industrial production index creates a sudden fall in portfolio investments, but it turns to the equilibrium later. Again, a shock occurred in IPI is seen to increase real interests sharply in the first place, but a return to the equilibrium is seen later. A positive shock occurred in exchange rate is observed to affect IPI negatively.

Appendix Figure 5 shows the economic results of certain movements from ergodic regime distribution towards a particular regime and transitions from one regime to another regime. As may be observed from Figure 5, according to the results of the regime shift: First, the bad extreme regime, regime 1 causes to the decrease of the IP, PR, CA, SE, EX variables and increase of BD and RI. In regime 2, an increase is observed in the IP, EX, CA, SE and PR. Second, in the transition from regime 1 to regime 2, there is an upwards tendency concerning IP, PR, EX and CA variables with the size of these tendencies differ.

Conclusion

This study argues that budget deficits in Turkey are financed through borrowing; this obligation leads to its increase by creating oppression on interests. As the increase of exchange rates makes public goods attractive in terms of banks, and as banks tend to short term external

Table 6. The results for the MSIH(2)-VECM(4) short-run dynamics.

	EX	SE	CA	PR	RI	IPI	BD
Coefficient (*std. error*)							
ΔEX 1	0.480	-5,375	1,099	1,473	2	-0.344	-1,191
	0.387	*1,879*	*1,18*	*2.795*	*0.549*	*0.123*	*9,18*
ΔEX 2	0.785	3,804	-2,139	7,601	-0.952	0.519	2,035
	0.744	*3,614*	*2,269*	*5.376*	*1.056*	*0.237*	*1,766*
ΔEX 3	-0.684	-5,432	2,340	-1,568	-1,731	-0.353	-7,331
	0.760	*3,688*	*2,315*	*5.485*	*1.078*	*0.242*	*0,180*
ΔEX 4	0.322	2,021	-1,280	6,386	0.401	0.150	-1,366
	0.422	*2,051*	*3,211*	*3.050*	*0.599*	*0.134*	*4,021*
ΔSE 1	-0.001	0.063	0.053	0.021	0.0005	-0.0007	-0.020
	0.001	*0.085*	*0.053*	*0.012*	*0.002*	*0.0005*	*0.041*
ΔSE 2	-0.001	-0.041	-0.039	0.010	-0.002	-0.0006	-0.037
	0.001	*0.087*	*0.054*	*0.012*	*0.002*	*0.0005*	*0.042*
ΔSE 3	-0.001	-0.130	0.053	0.008	-0.0009	-0.0002	-0.029
	0.001	*0.086*	*0.054*	*0.012*	*0.002*	*0.0005*	*0.042*
ΔSE 4	-0.0005	0.007	-0.060	-0.002	-0.001	-0.0002	0.029
	0.001	*0.085*	*0.053*	*0.012*	*0.002*	*0.0005*	*0.041*
ΔCA 1	0.0005	-0.195	-0.051	0.016	0.002	-0.0001	-0.069
	0.002	*0.141*	*0.089*	*0.0210*	*0.004*	*0.0009*	*0.069*
ΔCA 2	0.002	-0.055	-0.083	-0.013	0.003	0.0007	-0.023
	0.002	*0.142*	*0.089*	*0.021*	*0.004*	*0.0009*	*0.069*
ΔCA 3	-0.005	0.220	0.122	-0.019	0.005	-0.0018	0.016
	0.002	*0.139*	*0.087*	*0.020*	*0.004*	*0.0009*	*0.067*
ΔCA 4	-0.001	0.183	-0.070	0.014	0.007	-0.0001	-0.093
	0.002	*0.145*	*0.091*	*0.021*	*0.004*	*0.0009*	*0.070*
ΔPR 1	0.017	0.371	0.339	0.279	0.024	0.0060	-0.208
	0.0123	*0.597*	*0.375*	*0.088*	*0.017*	*0.0039*	*0.292*
ΔPR 2	-0.002	-0.447	-0.212	0.160	-0.027	-0.0010	-0.222
	0.012	*0.594*	*0.373*	*0.088*	*0.017*	*0.0039*	*0.290*
ΔPR 3	-0.007	-1,822	-0.068	0.206	-0.002	-0.0030	-0.465
	0.012	*0.586*	*0.368*	*0.087*	*0.017*	*0.0038*	*0.286*
ΔPR 4	-0.003	1,460	-0.002	0.036	-0.005	0.0001	0.591
	0.011	*0.569*	*0.357*	*0.084*	*0.016*	*0.0037*	*0.278*

Table 6. Contd.

	EX	SE	CA	PR	RI	IPI	BD
Coefficient (*std. error*)							
ΔRI 1	0.087 *0.063*	-2,515 *3.058*	-2,850 *1,92*	-0.507 *0.454*	0.438 *0.089*	0.0506 *0.0200*	-1,477 *1,494*
ΔRI 2	-0.008 *0.071*	1,817 *3.485*	2,442 *2,188*	0.781 *0.518*	0.722 *0.101*	-0.0134 *0.0228*	-0.548 *1,702*
ΔRI 3	-0.161 *0.077*	6,138 *3.763*	-3,720 *2,362*	-0.493 *0.559*	0.076 *0.110*	-0.0583 *0.0247*	0.429 *1,838*
ΔRI 4	0.099 *0.070*	-6,266 *3.442*	2,373 *2,161*	-0.375 *0.512*	-0.248 *0.1006*	0.0317 *0.0226*	0.681 *1,682*
ΔIPI 1	2,938 *1.222*	8,277 *59.31*	-2,462 *3,723*	-4,427 *8.820*	-739.397 *1.733*	249.286 *0.3895*	3,719 *2,897*
ΔIPI 2	-4,626 *2.377*	-1,204 *115.3*	7,228 *7,24*	-2,431 *1,715*	313.653 *3.371*	-230.738 *0.7574*	-5,357 *5,634*
ΔIPI 3	3,195 *2.395*	1,932 *116.2*	-8,303 *7,297*	4,876 *1,729*	551.151 *3.397*	142.106 *0.7633*	1,577 *5,678*
ΔIPI 4	-1,319 *1.294*	-8,028 *62.82*	3,481 *3,944*	-1,991 *9.343*	-137.211 *1.836*	-0.5592 *0.4125*	1,526 *3,069*
ΔBD 1	-0.003 *0.003*	-0.235 *0.181*	0.020 *0.113*	0.018 *0.026*	-0.0005 *0.005*	-0.0012 *0.0011*	-0.575 *0.088*
ΔBD 2	-0.005 *0.004*	-0.053 *0.210*	0.077 *0.132*	0.004 *0.031*	-0.002 *0.006*	-0.0019 *0.0013*	-0.281 *0.102*
ΔBD 3	0.003 *0.004*	-0.149 *0.209*	0.029 *0.131*	0.039 *0.031*	-0.002 *0.006*	0.0011 *0.0013*	-0.147 *0.102*
ΔBD 4	-0.002 *0.003*	-0.155 *0.181*	0.156 *0.113*	-0.027 *0.026*	0.0006 *0.005*	-0.0003 *0.0011*	-0.053 *0.088*
Equilibrium	-0.047	-0.012	-0.015	-0.164	-0.289	0.0001	-0.123
Correction	-0.002	-0.004	-0.016	-0.002	-0.007	0.0013	-0.002

external borrowing in order to lend treasury, when local hot money is added to hot money entered to the country, foreign exchange entrance to the country increases. The other factor enabling the entrance of foreign exchange to the country is the external borrowing of public sector, however in this work, that factor was excluded. Through the effect of foreign exchange coming from these two ways, while importation becomes cheaper exportation becomes more expensive, foreign trade deficit and hence, the current account deficit is growing. As the continuation of entrance of hot money to the country is dependent on high interest rates, real interest rates can not be decreased, while high real interest increases domestic and external borrowing of public, the second factor seen in the process is the growth of stock values artificially as a result of high interest rates and appreciated local currency. This situation makes the expectations and uncertainty more sensitive.

REFERENCES

Adelman I (1999). Financial crisis-causes, consequences and remedies, University of California at Berkeley Working Paper no: 889.

BDDK,http://www.bddk.org.tr/websitesi/turkce/Raporlar/Kur_Riski_Degerlendirme_Raporlari/7423Kur_Riski_Degerlendirme_Raporu_Eylul_2009.pdf

Beck T, Demirguc-Kunt A, Maksimovic V (2005). Financial and legal constraints to firm growth: does size matter? J. Financ., 60: 137-177.

Bekaert G, Harvey CR (2003). Emerging markets finance. J. Empirical Financ., 10(1-2): 3-56.

Bildirici ME, Ersin ÖÖ (2005). Fiscal Theory of Price Level and Economic Crises, J. Econ. Soc. Res., 7(2): 81-114.

Bildirici ME, Ersin ÖÖ (2007). "Theory of Domestic Debt and Inflation and Economic Crises: A Panel Cointegration Application to Emerging and Developed Economies", Appl. Econ. Int. Dev., 7(1), 31-47

Bildirici ME, Ersin ÖÖ, Aykac E (2008). "An Empirical Analysis of Debt Policies, External Dependence, Inflation and Crisis In the Ottoman Empire and Turkey: 1800-2005 Period", Appl. Econ. Int. Dev., 8(2): 79-100.

Bildirici ME, Bozoklu Ü (2008). Yabancı Sermayenin Ekonomi Üzerindeki Etkilerinin MS-VAR Yöntemi Kullanılarak Test Edilmesi, in proceedings of ICAM 2007, Balıkesir.

Bildirici ME, Bozoklu Ü (2010). Beklentilerin Ekonomi Üzerine Etkileri: MS-VAR Yaklaşımı. Tüsiad-Koç University Economic Research Forum Working Papers no:1019Bozoklu U (2010). "MS-VAR Yönteminin Çoklu Denge Modellemesinde Kullanılması". Unpublished Phd Thesis, Yıldız Technical University Institute of Social Sciences.

Caner M, Hansen BE (2001). Treshold autoregressions with a unit root, Econ., 69, 1555-97.

Dempsteir AP, Laird NM, Rubin DB (1977). "Maximum Likelihood Estimation from Incomplete Data via the EM Algorithm". J. Royal Stat. Society. 39: 1-38.

Dijk DV, Franses PH (2000). Nonlinear Time Series Models in Empirical Finance. Cambridge University Press.

Duasa J, Kassim S (2008). Hot money and economic performance: an empirical analysis, Munich Personal Repec Archive.

Hamilton J (1994). Time Series Analysis. Princeton: Princeton University Pres

Hansen BE, Seo B (2002). Testing for two-regime threshold co-integration in vector error-correction models, J. Econ., 110: 293-318.

Kim Han E, Singal V (2000). Stock market openings: Experience of emerging economies, J. Bus., 73: 25–66.

Knill A (2004). Can foreign portfolio investment bridge the small firm financing gap around the world? Working Paper. University of Maryland.

Krolzig HM (2006). "Impulse Response Analysis in Markov Switching Vector Autoregressive Models". Economics Department, University of Kent. Keynes Collage. https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=res2007 and paper_id=700

Laeven L (2003). Does financial liberalization reduce financing constraints? Financ. Manage., 32(1): 5-34.

La Porta R, Lopez-de-Silanes F, Shleifer A, Vishny R (2010). Law and finance. J. Polit. Econ., 106: 1113-1155.

Levine R, Zervos S (1996). Stock market development and long-run growth. World Bank Econ. Rev., 10: 323-339.

Love I (2003). Financial development and financing constraints: international evidence from the structural investment model. Rev. Financ. Stud., 6: 765-791.

Osava M (2002). Tobin Tax, Financial Reforms to Avert Crises. TWN, Third World Network, http://www.twnside.org.sg/title/tobin.htm

Palma G (2000). The three Routes to Financial Crises: The need for Capital Controls, CEPA Work. Paper Series 3(18): 1-52.

Patro D, Wald P (2005). Firm characteristics and the impact of emerging market liberalization. J. Bank. Financ. 29(7): 1671-1695.

Rajan R, Zingales L (1998). Financial dependence and growth. Am. Econ. Rev., 88(3): 559-586.

Sierimo C (2002). Testing the efficient market hypothesis of the Helsinki stock exchange: Further empirical evidence based on nonlinear models. Unpublished Phd Dissertation.

Tillmann P (2003). Cointegration and Regime-Switching Risk Premia in the U.S. Term Structure of Interest Rates, Bonn Econ Discussion Papers, University of Bonn, Germany.

Wurgler J (2000). Financial markets and the capital allocation. J. Financ. Econ., 58: 187-214.

APPENDIX

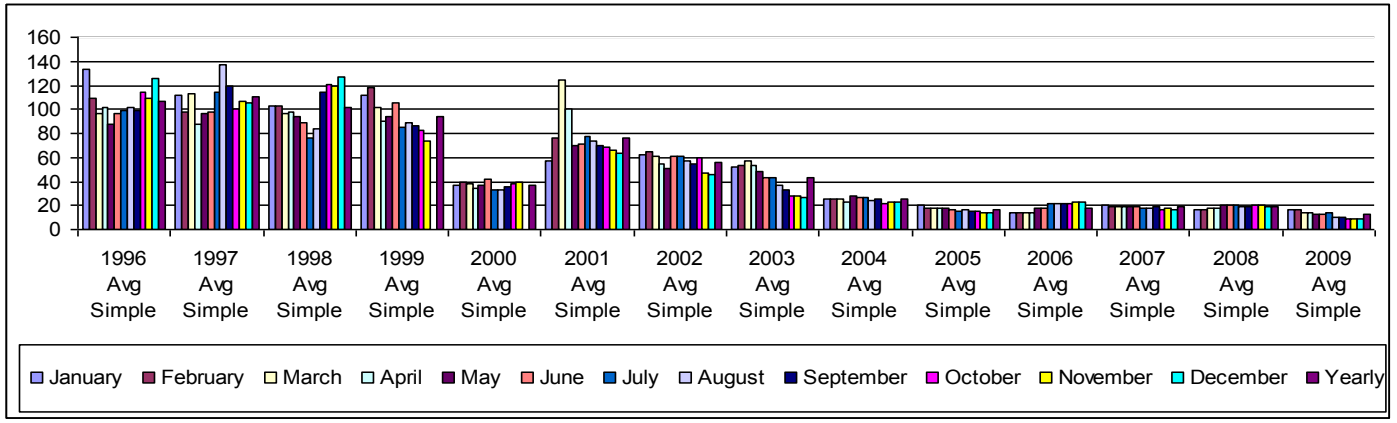

Figure 1. Interest rates by securities and maturity in treasury auction.

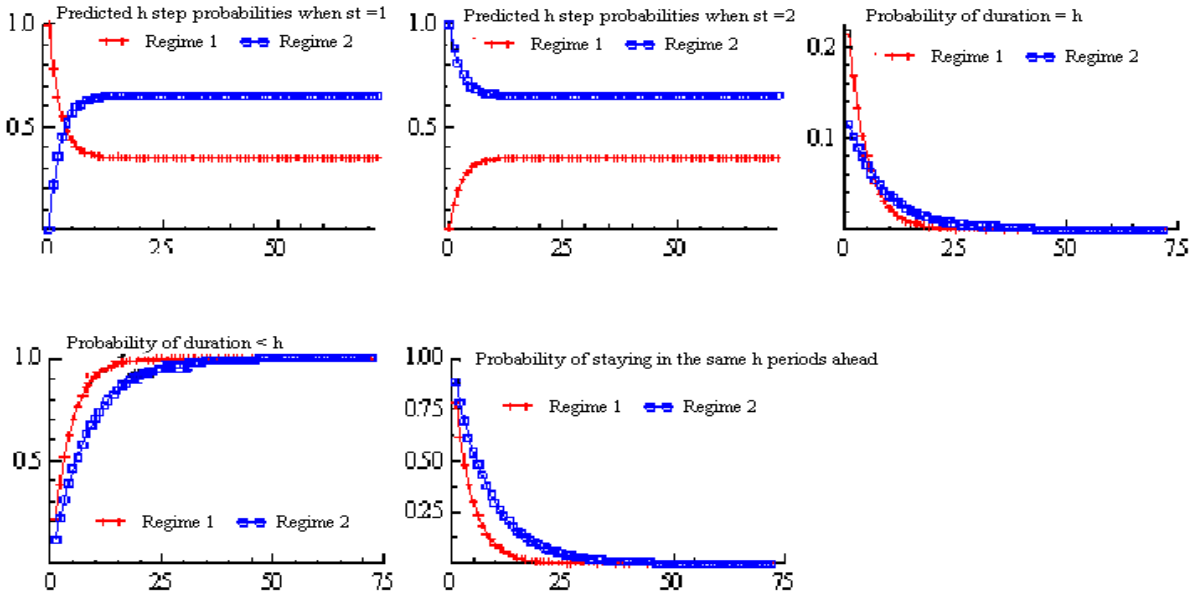

Figure 2. Dynamics of MSIH (2)-VAR (4) model.

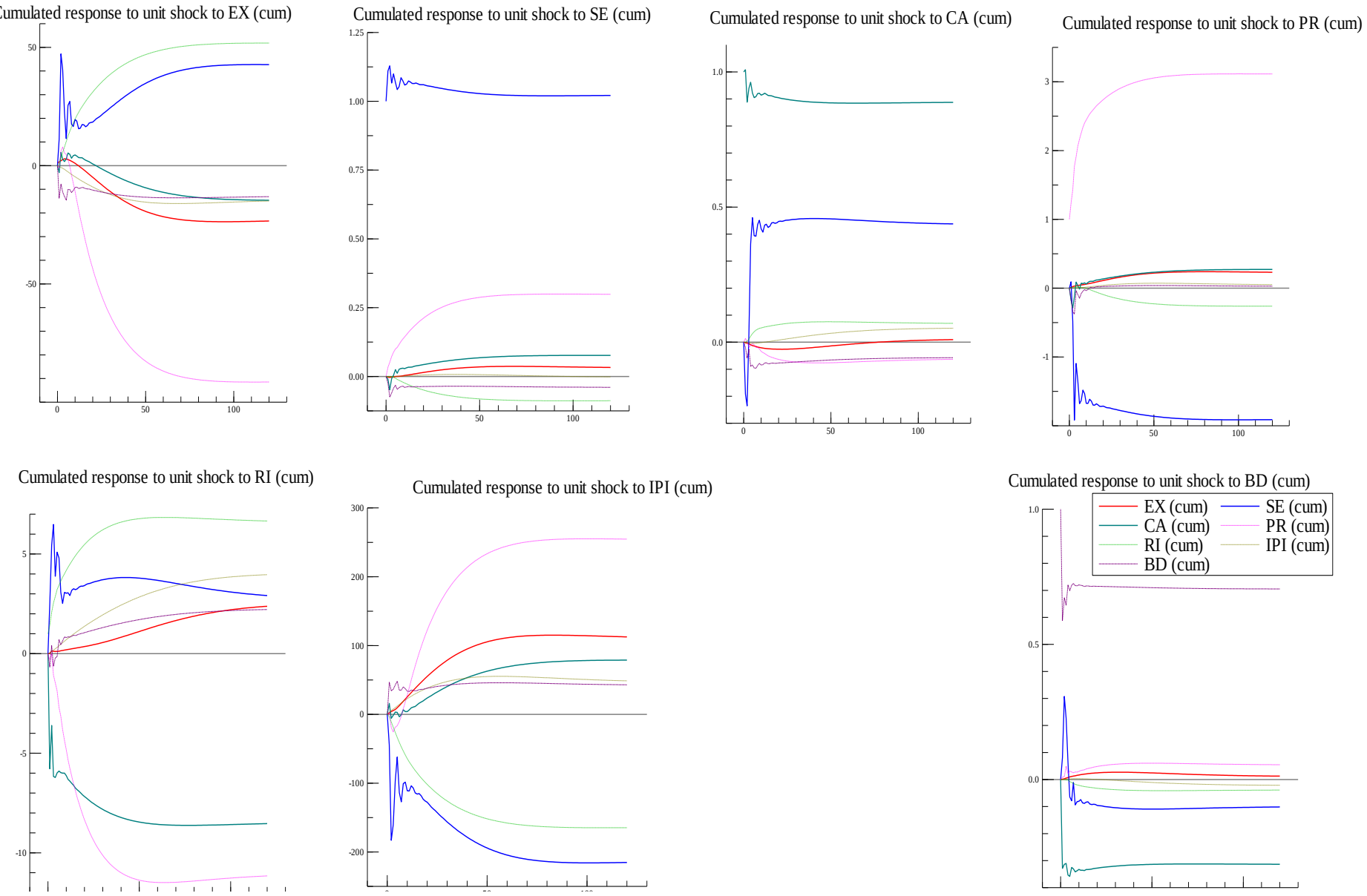

Figure 3. Orthogonalized Shock.

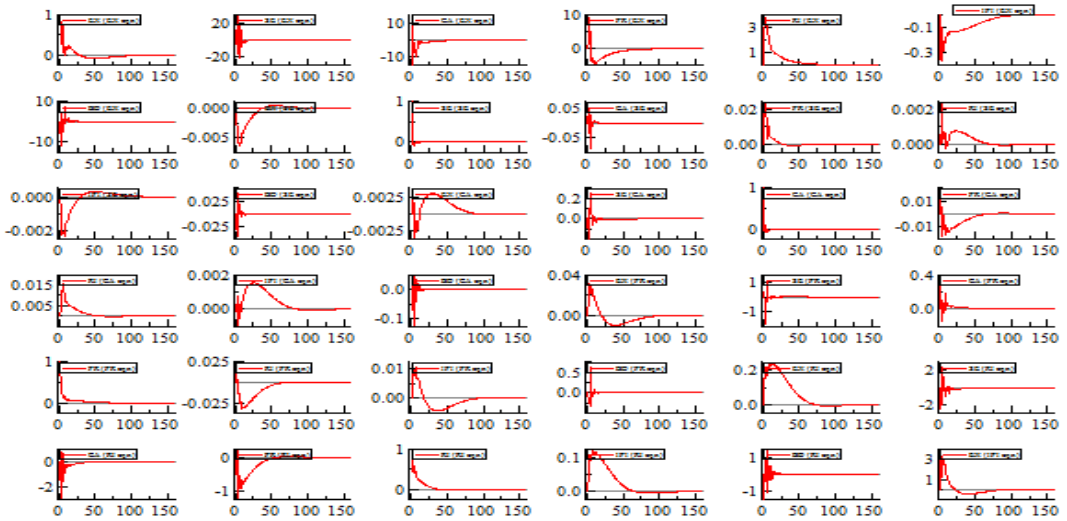

Figure 4. VEC - Impulse responses.

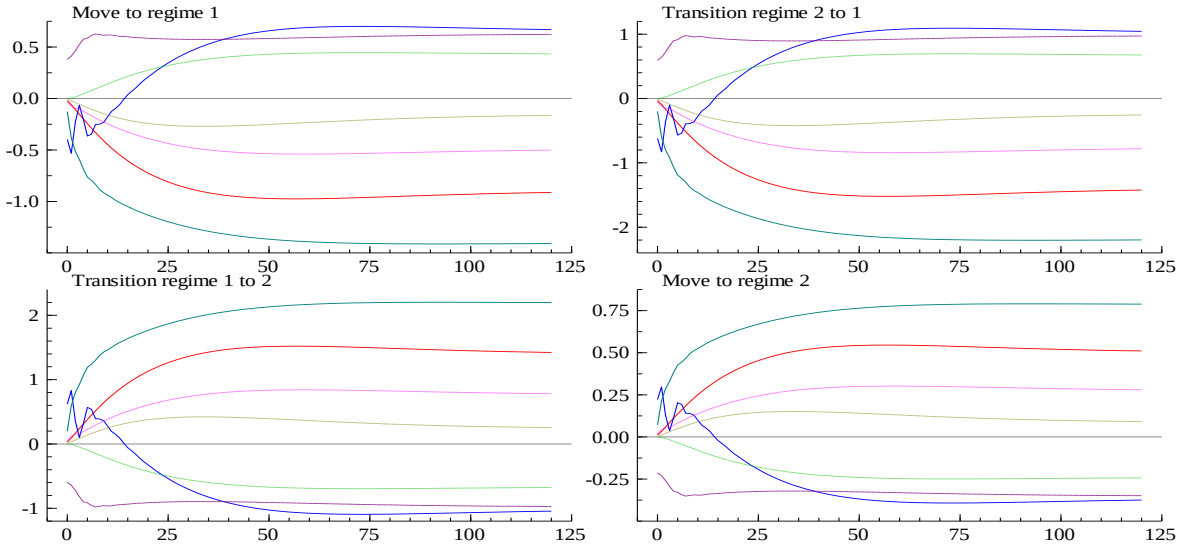

Figure 5. Regime Shifts for MS-VAR.