MONETARY TRANSMISSION MECHANISM IN AN OPEN ECONOMY FRAMEWORK: THE CASE OF TURKEY

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Abstract

Monetary transmission mechanism (MTM) is an illuminating policy tool in appreciating the monetary policy implementations by policy makers upon various nominal and real factors of interest in the eyes of economic agents. Especially in an open economy such as Turkish economy highly exposed to the effects of capital flows on domestic business cycles with a liberalised capital account, control over policy aggregates may be difficult since many other economic policy implementations would be of great consequence on some other policy targets on macroeconomic income generation process and in providing price stability and external balance. In this respect, in our paper we aim to estimate the MTM for the Turkish economy. Our *ex-post* estimates for the period 1992-2004 using contemporaneous vector autoregression models such as impulse response analysis indicate that weakly exogenous capital inflows appreciate the real effective exchange rate, and in turn lower the real interest rates and domestic inflation while increasing both the real output growth and also the stock exchange index considering an asset-price channel for the latter and vice versa. We find some significant effects of the courses of capital flows and real effective exchange rate on monetary policy variable in the transmission mechanism, and such a case may impose an endogenous characteristic on the policy variable given also that both domestic real interest structure is highly sensible to the monetary policy and that monetary policy is subject to the structural breaks in the sense of *so-called* Lucas' critique of contemporaneous economics.
Keywords:: Monetary Transmission Mechanism, Turkish Economy, Capital Flows, Real Exchange Rate, Real Interest Rate, Inflation, Income Growth, Stock Exchange, Price Puzzle
Jel Classification: E52, E58, G15

Özet

Parasal aktarım mekanizması politika yapıcılar tarafından gerçekleştirilen para politikası müdahalelerinin parasal ve reel içerikli iktisadi büyüklükler üzerindeki beklenen ve gerçekleşen etkilerini ortaya koymayı amaçlayan önemli bir politika aracı olma işlevine sahiptir. Özellikle Türkiye ekonomisi gibi serbestleştirilmiş bir sermaye hesabına sahip ve yurtiçi iş çevrimleri üzerinde sermaye akımlarının büyük etkisi bulunan bir ekonomide politika büyüklükleri makroekonomik gelir oluşum süreci, fiyat istikrarı ve dış dengenin sağlanması gibi politika hedefleri üzerinde farklı etkiler meydana getirebilmektedir. Bu açıdan kendi çalışmamızda parasal aktarım mekanizması Türkiye ekonomisi koşullarında tahmin edilmeye çalışılmıştır. Çalışmamızda 1992-2004 inceleme döneminde etki tepki çözümlemesi gibi çağdaş vektör ardışık bağlanım tahmin yöntemleri kullanılarak elde ettiğimiz temel politika bulguları kısaca açıklanmak istenirse; zayıf dışsal bir özellik gösteren sermaye girişleri öncelikle reel efektif döviz kurunun değerlenmesine yol açmakta ve bu şekilde hem reel faizlerde hem de yurtiçi enflasyonda bir gerileme meydana getirirken aynı zamanda reel çıktı büyümesinde ve varlık fiyatlaması kanalıyla borsa endeksinde artışına neden olmaktadır. Ayrıca, sermaye akımlarında ve reel efektif döviz kurunda meydana gelen gelişmelerin aktarım mekanizması içerisinde dikkate alınan para politikası değişkeni üzerinde istatistiksel olarak anlamlı etkiler meydana getirebildiği gözlenmiş, yurtiçi reel faiz yapısının para politikası gelişmelerine oldukça duyarlı olduğu ve aynı zamanda parasal büyüklüklerin çağdaş iktisat kuramına önemli bir katkı oluşturan Lucas eleştirisinin öncülüğünde yapısal kırılmalara maruz kaldığı bir ekonomik ortam içerisinde bu durumun politika büyüklükleri üzerine içsel bir işlev yükleyebileceği sonucuna ulaşılmıştır.
Anahtar Kelimeler: Parasal Aktarım Mekanizması, Türkiye Ekonomisi, Sermaye Akımları, Reel Döviz Kuru, Reel Faiz Oranı, Enflasyon, Gelir Büyümesi, Borsa Endeksi, Fiyat Sorunsalı
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I. INTRODUCTION

Examining the channels of monetary transmission mechanism (MTM) is of great importance to determine the potential effects of changes in monetary policy aggregates on general economic framework. Such a research empirically done would also give evidence to what purposes monetary authority aims at achieving and how it leads or has to be led by in conduct of monetary policy with respect to general economic policy purposes.

From different perspectives, monetary policy can work in order to affect the targets of policy makers. In our study, we follow Mishkin (1996: 1-27) to describe these channels briefly. The *so-called* interest rate channel is traditionally the most applied to when we call the effects of transmission mechanism, which is also usually coincided with the Keynesian economics of IS/LM framework such that expansinory monetary policy would stimulate the aggregate demand by increasing the demand for interest bearing assets thus lowering the interest structure of the economy, under a rediscount rate to present value using a constant rate of return on the future values of these assets.

The second potential transmission mechanism of monetary policy emphasizes the variety of returns on different assets considering relative asset prices between each other. For a developing country perspective such as Turkey, exchange rate could have been a consequential intermediary role to transmit the effects of monetary policy onto the real-production side. In this way, monetary policy interventions leading to lower the real domestic interest structure of the economy could cause the relative prices of the assets held in hand in terms of exchange rate to be higher by the depreciation of domestic currency, in turn this case would probably affect the net export component of aggregate demand and domestic real income positively. In an open economy framework, the larger the openness of domestic economy to world markets, the stronger the influence of exchange rate channel on real domestic activity through changes in net exports. Taylor (1995: 11-26) gives special emphasis to exchange rate channel of monetary transmission, which uses uncovered interest parity relationship under price rigidities employing an expectation model of term structures of interest rates settled in the economy. Dealing with the MTM and future path of inflation, Şahinbeyoğlu and Yalçın (2000: 1-27) apply to a similar framework for the case of Turkey, while Kunter and Janssen (2002: 1-45) give some country examples. Also considering a

Monetarist school of thought perspective, Meltzer (1995: 49-72) examines the MTM based on equalizing the relative prices of various assets held in hand reflecting to output changes in the long run.

Another possible transmission mechanism works through the changes in equity prices within the economy. Mostly accompanied by Tobin (1969: 15-29) as the *so-called Q-*theory, the principal way in which financial policies affect the aggregate demand is by changing the valuations of physical assets relative to their replacement costs. With respect to monetary policy, a monetary intervention increasing monetary base would also lead to an increase in domestic real income either through using a direct transmission mechanism of Monetarists causing excess monetary balances of economic agents to be spent or using an indirect interest rate transmission mechanism of *so-called* Keynesians. A higher demand in stock exchange leading to rise in equity prices related to changes in physical capital stocks can thus stimulate more investment and domestic income in the real side of the economy by the owners of these capital stocks. This case would also easily be coincided with a wealth effect leading economic agents to rise their expenditures due to an increase in their wealth resulted from changes in the prices of securities transacted in the secondary stock exchange market (Keyder, 1998: 342).

As a last and recently developing channel of monetary policy, we can consider the credit and balance sheet channels especially emphasized by the economists of New Keynesian school of thought concentrating on asymmetric information problems such as moral hazard and adverse selection in capital markets (Cooley, 1995: 131-137). The view of credit channel mainly emphasizes the role of bank credits in transmitting the effects of monetary policy onto real economy, and in this perspective, investigates the effects of credit rationing applied to firms by banking sector in financial markets led by asymmetric information problems (Ökte, 1999: 277). As to the main arguments alleged by this transmission channel, as was plainly expressed in Cecchetti (1995: 83-97), Hubbard (1995: 63-77) and Bernanke and Gertler (1995: 27-48), credit market imperfections making the calculation of the marginal efficiency of investment schedule more complex lead to information asymmetries and moral hazard problems meaning increased likelihood of the occurrence of the thing against which is insured (Begg et al., 1994: 240) or which should be avoided, and in this environment, policy-induced increases in interest rates managed to cause a deterioration in the firms' net worth both by reducing the expected future sales and increasing the real value of nominally denominated debt. With lower net worth, the firms would be less creditworthy, due to now an increased

incentive for themselves to misrepresent the riskiness of potential projects. In this case, potential lenders would increase the risk premium they required when making a loan. As a result, the asymmetric information problems in capital markets would make the internal finance of new investment projects cheaper than the external finance. But if this channel works in such a way expressed above, the more risky firms which do not have internal finance possibilities would unavoidably accept and try to use the harder borrowing possibilities and this case would in turn cause an adverse selection problem in these markets decreasing the efficiency of credit channel (Paya, 1997: 346).

Having examined the different transmission channels indicating how the monetary policy works in order to attain the *ex-ante* targets, in this paper our aim is to follow an approach examining the main characteristics and effectiveness of conduct of policy interventions of monetary authority giving special emphasis to the effects of capital flows and then the following course of real exchange rate and the monetary policy aggregate by way of employing a transmission mechanism ended with changes in the real interest rate and stock exchange as well as domestic inflation and real income growth. For this purpose, the next section gives a brief literature review on MTMs, and the section three both deals with some stylized facts of the Turkish economy and applies to a contemporaneous vector autoregression (VAR) estimation procedure for the Turkish economy affected by the courses of capital flows and real exchange rate when dealing with MTM. And the final section concludes.

II. LITERATURE REVIEW

Considering briefly economics literature and using traditional approaches of MTM, Kamas (1985: 313-327), Savvides (1998: 809-827) and Fry (1998: 512-529) can be considered as giving international evidence of some country cases using simultaneous equation systems producing conventional sterilization, offset and neutralization coefficients of MTM. Altınkemer (1998: 1-31), Celasun et al. (1999: 1-58) and Emir et al. (2000: 1-26), in this sense, apply to a similar methodology for the Turkish case, while Şahinbeyoğlu (2001: 1-39) approaches the MTM using a small macroeconometric model developed for the Turkish economy such as Pongsaparn (2002: 1-27). Following the contemporaneous developments in the vector autoregression (VAR) methodology enabling dynamic interactions between policy aggregates and targets, many empirical studies such as Sims (1992: 975-1011), Bernanke and Blinder (1992: 901-921), Kamas (1995: 145-161), Moreno (1996: 23-33), and Leeper (1997:

641-657) examine monetary policy shocks on reserve aggregates or short-term interest rates by policy makers in affecting inflationary pressures or domestic output.[1] Bank of International Settlements (2001) also gives international evidence using a sequential of papers of various country cases based on MTM using VARs. Considering the effects of capital flows on MTM, Alper and Sağlam (2001: 29-48) give evidence of various channels of MTM for the Turkish economy. Using a dynamic VAR methodology, Altuğ and Yılmaz (1998: 81-103) compare the interactions between filtered real interest rate and real stock return, inflation, real exchange rate and detrended industrial production for the cases of Turkey and Mexico. Çavuşoğlu (2002: 1-30) examines the validity of bank lending channel, but finds no evidence of a potential for this channel of credit transmission to exist in the Turkish economy, while Bozoklu (2005: 1-33) supports somewhat the effectiveness of the credit channel. Besides, some new literature arises on the impacts of foreign exchange interventions dealing with the free float exchange rate regime of the post-2001 period by the researchers of the Central Bank of Republic of Turkey (CBRT) such as Domaç and Mendoza (2004: 1-33), Akıncı et al. (2005a: 1-22) and Akıncı et al. (2005b: 1-31), Herrera and Özbay (2005: 1-37), and by Selçuk (2005: 295-312) and Ardıç and Selçuk (2006: 931-942), while Berument and Taşçı (2004: 33-38) approach the policy targets of moneray authority in implementing the reaction function with a different methodological perspective.

III. EMPIRICAL MODEL

III.1. SOME STYLIZED FACTS OF THE TURKISH ECONOMY

We begin our analysis by investigating the relative contributions of some main items in analytical balance sheet of the CBRT to the central bank (CB) money in a similar way to Altınkemer (1998: 1-31). We thus decompose the formation process of this aggregate to some sub-components as the net domestic assets (NDAs), net foreign assets (NFAs) and liabilities of foreign exchange (FX) deposits of the banking and non-bank sectors to the residents, such that all is summing to unity. The net domestic assets consist of sum of the Treasury's debt resulted from credits granted to public sector, credits to banking sector, and other items excluding FX revaluation account.[2] Net foreign assets are calculated as the difference between

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[1] For these papers, in our opinion, Sims (1992: 975-1011) yielding price puzzle in MTM should be dealt with cautiously to shed some light upon the case of the Turkish economy. For a recent paper upon Turkish economy on this issue, see Aktaş, Kaya and Özlale (2005: 1-28).

[2] We must specify that for the post-2001 period, through the amendment of the CBRT Law on April 22 2001, the granting of cash advances to the Treasury and credits to the public institutions was ceased and it was stated by

total foreign assets and foreign liabilities to non-residents. And CB money under the liability of monetary authority is calculated as the sum of currency issued, deposits of banking sector as required reserves and free deposits, extrabudgetary funds, deposits of non-bank sector, open market operations and YTL deposits of public sector. We use all the data from the electronic data delivery system of the CBRT. Table 1 indicates the decomposition of CB money into its components,

TABLE 1: DECOMPOSITION OF CB MONEY

YEAR	RELNDA	RELNFA	RELFX	% change in CB money
1987	1.166002	-1.015116	-0.150885	
1988	1.015202	-0.759940	-0.255260	71.45465
1989	0.601366	-0.172358	-0.429008	90.05006
1990	0.427606	-0.064684	-0.362902	21.83175
1991	0.492188	0.034435	-0.526622	57.39809
1992	0.795183	0.026160	-0.821343	97.03735
1993	0.882254	0.173050	-1.055304	70.02127
1994	1.157080	-0.205848	-0.951232	43.19260
1995	0.952967	0.489315	-1.442282	120.5717
1996	0.991924	0.842517	-1.834441	45.31267
1997	0.727866	1.344535	-2.072401	77.46301
1998	0.211822	2.030435	-2.242256	69.82303
1999	-0.102288	2.730493	-2.628206	31.57352
2000	-0.499727	3.538735	-3.039008	31.07270

RELNDA = NDAs / CB money
RELNFA = NFAs / CB money
RELFX = liabilities of foreign exchange (FX) deposits of the banking and non-bank sectors to residents / CB money

In Table 1, we see that the main contribution to CB money for the pre-1994 period is led by NDAs supporting some monetization of the economy due to various factors expressed in Altınkemer (1998: 1-31) such as elections, the Gulf crisis and Treasury's resort to short term advances with the aim of lowering interest rates. Especially during the crisis period of 1994,

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the CBRT that the Central Bank will no longer purchase t-bills from the primary market starting from November 5 2001. On this account, some definition changes in certain balance sheet items were made to provide that the developments in the CBRT's securities portfolio were easily monitored. In this respect, "Credits to the Public Sector (net)" item under Net Domestic Assets has been altered as "Treasury Debt". Prior to November 5 2001, "DİBS prior to Nov. 5 2001" item under "Treasury Debt" has moved due mainly to the direct purchases of the Central Bank in line with the restructuring of the banking system. Following that date, this item has changed mainly because of reverse repo operations and exchange rate differences related to foreign exchange indexed Government Domestic Debt Securities. (CBRT, 2002: 29). Here we restrict ourselves for the pre-2001 period due to the definition changes in the CBRT's balance sheet items since then. With our best intentions, we thank Nuray Altuğ and Osman Z. Orhan of the Marmara University who call our attention to this point.

a large amount of growth in NDAs thus huge monetization is tried to be offset by monetary authority leading to reserve losses with FX sales and a decrease in NFAs. The central bank seems not to give much importance to accumulate NFAs in this period, rather some losses occur in NFAs of monetary authority at the end of 1980s and by the beginning of 1990s indicating the net seller characteristics of monetary authority in FX market leading to reserve losses.

However, this case starts to be changed inversely in the second period of 1990s and the monetary authority possibly aims at strengthening its foreign assets position in this period. For the post-1997 period, the growth rate of NDAs significantly decreases indicating the efforts of monetary authority not to monetize the economy, rather to target a constant growth rate of reserve money for the first half of 1998 and then, due to the lack of estimation of demand for reserve money, that of NDAs thought to had been indicating the size of credit relation between the CBRT and domestic financial market up to the post-2001 crisis period (Baydur and Süslü, 2002: 37-85). An increasing trend in NFAs and a decreasing trend in NDAs coincides with large increases in the growth rate of CB money especially for the period 1997-1998, which also reflect an increasing trend in capital flows. This case might also be perceived as an indicator of NFAs management leading to real exchange rate targeting framework for monetary authority enabling the CBRT to decrease the volatility in FX market. Although not given in Table 1, the post-2001 period coincides with a large increase in NDAs through which the CB money expands in a massive way indicating excess liquidity resulted from the financing of Saving Deposit and Insurance Fund Banks and State Banks by Treasury. But however large increases in NDAs and NFAs carry on for the period of 2003-2004, the growth rate of CB money significantly decreases indicating both open market operations realized to eliminate excess liquidity in the money market (Yılmaz, 2002: 1-23) and large sterilization attempts aiming to offset NDAs growth. Also an interesting point in Table 1 is that the total foreign exchange liabilities accumulate in a massive way inside the period, giving support to the role of increasing currency substitution on base money.

We can also examine the balance of payment statistics in order to catch up the policy changes in our examination period as a complementary factor such as Altınkemer (1998: 1-31) and Celasun et al. (1999: 1-58). In Table 2 and Table 3 below, we give some statistics of external balance in millions of US$ and easy calculations which can support the findings

estimated above. In Table 2, we have calculated the Global Balance as the total of Capital Account Balance including Net Errors and Omissions and Current Account Balance,

TABLE 2: EXTERNAL BALANCE 1

Year	Current Account Balance	Capital Account Balance	Net Errors and Omissions	Global Balance	Reserve Assets
1987	-806	1891	-505	580	-580
1988	1596	-958	515	1153	-1153
1989	938	780	1007	2725	-2725
1990	-2625	4037	-583	829	-829
1991	250	-2397	924	-1223	1223
1992	-974	3648	-1190	1484	-1484
1993	-6433	8903	-2156	314	-314
1994	2631	-4257	1911	285	-285
1995	-2339	4565	2459	4685	-4685
1996	-2437	5483	1499	4545	-4545
1997	-2638	6969	-987	3344	-3344
1998	1984	-840	-697	447	-447
1999	-1344	4829	1721	5206	-5206
2000	-9819	9584	-2762	-2997	2997
2001	3390	-14643	-1671	-12924	12924
2002	-1522	1161	149	-212	212
2003	-8037	7100	5034	4097	-4097
2004	-15543	17031	2854	4342	-4342

We see that an increasing trend in reserve accumulation seems to be dominated with regard to the monetary authority's intervention policies for the post-1994 period supporting a possible real exchange rate targeting policy. This case can also be perceived as a support against the volatilities led by the short-term speculative capital flows. Inversely for the years 1991, 2000, 2001 and 2002 some reserve losses occur. The first one possibly interests in the efforts of monetary authority trying to eliminate the impacts of Gulf crisis period on Turkish trade balance. In this year, the real effective exchange rate depreciates due to the interventions of the CBRT in such a way opposed to the general tendency in the 1990s. The latters are resulted from the effects of 2000-stabilization program in order to defend the nominal exchange anchor followed by an enormous economic crisis period,

TABLE 3: EXTERNAL BALANCE 2

Year	(-1)*Current Account / Capital Account Including Net Errors and Omissions	(-1)*Official Reserve Assets / Capital Account Including Net Errors and Omissions
1987	0.581530	0.418470
1988	3.602709	-2.602709
1989	-0.524902	1.524902
1990	0.759988	0.240012
1991	0.169722	0.830278
1992	0.396257	0.603743
1993	0.953461	0.046539
1994	1.121483	-0.121483
1995	0.333001	0.666999
1996	0.349040	0.650960
1997	0.440990	0.559010
1998	1.290826	-0.290826
1999	0.205191	0.794809
2000	1.439314	-0.439314
2001	0.207797	0.792203
2002	1.161832	-0.161832
2003	0.662354	0.337646
2004	0.781644	0.218356

Also in Table 3, we measure the course of Current Account and Official Reserve Changes proportioned to Capital Account. We find for the post-1994 crisis period that, similar to the findings of Altınkemer (1998: 1-31) and Celasun et al. (1999: 1-58), reserve growth accelerates for monetary authority, which is resulted from capital inflows leading to capital account surplus in Table 2. But this process is turned over for the years 1998, 2000 and 2002. The first case is resulted from capital outflows, while the reserve losses lead to the second and third cases.

After considering these stylized facts of the Turkish economy, we also examine the direction of causal relationship between NDAs and NFAs in Table 4 below by employing bivariate Granger causality tests using lag length 4. The letter 'D' beginning of NDAs and NFAs indicates the first difference operator to provide the stationarity of these aggregates. We must specify that, we have estimated just the same results when we used the lag specifications 1 or 12 in the causality tests.[3] Under the null hypothesis of non-causality, we see that there exists a bi-directional causal relationship between NDAs and NFAs for the pre-1994 crisis period, while in the crisis period of 1994 the direction of causality is stronger from NDAs

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[3] All these bivariate Granger-causality estimation results not reported here are available from the authors upon request.

towards NFAs if we look at the probability values of F-statistics, indicating increased capital mobility resulted from the changes in NDAs. For the 1995-1999 period, changes in NFAs do not Granger cause to changes in NDAs supporting possibly the case of insufficient sterilization or a monetary targeting framework using the growth rate of NDAs. But changes in NDAs seem to be Granger cause to changes in NFAs possibly reflecting to increasing foreign assets accumulation process of monetary authority through narrowing monetary base leading to huge increases in returns thus interest rates of domestic currency-based assets encouraging capital inflows. All of these estimates based on bivariate causality tests support the case of increased capital mobility in the economy for the post-1994 period in line with the findings estimated above. These results together might reflect some moral hazard problem in the Turkish financial markets and banking system acting as an intermediary to capital flows and taking on substantial risks dealing with maturity mismatches and unhedged foreign currency positions under the extensive government guarantees as was explained in Celasun et al. (1999: 1-58).

TABLE 4: PAIRWISE GRANGER CAUSALITY TESTS USING LAG SPECIFICATION 4

Sample : 1989.01 1994.03			
Null Hypothesis	Observations	F-Statistic	Probability
DNFA does not Grange cause DNDA	63	4.61985	0.00279
DNDA does not Granger cause DNFA	63	4.24757	0.00463
Sample : 1989.01 1994.12			
Null Hypothesis	Observations	F-Statistic	Probability
DNFA does not Grange cause DNDA	72	2.58738	0.04520
DNDA does not Granger cause DNFA	72	15.2378	9.1E-09
Sample : 1995.01 1999.12			
Null Hypothesis	Observations	F-Statistic	Probability
DNFA does not Grange cause DNDA	60	0.81648	0.52062
DNDA does not Granger cause DNFA	60	3.69414	0.01024

III.2. DATA AND MODEL SPECIFICATION

We now follow Alper and Sağlam (2001: 29-48) and apply to a similar modelling framework dealing with the MTM of the Turkish economy considering the effects of the courses of capital flows and real exchange rate as well as of monetary policy variable on domestic real interest structure, stock exchange, inflation and real income growth process using contemporaneous dynamic VAR modelling approach, and in this respect, we define a

seven variable unrestricted VAR model. If we briefly define such aggregates expressed above, in order to consider the effects of capital flows on other macroeconomic aggregates used in this paper, short-term or volatile capital flows (CAP) experienced in the Turkish economy in millions of US$s as the sum of portfolio investments net of assets and liabilities as equity securities and debt securities and that of the short term net capital movements through banking sector are used.

Following the definitions used by the CBRT, the real effective exchange rate data (REER) are computed as the weighted geometric average of the price of the domestic country relative to the prices of its trade partners, which can be indicated in equation (1) using wholesale price index (WPI) based price indices with the base year 1995: 100 below,

$$REER = \Pi \ [(P_i R_i) / (P_j R_j)]^{W_{ij}}, \quad j \neq i, \tag{1}$$

where P_i is the Turkey's price index, R_i is the nominal exchange rate of Turkish Lira in US dollars, P_j is the price index of country j, R_j is the nominal exchange rate of country j's currency in US dollars, W_{ij} is the country j's weight for Turkey. A critical point which should be considered here is that an increase in the real effective exchange rate index would denote a real appreciation of the Turkish Lira, whereas a decrease would denote a real depreciation.

The monetary policy variable (RES) is represented by the monthly percentage change in the reserve money aggregate -or outside money- in analytical balance sheet of the CBRT, which is the sum of currency issued, required reserves, free deposits of banking sector, extrabudgetary fund accounts, and deposits of non-banking sector. In a similar way, we construct the asset-price variable (ISE) in the transmission mechanism as the monthly percentage change in Istanbul Stock Exchange ISE National-100 price index with the base January 1986=1.

The real interest variable (IREAL) represents the *ex-post* real interest rate adjusted for real output growth and inflation which is calculated by following the estimation procedure in Akçay et al. (2002: 77-96). For this purpose, we used interbank money market rates (INTER) in monthly frequency as a representative short-term interest rate, monthly percent change in industrial production index (GETIPI) for real output growth rate and monthly domestic inflation (INF) described as in Equation 2 below,

$$IREAL2=[INTER-INF-GETIPI-(INF*GETIPI)] / [(1+GETIPI)*(1+INF)] \tag{2}$$

The domestic inflation variable is represented by monthly domestic inflation rate (INF) based on consumer price index with the base year 1987: 100, while monthly percent change of the seasonally adjusted real gross domestic product data (GETRGDP) which is interpolated from the quarterly time series following QMS (2004: 108-111) by applying to low frequency to high frequency quadratic match average conversion option is used for the real income variable. In the paper, the monthly frequency data are used and the time period for estimation purposes covers the time span of 1992.01-2004.12. All the data are taken from the electronic data delivery system of the Central Bank of Republic of Turkey (CBRT) and due to using this source our estimation sample begins as of the beginning of 1992.[4]

We thus first determine the lag length of our unrestricted VAR model for which the maximum lag number selected is 12 due to using monthly frequency data considering sequential modified LR statistics employing Sims' (1980: 1-48) small sample modification, which compare the modified LR statistics to the %5 critical values starting from the maximum lag, and decreasing the lag one at a time until first getting a rejection (QMS, 2004: 709). In our case, reduction of system is first rejected when testing the reduction of lag length 7 to lag length 6. Thus we consider the lag length 7 to estimate our VAR model.

For the pairwise Granger causality tests in which each equation are represented by columns and probs. are in parantheses, we test whether an endogeneous variable can be treated as exogeneous under the null hypothesis. For each equation in the VAR, we consider χ^2 (Wald) statistics for the joint significance of each of the other lagged endogeneous variables in that equation. The statistic in the last row (All) is the χ^2 statistic for the joint significance of all other lagged endogeneous variables in the equation. We examine the pairwise Granger causality/block exogeneity Wald test results in Table 5 below using lag length 7 of sequential modified LR statistics,

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[4] A preliminary investigation reveals that all the variables considered have stationary time series characteristics. All these estimation results not reported here to save space following suggestions by an anonymous referee are available from the authors upon request.

TABLE 5: VAR PAIRWISE GRANGER CAUSALITY/BLOCK EXOGENEITY WALD TEST						
(probs. in parantheses)						
	CAP	REER	RES	IREAL	ISE	INF	GETRGDP
CAP		5.144502	4.084832	16.39239	25.32413	7.784705	18.03579
		(0.6423)	(0.7700)	(0.0218)**	(0.0007)*	(0.3520)	(0.0118)*
REER	5.596379		8.146259	2.872243	20.66695	13.65160	9.871136
	(0.5876)		(0.3199)	(0.8966)	(0.0043)*	(0.0577)***	(0.1960)
RES	6.784603	5.838146		19.47655	3.116898	5.293405	1.187580
	(0.4516)	(0.5588)		(0.0068)*	(0.8740)	(0.6242)	(0.9912)
IREAL	7.691953	25.58246	14.44286		2.415197	35.81399	13.96368
	(0.3605)	(0.0006)*	(0.0438)**		(0.9333)	(0.0000)*	(0.0518)***
ISE	12.22878	5.024040	15.56128	8.949223		11.61592	6.311170
	(0.0933)***	(0.6570)	(0.0294)	(0.2563)		(0.1034)	(0.5039)
INF	12.54473	10.80305	15.50699	14.79297	9.838344		11.68970
	(0.0840)***	(0.1474)	(0.0300)**	(0.0387)**	(0.1979)		(0.1112)
GETRGDP	8.272777	5.334617	10.17439	21.97485	8.476459	9.914097	
	(0.3092)	(0.6192)	(0.1789)	(0.0026)*	(0.2925)	(0.1935)	
All	52.92634	101.7212	99.58926	82.56158	66.38910	118.2000	82.30755
	(0.1203)	(0.0000)*	(0.0000)*	(0.0002)*	(0.0096)*	(0.0000)*	(0.0002)*

*, ** and *** indicate the significance of the relevant variable considering %1, %5 and %10 probability values against the null hypothesis.

An interesting point in Table 5 is that the variable CAP has a weakly exogeneous characteristic in our dynamic system specification. Thus no dynamic simultaneous equation on the variable CAP should be constructed since our dynamic VAR system rejects such an equation using χ^2 statistics under the null of being weakly exogeneous. Besides, all other variables have an endogeneous characteristic as to our system specification revealing that the only variable of which the course is determined out of the system, e.g. determined possibly by exogeneous expectations of economic agents, is the short-term capital flows. Alper (2002: 22-54) examining the stylized facts of business cycles for the cases of Mexico and Turkey also emphasizes the capital inflows being expectations driven rather than responding to the changes in the real interest rate. We give support to such a finding but now by considering a multivariate dynamic simultaneous system specification. The main determinant of the course

of real effective exchange rate is found as the real interest rate. But here we do not assume any transmission mechanism from real interest rate till real effective exchange rate through the capital flows variable due to the weakly exogeneous characteristics of the latter. The policy aggregate RES is sensitive to the real interest structure settled in the economy, and even this effect on the policy aggregate is enough to consider the policy aggregate an endogeneous variable rather than an exogeneous policy variable. That is to say, monetary authority seems to react to the course of domestic interest structure mainly led by public sector borrowing requirement and thus by the need to rolling-over the domestic debt stock with an endogeneous money creation framework.[5] Besides, domestic inflation is Granger cause to the growth rate of outside money supporting endogeneity of outside money in line with the estimation results in CBRT (2002).

As can be expected, the policy aggregate RES and the real interest rate IREAL have a mutually causal relationship between each other. Here we must specify that we consider the probability levels under %10 to require a cursory causal relationship since such an estimation result measures only precedence and information content but does not by itself indicate causality in the more common use of the term (QMS, 2004: 376-377). In this line, capital inflows precede real interest rate but there exists no reverse causal relationship, supporting the weakly exogeneous characteristic of volatile capital flows. As the real interest rate precedes the representative real output variable, the latter precedes the former in a mutually causal relationship as well, leading us *a priori* to assume that production possibilities in the economy, or the growth performance may also affect the cost-pressure settled in the economy, possibly through the course of short-term capital flows and the real exchange rate, supporting the explanation of the Turkish business cycles in a supply-driven modelling.[6] The changes in the stock exchange is sensitive to both volatile capital flows and the following course of real

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[5] Similar estimation results upon the Turkish economy can be found in Saatçioğlu (2005: 155-184).

[6] Alper (1998: 233-244), Alper (2002: 22-54), Saatçioğlu and Korap (2006: 1-23), and Aslan and Korap (2007) touch on similar subjects upon Turkish economy from different methodological perspectives. Especially *ex-post* findings in Alper (2002: 22-54) estimating countercyclical prices and inflation in a real business cycle perspective may restrict monetary authority in implementing demand driven discretionary policies for price stability in favor of rule-based supply driven policies. As will be emphasized below, especially policy rules for the course of fiscal policy can affect the monetary policy for the case of Turkish economy. In line with such a presumption, estimation results in Çetinkaya and Yavuz (2002: 1-19), which express that disinflations in Turkey would not be characterized by huge losses in output and be affected significantly by positive supply shocks, give support to a supply driven modelling for the Turkish inflation. Similarly, Özlale and Metin-Özcan (2005: 1-30) producing a long run stationary negative relationship between inflation and output suggest policy makers not to attempt to stabilize output discretionarily through exploiting an expectational Phillips curve.

effective exchange rate. The domestic inflation is preceded mainly by the course of real effective exchange rate and real interest rate, and maybe interestingly the growth rate of outside money does not precede the domestic inflation even though the reverse causal relationship have been found significant as expressed above. Of course, such a finding would not be consistent with approaches in line with the Quantity Theory of Money and requires a different methodological explanation. Also the capital flows precede the course of real income growth path.

We now focus on the generalized impulse responses and examine the effects of the one standard deviation shocks of the capital inflows, real effective exchange rate, and monetary policy variable upon the domestic real interest rate, domestic inflation, stock exchange index and real income growth process considering 1000 Monte Carlo repetitions of plus/minus two standard deviations.[7]

In Figure 1, we find that a one standard deviation (st. dev.) positive shock to the capital flows, i.e., capital inflow, would lead to %1.2 appreciation of the real effective exchange rate, and this effect carries on its statistical significance approximately two periods. Effects of capital flows on domestic real interest structure reveals that the larger the capital inflows the lower would be the real interest structure. Shocks to the capital flows would have its significant effects on the real interest structure for the first and fourth periods following the shock. Thus for the first period, a one st. dev. positive shock on capital flows would decrease the real interest structure %9, while this effect occurs with a %16 decrease in real interest rates for the fourth period. Such an effect can be attributed to the course of nominal interest rates occured downwards because of the relevant effect on domestic borrowing possibilities pulling down the nominal interest rates, given the price inertia dominated in the economy in the short run. Due to the symmetric nature of impulse responses, we can conclude here that the adverse developments in capital flows, i.e., capital outflows, would increase the real interest structure. We here omit any transmission mechanism from real exchange rate till capital flows due both to that our main interest is the effects of capital flows on domestic macroeconomic aggregates and to that capital flows have a weakly exogeneous characteristic in our Granger causality/system block exogeneity Wald tests estimation results. For such a transmission mechanism dealing with effects of real interest rates or real interest rate
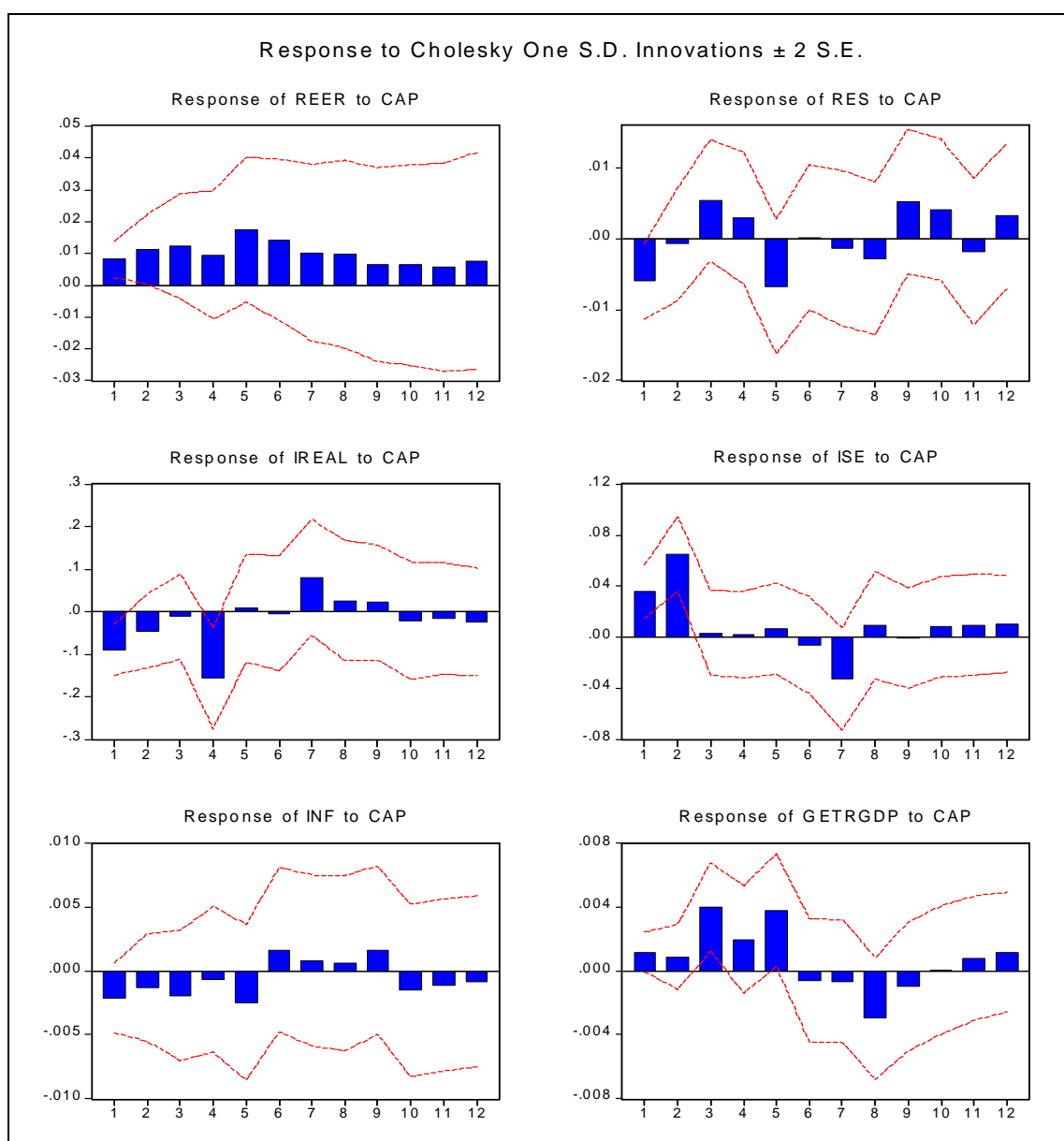
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[7] For informative purposes, that all the impulse responses considering 12 months horizon die out to zero would indicate the stationary characteristics of the variables used.

differentials on capital inflows and real exchange rate, Agénor, McDetmott and Ucer (1997: 1-20) give an highly illuminating paper upon Turkish economy,

FIGURE 1: GENERALIZED IMPULSE RESPONSES OF THE INNOVATIONS ON CAPITAL FLOWS

Capital inflows have a positive significant effect on the Istanbul Stock Exchange such that a one st. dev. positive shock on capital flows would increase the growth in stock exchange

approximately %4 for the first period and %7 for the second period following the relevant shock. No direct significant effect of capital flows on the domestic inflation rate can be found, but of course such an effect can be occured indirectly through the changes in real effective exchange rate as will be examined below. The domestic real income growth process would be affected positively by the shocks on capital flows. Statistically significant in a five periods length, a one st. dev. positive shock on capital flows would increase real income growth approximately %0.4 for the fifth period following the shock, while cumulative significant effect on the growth rate considering all five periods is about %0.9 increase. Thus, capital outflows rather than inflows would depreciate the growth process of the domestic economy.

Finally we find significant effects of capital flows on the monetary policy aggregate (RES). A one st. dev. positive shock on capital flows would decrease the base money growth %0.6 in a significant way for the first period following the shock. We can attribute this result to that capital inflows lead to real appreciation of domestic currency and following intervention of monetary authority in the foreign exchange market given the *a priori* determined real exchange target would narrow, rather than extend in the Turkish case, the monetary base, maybe due to different monetary policy purposes in policy implementation process leading to narrowing monetary base. Also Alper and Sağlam (2001: 29-48) trying to examine the effects of capital outflows on MTM for the Turkish economy express that sudden capital outflows would bring about an equal amount of reduction in the foreign exchange reserves, which leads to the contraction of domestic money supply, and if the monetary authority is able to sterilize the effects of this outflow by buying government securities or lending money through the discount window, reserve money would remain constant. Thus if monetary authority implements an active and effective sterilization policy, no significant change should have been occured on the monetary base. But our estimation results point out that there exists a negative significant effect on the monetary base. Even if such a finding can be attributed to some lack of sterilization attempts of the monetary authority inside the period examined, some major policy changes in the sense of Lucas' critique of Lucas (1981: 104-130) should be considered when criticizing the estimation results on the Turkish economy. Thus that is necessary to appreciate such an estimation result in a cautious way.[8]

When we deal with the effects of the course of real effective exchange rate in our dynamic simultaneous equation system, we find in Figure 2 below that appreciation of real effective
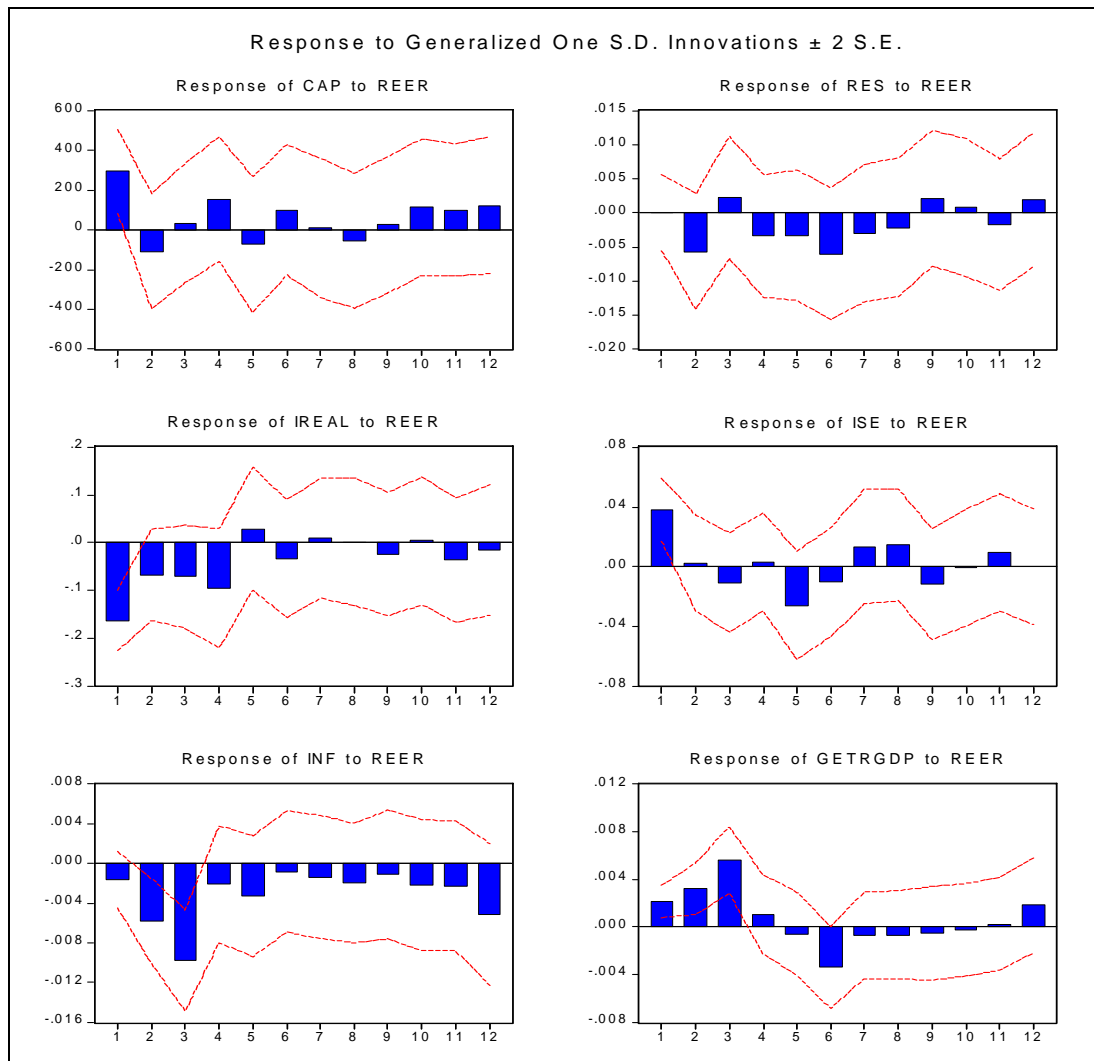
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[8] See also Ardıç, K. (1997: 330-333) for an overview of well-known Lucas' critic upon this issue.

exchange rate leads to further capital inflows. No significant effect of a shock on real effective exchange rate can be found on the growth rate of outside money. Also in line with the above findings, appreciation of domestic currency due to capital inflows decrease the real interest rate. A one st. dev. positive shock on real effective exchange rate decreases the real interest rate %16 for the first period, and in addition to this effect, %7 decrease occurs significantly on real interest rate for the second period following the shock on real exchange rate.

FIGURE 2: GENERALIZED IMPULSE RESPONSES OF THE INNOVATIONS ON REAL EFFECTIVE EXCHANGE RATE

A positive significant effect on the stock exchange can also be noticed here such as the effects of capital flows on the stock exchange. A one st. dev. positive shock on real effective exchange rate brings about an immediate %4 increase in the stock exchange. The domestic inflationary framework has a negative and significant dynamic relationship with real effective exchange rate. A positive one st. dev. positive shock on real effective exchange rate would decrease the inflationary pressure approximately %0.6 and %1.0 for the second and third periods after the shock respectively. Real income growth rate is in a positive dynamic relationship with real effective exchange rate supporting the arguments estimated so far in the sense that real appreciation of domestic currency would steadily increase the real income growth for three periods.[9]

As to the monetary policy aggregate in Figure 3 below, a one st. dev. shock on the growth rate of reserve money has a statistically significant effect on capital flows only one period, and the lower the growth rate of reserve money the larger would be the capital inflows due possibly to increasing domestic borrowing rates providing extra profits for 'hot money'.[10] Indeed, that is what has been occuring on domestic interest rates. A one st. dev. negative shock on the growth rate of reserve/outside money would lead to approximately %15 increase in real interest rates for the second period after the shock. Interestingly a negative dynamic relationship not consistent with Quantity theoretical approaches seems to exist between domestic inflation and reserve money growth. A one st. dev. negative shock on the policy aggregate leads to %0.5 increase in domestic inflation in a statistically significant way, *alas*, rather than a decline. Considering the importance of inflation phenomenon for the Turkish economy and to be able to shed some light upon recent monetary policy developments for the post-April 2006 period, we can now briefly try to construct a cursory policy scenario, leaving more analytical approaches to future papers, for such an anomaly with regard to the Monetarist explanation of business cycles.

Not only should such a result not absolutely mean that monetary authority must print money to fight against inflationary pressures, but also, ceteris paribus given both the acceptance of nonmonetary factors for the reasons of domestic inflation and the endogeneity
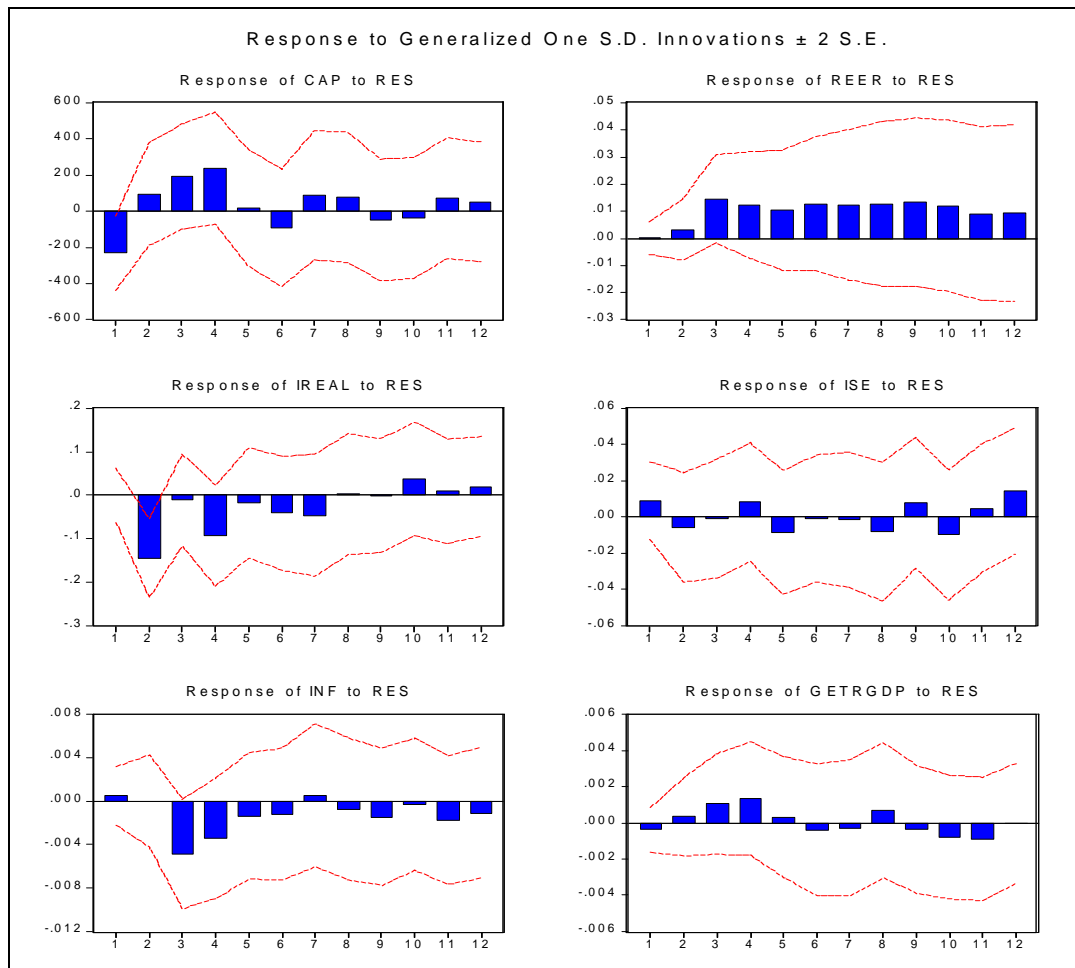
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[9] Similar estimation results dealing with the effects of capital inflows and real effective exchange rate on the interest rates, inflation and growth process can be found in Kirmanoğlu and Özçiçek (1999: 27-34), Berument and Paşaoğulları (2003: 401-435), and Berument and Dinçer (2004: 20-32).
[10] But, we here do not neglect in our minds the weakly exogeneous characteristic of short-term capital flows estimated above, and thus should be cautious in appreciating the *ex-post* findings.

of outside money as to the domestic inflation and domestic interest structure (CBRT, 2002; Saatçioğlu and Korap, 2006: 1-23), applying to tight monetary policies to fight against domestic inflation may create upward pressure on domestic real interest rates and lead to doubts as for the rolling over the domestic debt stock in the future periods, due to e.g. the lack of fiscal discipline and the associated high risk premium (Aktaş et al. (2005: 1-28)).[11,12] And also given the acceptance that demand for exchange rate is mainly determined by

FIGURE 3: GENERALIZED IMPULSE RESPONSES OF THE INNOVATIONS ON MONETARY POLICY AGGREGATE

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[11] See Baydur and Süslü (2002: 37-85) and Ertuğrul and Selçuk (2002: 13-40) in this sense for an overview of the Turkish economy. Korap (2006: 1-34) also gives the post-crisis analysis of the CBRT on monetary policy using official monetary policy reports.

[12] Yenal (2002) and Özmen (2002) briefly argue the claims of CBRT (2002) in a some enthusiastic way.

precautionary motive by domestic economic agents as a hard currency, increasing currency substitution in the economy considering the uncertainties caused mainly by doubts on debt sustainability may create upward pressures on exchange rate which cause the exchange rate to be the main reason of domestic inflation in such an economy that highly depends upon imports on inputs for growing.[13]

Combining all these effects with a highly liberalised capital account, capital inflows being weakly exogeneous may be reversed due to all these possible factors led by doubts on public sector borrowing requirement increasing the probability of default risk, and the resulting depreciation in real exchange rate may aggravate the cost pressure settled in the economy through the pass-through mechanism on domestic inflation, given also the backward-looking price inertia phenomenon settled in the economy. Thus, tight monetary policies may lead to a 'price puzzle' against what the conservative Monetarists allege, and following Aktaş et al. (2005: 1-28) emphasizing the predominance of risk premium affected by domestic fundanentals such as debt stock management, such a 'prize puzzle' that stems from the misidentification of VAR models for industrialized countries may emerge as a structural characteristic for emerging market economies. All these possible scenarious, in our opinion, necessitate an analysis based on unpleasant monetarist arithmetics of Sargent and Wallace (1981: 1-17) and fiscal theory of price level (FTPL) of Sims (1994: 381-399), Cochrane (1998: 1-59) emphasizing the frictionless view of inflation and Woodford (2001: 1-78).[14] Besides, estimation results of Akçay et al. (2002: 77-96), Özmen (1998: 545-552), Koru and Özmen (2003: 591-596) and Saatçioğlu and Korap (2006: 1-23) are somewhat supportive to such a scenario developed in a cursory way in this paper for the Turkish economy, emphasizing the role of nonmonetary factors on domestic inflation or giving the monetary factors an endogeneous characteristic rather than considering them as a policy aggregate

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[13] A recent paper by Sarıkaya et al. (2005: 1-30) emphasize the importance of exchange rate cost channel on the output gap, which dominates the demand channel, in the sense that appreciation of the domestic currency would lead to a significant decline in the cost of the imported capital goods and thereby result in an increase in the production that outweighs possible decrease in the net exports caused by the appreciation of the Turkish Lira.

[14] See Uygur (2001: 7-23) and Aktaş et al. (2005: 1-28) on this issue. The latters also follow recent developments in economics theory upon developing countries emphasized, e.g., in Blanchard (2004: 1-35) revealing the effects of tight monetary policy on domestic inflation. Briefly to say for informative purposes in line with the above-mentioned cursory policy scenario, tight monetary policies leading to increasing real interest structure would also increase the probability of default risk on domestic debt stock, and this adverse policy effect would make domestic government debt less attractive and result in a real depreciation in turn leading to further increase, rather than decrease, in domestic inflation. On this point, in his analytical modelling approach on Brazil, Blanchard gives special emphasis to fiscal policy rather than monetary policy, as the right instrument to decrease inflation. Favero and Giavazzi (2004: 1-21) also examine such a scenario of fiscal dominance hindering the effectiveness of monetary policy by applying to Brazilian data.

under an endogeneous money creation framework as to the course of the domestic interest structure.[15]

We finally emphasize that our VAR model satisfies the stability condition that enable us to implement impulse response analysis, and that no serial correlation problem considering %5 significance level under the null of no serial correlation, using LM(1) = 57.73702 (0.1837) and LM(12) = 54.19751 (0.2829) of which probs. are in paranthesis, respectively. [16]

IV. CONCLUDING REMARKS

In our paper, we try to investigate the determinants of monetary transmission mechanism (MTM) in the Turkish economy considering the effects of the courses of capital flows and real effective exchange rate as well as of monetary policy variable on domestic real interest structure, stock exchange, inflation and real income growth process using contemporaneous VAR modelling approach for the period 1992-2004 of the monthly observations. Having examined the main channels of MTM and dealt briefly with some developments in the Turkish monetary markets, we estimate that the courses of real effective exchange rate and short term capital flows dominate the course of monetary transmission mechanism as *a priori* expected. In line with such an estimation result, we can briefly express the main policy conclusion such that Turkish policy makers should focus on, or at least, consider how the real effective exchange rate and short term capital flows change when applying to monetary policy instruments, employing also a business cycle perspective. Besides, future researches revealing both the role of monetary aggregates in the conduct of monetary policy from different methodological perspectives, and the main determinants of Turkish business cycles emphasizing the predominance of fiscal factors in policy design by policy makers in both analytical and empirical perspectives will be complementary to this paper.

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[15] But recent official declarations of the CBRT for the post-April 2006 period may somewhat contradict such a policy proposal in such a way indicating the consideration of the CBRT the Turkish inflation in a different way from the period of Governor Serdengeçti. See CBRT (2006) declaring that Bank will not hesitate to implement further tightening if the incoming data suggest an unfavorable medium-term inflation outlook, which in our opinion does not consider the predominant reasons of Turkish inflation differently from CBRT (2002), decomposing the reasons of inflation into sub-components and suggesting policies as to the estimation results.

[16] All these diagnostic estimation results are also available from the authors upon request.

REFERENCES

Agénor, P.R., McDermott, C.J. and Ucer, E. M. (1997), "Fiscal Imbalances, Capital Inflows, and the Real Exchange Rate: The Case of Turkey", *IMF Working Paper*, WP/97/1, 1-20.

Akçay, O. C., Alper, C. E. and Özmucur, S. (2002), "Budget Deficit, Inflation and Debt Sustainability: Evidence from Turkey (1970-2000)", in A. Kibritçioğlu, L. Rittenberg and F. Selçuk (eds.), *Inflation and Disinflation in Turkey*, Ashgate Publishing Limited, 77-96.

Akıncı, Ö., Çulha, O. Y., Özlale, Ü. and Şahinbeyoğlu, G. (2005a), "Causes and Effectiveness of Foreign Exchange Interventions for the Turkish Economy", *CBRT Research Department Working Paper*, No. 05/05, February, 1-22.

Akıncı, Ö., Çulha, O. Y., Özlale, Ü. and Şahinbeyoğlu, G. (2005b), "The Effectiveness of Foreign Exchange Interventions for the Turkish Economy: A Post-Crisis Period Analysis", *CBRT Research Department Working Paper*, No. 05/06, February, 1-31.

Aktaş, Z., Kaya, N. and Özlale, Ü. (2005), "The Price Puzzle in Emerging Markets: Evidence from the Turkish Economy Using "Model Based" Risk Premium Derived from Domestic Fundamentals", *CBRT Research Department Working Paper*, No. 05/02, February, 1-28.

Alper, C. E. (1998), "Nominal Stylized Facts of Turkish Business Cycles", *METU Studies in Development*, 25/2, 233-244.

Alper, C.E. (2002), "Stylized Facts of Business Cycles, Excess Volatility and Capital Flows: Evidence from Mexico and Turkey", *Russian and East European Finance and Trade*, 38/4, 22-54.

Alper, C. E. and Sağlam, İ. (2001), "The Transmission of a Sudden Capital Outflow: Evidence from Turkey", *Eastern European Economics*, March/April, 39/2, 29-48.

Altınkemer, M. (1998), "Capital Inflows and Central Bank's Policy Response", *CBRT Research Department Working Paper*, December, 1-31.

Altuğ, S. and Yılmaz, K. (1998), "Asset Returns, Inflation and Real Activity The Case of Mexico and Turkey", *Boğaziçi Journal, Review of Social, Economic and Administrative Studies*, 12/1, 81-103.

Ardıç, K. (1997), "Lucas Eleştirisi", in Merih Paya, *Makroiktisat*, Filiz Kitabevi, İstanbul, 330-333.

Ardıç, O. P. and Selçuk, F. (2006), "The Dynamics of a Newly Floating Exchange Rate: The Turkish Case", *Applied Economics*, 38/8, 931-942.

Aslan, Ö. and Korap, L. (2007), "An Essay upon Business Cycle Facts: The Turkish Case", forthcoming in Atatürk University Journal of Economics and Administrative Sciences.

Bank of International Settlements (2001), "Modelling Aspects of the Inflation Process and the Monetary Transmission Mechanism in Emerging Market Countries", *BIS Papers*, 8.

Baydur, C. M. and Süslü, B. (2002), "1990'lı Yıllarda Türkiye'de Para Politikası Uygulamasında Çapalar", *IMKB Dergisi*, Cilt 6 , Sayı 21, 37-85.

Begg, D., Fischer, S. and Dornbusch, R. (1994), *Economics*, Fourth Ed., 1994.

Bernanke, B. S. and Blinder, A. S. (1992), "The Federal Funds Rate and the Channels of Monetary Transmission", *The American Economic Review*, 82/4, 901-921.

Bernanke, B. S. and Gertler, M. (1995), "Inside the Black Box: The Credit Channel of Monetary Policy

Transmission", *Journal of Economic Perspectives*, 9/4, Fall, 27-48.

Berument, H. and Paşaoğulları, M. (2003), "Effects of the Real Exchange Rate on Output and Inflation: Evidence from Turkey", *The Developing Economies*, 41/4, 401-435.

Berument, H. and Dinçer, N. (2004), "Do Capital Flows Improve Macroeconomic Performance in Emerging Markets? The Turkish Experience", *Emerging Markets Finance and Trade*, 40/4, 20-32.

Berument, H. and Taşçı, H. (2004), "Monetary Policy Rules in Practice Evidence from Turkey", *International Journal of Finance and Economics*, 9, 33-38.

Blanchard, O. (2004), "Fiscal Dominance and Inflation Targeting: Lessons from Brazil", *NBER Working Paper*, w10839, March, 1-35.

Bozoklu, Ş. (2005), "Banka Kredisi Aktarım Mekanizması", *Unpublished Seminar Paper*, Istanbul University Department of Economics, 1-33.

CBRT (2002), *Monetary Policy Report*, April.

CBRT (2006), *The Decision of the Monetary Policy Committee*, August 24.

Cecchetti, S. G. (1995), "Distinguishing Theories of the Monetary Transmission Mechanism", *FRB of St. Louis Review*, May/June, 83-97.

Celasun, O., Denizer, C. and He, D. (1999), "Capital Flows, Macroeconomic Management and the Financial System: The Turkish Case, 1989-97", *World Bank Working Paper*, No. 2141, 1-58.

Central Bank of Republic of Turkey Electronic Data Delivery System.

Cochrane, J. H. (1998), "A Frictionless View of US Inflation", *NBER Working Paper*, No. 6646, 1-59.

Cooley, T. F. (1995), "A Conference Panel Discussion: What Do We Know about How Monetary Policy Affects the Economy?", *FRB of St. Louis Review*, May/June, 131-137.

Çavuşoğlu, A. T. (2002), "Credit Transmission Mechanism in Turkey: An Empirical Investigation", *METU ERC Working Papers in Economics*, 02/03, November, 1-30.

Çetinkaya, A. A. and Yavuz, D. (2002), "Calculation of Output-Inflation Sacrifice Ratio: The Case of Turkey", *CBRT Research Department Working Paper*, No. 11, October, 1-19.

Domaç, İ. and Mendoza, A. (2004), "Is There Room for Foreign Exchange Interventions under an Inflation Targeting Framework", *World Bank Policy Research Working Paper*, No. 3288, April, 1-33.

Emir, O. Y., Karasoy, A. and Kunter, K. (2000), "Monetary Policy Reaction Function in Turkey", *Paper Presented at the Conference Titled 'Banking, Financial Markets and the Economies of the Middle East and North Africa' during May 25-27 in Beirut*, 1-26.

Ertuğrul, A. and Selçuk F. (2002), "Turkish Economy 1980-2001", in Kibritçioğlu, A. Rittenberg, L. and Selçuk, F. (2002), *Inflation and Disinflation in Turkey*, 13-40.

Favero, C.A. and Giavazzi, F. (2004), "Inflation Targeting and Debt: Lessons from Brazil", *NBER Working Paper*, w10390, March, 1-21.

Fry, M. J. (1998), "Assessing Central Bank Independence in Developing Countries: Do Actions Speak Louder than Words", *Oxford Economic Papers*, 50, 512-529.

Herrera, A. M. and Özbay, P. (2005), "A Dynamic Model of Central Bank Intervention", *CBRT Research Department Working Paper*, No. 05/01, January, 1-37.

Hubbard, R. G. (1995), "Is There a 'Credit Channel' for Monetary Policy?", *FRB of St. Louis Review*, May/June, 63-77.

Kamas, L. (1985), "External Disturbances and the Independence of Monetary Policy under the Crawling Peg in Colombia", *Journal of International Economics*, 19, 313-327.

Kamas, L. (1995), "Monetary Policy and Inflation under the Crawling Peg: Some Evidence from VARs for Colombia", *Journal of Development Economics*, 46, 145-161.

Keyder, N. (1998), *Para, Teori, Politika, Uygulama*, Geliştirilmiş 6. Baskı, Beta Dağıtım.

Kirmanoğlu, H. and Özçiçek, Ö. (1999), "The Effect of Short-Term Capital Inflow on the Turkish Economy", *Yapı Kredi Economic Review*, 10/1, 27-34.

Korap, L. (2006), "An Analysis of Central Bank Interventions on FOREX Market for the post-Crisis Period", *Turkish Economic Association Discussion Paper*, 2006/4, 1-34.

Koru, A. T. and Özmen, E. (2003), "Budget Deficits, Money Growth and Inflation: The Turkish Evidence", *Applied Economics*, 35/5, 591-596.

Kunter, K. and Janssen, N. (2002), "Credibility of Monetary Regimes: Is Inflation Targeting Different?", *CBRT Research Department Discussion Paper*, No. 2002/1, Ankara, January, 1-45.

Leeper, E. M. (1997), "Narrative and VAR Approaches to Monetary Policy: Common Identification Problems", *Journal of Monetary Economics*, 40, 641-657.

Lucas, R. E. (1981), "Econometric Policy Evaluation: A Critique", in R. E. Lucas (ed.), *Studies in Business-Cycle Theory*, MIT Press, 104-130.

Meltzer, A. H. (1995), "Monetary, Credit and (Other) Transmission Processes: A Monetarist Perspective", *Journal of Economic Perspectives*, 9/4, Fall, 49-72.

Mishkin, F. S. (1996), "The Channels of Monetary Transmission: Lessons for Monetary Policy", *NBER Working Paper Series*, No. 5464, February, 1-27.

Moreno, R. (1996), "Intervention, Sterilization and Monetary Control in Korea and Taiwan", *FRB of San Francisco Review*, 3, 23-33.

Ökte, M. K. S. (1999), "Makroiktisat Teorisinde Reel Kesim / Finansal Kesim Etkileşimi: Türkiye'de Para Politikasının Aktarım Kanalı Üzerine Bir Uygulama*", Unpublished Ph.D. Thesis*, The Istanbul University Institute of Social Sciences, İstanbul.

Özlale, Ü. and Metin-Özcan, K. (2005), "Does Time Inconsistency Problem Apply for Turkish Monetary Policy", *Turkish Economic Association Discussion Papeps*, 2005/2, February, 1-30.

Özmen, E. (1998), "Is Currency Seigniorage Exogeneous for Inflation Tax in Turkey", *Applied Economics*, 30/4, 545-552.

Özmen, E. (2002), "Teoriler Verilerle Sınanır", *http://www.e-konomistdergi.com/makale.asp?id=34* (17/08/2006).

Paya, M. (1997), *Makro İktisat*, Filiz Kitabevi, İstanbul.

Pongsaparn, R. (2002), "Inflation Dynamics and Reaction Function in High-Inflation Environment: An Implication for Turkey", *CBRT Research Department Working Paper*, No. 10, September, 1-27.

QMS (2004), *EViews 5 User's Guide*, April.

Saatçioğlu, C. (2005), "Türkiye Ekonomisindeki Enflasyonist Sürecin İncelenmesine Yönelik Bir Uygulama", *METU Studies in Development*, 32/1, 155-184.

Saatçioğlu, C. and Korap, L. (2006), "Determinants of Turkish Inflation", *Turkish Economic Association Discussion Paper, 2006/7*, 1-23.

Sargent, T. J. and Wallace, N. (1981), "Some Unpleasant Monetarist Arithmetic", *FRB of Minneapolis Quarterly Review*, 5/3, 1-17.

Sarıkaya, Ç., Öğünç, F., Ece, D., Kara, H. and Özlale, Ü. (2005), "Estimating Output Gap for the Turkish Economy", *CBRT Research Department Discussion Paper*, No. 05/03, 1-30.

Savvides, A. (1998), "Inflation and Monetary Policy in Selected West and Central African Countries", *World Development*, 26/5, 809-827.

Selçuk, F. (2005), "The Policy Challenges with Floating Exchange Rates: Turkey's Recent Experience", *Open Economies Review*, 16/3, July, 295-312.

Sims, C. (1980), "Macroeconomics and Reality", *Econometrica*, 48/1, 1-48.

Sims, C. (1992), "Interpreting the Macroeconomic Time Series Facts", *European Economic Review*, 36, 975-1011.

Sims, C. (1994), "A Simple Model for the Determination of the Price Level and the Interaction of Monetary and Fiscal Policy", *Economic Theory*, 4/3, 381-399.

Şahinbeyoğlu, G. (2001), "Monetary Transmission Mechanism: A View from a High Inflationary Environment", *CBRT Research Department Discussion Paper*, No. 2001/1, 1-39.

Şahinbeyoğlu, G. and Yalçın, C. (2000), "The Term Structure of Interest Rates: Does It Tell About Future Inflation?", *CBRT Research Department Discussion Paper*, No. 2000/2, Ankara, March, 1-27.

Taylor, J. B. (1995), "The Monetary Transmission Mechanism: An Empirical Framework", *Journal of Economic Perspectives*, 9/4, Fall, 11-26.

Tobin, J. (1969), "A General Equilibrium Approach to Monetary Theory", *Journal of Money, Credit and Banking*, 1/1, February, 15-29.

Uygur, E. (2001), "Enflasyon, Para ve Mali Baskı: İktisat Politikasında Geri Kalmışlık", *İktisat, İşletme ve Finans*, 16/189, 7-23.

Woodford, M. (2001), "Fiscal Requirements for Price Stability", *NBER Working Paper*, No. 8072, 1-78.

Yenal, O. (2002), "Merkez Bankası İktisat Bilmiyor", *http://www.e-konomistdergi.com/makale.asp?id=33* (17/08/2006).

Yılmaz, G. (2002), "Open Market Operations in Turkey", *CBRT Research Department Working Paper*, 1-23.