

THE EFFECTS OF EXTERNAL MONETARY POLICY SHOCKS ON TURKISH MACROECONOMIC VARIABLES

Ahmet TİRYAKİ*

Özet

Ekonomik olarak gelişmiş ülkelerin para politikalarındaki değişiklikler sadece bu ülkelerin reel makro ekonomik değişkenlerini değil aynı zamanda efektif talep dışsallıkları yoluyla onlarla ekonomik ve finansal anlamda entegre olan diğer ülkelerin reel makro değişkenlerine etki etmektedir. Bu çalışma ampirik olarak Amerika ve Almanya gibi ekonomik anlamda büyük ülkelerin uygulamış oldukları tight(sıkı) para politikalarının Türkiye gibi küçük ülkelerin finansal piyasalarını ve reel çıktılarını negatif yönde etkilediğini ortaya koymaktadır.

Anahtar Kelimeler: Para politikası şokları, Türkiye ekonomisi, dışsallıklar

Abstract

Monetary policy shocks of a large country such as the U.S. have real effects not only domestically but also abroad, affecting foreign macroeconomic variables through aggregate demand externalities. This paper presents empirical evidence that when a relatively small economy, such as Turkey, attempts to prevent inflation surges by pegging or fixing its currency to hard currencies, contractionary monetary policies in large countries have negative effects on that small economy's stock returns and output.

Keywords: Monetary policy shocks, Turkish economy, externalities

1. Introduction

Monetary policy shocks of a large country such as the U.S. have real effects not only domestically, but also abroad, affecting foreign macroeconomic variables through aggregate demand externalities. This paper presents empirical evidence that, when a relatively small economy, such as Turkey, attempts to prevent inflation surges by pegging or fixing its currency to hard currencies, contractionary monetary policies in large countries have negative effects on that small economy's stock returns and output. In addition, this paper points out the different response of

* Yrd. Doç. Dr., Anadolu Üniversitesi İktisadi ve İdari Bilimler Fakültesi

macroeconomic variables of different sized economies under distinct exchange rate regimes to contractionary monetary policy shocks emanating from large economies.

The monetary policy shocks of a large country affect not only domestic macroeconomic variables (nominal and real interest rates and exchange rates, investment, output and stock returns), but also macroeconomic variables abroad. Expansionary monetary policy shocks in the US reduce domestic and world interest rates, depreciate the domestic currency (the US dollar), and increase the level of domestic investment, consumption and output. The reduction in the world real interest rate and the nominal depreciation of the US dollar translate into a decline in the domestic terms of trade: both factors generate an increase in foreign consumption and, consequently, in investment. The demand-driven increase in world output raises welfare in both countries (aggregate demand externality), increasing stock prices and output both domestically and abroad¹.

There are several factors that determine the extent to which domestic and foreign interest rates and, consequently, other major macroeconomic variables move together². The first important factor is the development of the domestic financial markets and the degree of financial integration of the domestic economy into international financial markets. Restrictions to capital flows, for example, reduce the responses of domestic macroeconomic variables to changes in the international interest rates (see Frankel, Schmukler, and Serven [2000]). The second factor is the degree of real international integration. For instance, if business cycles are highly synchronized across countries, then domestic and foreign interest rates and other macroeconomic variables will tend to move closely together. Finally, the nature of shocks also influences the degree of comovement.

In theory, for given degrees of international real and financial integration, the effect of this aggregate demand externality from a large economy (country) to a smaller economy will be stronger if this small

¹ Finance theory suggests that stock prices equal the expected present value of future net cash flows. Since the referred aggregated demand externality implies that firms' cash flows will rise as output and investment expands, one should expect stock returns to increase.

² See Backus, Kehoe, and Kydland (1993), Stadler (1994) and Basu and Taylor (1999) with regards to international business cycles facts.

economy (country) pursues a fixed or pegged exchange rate regime. For instance, Frankel, Schmukler and Serven (2000) investigate the sensitivity of local interest rates to international interest rates and how this sensitivity is affected by the countries' choice of exchange rate regime and they present evidence for a full transmission of interest rates. They show that more rigid currency regimes tend to exhibit a stronger transmission of interest rates than more flexible regimes.

In countries where a fixed exchange rate regime is implemented, the government loses its ability to use monetary policy. According to Obstfeld and Rogoff (1995), when a country implements fixed exchange rates in the presence of temporary rigidities in nominal prices and wages, the negative effects of a sudden and permanent fall in the demand for its exports is magnified, as domestic employment and output fall significantly. The government cannot lower interest rates and stimulate short-run demand because, under a fixed exchange rate regime with capital mobility, the domestic nominal interest rate must equal the foreign nominal interest rate³.

Therefore, this implies that interest rates are determined abroad, not by domestic monetary policy. If the government tries to expand the money supply, agents simply sell their excess money holding to the home central bank for foreign currency at the fixed exchange rate, or substitute currency with the pegged currency or currencies. Thus, any attempt to increase the money supply results in a loss in reserves by the central bank. If the central bank refuses to buy back the excess money holdings, then this leads to domestic currency depreciation.

In case of a major speculative attack, according to Obstfeld and Rogoff, "the monetary authorities...must be prepared to allow a sharp increase in domestic interest rates, especially short-term rates. Such sharp spikes in interest rates...can wreck havoc with the banking system, which typically borrows short and lends long." (p.11) In the long run, these rises in interest rates have real negative effects on investment, output, government budget deficit, and distribution of income.

³ Frankel, Schmukler, and Serven (2000) present evidence that, in emerging markets, the increases in domestic interest rates were in several cases proportionally larger than those experienced in the US, presumably because country and currency risks increased after the Fed decided to tighten US monetary policy.

Until 2001, Turkey used a “crawling peg” exchange-rate regime, which is common among high-inflation developing countries⁴. In this framework, the government announces a schedule of small, discrete devaluations to put the value of domestic currency on a pre-determined path vis-à-vis the foreign currency.

According to traditional arguments, under pegged exchange rates and unrestricted capital flows, domestic interest rates cannot be set independently, but rather must track closely those prevailing in the country to which the domestic currency is pegged. However, Calvo and Reinhart (2000) argue that there exists “fear of floating,” that prevents countries from pursuing flexible exchange rate regimes even if they intend to do so. According to these authors, factors like lack of credibility of the central bank, exchange rate pass-through, and foreign currency liabilities prevents countries from pursuing an independent monetary policy, regardless of their announced regime. In the case of Turkey, all these factors had been present: the high inflation rates, contributing to a lack of credibility, and the high short-term foreign currency indebtedness⁵ had rendered monetary policy independence unfeasible.

A high-inflation developing country’s central bank policies are generally not independent of the central government authority, which implies greater difficulties in controlling the monetary aggregates in order to bring about price stability. In this context, exchange rate targeting has some advantages. Exchange rate targeting avoids the time inconsistency problem by pre-committing a country’s central bank so that it cannot pursue an overly expansionary monetary policy that would lead to a devaluation of the exchange rate. It also creates the expectation that the inflation rate will approach that of the country to which its currency is pegged⁶, and provides reduced transactions costs and exchange rate risk that often discourage trade and investment. Finally, the public easily understands exchange rate targeting.

4 Obstfeld and Rogoff (1995) argue that crawling pegs or real exchange rate targeting share many of the problems of the fixed nominal rates and, in the short run, real and nominal exchange rate movements often are virtually indistinguishable.

5 The net foreign debt of Turkish public sector has been 26% of the GNP on average during the 1990s. The greatest level was registered in 1994, when the ratio reached 30.7 (see IMF Staff Country Report No. 00/14, February 2000).

6 Note that in a crawling peg or target, the inflation rate can be higher than that of the country to which it is pegged, since its currency is allowed to depreciate at a steady rate against that of the other country.

However, there are many disadvantages associated with exchange rate targeting⁷. First, targeting not only prevents a country from using monetary policy to respond to domestic shocks, but also makes the country vulnerable to shocks emanating from the country to which its currency is pegged. Second, fixed exchange rate regimes are subject to breakdowns that may entail sharp changes in exchange rates, and a sharp depreciation of the domestic currency can produce a full-scale banking and financial crisis that can tip a country's economy into a severe depression. Third, defending the domestic currency when it is under pressure may require substantial increases in interest rates that directly reduce economic activity. Fourth, Erol and Van Wijnbergen (1997) argue that in the presence of capital mobility, the monetary authority's ability to control the money supply is limited and the central bank loses a nominal anchor to fight domestic inflation when an exchange rate target is pursued. Finally, Mishkin and Posen (1997) and Mishkin (1999) argue that if a country has an institutional structure of a fragile banking system and a substantial debt dominated in foreign currencies, using an exchange rate peg to control inflation can be very risky.

This paper focuses on the case of Turkey for the period of 1980 to 2001. It presents evidence that the impact of monetary policy shocks in both the US and Germany affects the Turkish exchange rate and stock returns, and compares these results with those found in literature. By using a vector autoregression technique, this study shows that the impact of a monetary policy shock in a large country on a small economy varies depending on whether that small economy is subject to a fixed exchange rate regime. Because the Turkish central bank reacts to the foreign contractionary monetary policy shock by raising the domestic interest rates, the effect of the international monetary transmission mechanism is weaker than in countries with flexible exchange rate regimes, although the responses in the Turkish case are still statistically significant. In addition, this study shows that three other factors are important when explaining the degree of the international monetary transmission mechanism: the level of financial development of a country, its integration with the international financial markets and the synchronization of domestic and foreign business cycles.

7 See Obstfeld and Rogoff (1995), Mishkin and Posen (1997) and Mishkin (1999) for a detailed explanation of fixed exchange rate regimes and its advantages and disadvantages.

2. Macroeconomic Policies in Turkey Since the 1980s

Persistent fiscal deficits and an accommodating monetary stance are at the heart of the inflationary process in Turkey. The central bank governor Gazi Ercel (1996a) argues that the main cause of inflation in Turkey after 1980 was “the sizeable public deficits and deeply entrenched inflationary expectations” (p. 2). According to the IMF Staff Country Reports (1997, 1998 and 2000), financing the budget by using conventional government securities bearing high nominal yields locks in inflation expectations, and projects these expectations forward. These high nominal yields make disinflation difficult and costly as the real interest burden rises as inflation falls.

During the post-1980 period, Turkish monetary policy aimed at preserving the stability of financial markets and of the real exchange rate. In order to maintain external competitiveness, the nominal exchange rate has been managed to achieve a certain level of the real exchange rate (see Erol and Van Wijnbergen [1997]). The Turkish monetary policy experience after 1980 and the underlying reasoning of the policy implementation and targeting can be best understood by Governor Ercel’s (1996, 1999) speeches on different occasions. According to Governor Ercel (1996), “Exchange rates are a good...intermediate target variable, because, unlike monetary aggregates they are little affected by financial innovations. When using exchange rates as the intermediate target, the central bank makes sure that short-term interests are continuously consistent with the targeted level of the exchange rate.” (p.2) Ercel (1999) describes the monetary policy experience of the central bank for the 1980-1999 period as follows: “...the monetary policy of the [Turkish] central bank was based on exchange rate policy: in other words, the monetary policy implemented by the central bank was to pursue an exchange rate policy based on current account equilibrium.”(p.4). The Turkish exchange rate policy was based on a basket consisting of the nominal exchange rates of the US Dollar and the Deutsche mark, and the weights are 1US\$ and 1.5DM.

3. Literature Overview on Turkish Exchange Rates and Stock Returns

The literature on the impact of domestic monetary policy shocks on domestic stock returns is extensive (see a survey on Tiryaki (2001). This

paper differs from this literature in two aspects: first, no study has established a causal relation on the impact of a large country nominal shocks on foreign stock returns. Second, no study has compared how such shock affects countries differently, depending on whether a country is subject to a fixed or floating exchange rate regime. This paper focuses on the case of Turkey, since previous literature on this country's exchange rates and stock returns have not established such relation.

Several works have focused on the determinants of the Turkish real exchange rates. Akcay, Alper, and Karasulu (1997), for example, have tested for the presence of dollarization and its effects on the volatility of exchange rate, and they found that the higher the currency substitution, the higher the volatility of the exchange rates. Agenor, McDermott, and Ucer (1997) have examined the links between fiscal policy, capital inflows, and the real exchange rate in Turkey since late 1980's by using an unrestricted VAR model; they present evidence that a positive shock to government spending and capital inflows lead to a real appreciation of the real exchange rate, whereas positive shocks to the uncovered interest rate differential lead to a capital inflow and an appreciation of the real exchange rate.

Erlat and Erlat (1998), in turn, have investigated the real sources of real exchange rate (RER) fluctuations in Turkey during post-1980 period by using a VAR technique. They found that real shocks were dominant in explaining the fluctuations in real exchange rates. Finally, Erol and Van Wijnbergen (1997) have analyzed the monetary policy experience during the post-1980 period and reported that the nominal exchange rate (crawling peg regime) is managed to achieve a certain level of the real exchange rate in order to maintain external competitiveness, and they also presented evidence that a real exchange rate appreciation is contractionary.

Empirical studies about Turkish stock returns are limited. Bahmani-Oskooee and Domac (1997), for example, tested for a link between exchange rates and stock price movements by using a cointegration technique. They showed that Turkish stock prices and exchange rates have a long-run relationship, and, in the short-run, stock prices and exchange rates do Granger-cause each other. Depreciation of the Turkish lira is associated with an increase in Turkish stock prices in the long run.

They argued that when the domestic currency depreciates, domestic multinational firms show an increase in the domestic currency value of their foreign assets, part of which could be reflected as profit in their balance sheet. Once the profit is announced, their stock prices rise. The same would be true for domestic firms that are heavily export-oriented: a depreciation of the domestic currency may increase their exports, and hence their profits; however, a depreciation of the domestic currency raises the costs of imported inputs of domestic firms that are not multinationals.

Two problems arise from their reasoning. First, the cost increase for imported inputs after a currency depreciation should affect all firms dependent on foreign inputs. Second, their analyses ignore the fact that the appreciation of the foreign currency is a result of a contractionary monetary policy of that foreign country and hence correlated to the declining output and employment of the foreign country. Thus, the depreciation of the domestic currency may not necessarily increase the exports of domestic firms due to low demand abroad.

4. Data and Methodology

The data sample ranges from 1981:1 to 1999:12 when stock returns are excluded, or from 1986:1 to 1999:12 when stock returns data is included. These two sample periods are chosen for the following reasons. First, Turkey's development strategy and exchange rate policy changed after January 1980, and monthly exchange rates data is consistently available after this period. Second, the Turkish stock market (Istanbul Stock Exchange) was established in 1986, and stock prices data is available starting from January 1986. Finally, the data sample ranges up to the year 2000 because of the monetary unification of the EU countries, and the severe financial crisis took part in Turkey in year 2001.

The main source of Turkish data is the Turkish Central Bank database and the Istanbul Stock Exchange. The source of the US data is the Federal Reserve Bank of St. Louis database, while German data was obtained from the International Financial Statistics.

The methodology used is similar to that implemented in Tiryaki (2001)'s second chapter (see also Eichenbaum and Evans [1995], and Christiano, Eichenbaum and Evans [1998]). Because Turkish, German

and the US indicators may be endogenous, a vector autoregression technique (VAR) is used. The tests are conducted first including only Turkish exchange rates and then including only stock returns. Each set of tests shows dynamic response functions to either the US or Germany monetary policy shocks. Six lags of each variable are included.

The choice of these two large countries was determined by two reasons. First, the US was chosen because of its position as the largest world economy, and because the US Dollar is the main substitute currency for the Turkish Lira. Second, Germany and the US constitute the main trade partners of Turkey⁸.

The tests show the impulse functions of the interest rates of Turkey and the US/Germany, and of the exchange rates or of the stock market returns and/or of output in Turkey to a contractionary monetary policy shock that is orthogonal to US/Germany price level and output. For the US, the stance of monetary policy is represented by the changes in US Federal Funds rate (FFR), while for Germany the monetary policy is proxied by either the German discount rate or M3⁹.

The tests are run using the Wold ordering of:

$$\{Y^{us/ge}, CPI^{us/ge}, FFR/R^{ge}, R^{Tur}, ExR, Y^{Tur} \text{ and/or } SPI^{Tur}\}$$

where $Y^{us/ge}$ represents the US's or Germany's industrial production index, $CPI^{us/ge}$ is the US or Germany's consumer price index, FFR is the US federal funds rate and R^{ge} is the German Discount rate, R^{Tur} is the nominal or real interest rates for Turkey (3-month bank rate), ExR represents nominal or real exchange rate (TL/\$ or TL/DM), and Y^{Tur} and SPI^{Tur} represent Turkey's industrial production index and stock price index, respectively. When the response function of the Turkish stock

8 Turkish exports to Germany and to the US constitute on average 30% of the total exports, while Turkish imports from these two countries also reach an average of 30% of the total imports. Turkish imports are mostly constituted of industrial products (85% of the total imports during the 1990s), while oil imports represents around 10% of the total imports. Thus, upward pressures on TL\$/US Dollar or German Mark have a high impact on input costs (Data source: IMF, 1998).

9 According to Mishkin and Posen (1997), between 1973 to 1987, the German Central Bank (the Bundesbank) explicitly targeted central bank money stock (CBM) which is defined as currency in circulation plus sight deposits, time deposits with maturity under four years, and savings deposits and savings bonds. Since 1988, the Bundesbank has targeted M3 as its intermediate target. However, those authors claim that because of the definitions of the two different monetary aggregates, M3 and CBM move really closely. Thus, this study uses only M3.

returns is tested, the VAR also included the US or German stock returns variables in the Wold ordering.

5. Empirical Results

In general, the tests results present evidence that contractionary US and/or German monetary policy shocks cause the Turkish output and stock returns to decline, and the results are statistically significant. The Turkish nominal and real interest rates and also nominal and real exchange rates move in the same direction after a nominal shock, indicating that monetary policy has real effects¹⁰.

Note that although the responses of the Turkish economy to contractionary monetary policies in the US are statistically significant, they are weaker and not long lasting. The Turkish results seems to arise because Turkey has relatively less developed financial systems and reduced financial integration with international financial markets¹¹. As explained previously, these factors are essential in explaining the international monetary transmission mechanism.

The following two sections gives a detailed explanation of impact of contractionary monetary policy shocks in the US and Germany on Turkish macroeconomic variables (nominal and real interest rates and exchange rates, industrial production and stock returns).

5.1. Impact of the Changes of FFR on Turkish Macroeconomic Variables

Contractionary monetary policy shocks in the US identified as increases in the federal funds rates raise both nominal and real Turkish interest rates, appreciate the nominal and real exchange rates (TL/US\$), and lead to the declining of both Turkish output and stock returns (see Figures 1 to 6 on Appendix 2).

After the contractionary shock in the US, both the nominal and real Turkish interest rates rise sharply, reaching a peak around the third and fourth months and returning to their initial levels around the twelfth month. In both cases, the increase in interest rates is statistically significant.

¹⁰ These results conform to the findings of Eichenbaum and Evans (1995) and Christiano, Eichenbaum and Evans (1998).

¹¹ See appendix 1 with regards to the financial development indicators of selected countries.

The response of the Turkish exchange rates to the contractionary US monetary policy shocks is puzzling. Following the shock, nominal and real exchange rates initially depreciates for about seven months, and then appreciates for a long period. The initial depreciation of Turkish Lira against the US Dollar is not statistically significant, but the appreciation of the Lira against Dollar is statistically significant (this significance is greatest around the twentieth month). This puzzling response can be explained by the fact that the Turkish monetary authorities may react to the shock by increasing domestic interest rates significantly. This prevents the floating of the currency, since contractionary US monetary policies increase Turkey's country and currency risks, as explained previously.

The decline in Turkish output occurs between the second and twelfth months, and it is also statistically significant. Turkish stock returns, in turn, decline following the contractionary monetary policy shock in the US. The stock returns decline significantly until the eighteenth month, around twentieth month it comes closer to initial level, and then declines again after that point.

The results for output and stock returns hold when either nominal or real interest rates and exchange rates are used in the VAR ordering.

5.2. Impact of German Monetary Policy Shocks on Turkish macroeconomic Variables

The positive innovations to the German interest rates (discount rate) or negative innovations to the German monetary aggregate (M3)¹² lead to increases in nominal and real Turkish interest rates, to the depreciation of the Turkish Lira against the German Mark, and to the decline in both Turkish output and stock returns (see Figures 1 to 4 in Appendix 3).

Contractionary German monetary policy shocks identified as the positive innovations to the German discount rate cause the Turkish nominal and real interest rates to increase. The increase in Turkish interest rates is statistically significant during the first eight months.

The Turkish nominal and real exchange rates (TL/DM), in turn, depreciate after a contractionary shock to the German monetary policy.

¹² Test results when M3 is used as a proxy of the stance of German monetary policy is weaker relative to the results we get using German discount rate.

The depreciation of the Turkish Lira against the German Mark is significant, and its peak occurs right after the shock. The exchange rates then return to their initial level around the eighth month.

Turkish output and stock returns move in same direction with the German output and stock returns, declining significantly following the German monetary policy shock. The response of the Turkish stock returns to the shock is immediate but not statistically significant at 5% level. However, the Turkish output response to the contractionary shock is statistically significant and it reaches its trough around the ninth month.

The response functions of the Turkish output and stock returns remain the same when nominal interest rate and exchange rate is replaced with the real interest and exchange rates, respectively.

6. Concluding Remarks

The impulse response functions of the Turkish interest rates, exchange rates, output and asset prices show the same pattern as the literature indicates. An expansionary monetary shock to either the US or Germany policies depreciates domestic currencies and increase stock returns and output in the US and Germany. Through aggregate demand externalities and the depreciation of the US Dollar and the German Mark, the Turkish output and stock returns are affected positively.

Since the Turkish monetary policy authorities target exchange rates, the impact of an expansionary policy in the US, for example, has another effect besides the aggregate demand externality explained above. The depreciation of the US Dollar exerts an upward pressure on the Turkish Lira. To avoid the appreciation of the Lira, the Turkish monetary authority implements open market purchases, increasing the money supply, reducing the pressure on interest rates, increasing output, investment, and hence, stock returns in Turkey.

Contractionary monetary policy of the US increases the Turkish nominal and real interest rates, appreciates the Lira against the Dollar in both nominal and real terms, and leads to declining in both output and stock returns in Turkey. A contractionary monetary policy shock in Germany has the same effects on interest rates, output and stock returns, but the effect on the Turkish Lira is depreciating. The puzzling appreciation of nominal and real exchange rates (TL/\$) following the

contractionary US monetary policy shock can be explained as follows: since the monetary policy of the Turkish central bank has been based on exchange rate targeting and the monetary policy implemented by the central bank has pursued current account equilibrium, Turkey's country and currency risks increase after the Fed tightens the US monetary policy. This leads the Turkish monetary policy authorities to tight the monetary policy in order to prevent major speculative attacks, which results in higher domestic interest rates. Thus, the significant increase in Turkish interest rates can lead to the appreciation of the local currency, which has been pointed out in the previous description of the test results.

The response of the Turkish macroeconomic variables to a nominal shock from the US is similar to the response of the non-US G7 countries, as indicated by Tiryaki's (2001) chapter 2. However, the significance and the duration of the response, compared to the results from non-US G7 countries, are weaker and shorter. As argued before, in theory, if the integration of an economy's financial market to the international financial markets is complete and that economy's financial market is developed, and if there is good synchronization of that economy's output and investment with the international economies, the fixed or pegged exchange rate targeting leads to a stronger transmission of the pegged country's monetary policy shocks to the domestic country through interest rates, exchange rates and aggregate demand externalities. The weaker -though statistically significant - and shorter duration of the response of the Turkish macroeconomic variables to external nominal shocks indicate that the financial system in Turkey is neither well developed, nor well integrated to the international financial markets.

REFERENCES

- Akçay, C.O., Alper, C.E., and Karasulu, M., 1997 "Currency Substitution and Exchange Rate Instability: The Turkish Case", **European Economic Review**, v.41
- Agénor, P-R., McDermott, J., Ucer, M., 1997 "Fiscal Imbalances, Capital Inflows, and the Real Exchange Rate: The Turkish Case", **European Economic Review**, v.41

Bahmani-Oskooee, M., Domac, I., 1997 “Turkish Stock Prices and the Value of Turkish Lira”, **Canadian Journal of Development Studies**, v.18, no:1

Calvo, G. and Reinhart, C. 2000. “Fear of Floating,” **Mimeo**, University of Maryland.

Christiano, L.J., Eichenbaum, M., and Evans, C. 1998 “Monetary Policy Shocks: What Have We Learned and to What End?” **NBER Working Paper Series**, No 6400

Eichenbaum, M., Evans, C. 1995 “Some Empirical Evidence on the Effects of Shocks to Monetary Policy on Exchange Rates”, **The Quarterly Journal Of Economics**, (November).

Ercel, Gazi, 1996. “Implementations and Outcomes of Monetary Policy in Turkey.” A speech on Nov. 14, at homepage: www.tcmb.tr

Ercel, Gazi, 1999. “European Financial markets and its implementations for Turkish Financial Institutions.” A speech on Oct. 23-25 at homepage: www.tcmb.tr

Erlat, H., Erlat, G. 1998 “Permanent and Transitory Shocks on Real and Nominal Exchange Rates in Turkey During the Post-1980 Period”, **Applied Economic Journal**, v.26, no: 4

Erol, T., Van Wijnbergen, S., 1997 “Real Exchange rate targeting and Inflation in Turkey: An Empirical Analysis with Policy Credibility”, **World Development**, v.25, no: 10

Frankel, J., Schmukler, S., and Serven, L. 2000. “Global Transmission of Interest Rates: Monetary Independence and Currency Regime”, **The World Bank Policy Research Working Papers**, August.

International Monetary Fund, 1998, “Turkey: Recent Economic Developments and Selected Issues.” **IMF Staff Country Report**, no.98/104, September.

International Monetary Fund, 2000, “Turkey: Selected Issues and Statistical Appendix.” **IMF Staff Country Report**, no.00/14, February.

Mishkin, F.S., 1999. “Lessons From the Asian Crisis.” **NBER Working Paper Series**, # 7102, April.

Mishkin, F.S., Posen, A.S., 1997. "Inflation Targeting: Lessons from Four Countries." **FRBNY Economic Policy Review**, v.3, n.3, August.

Obstfeld, M., Rogoff, K., 1995 "The Mirage of Fixed Exchange Rates." **NBER Working Paper Series**, no: 5191, July.

Silva, G.F., 2001 "How the Development of the Financial System Affects Business Cycles Volatility: Cross-Country Evidence" Unpublished manuscript, George Mason University.

Tiryaki, A., 2001 "Empirical Studies on the Real Effects of the US monetary Policy Shocks." Ph.D. Dissertation, George Mason University

Appendix 1. Indicators of Financial development for Selected Countries

Country	LLY	PRIVY	SM	AVG
Canada	0.348	0.436	0.438	.407
France	0.464	0.745	0.135	.448
Germany	0.548	0.760	0.244	.517
Italy	0.678	0.565	0.098	.447
Japan	0.855	0.877	0.531	.754
Turkey	0.224	0.163	0.080	.156
UK	0.385	0.326	0.583	.431
US	0.646	0.633	0.825	.701

LLY: the ratio of liquid liabilities to GDP.

PRIVY: credit directed to the private sector from banking system over GDP.

SM: size of stock market in economy

AVG: average of the above indicators

Source: Unpublished manuscript by Gisele F. Da Silva, [2001].

Appendix 2. Effects of Change in FFR on Turkey's Macroeconomic Variables

Response to One S.D. Innovations ± 2 S.E.

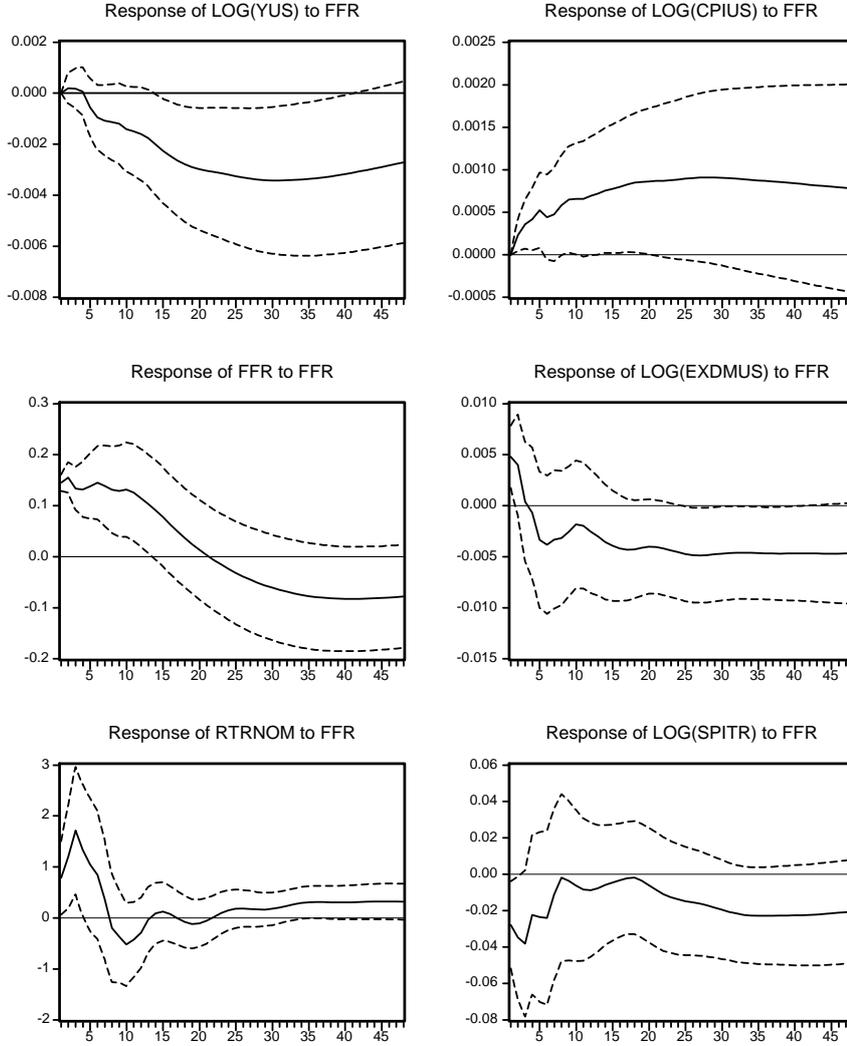


Figure A2.1. Wold Ordering: $\{Y^{us}, CPI^{us}, FFR, R^{usTBILL}, EX^{DM/US}, R^{TRNom}, SPI^{TR}\}$

Response to One S.D. Innovations ± 2 S.E.

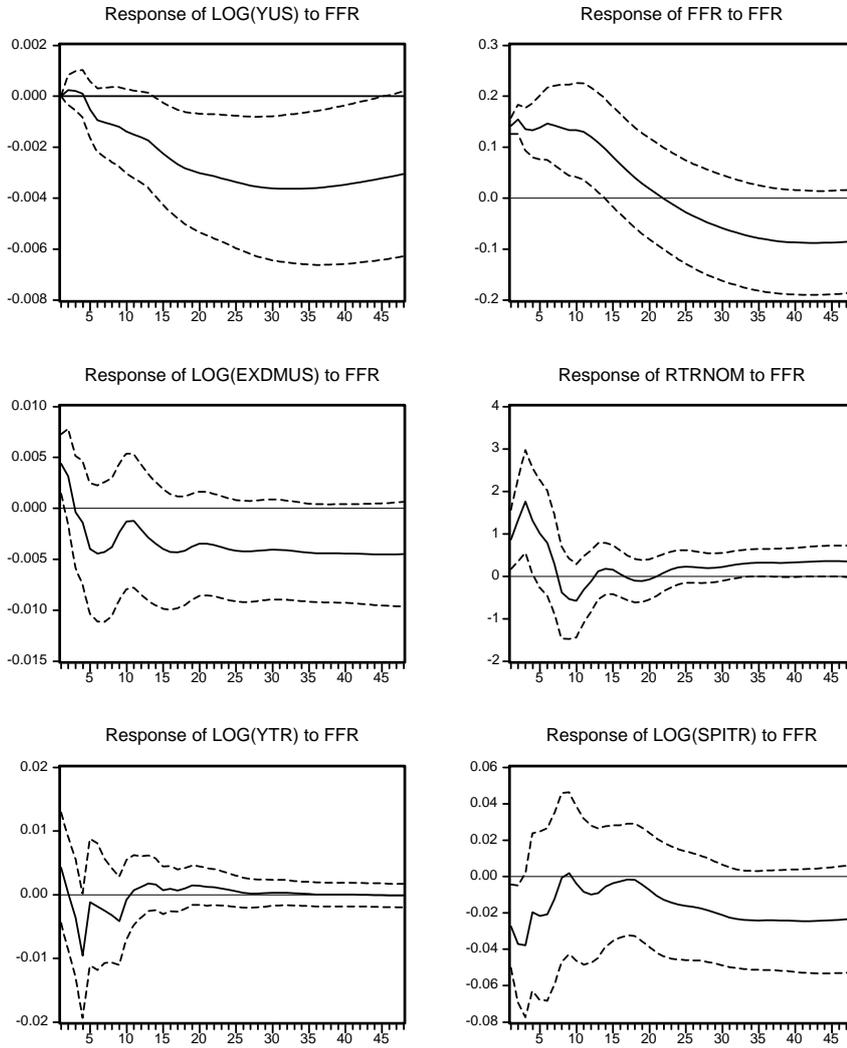


Figure A2.2. Wold Ordering: $\{Y^{us}, CPI^{us}, FFR, R^{us-TBILL}, EX^{DM/US}, R^{TRNom}, Y^{TR}, SPI^{TR}\}$

Response to One S.D. Innovations ± 2 S.E.

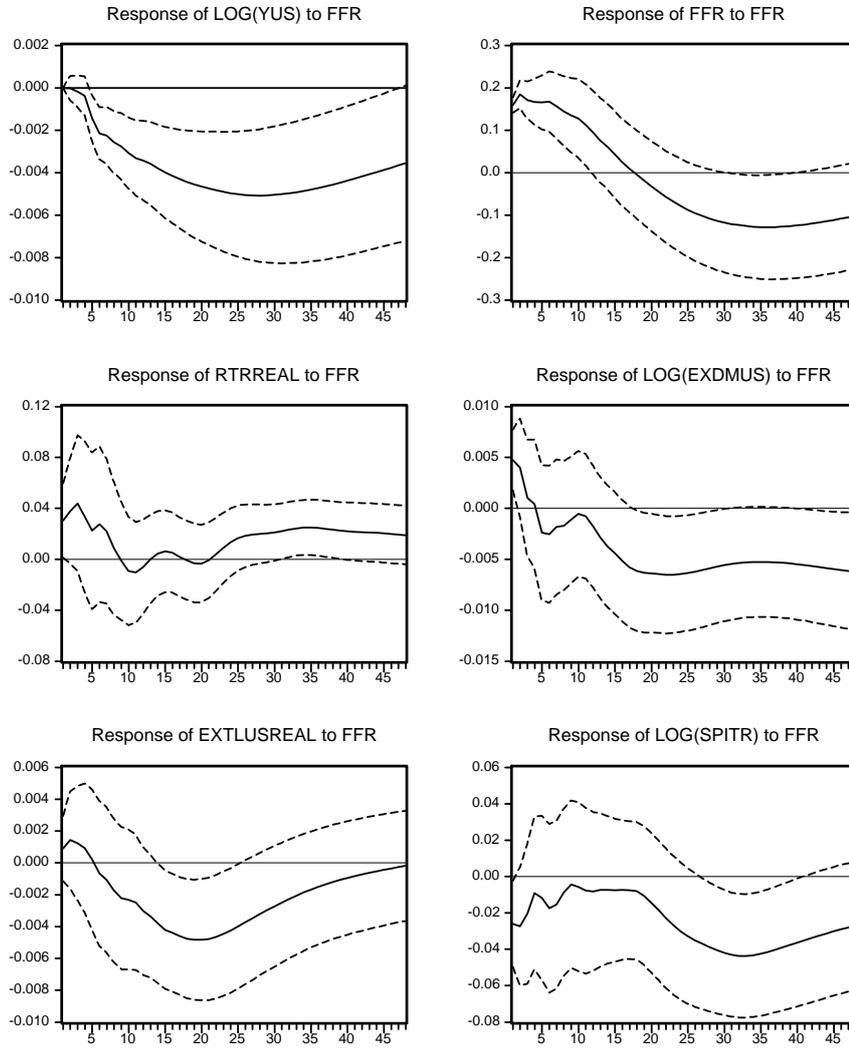


Figure A2.3. Wold Ordering: $\{Y^{us}, CPI^{us}, FFR, R^{TR}Real, EX^{DM/US}, EX^{TL/US}Real, SPI^{TR}\}$

Response to One S.D. Innovations ± 2 S.E.

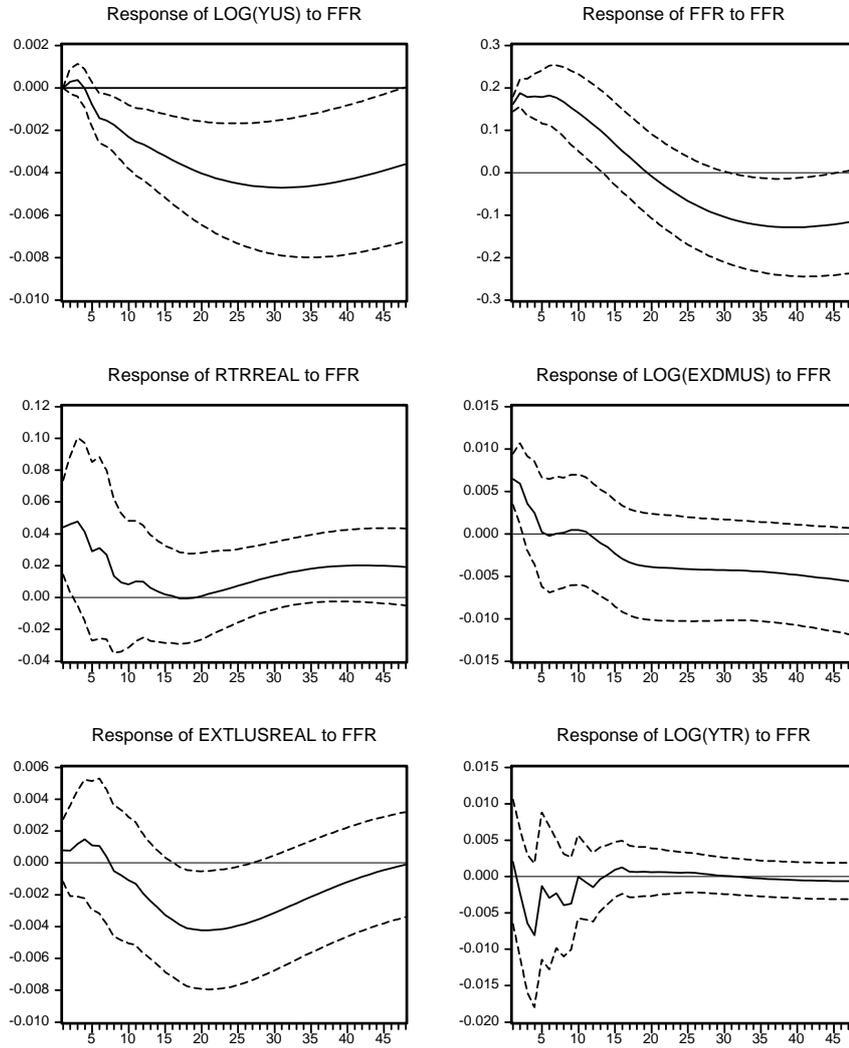


Figure A2.4. Wold Ordering: $\{Y^{us}, CPI^{us}, FFR, R^{TR}Real, EX^{DM/US}, EX^{TL/US}Real, Y^{TR}\}$

Response to One S.D. Innovations ± 2 S.E.

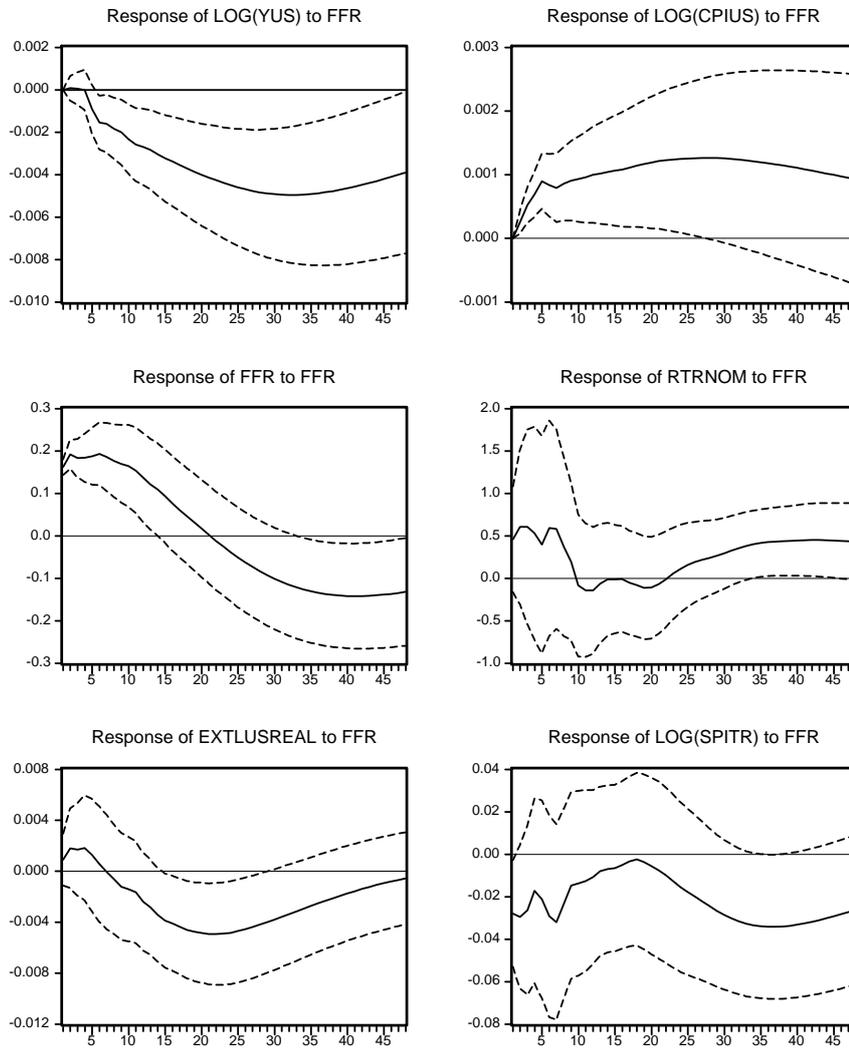


Figure A2.5. Wold Ordering: $\{Y^{us}, CPI^{us}, FFR, R^{TR}Nom, EX^{TL/US}Real, SPI^{TR}\}$

Appendix 3. Effects of Change in German Interest Rates on Turkish Macroeconomic Variables

Response to One S.D. Innovations ± 2 S.E.

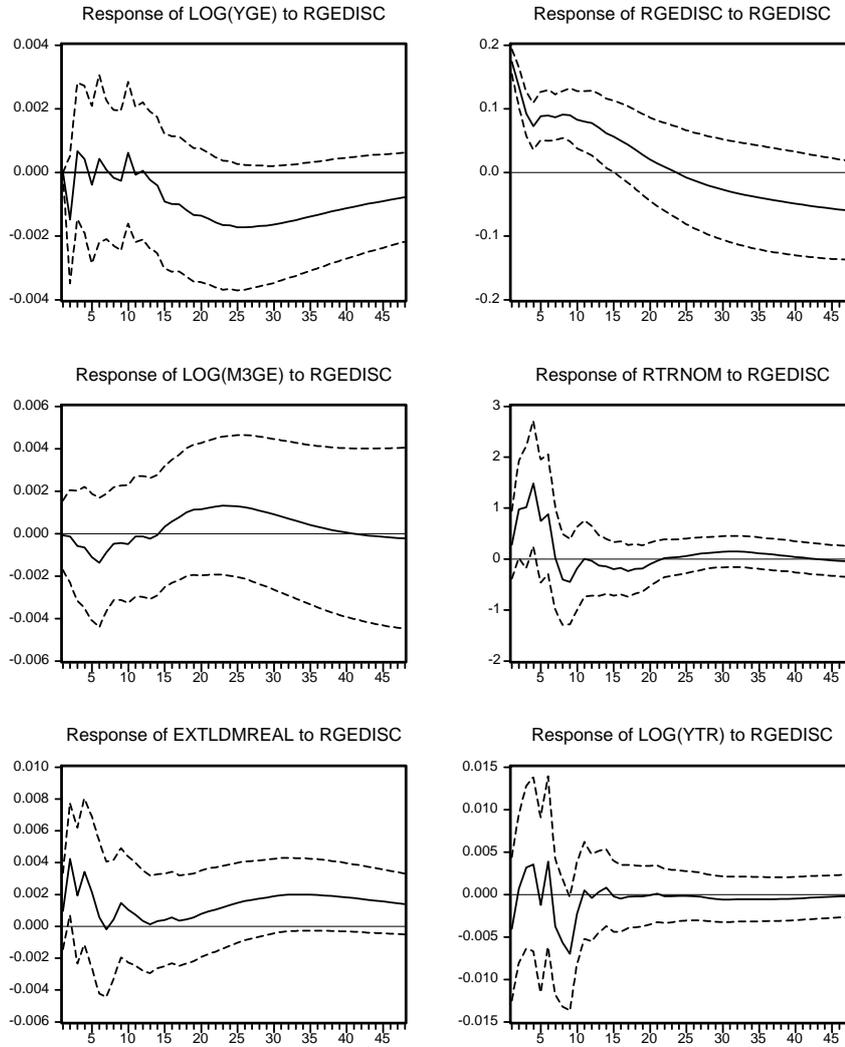


Figure A3.1. Wold Ordering: $\{Y^{GE}, CPI^{GE}, R^{GE}Disc, M3^{GE}, R^{TR}Nom, EX^{TL/DM} Real, Y^{TR}\}$

Response to One S.D. Innovations ± 2 S.E.

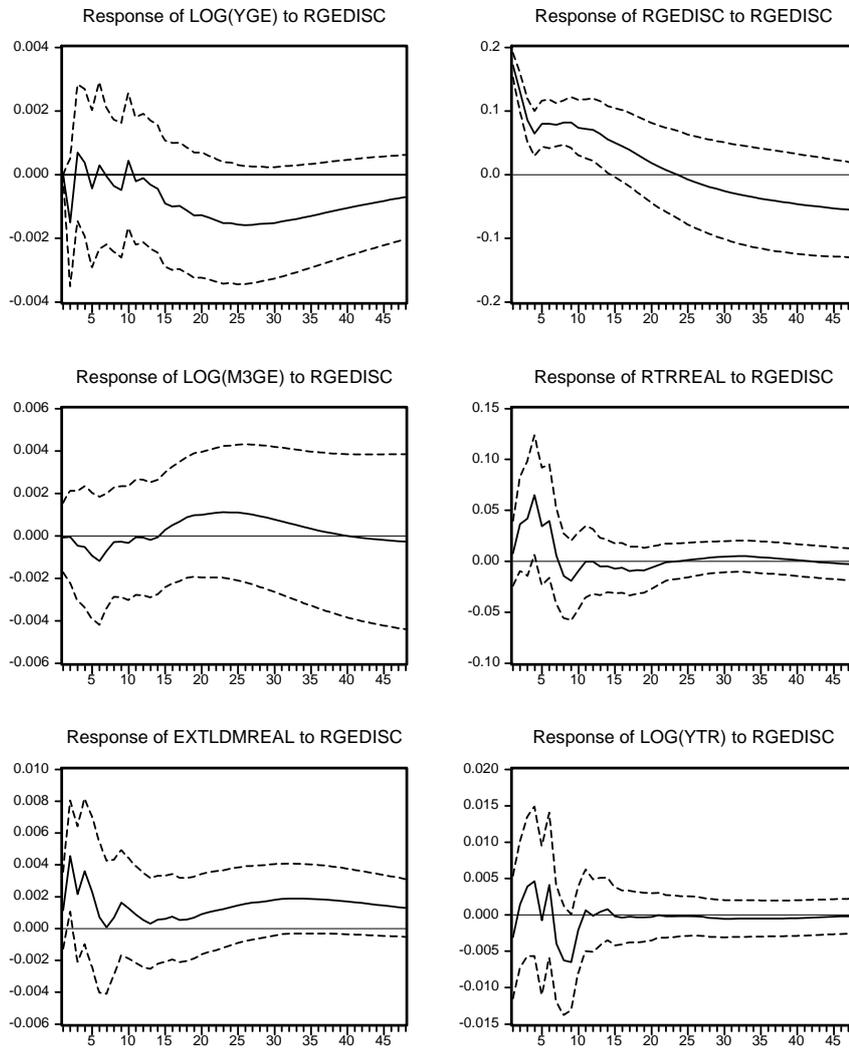


Figure A3.2. Wold ordering: $\{Y^{GE}, CPI^{GE}, R^{GE} Disc, M3^{GE}, R^{TR} Real, EX^{TL/DM} Real, Y^{TR}\}$

Response to One S.D. Innovations ± 2 S.E.

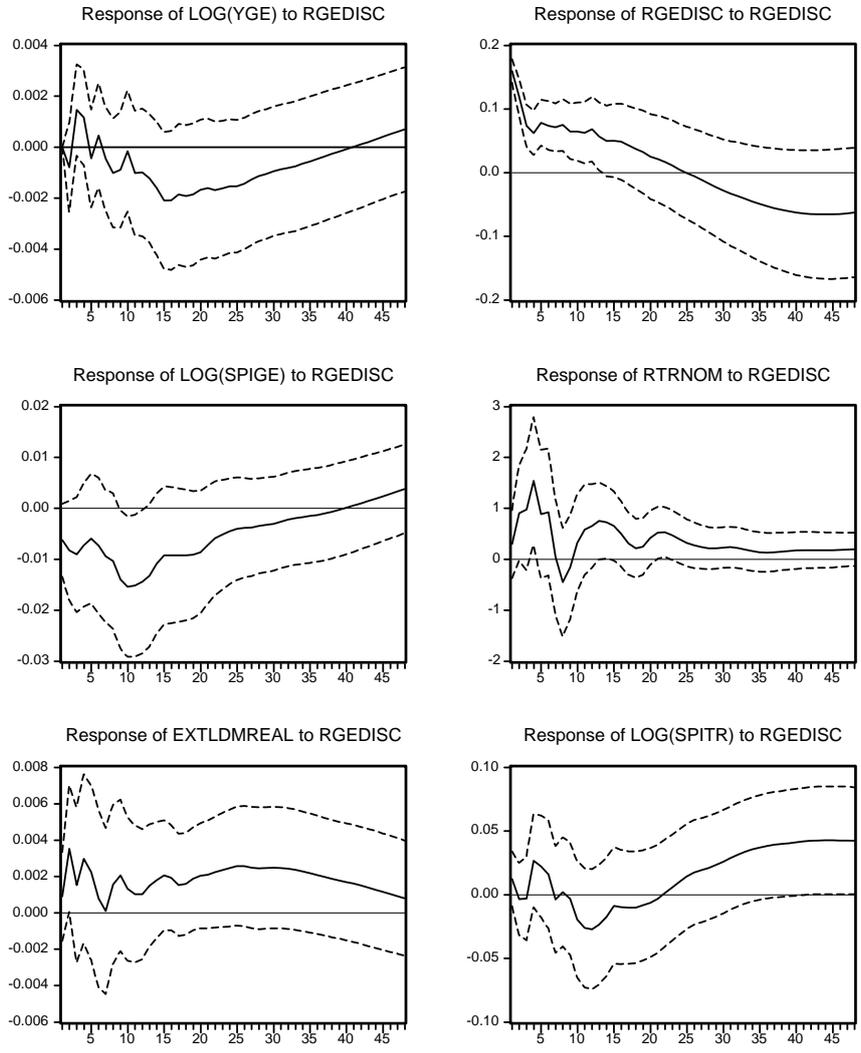


Figure A3.3. Wold ordering: $\{Y^{GE}, CPI^{GE}, R^{GE}TBill, R^{GE}Disc, SPI^{GE}, R^{TR}Nom, EX^{TL/DM}Real, SPI^{TR}\}$

Response to One S.D. Innovations ± 2 S.E.

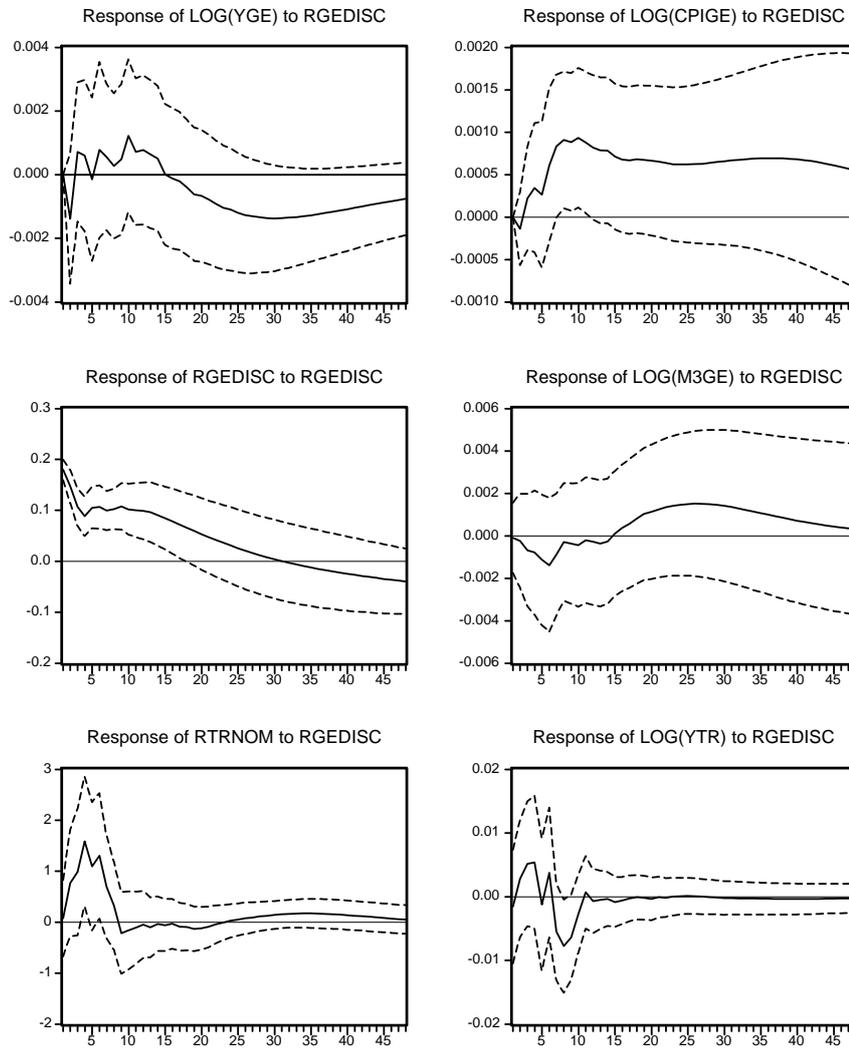


Figure A3.4. Wold Ordering: $\{Y^{GE}, CPI^{GE}, R^{GE}Disc, M3^{GE}, R^{TR}Nom, Y^{TR}\}$