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PORTFOLIO INVESTMENTS AND ASSET PRICES RELATIONSHIP IN TURKEY

Abstract:

This study aims to investigate the linkage between portfolio investments and asset prices in Turkey for the period of September 2008-December 2013. The accommodative policies implemented in advanced economies in order to cope with the global crisis and fragilities in the global financial system have led to considerable volatility in capital flows. Capital flows towards emerging economies have been volatile, particularly to those with large external financing needs such as Turkey. This situation has created risk of macroeconomic and financial instability in these economies. Accordingly, this paper examines the effects of portfolio investments on the main financial assets such as equity market, exchange rate and interest rates in Turkey. Toda and Yamamoto (1995) method and generalized impulse response analysis have been utilized in this study. It is found that portfolio investments have a considerable and steady impact on the exchange rate. However, severe impacts of portfolio flows are not observed on the stock market and interest rates in the long run.

Keywords:

Capital Flows, Portfolio Investments, Asset Prices, Turkey

JEL Classification: E44, F30, F40

1. Introduction

In order to cope with the devastating impacts of 2008-2009 global financial crisis, the advanced economies have implemented accommodative policies, which leads to surplus liquidity at global dimension. The low interest environment in advanced economies promotes international investors to make investments into the economies where the returns are relatively higher. Hence, the abundance in liquidity and ongoing fragilities in the global financial system have given rise to considerable volatility in cross border capital flows towards emerging economies especially which are in the need of external financing, such as Turkey (Kara 2012). Besides the differences between the interest rates in emerging economies and advanced economies, the global risk appetite has also contributed to the capital flows, particularly portfolio flows, towards emerging economies after global financial crisis (Ahmed & Zlate 2013). On the other hand, high volatile movements in the portfolio investments could also lead to sudden-stop episodes or capital outflows which may create the risk of macroeconomic and financial instability. Thus, the movements of capital flows (both inflows and outflows) have affected these economies via some channels. Firstly, emerging markets are exposed to asset price bubbles and excessive domestic exchange rate appreciation, which harm their competitive advantages during the times of inflows. Secondly, the abundance of inflows decreases the cost of funding which promotes domestic credit growth. Finally, sudden stop of inflows or sudden withdrawals may result in economic contraction in emerging market economies which are heavily dependent on the external financing to sustain their economic activities (Brana, Djigbenou & Prat 2012).

The relationship between capital flows and macroeconomic indicators for emerging markets are well documented in the literature (Gumus, Duru & Gungor 2013; Gossel & Biekpe 2012; Kim & Yang 2009; Berument & Dincer 2004). However, this study may contribute to the prior literature through several points. Turkey is one of the emerging economies that have been affected by the capital flows resulted from accommodative policies of advanced economies after 2008-2009 global crisis and tries to handle the consequences of high capital volatilities on its financial system after the global financial crisis. Thus, as a first contribution, this study aims to explore the impacts of portfolio investment on main financial assets such as equity market, exchange rate and interest rate in Turkey for the time line of September 2008 to December 2013 in which there has been high volatility in foreign portfolio investments of emerging markets. The developments following the global financial crisis motive us to investigate the linkage between foreign portfolio investments and financial asset prices for this time line. Moreover, this study tries to capture how the values of these financial assets respond to portfolio investments. Secondly, the relationship between portfolio investments and financial asset prices for the pointed time period has not been investigated by employing Toda and Yamamoto (TY) (1995) method. Hence, this study has utilized TY method and then has applied generalized impulse response analysis.

The organization of the paper is as follows: In Section 2, a brief literature review is given. The data and its properties are offered, and then empirical model is constructed in Section 3. In Section 4, the empirical test results are displayed and discussed. Finally, Section 5 concludes the study by evaluating the results.

2. Literature Review

The cross border capital flows have both benefits and drawbacks on the economies. When the gains of these flows on economy are considered, it is maintained that there exists a close linkage between capital flows and domestic interest rates. The capital inflows reduce the interest rates which promotes upsurge in investment opportunities and consumption, leading to an increase in aggregate output (Berument & Dincer 2004; Kim, Kim & Wang 2004; Jansen 2003; FitzGerald 1998; Corbo & Hernandez 1996). However, in spite of these advantages, capital inflows may bring their own drawbacks. Firstly, the capital inflows may give rise to real exchange rate appreciation, which weakens the competitiveness of economies at international markets (Hegerty 2009; Agenor 1998). Secondly, capital inflows may prevent monetary authority of a country to implement tight monetary policies and this may bring about inflationary pressure (Tillman 2013). Finally, large capital inflows may create asset price booms such as in equity and real estate markets, which increases likelihood of financial fragility (Tillman 2013; Brana, Djigbenou & Prat2012, Olaberría 2012). Actually, the capital inflows may generate asset price bubbles through several channels (Kim & Yang 2009). Firstly, capital inflows boost the demand for the assets and then this generates a raise in asset prices. Additionally, this may create spillover effect to different markets such as real estate. Secondly, the escalation in money supply and liquidity because of capital inflows also contribute to an increase in asset prices. Thirdly, a country, receiving high capital flows, tends to experience economic booms due to lower interest rates which may also trigger increases in asset prices. Furthermore, Caballero and Krishnamurthy (2006) attribute the asset price bubbles in emerging market economies to the inadequate domestic stores of value. Since there are not sufficient investment alternatives in these economies, foreign investments tend to several investments opportunities, which raises the asset prices.

In the existing literature, there are some empirical studies focusing on the influences of capital flows on the financial asset prices. Sarno and Taylor (2003) have conducted an empirical analysis to examine whether asset price bubbles are related to large capital flows into Latin America for the second half of the 1980s through the 1990s or not. The study indicates that there is a strong evidence for the existence of stock price bubbles in Latin America. Additionally, the study of Brana, Djigbenou and Prat (2012) investigate the effect of global liquidity occurring last decade on the asset prices. The panel vector autoregressive (VAR) method has been employed for a set of emerging market countries and it is concluded that global liquidity surplus has weaker impact on stock, real estate and commodity prices whereas it has strong spillover effects on output and price levels. Olaberría (2012) also provides empirical evidence that during the times of large capital inflows, there is a link between capital inflows and asset price booms by using a panel of 40 countries for the time line: 1990-2010.

Moreover, Tillman (2013) has employed a panel VAR for a set of Asian emerging economies. This study provides that the capital inflow shocks have significant effect on equity and house prices. Kim and Yang (2009) has also examined how the asset prices have been influenced by the capital inflows, especially portfolio inflows in Korea. It is found that capital inflows contribute to an increase in stock prices while such a contribution is not valid for the land prices in Korea. On the other hand, the impact of capital inflows on nominal and real exchange rate is limited. It is concluded the capital inflow shocks are more significant on the stock market while this impact is limited for the other economic indicators. Gossel and Biekpe (2012) also examine the effects of capital inflows on South Africa's economy. A shock to portfolio investments

leads to exchange rate appreciation and decreases in interest rates in South Africa. Additionally, a shock given to short term capital investments also brings about raise in stock and house prices. Berument and Dincer (2004) analyze the causal relationship between capital flows and macroeconomic performance in Turkey for the time line between 1992:01 and 2001:06. Their findings show that a positive innovation in capital inflows gives rise to domestic currency appreciation and decline in interest rates in the short run. Another study for Turkey, Gumus, Duru and Gungor (2013) have conducted a study focusing on the foreign portfolio investments (only stock investments) and main macroeconomic variables for the period of 2006:12-2011:12. By employing VAR Granger causality test and impulse response analysis, they have found that foreign portfolio investments have an effect on stock market and exchange rate. They have also attained that only industrial production has impact on portfolio investments.

3. Data and Empirical Model

The data is collected monthly over the period of September 2008- December 2013. Stock market is measured by the return of equity index (BIST100). BIST100 series is composed of the log returns that are calculated as $\ln(P_t/P_{t-1})$. The exchange rate is denoted by REER which is the logarithm of real effective exchange. Interest rate is denoted by INTRT which is benchmark interest rate on 2-year government bonds. The data of portfolio investments, denoted by PI, is taken as net portfolio liabilities (covering both stocks and bonds) to consider both inflows and outflows (in US Dollars). Portfolio investments are particularly considered here rather than the long term capital investments such as foreign direct investment (FDI) or long term bank loans since financial assets are more sensitive to movements of portfolio investments. The inflation, CPI, is the logarithm of seasonally adjusted consumer price index. Finally, economic growth is proxied as the logarithm of seasonally adjusted industrial production index. All the series are obtain from the Bloomberg except real effective exchange rate data. The REER series is retrieved from statistical database of the Central Bank of the Republic of Turkey.

Toda and Yamamoto (TY) (1995) procedure has been utilized in order to explore whether portfolio investments affect financial assets by considering economic growth and inflation in Turkey by following steps in Soytas and Sari (2009) and Dogrul and Soytas (2010). Actually there is a simultaneous relationship between portfolio investment and financial assets, which means that the value of financial assets also influences the portfolio investments. When examining the impact of portfolio inflows on financial assets by TY method, this endogenity issue is handled under VAR structure. Before starting with TY procedure, it is required to obtain integration orders of variables. The integration orders are determined by 5 different unit root tests for both levels and first difference levels. The unit root test results of Augmented Dickey and Fuller (1979) (ADF), Elliot, Rothenberg, and Stock's (1996) Dickey Fuller GLS detrended (DF-GLS), Phillips and Perron (1998) (PP), Kwiatowski, Phillips, Schmidt and Shin (1992) (KPSS) and Ng and Perron's (2001) MZ_α are given as in Table 1:

Table 1. Unit Root Test Results

		ADF	DF_GLS	PP	KPSS	NP_MZ_a
	Level					
Intercept	BIST100	-5.906791[a]	-2.143105[b]	-5.906791[a]	0.086737	-6.43382[c]
	REER	-1.646425	-0.931924	-2.511102	0.165107	-2.72634
	INTRT	-5.343160[a]	-0.931924	-3.151708[b]	0.585016[b]	-1.14192
	PI	-5.872362[a]	-5.513648[a]	-5.858903[a]	0.553376[b]	-27.8055[a]
	CPI	0.098761	1.997391[b]	0.094047	1.015406[a]	1.71135
	IP	-1.390382	-0.369933	-0.939185	0.952232[a]	-3.93203
	Level					
Intercept and Trend	BIST100	-5.864376[a]	-5.210813[a]	-5.798262[a]	0.083421	-26.4825[a]
	REER	-1.856082	-0.422961	-2.532618	0.075844	-6.87997
	INTRT	-4.331176[a]	-2.238128	-1.903993	0.177990[b]	-4.78986
	PI	-6.449287[a]	-6.476295[a]	-6.463729[a]	0.103340	-30.4380[a]
	CPI	-2.774205	-2.468957	-2.774205	0.083457	-9.93452
	IP	-0.663382	-1.241405	-1.136149	0.234151[a]	-3.25892

		ADF	DF_GLS	PP	KPSS	NP_MZ_a
	First Differences					
Intercept	BIST100	-6.479530[a]	-0.736447	-14.94872[a]	0.500000[b]	-0.10532
	REER	-7.134924[a]	-0.422961	-7.130871[a]	0.090684	-0.49445
	INTRT	-5.964994[a]	-1.492095	-6.055099[a]	0.403354[c]	-0.71681
	PI	-8.067231[a]	-0.597147	-23.02541[a]	0.247832	-0.36667
	CPI	-7.018664[a]	-6.614290[a]	-6.987798[a]	0.059293	-30.1357[a]
	IP	-2.370081	-1.295182	-8.188293[a]	0.227263	-0.99687
	First Differences					
Intercept and Trend	BIST100	-6.513364[a]	-8.384419[a]	-16.37071[a]	0.500000[a]	-30.4625[a]
	REER	-7.081293[a]	-3.630506[b]	-7.087348[a]	0.091198	-16.8984[c]
	INTRT	-6.775609[a]	-3.816232[a]	-6.776008[a]	0.087170	-18.1180[b]
	PI	-8.063138[a]	-8.922445[a]	-27.08013[a]	0.207076[b]	-30.1508[a]
	CPI	-6.977787[a]	-6.943123[a]	-6.943790[a]	0.049182	-30.5372[a]
	IP	-7.193108[a]	-1.575353	-8.168419[a]	0.145469[c]	-1.54532

Notes: Superscripts a, b and c point out the significance levels of 1%, 5% and 10% respectively. The null hypotheses of all tests imply that the series have unit root except KPSS. KPSS has null hypothesis stating stationary.

As seen from the unit root test results, the series have different integration orders. BIST100 and PI series are integrated order of zero (i.e. I(0)) whereas REER, INTRT, CPI and IP series appear to be integrated order of one (I(1)). In such a case, cointegration cannot be applied since all the series are not in the same integration order. That is why, TY procedure has been preferred here since it does not require the pretest of integration or cointegration among the series (Ghazali et. al 2008; Masih & Masih 2001). Additionally, because TY method does not require the series to be in the same integration order and it enables to use the variables in levels under VAR structure, which hinders the loss of information stemmed from differencing (Soytas & Sari 2009). Hence, these properties make TY procedure more robust method when examining causality relationships.

In order to apply TY procedure, the maximum order of integration (d_{max}) must be determined. For these series, d_{max} is equal to 1 here. Then, Akaike information criterion (AIC), Schwarz information criterion (SIC), likelihood ratio test (LR) and

Hannan Quinn (HQ) information criterion have been conducted to determine the optimal lag length (p) for VAR in levels. All criterions favor 1 as an optimal lag length. Therefore, the augmented VAR ($p+d_{max}$) model is constructed as VAR(2) (1+1=2), then Wald test is carried out to test the first p coefficients of each variable in VAR($p+d_{max}$) by following the asymptotic Chi-square distribution with p degrees of freedom. The null hypothesis of Wald test is that the first p coefficients are jointly equal to zero which implies no Granger causality.

Here, VAR(2) (1+1=2) model has been structured as in Equation 1:

$$\begin{bmatrix} BIST100_t \\ REER_t \\ INTRT_t \\ PI_t \\ CPI_t \\ IP_t \end{bmatrix} = \alpha + \beta_1 \begin{bmatrix} BIST100_{t-1} \\ REER_{t-1} \\ INTRT_{t-1} \\ PI_{t-1} \\ CPI_{t-1} \\ IP_{t-1} \end{bmatrix} + \beta_2 \begin{bmatrix} BIST100_{t-2} \\ REER_{t-2} \\ INTRT_{t-2} \\ PI_{t-2} \\ CPI_{t-2} \\ IP_{t-2} \end{bmatrix} + \varepsilon_t \qquad \textbf{(Eq.1)}$$

where α is the vector of constants, β_1, β_2 are coefficient vectors and ε_t implies noise residuals.

Before testing with Wald test, it is required to check the stability of the VAR(2) model and the conformity of assumptions via diagnostic tests. VAR(2) satisfies the stability condition since no roots lies outside the unit circle.[1] As seen in Table 2, the diagnostic test results of each equation has been presented as below:

Table 2. Diagnostic Test Results

Equation	B-G test	J-B test	B-P test	Ramsey RESET
BIST100	1.317969	1.222986	1.076736	0.355551
REER	0.036610	0.712023	1.067957	1.822077
INTRT	1.329551	0.115057	2.466401[b]	1.347846
PI	1.869233	0.621132	1.502837	1.095968
CPI	2.085076	1.594633	1.383225	1.384198
IP	5.109897	3.061667	0.918398	6.135285[b]

Notes: The Breusch-Godfrey serial correlation LM test has null of no serial correlation. Jarque-Bera tests the null of normality. Breusch-Pagan test checks no heteroscedasticity of residuals. Ramsey RESET test the null hypothesis of no specification errors for one fitted term. Superscripts a, b and c point out the significance levels of 1%, 5% and 10% respectively.

The diagnostic assumptions of each model appear to be valid expect for the heteroscedasticity case of interest rate model and specification problem of industrial production model. However, we check the stability of interest rate and industrial production models by CUSUM and CUSUM of squares test. Both tests do not imply the instability of models. After checking diagnostic assumptions and the stability of VAR, Granger causality tests under TY method and generalized impulse response analysis are applied in the next section.

4. The Causality Tests and Generalized Impulse Responses

By constructing augmented VAR(2) under TY method, it is possible to detect long run Granger causality existence and its direction among variables. In this VAR(2) model,

[1] All omitted results are available upon request.

only first beta coefficients are tested by the Wald test with 1 degree of freedom for each model since optimal lag number (p) is 1 here. The Wald test statistics are given in Table 3:

Table 3. Granger Causality Test Results

Dependent Variable	BIST100	REER	INTRT	PI	CPI	IP
BIST100	-	0.001071	0.882000	2.597568	0.097935	0.065457
REER	0.081119	-	0.061228	3.925210[b]	1.687203	0.271550
INTRT	0.513162	0.578922	-	2.486057	0.369057	1.139443
PI	1.639574	0.135156	0.388080	-	0.003457	0.026868
CPI	0.657886	0.641873	3.708524[c]	0.727110	-	0.011113
IP	1.530598	0.020363	5.488575[b]	1.968804	0.090540	-

Notes: Superscripts a, b and c point out the significance levels of 1%, 5% and 10% respectively. The significant denotes that the column variable Granger causes the row variable.

According to empirical test results, the only long run Granger causality runs from portfolio investment to the real effective exchange rate. On the other hand, significant long run Granger causality running from portfolio investments to the stock market and interest rate are not detected in the long run. Moreover, no Granger causality from any financial assets to the portfolio investment is found out. When it comes to the other two significant results, interest rate Granger causes both inflation and economic growth in the long run in Turkey.

By the help of TY method, the existence of long run Granger causality among the series and its direction can be clarified. Nevertheless, this method does not demonstrate how each variable reacts if a shock is given to other variables. Additionally, it is required to observe whether the given shocks to one variable are permanent on others or not (Soytas & Sari 2009). This can be solved by utilizing the generalized impulse response analysis. Generalized impulse response, a method proposed by Pesaran and Shin (1998), does not necessitate the orthogonalization of shocks in VAR model. Moreover, this analysis is indifferent to the order of variables in VAR structure unlike traditional impulse response analysis. Hence by the help of this analysis, it is possible to observe how the financial assets in Turkey such as stock market returns, exchange rate and interest rate react to the foreign portfolio investments. It can also be found out how the portfolio investments towards Turkey give response to the shocks in financial assets. Hence, the responses of stock market, exchange rate, interest rate and portfolio investments to one standard deviation shock to other variables except self shocks are given as follows[2]:

As seen in Figure 1, one standard deviation shock in net portfolio investments leads to positive and significant effect on stock market returns up to one month period. After one month, the response of stock market to the portfolio investments has started to decline and then vanishes. This means that portfolio investments affect the stock market in a positive way initially but this impact is not sustainable as time passes. As given in Figure 2, one standard deviation shock to portfolio investments has positive and significant impact on real effective exchange rate and this impact seems sustainable up to ten months. This implies that as portfolio inflows into Turkey increase, Turkish Lira tends to appreciate. Moreover, one standard deviation shock in portfolio investments gives rise to negative and significant impact on interest rate on Turkey as in Figure 3. It is remarkable that negative and significant response of

[2]All omitted responses are available upon request.

interest rate to the shocks of portfolio investments does not tend to die up to the following ten months despite no Granger causality has been detected between the two. As Turkey receives portfolio investments, the interest rate tends to decrease. Figure 4 demonstrates the responses of portfolio net inflows to the shocks of financial assets. The response of portfolio net inflows to the one unit shock of stock market in Turkey is positive and significant up to one month. After one month, this response has commenced to decline and then has disappeared. This pattern is also valid for the response of portfolio investments to real effective exchange rate. The appreciation of Turkish Lira influences the portfolio investment in a positive way and significantly at initial period. On the other hand, the reaction of portfolio investments to the interest rate has been negative and significant initially; however, this response has leaned to be positive and then has vanished within the statistically insignificant area.

5. Conclusion

This study aims to investigate the impact of portfolio investments on the main financial assets such as equity market, exchange rate and interest rate in Turkey for the period of September 2008-December 2013 by controlling economic growth and inflation. The analyzed timeline is especially concerned for Turkey since during this period there have been huge swings in capital flows to and from emerging markets, resulting from the extraordinary loose monetary policies implemented by advanced economies following the global crisis. Toda and Yamamoto (TY) (1995) procedure and generalized impulse response analysis are utilized here. The only significant long run Granger causality has been detected from portfolio investments to exchange rate in Turkey. As portfolio investments increase towards Turkey, the real exchange rate tends to increase, which shows the appreciation in Turkish Lira. Furthermore, the impact of portfolio investments on the exchange rate seems sustainable according to generalized impulse response results. This reveals vulnerability of Turkish Lira to a sudden loss of investor sentiment. Given Turkey's high current account deficit and associated macro financial risks, recent policy implementations to curb the current account deficit, including macroprudential ones seem to be appropriate steps forward. On the other hand, significant long run causality from portfolio investments to stock market and interest rate cannot be observed. There is also no causal relationship running from any financial assets to the portfolio investments.

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Figure 1. Generalized Impulse Responses of Stock Market to Other Variables

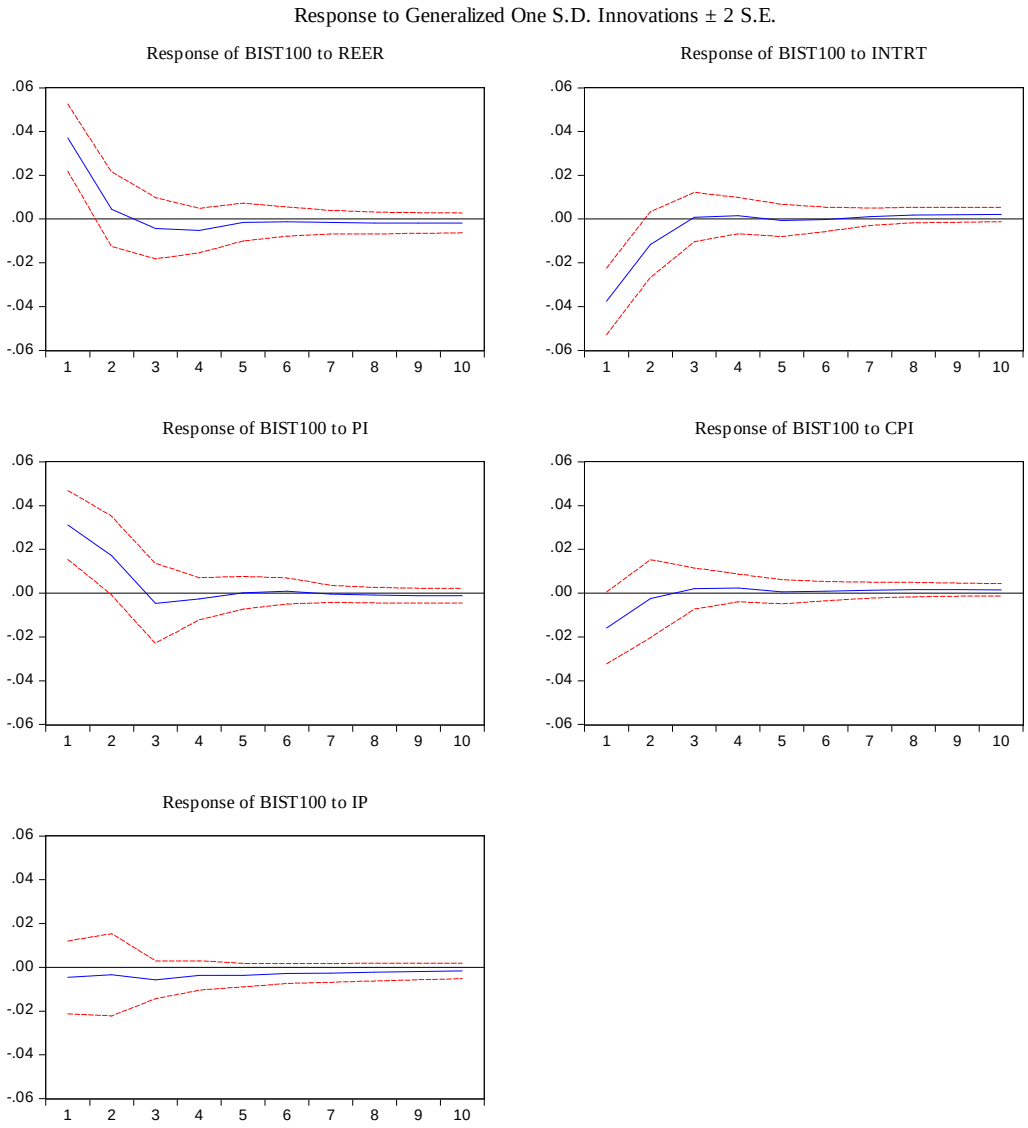

Figure 2. Generalized Impulse Responses of Exchange Rate to Other Variables

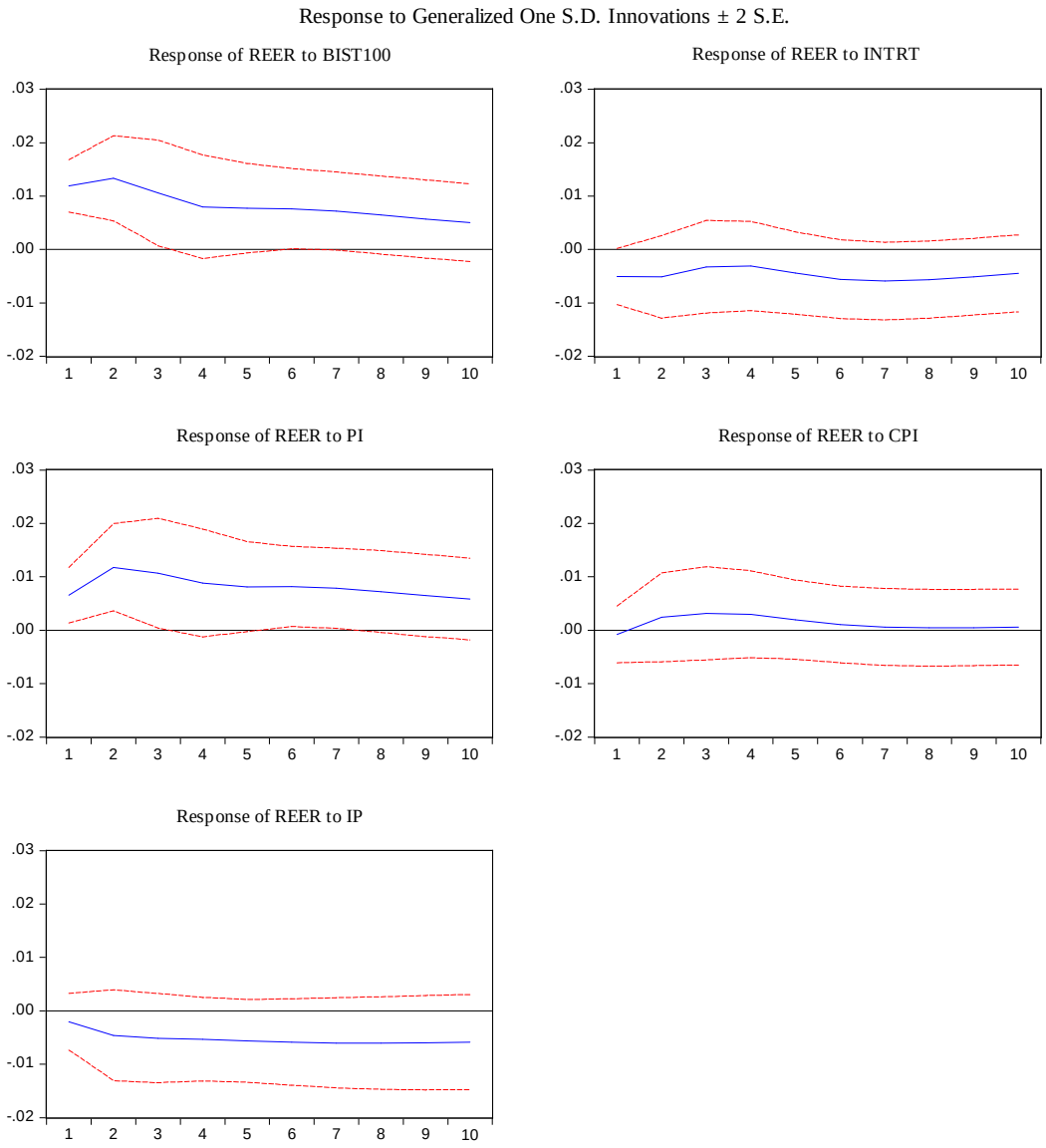

Figure 3. Generalized Impulses Responses of Interest Rate to Other Variables

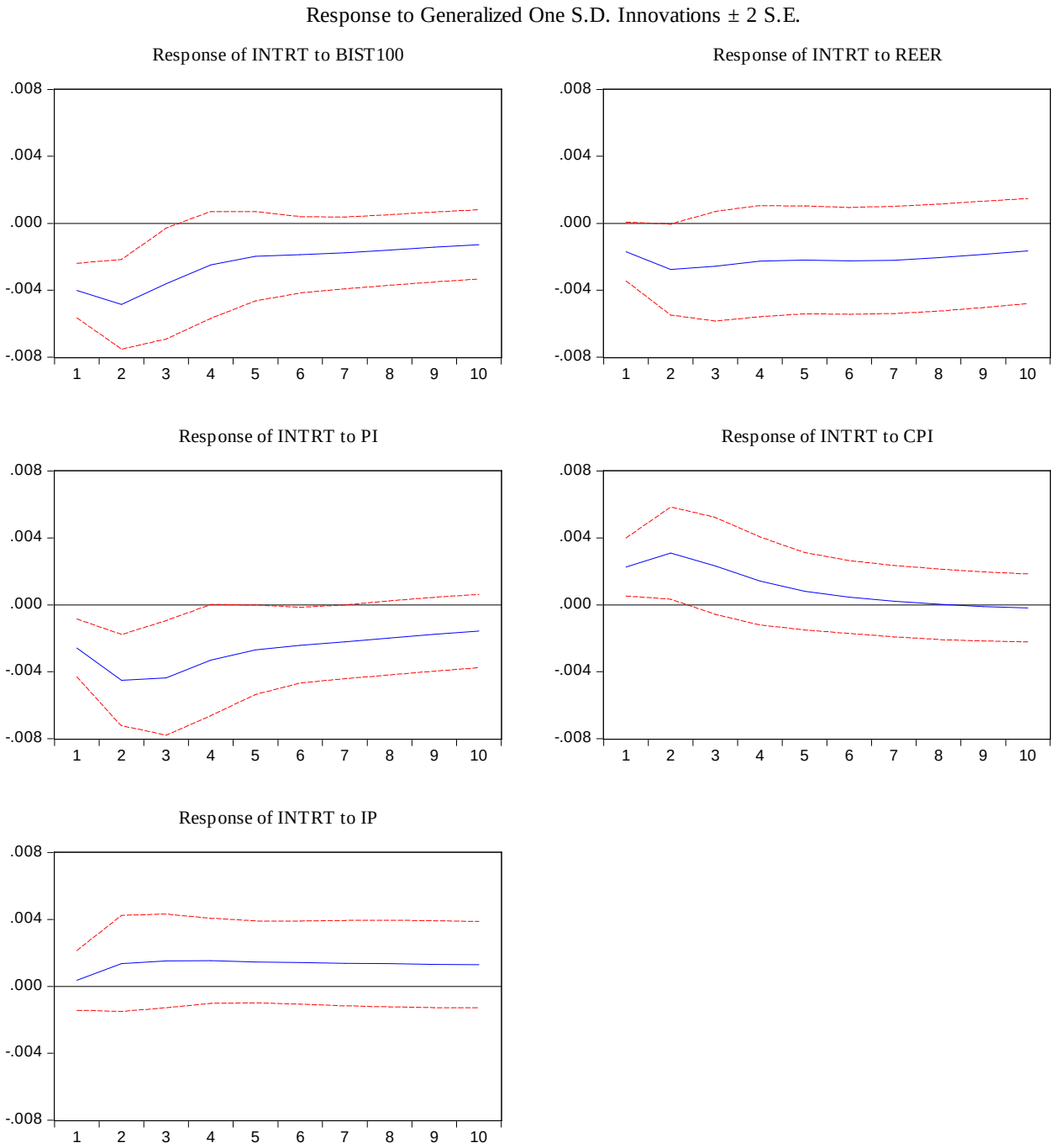

Figure 4. Generalized Impulses Responses of Portfolio Investments to Other Variables