

The effects of capital inflows on Turkish macroeconomic performance

M. Hakan Berument · Zulal S. Denaux ·
Furkan Emirmahmutoglu

Published online: 13 January 2015
© Springer Science+Business Media New York 2015

Abstract Capital inflows are important factor affecting macroeconomic performance, such as the real exchange rate, interest rates, output, and price level. However, the components of capital inflows are also important. Capital inflows in the forms of portfolio investment liabilities, foreign direct investment, and other investment liabilities may affect these macroeconomic variables differently. The main focus of this study is to analyze the behavior of key macroeconomic variables in response to the different components of capital inflow shocks for Turkey using monthly data from 2000:1 to 2012:12 by utilizing a vector autoregression model.

Keywords Capital flows · Vector autoregression model

JEL Classification C32 · F32 · F41

M. H. Berument
Department of Economics, Bilkent University, 06800 Ankara, Turkey
e-mail: berument@bilkent.edu.tr
URL: <http://www.bilkent.edu.tr/~berument/>

Z. S. Denaux (✉)
Department of Economics and Finance, Valdosta State University, Valdosta, GA 31698, USA
e-mail: zsdenaus@valdosta.edu
URL: <http://www.valdosta.edu/~zsdenaus/>

F. Emirmahmutoglu
Department of Econometrics, Gazi University, 06500 Ankara, Turkey
e-mail: furkan@gazi.edu.tr
URL: <http://websitem.gazi.edu.tr/furkan>

1 Introduction

The global mobility of international capital increased starting in the early 1990s, due to serious liberalization policies related to financial markets and foreign exchange transactions. Developing countries and emerging countries witnessed a remarkable surge in capital inflows over the years as a result. According to the study by Calvo et al. (1996), in the 5 years from 1990 to 1994, the developing economies of Asia and Latin America received nearly \$670 billion in foreign capital, which was about five times higher than the previous 5 years. However, this tremendous increase in capital inflow to these economies was interrupted by successive crises starting with Mexico in 1995 and followed by East Asian countries in 1997–1998, Russia in 1998, Latin America in 1999 and 2001, Turkey in 2001 and the latest global financial turmoil in 2008. Since the end of the current global financial crisis, capital inflows to these regions rebounded strongly and reached historical heights (Pradhan et al. 2011; Bonizzi 2013). Concurrent with this trend, the compositions of capital inflows changed remarkably. During the 1990s, the composition of capital inflows switched to mainly foreign direct investment (FDI) and portfolio investments (PIL; both bond and equity) as short-term investment (Ghose 2004; Carlson and Hernandez 2002; Alba et al. 1998). In recent years, the trend has tilted towards more short-term investments, exposing countries to more volatile and sudden withdrawal risks (Kohli 2001).

Therefore, understanding the economic effects of increasing international capital mobility has been of interest. Especially, the effects of capital inflows on macroeconomic performance have been extensively investigated in the literature (Calvo et al. 1993, 1996; Corbo and Hernandez 1994; Gunther 1994; Kohli 2001; Berument and Dincer 2004; Çimenoğlu and Yentürk 2005; Çulha 2006; Yalta 2010). According to open macroeconomics models, a surge in capital inflows lowers the interest rates, which leads to a higher level of investment, consumption and economic growth. Simultaneously, real exchange rate appreciation, widening current account deficits and higher price level, due to the increased consumption demand are commonly observed effects of larger capital inflows. However, the empirical literature has found mixed evidence on the existence of positive effects in the recipient country facilitated by the capital inflows (Berument and Dincer 2004; Pirovano et al. 2009). Even though the majority of these empirical studies are dealt with the effects of capital inflows to developing countries and emerging countries, few studies analyze the implications of capital outflows (capital flight) from those economies. The empirical findings of the study by Altan (2010) suggest that capital flight reduces private investment dramatically but does not have any effect on public investment for twenty-two emerging market economies between 1975 and 2000.

These factors listed above are important for Turkey for various reasons. First of all, Turkey lifted the restrictions on capital movements in 1989, which provided a springboard to a full integration with the international financial market. Second, the Turkish economy experienced volatile capital flows due to economic and financial crises in 1994, 2001 and 2008. Starting in 2009, the composition of capital inflows to Turkey moved toward short-term foreign investment, which is considered to be more volatile and risky compared to long-term foreign investment, FDI (Aysan et al.

2014b). Third, the Turkish economy has been experiencing a current account deficit for a long time. The deterioration in the current account balance, coupled with the increasing share of short-term capital inflows to finance this deficit, causes the Turkish economy to more vulnerable in sudden global financial changes (Akçelik et al. 2013). According to study by Çimenoğlu and Yentürk (2005), one of the major reasons for making Turkish's economy more vulnerable to crisis is the distribution of private investments more in favor of nontradable than tradable sectors during surge in capital inflows. Finally, Turkey is a small-open economy with years of persistent-high inflation. Therefore, the reasons listed previously make it easier to assess the effects of capital inflows on the Turkish macroeconomic performance.

Our study follows closely the study by Berument and Dincer (2004), except we extend the data set by including the current global financial crisis and assessing effects of the different compositions of capital inflows on the Turkish economy. To the best of our knowledge, this is the first study that attempts to assess the effects of different compositions of capital inflows on main macroeconomic variables, namely the interest rates, the real effective exchange rate (REER), the real gross domestic product (RGDP), and the consumer price index (CPI).

The purpose of this study is twofold. First, the effects of gross- capital-inflow shock on the main macroeconomic variables are examined. Second, the effects of each component of gross-capital inflows on those macroeconomic variables are analyzed. A vector autoregression (VAR) model is utilized for the empirical estimations. The monthly data from 2000:1 to 2012:12 for Turkish economy is used for this study.

The organization of the paper is as follows. The next section documents the trends and composition of capital movements into Turkey since the 1990s. Section 3 lists the sources and definitions of data used in this study. Section 4 tabulates the empirical findings. Section 5 concludes with a discussion of the main findings and their implications.

2 Trends and composition of capital flow in Turkey

Since the beginning of the 1990s, Turkey has undertaken various liberalization policies related to financial markets. After lifting all restrictions on capital movements, there has been a considerable surge in the capital inflow to Turkey with a similar experience in Asia and Latin America. According to the study by Çulha (2006), the capital flows to Turkey reached \$16 billion in 1992 and 1993, which was almost 8 % of the Turkish GDP. Turkey witnessed a significant capital outflow due to the economic and financial crises in 1994, 2001 and 2008. However, a large amount of capital inflow has been the trend in Turkey over last two decades. Figure 1 depicts the gross capital inflows (GCI), measured by the sum of direct foreign investment in Turkey (FDI), portfolio and other investment liabilities (OI); and a net capital inflow, which is the difference between the GCI and gross capital outflows, measured by the sum of direct investment abroad, portfolio and other investment assets over the years.

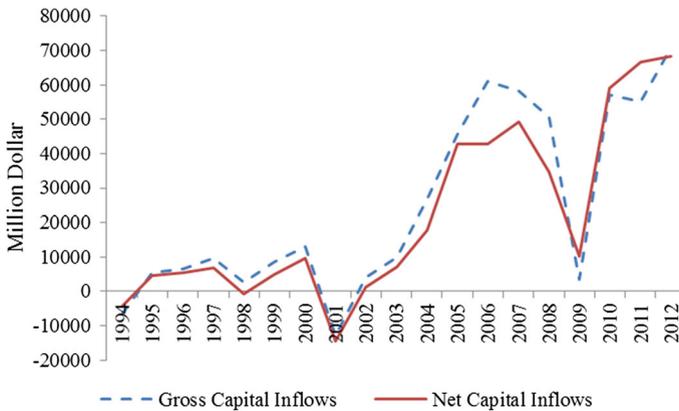


Fig. 1 Capital inflows to Turkey: 1994–2012

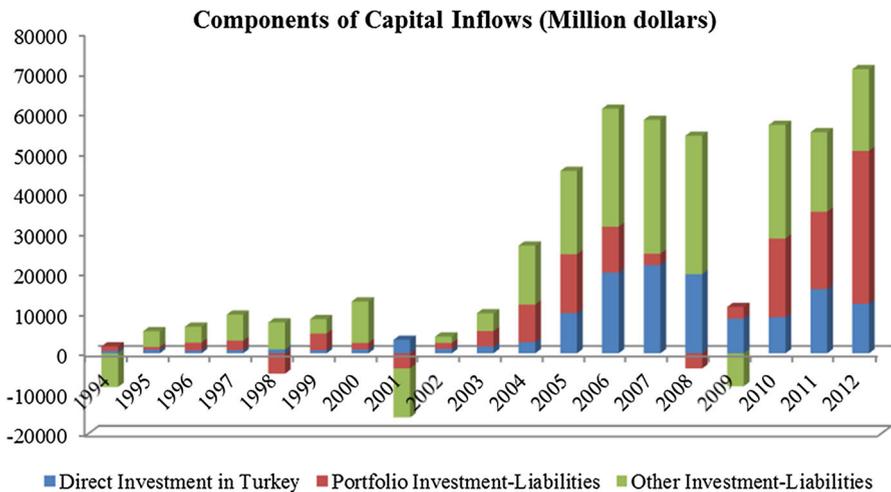


Fig. 2 Components of capital inflows to Turkey: 1994–2012

The change in the compositions of Turkish’s capital inflow is important for the last two decades as well. Figure 2 profiles the different components of Turkish capital inflow for the period of 1994–2012. The FDI to Turkey was very stable between 1994 and 2000, averaging 8.5 % growth. Turkey experienced a marked surge in FDI with a 241 % increase from 2000 to 2001, which was the first year that the FDI was over \$1 billion (Çimenoğlu and Yentürk 2005). The FDI to Turkey in the 2001–2007 period was remarkable with an increase of 95 %. Due to the global economic downturn starting in 2008, the record amount of FDI in Turkey worsened over 2008–2012. In addition, both portfolio and OI were more volatile over this period. According to Fig. 2, the PIL liabilities experienced peaks in 1996 and 2010

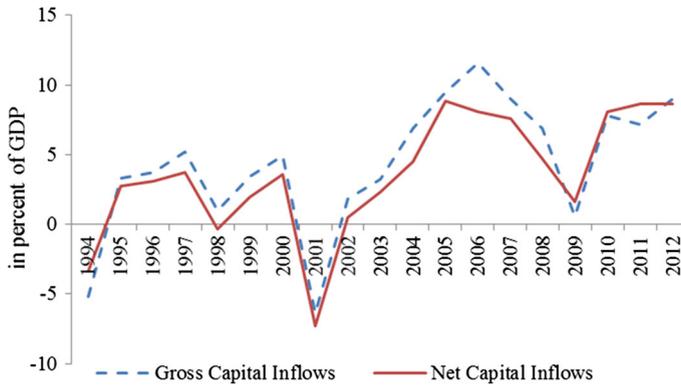


Fig. 3 Capital inflows as a share of GDP: 1994–2012

at a yearly average of 177 and 567 %, respectively. Meanwhile, the sharp reversals of foreign PIL were a common feature for the Turkish economy during the crisis years (1994, 2001 and 2008). In 2004, the OI reached their highest annual growth rates at 228 %. The annual sharpest decline of 446 % in other investments occurred in 2010.

According to the study by Aysan et al. (2014a) after the recent global financial crisis, the capital inflows to Turkey switched mainly to short term PIL, which rendered the economy more vulnerable to future financial risks of sudden stop.

The GCI as a share of GDP reached their peak in 2006, at 11.60 % but showed great volatility in the period between 1994 and 2001, depicted in Fig. 3. The net capital inflows as a share of GDP show a similar pattern as the GCI except they reached their peaks in 2005, at 8.81 %.

3 Description of data and data sources

To examine the effects of the capital inflows on main macroeconomic variables in Turkey, the study uses monthly data covering the period from 2000:01 to 2012:12. The beginning of our sample is dictated by the end of the financial dominance caused by short-term maturity of debt (see Economic Research Forum, Egypt Institut de La Méditerranée, France 2005). In order to construct the net capital inflows, data on FDI in Turkey, PIL and OI are obtained from the Balance of Payment Statistics of the Central Bank of the Republic of Turkey (CBRT). The other investment is comprised of Monetary Authorities, General Government, Banks, and Other sectors. Then, the GCI variable is calculated as the sum of direct investment in Turkey, portfolio investment-liabilities and other investment-liabilities.

This study considers monthly data of four macroeconomic variables, namely the overnight interest rates (i), the REER, the RGDP and the CPI. A vector autoregressive (VAR) model is used to analyze the effect of capital inflows on

these macroeconomic variables. The GCI measures are deflated with the lagged value of real GDP. The macroeconomic variables namely REER, RGDP and CPI, except the GCI and interest rate (i), are used in logarithmic forms in the VAR model.

All macroeconomic variables were obtained from the CBRT electronic data delivery system, except the REER. Since RGDP data are not available in monthly, the interpolation method of Chow and Lin (1971) was used to convert the RGDP data into monthly frequency. In the Chow-Lin methods, the monthly data on the index of industrial production as the proxy for the RGDP were used. The REER was extracted from the Bank for International Settlement's database.

4 Empirical evidence

In order to capture the effect of capital inflows on four macroeconomic variables, we set up a benchmark VAR model. The orders of the variables in this benchmark model are the GCI, the interest rate (i), the REER, the RGDP and the CPI. The appropriate lag length for the level VAR is estimated by using Schwarz criteria and the optimal lag length is found to be two. In order to identify the shocks, we used the Cholesky decomposition. The ordering of the macroeconomic variables in the model is important and our study followed the study by Çimenoğlu and Yentürk (2005) for the ordering of these variables in the VAR model.

To properly take out all of the interrelated effects, this model assumes that the first variable affects the second variable but not vice versa, contemporaneously. Both the first and second variables affect the third variable, contemporaneously. However, the third variable doesn't affect the first and second variables contemporaneously, etc. However, all the variables affect each other with lags. It is also worth mentioning that capital inflow variables used in the empirical analysis are deflated by the lag value of real GDP to avoid any simultaneity problems between RGDP and capital inflow variables. In addition, a constant, eleven monthly dummies to account for seasonality, four dummy variables for the November 2000 and February 2001 crises in Turkey (to be more specific, dummies for 2000:11, 2000:12, 2001:02, and 2001:03 periods) and a dummy variable for the September 2008 global Financial crisis are included into the VAR estimation.

In each figure, the solid line represents the values of the impulse response, with the dotted line representing the upper and lower bounds of a one-standard deviation confidence band, following the study by Sims and Zha (1998). Graphs in Fig. 4 depict the impulse responses of the macroeconomic variables to gross-capital-inflows shocks for the 18 periods.

The impulse responses suggest that the positive shock to GCI decreases the interest rate for the 18 periods and is statistically significant for the 18 periods except the 3rd and 4th periods that we consider. As seen in Fig. 4, the REER increases (real appreciation of domestic currency). This effect is statistically significant after the 4th period. The real GDP also increases and is statistically significant for the entire 18 periods used in this study. Finally, the CPI decreases in response to the positive shock to gross capital inflow, which is statistically

Response to Cholesky One S.D. Innovations ± 1 S.E.

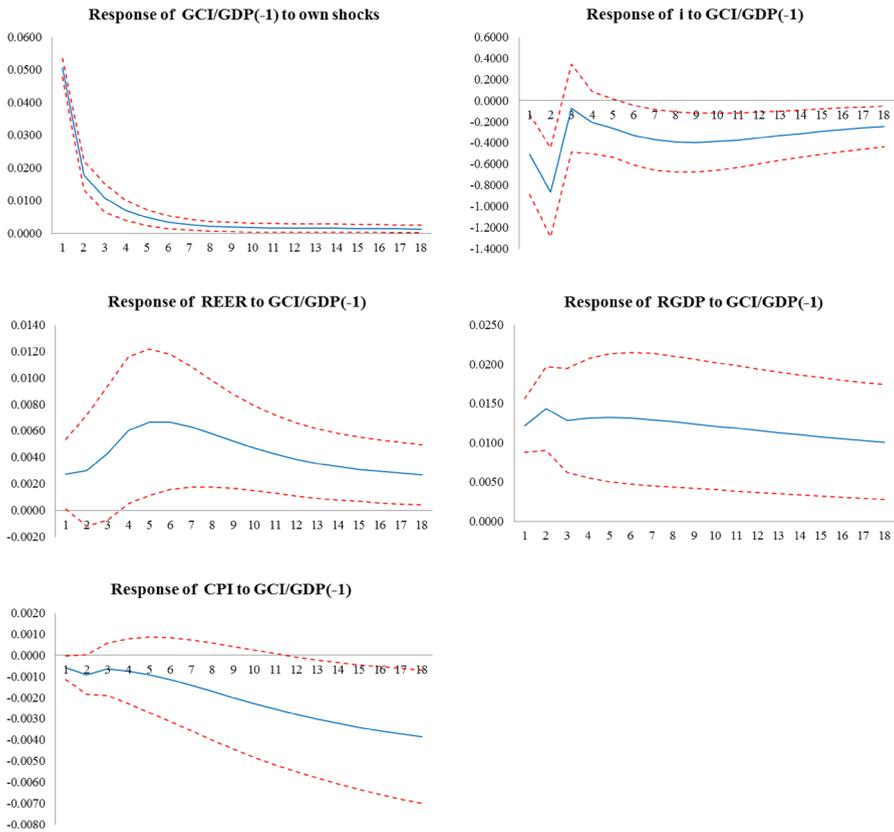


Fig. 4 The response of macroeconomic variables to gross capital inflow shock estimated VAR model: GCI/GDP(-1) i REER RGDP CPI

significant for two periods at the margin and after the 13th period. It is worth mentioning that this study utilized the general impulse response analysis (an ordering invariant approach) to recalculate the impulse responses which our results were robust to the selection of method for the ordering of variables (Pesaran and Shinm 1998).

As a next step, the purpose of this research is to assess whether or not each component of GCI affects the main macroeconomic variables differently. It is widely accepted that FDI in Turkey, PIL and OI have different transmission mechanisms to affect the economic performance. FDI is more likely to increase the private investment causing price of investment products and aggregate demand (AD) to increase. This upward pressure in AD increases prices further. On the other hand, increase in PIL leads to domestic currency appreciation. Due to exchange rate pass-through, the relative price of imported goods and consumption of nontradables goods will decrease which tend to alleviate inflationary pressure. Finally, OI

consists of Monetary Authorities, General Government, Banks, and Other sectors. Those categories also include drawing and repayments of use of fund credits and loans, currency, deposits, foreign exchange and Turkish Lira. OI is more likely to lead an appreciation of the domestic currency.

In order to assess this relationship, each component of GCI, namely FDI in Turkey, PIL and OI is entered into the benchmark VAR specification just after the GCI variable. Following this specification allows us to investigate whether effects of different composition of the GCI on the macroeconomic performance are different after controlling for the GCI. Thus, the impulse responses for the second variable in the VAR model show the effect of each capital inflow relative to the GCI. A similar identification scheme is also employed by Strongin (1995).

Figures 5, 6 and 7 demonstrates the impulse responses of macroeconomic variables to one standard deviation shock due to each component of GCI (FDI, PIL and OI), respectively. Thus, the total effect of these three shocks to economic

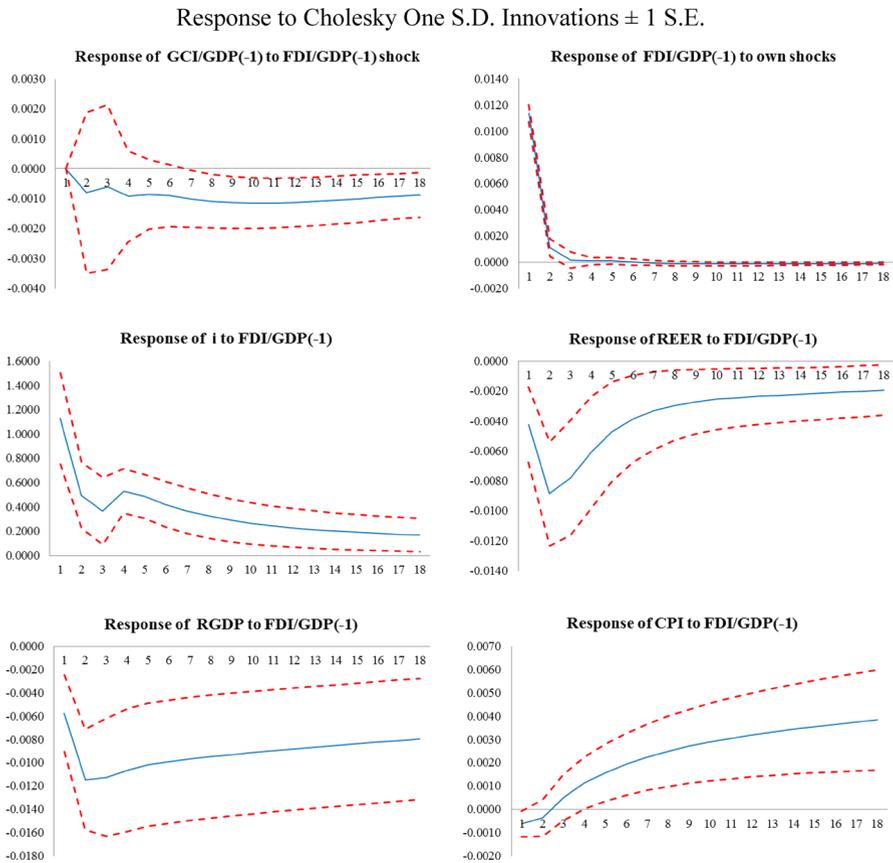


Fig. 5 The response of macroeconomic variables to direct investment shock estimated VAR model: GCI/GDP(-1) FDI/GDP(-1) *i* REER RGDP CPI

Response to Cholesky One S.D. Innovations \pm 1 S.E.

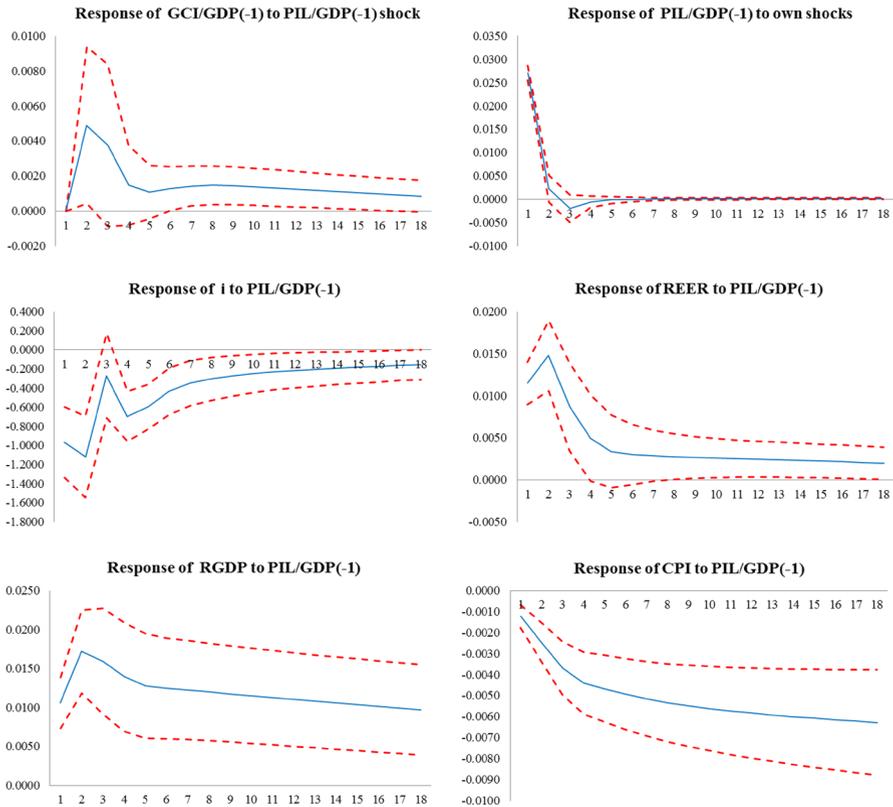


Fig. 6 The response of macroeconomic variables to portfolio investment shock estimated VAR model: GCI/GDP(-1) PIL/GDP(-1) i REER RGDP CPI

performance should be zero since they capture the effect of these three variables relative to GCI. It is worth re-emphasizing that each component is deflated by the lag value of real GDP.

Figure 5 reports the impulse response functions when there is a one standard deviation shock to FDI in Turkey. Since FDI is placed after the GCI variable, Fig. 5 should be interpreted as how one-standard shock to FDI affects the macroeconomic variables concerned once GCI is accounted for. Therefore, Fig. 5 suggests that a shock to FDI decreases the interest rate less, increases REER less, increases RGDP less and decreases CPI less compare to Fig. 4. The effect observed in Fig. 5 clearly suggests that there is a statistically significant difference between a shock to FDI and a shock to GCI.

In Fig. 6, we present the impulse response functions when there is a one standard deviation shock to PIL in Turkey. Since the PIL variable is put after the GCI variable, Fig. 6 should be interpreted as how one-standard shock to PIL affects the macroeconomic variables concerned after controlling GCI. According to Fig. 6, a

Response to Cholesky One S.D. Innovations \pm 1 S.E.

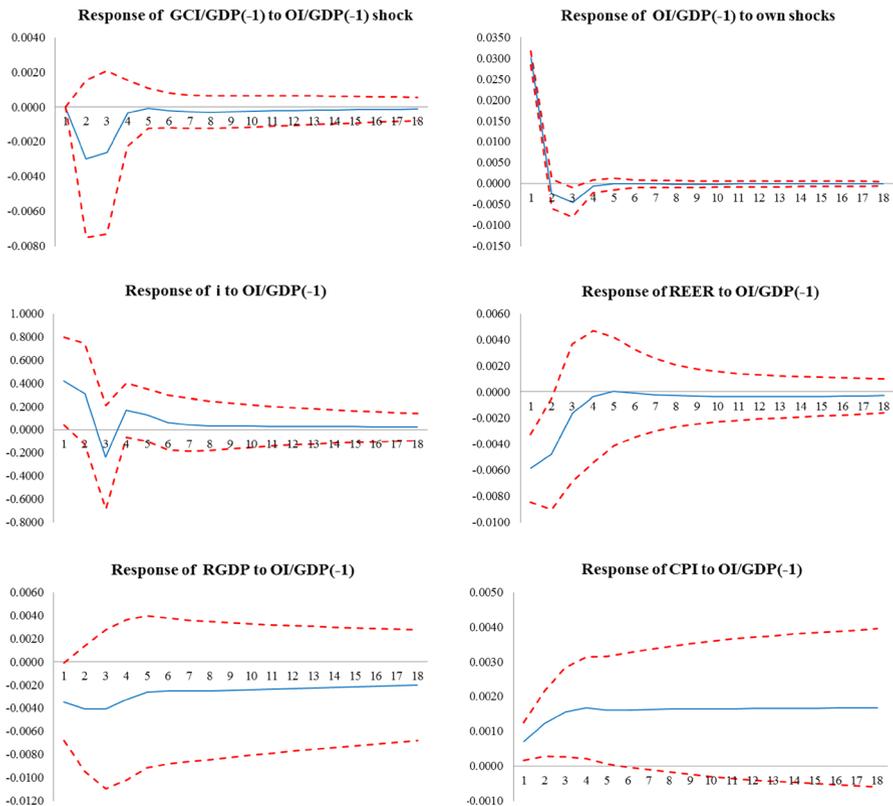


Fig. 7 The response of macroeconomic variables to other investment-liabilities shock estimated VAR model: GCI/GDP(-1) OI/GDP(-1) i REER RGDP CPI

shock to PIL decreases the interest rate more, increases REER more, increases RGDP more and decreases CPI more compared to Fig. 4. In general, the effects shown in Fig. 6 claims that there is a statistically significant differences between a shock to PIL and a shock to GCI.

Figure 7 represents the impulse response functions when there is a one standard deviation shock to other investment in Turkey (OI). Since the OI variable is placed after the GCI variable, Fig. 7 should be interpreted as how one-standard shock to OI affects the macroeconomic variables concerned once GCI is accounted for. Figure 7 shows that a shock to OI decreases the interest rate less, increases REER less, increases RGDP less, decreases CPI less compared to Fig. 4. However, in general, these differences between a shock to OI and a shock to GCI are statistically insignificant. An overview of the impulse responses of the macroeconomic variables to capital-inflow shocks are tabulated in Table 1.

Table 1 The VAR estimation results

| Model | <i>i</i> | REER | RGDP | CPI |
|---------------------|---------------|---------------|---------------|---------------|
| Benchmark | Decrease | Increase | Increase | Decrease |
| 1 s.d. shock to FDI | Decrease less | Increase less | Increase less | Decrease less |
| 1 s.d. shock to PIL | Decrease more | Increase more | Increase more | Decrease more |
| 1 s.d. shock to OI | Decrease less | Increase less | Increase less | Decrease less |

i overnight interest rates, *REER* real effective exchange rate, *RGDP* real gross domestic product, *CIP* the consumer price index, *FDI* foreign direct investment, *PIL* portfolio investment liabilities, *OI* other investment liabilities

5 Conclusion

After the capital account liberalization in the early 1990s, Turkey attracted remarkable amount foreign capital inflows, in the forms PIL, FDI, and OI. Capital inflows affect the wide range of key macroeconomics variables, such as the real exchange rate, the interest rate, output, and the price level. This study examines the effects of capital inflows and its components on the key macroeconomic variables for Turkey using monthly data from 2000:1 to 2012:12 by utilizing a VAR model.

The impulse responses suggest that a positive shock to gross capital inflows—sum of direct investment, PIL and OI—decreases the interest rate and CPI, the real appreciation of domestic currency, and increases the real GDP. These effects are consistent with the theoretical predictions. However, this study shows that each component of GCI, namely FDI in Turkey, PIL and OI has different effects on the macroeconomic variables. Also, FDI and PIL have statistically significant effects on macroeconomic variables whereas OI has an insignificant effect.

Capital inflows are important factor to ease the country's financial constraint. However, it is commonly perceived that the types of capital flows are essentially the same. This paper provides empirical evidences that different components of capital inflows have different effect on the economic performance. Therefore, the appropriate policy responses to capital flows must depends on composition of the inflows.

The Central Bank of Turkey started the inflating targeting regime in 2005. The different types of capital flows affect exchange rate and price level differently. So the Central Bank may set up its policy tool (short-term interest rate) differently depending on the types of capital flows. Moreover, the central government may have higher concern about the economic growth of the country. If so, the structural reforms and fiscal policy tools must be used to affect the composition of capital inflows into the country.

The different components of capital inflows have different volatilities (for our sample, FDI has the lowest volatility; PIL has the highest volatility). If the policy makers also concern about the variability of output and price level, thus the set of macro prudential policies should be adopted to decrease volatility of short-term capital inflows.

References

- Akçelik Y, Basci E, Ermisoglu E, Oduncu A (2013) The Turkish approach to capital flow volatility. Working paper no. 13/06, Central Bank of the Republic of Turkey
- Alba P, Hernandez L, Bhattacharya A, Ghosh S, Claessens S (1998) Volatility and contagion in a financially integrated world: lessons from East Asia's recent experience. Policy research working papers. World Bank, Washington
- Aysan AF, Fendoglu S, Kilinc M (2014a) Managing short-term capital flows in new central banking: unconventional monetary policy framework in Turkey. Working paper no. 14/03, Central Bank of the Republic of Turkey
- Aysan AF, Fendoglu S, Kilinc M (2014b) Macroprudential policies as buffer against volatile cross-border capital flows. Working paper no. 14/04, Central Bank of the Republic of Turkey
- Berument H, Dincer NN (2004) Do capital flows improve macroeconomic performance in emerging markets? *Emerg Mark Financ Trade* 40(4):20–32
- Bonizzi B (2013) Capital flows to emerging markets: institutional investors and the post-crisis environment. In: 17th FMM conference of the research network macroeconomics and macroeconomic policies, Berlin
- Calvo AG, Leiderman L, Reinhart CM (1993) Capital inflows to latin America: the role of external factors. *IMF Staff Pap* 40(1):108–151
- Calvo AG, Leiderman L, Reinhart CM (1996) Inflows of capital to developing countries in the 1990s. *J Econ Perspect* 10(2):123–139
- Carlson M, Hernandez L (2002) Determinants and repercussions of the composition of capital inflows. IMF working papers no. 02/86
- Chow GC, Lin A (1971) Best linear unbiased interpolation, distribution and extrapolation of time series by related series. *Rev Econ Stat* 53:372–375
- Çimenoğlu A, Yentürk N (2005) Effects of international capital inflows on the Turkish economy. *Emerg Mark Financ Trade* 41(1):90–109
- Corbo V, Hernandez L (1994) Macroeconomic adjustment to capital inflows: Latin American style versus East Asian style. World Bank policy research working paper no. 1377
- Çulha AA (2006) Structural VAR analysis of the determinants of capital flows into Turkey. *Cent Bank Rev Cent Bank Repub Turk* 2:11–35
- FEMISE Coordinators (2005) Turkey country profile, the road ahead for Turkey. Economic Research Forum, Egypt Institut de La Méditerranée, France
- Ghose AK (2004) Capital inflows and investment in developing countries. Employment strategy paper no. 11. Employment sector, International Labour Office, Morillons, Geneve
- Kohli R (2001) Capital flows and their macroeconomic effects in India. IMF working papers no. 01/192
- Pradhan M, Balakrishnan R, Baqir R, Heenan G, Nowak S, Oner C, Panth S (2011) Policy responses to capital flows in emerging markets. IMF staff discussion note SDN/11/10
- Sims CA, Zha T (1998) Error bands for impulse responses. *Econometrica* 67(5):1113–1156
- Strongin S (1995) The identification of monetary policy disturbances explaining the liquidity puzzle. *J Monet Econ* 35:463–497
- Yalta AA (2010) Effect of capital flight on investment: evidence from emerging markets. *Emerg Mark Financ Trade* 46(6):40–54