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Abstract

The paper sheds light on the Turkish experience of capital account liberalization and its effect on key macroeconomic variables, using quarterly data in a multivariate autoregressive vector (VAR) model. We also take into consideration the crisis breakpoint in 2001 and estimate the effect of shocks attributed to capital flows, using quarterly data during the sub-periods 1989:01–2001:01 and 2001:02–2009:03. The findings indicate that capital flows have varying effects on the Turkish economy before and after the crisis in 2001 and the evidence supports significant effects of freeing financial flows on macroeconomic performance, especially during the post-crisis period (2001:02–2009:03). Specifically, this latter period exhibited less money growth and inflationary pressures, reflecting better management of public finances, which helped to stem the appreciation of the real exchange rate and preserve export competitiveness. Finally, there is significant evidence of sterilization policy that has aimed to curtail the effects of capital inflows on the exchange rate and domestic liquidity.

ملخص

تلقي هذه الورقة الضوء على تجربة تركيا لتحرير حساب رأس المال وأثره على المتغيرات الاقتصادية الكلية الرئيسية، وذلك باستخدام بيانات فصلية في نموذج متعدد المتغيرات و ناقل ذاتي الإنحدار (VAR). نأخذ أيضا في الاعتبار النقطة الفيصلية للأزمة في عام 2001 ، ونقدر تأثير الصدمات العائدة إلى تدفقات رأس المال، وذلك باستخدام البيانات ربع السنوية خلال الفترات الفرعية 1989:01-2001:01 و2001:02-2009:03. وتشير النتائج إلى أن تدفقات رأس المال لها آثار متباينة على الاقتصاد التركي قبل وبعد الأزمة في عام 2001 و تدعم الأدلة آثار كبيرة لتحرير التدفقات المالية على أداء الاقتصاد الكلي، خصوصا خلال فترة ما بعد الأزمة (2001:02-2009:03). و على وجه التحديد، أظهرت هذه الفترة الأخيرة نمو نقدي وضغوط تضخمية أقل ، مما يعكس تحسن إدارة المالية العامة ، الأمر الذي يساعد في وقف ارتفاع سعر الصرف الحقيقي والحفاظ على القدرة التنافسية للصادرات.و أخيرا ، هناك أدلة هامة على سياسة التعقيم التي تهدف إلى وقف آثار تدفقات رأس المال على سعر الصرف والسيولة المحلية.

1. Introduction

Over the past two decades, many countries in the developing world have taken measures to liberalize their capital and financial accounts in order to capitalize on a larger pool of global liquidity that seeks opportunities for higher return across the globe. There is a widespread belief that more financial and capital inflows could play a fundamental role in boosting growth and welfare by improving the allocation of capital based on productivity and rate of return across recipient countries. However, in the aftermath of the global financial crisis, concerns have risen about the risk of speedy financial integration in developing countries, in the absence of necessary reforms to ensure prudence and mitigate potential risk. To substantiate these arguments we cite some cases where previous experiences of financial liberalization may have turned to be disastrous and contributed to wide-spread financial crises in Mexico (1994), South East Asia (1997), Russia (1998), Brazil (1999), Turkey (2001) and in Argentina in late 2001 and early 2002.

Turkey was among the first group of countries in the MENA region to liberalize its capital and financial account, a task which was completed as early as 1989. However, the post-liberalization experience for Turkey in the 1990s was not as successful as expected. Financial integration was implemented before undertaking the necessary reforms to ensure a strong and efficient financial system that would facilitate mobilizing the additional resources which had become available post-liberalization. As a result, the country underwent two serious crises in 1994 and 2001, both of which had financial roots underpinned by serious mismatches between the structure of liabilities and assets in terms of currency and maturity. Subsequently, Turkey embarked on serious structural and financial reforms in 2001. The banking sector reform proved to be an important benchmark of the reform sequence, resulting in a structural break that deserves a special treatment in the time-series analysis of the Turkish economic history.

The literature on the effects of capital mobility under capital account liberalization follows two theoretical tracks. The first approach draws heavily on the predictions of the neoclassical model where capital account liberalization is expected to facilitate the efficient allocation of resources at an international level (Obstfeld 1996/1998; Rogoff 1999; and Fischer 1998). The second view, presented by Rodrik (1998), raises much doubt of the wisdom of freeing capital flows as a strategic public choice. The concerns were further substantiated in Eichengreen (2001, 2004) and Prasad et al. (2003) who questioned the wisdom of liberalization in the absence of measures to ensure the productive usage of inflows and the right institutional setting—including financial channels—to facilitate the efficient intermediation of these inflows.

So, does the capital account liberalization necessarily increase the risk of financial crises or is it possible that it could be beneficial to growth by allowing for higher levels of capital accumulation? This question carries significant policy implications for many developing countries that are in the process of contemplating the speed and the degree of capital account liberalization. To shed additional light on the underlying issues, it is necessary to understand how capital account liberalization affects the dynamics of domestic macroeconomic variables in countries that have embarked on such liberalization. Despite its importance, this issue has not been thoroughly explored [for a survey see Henry (2003) Edwards (2001), Eichengreen (2001), Stiglitz (2000) and Grilli and Milesi-Ferretti (1995)].

In this paper we shed light on the Turkish experience of capital account liberalization and its effect on domestic macroeconomic variables, using quarterly data in a multivariate autoregressive vector (VAR) model. The proposed methodology analyzes the dynamics of the interaction between capital flows and macroeconomic performance, and provides the necessary evidence to study the macroeconomic effects of capital account liberalization.

Among MENA countries, the Turkish economy provides a unique example in terms of domestic and external financial reforms throughout the 1980s and yet experiencing a financial crisis in 2001. Hence, the analysis will draw lessons that could prove informative for other countries in the region that have lagged behind in the process of financial liberalization.

Accordingly, we examine the macroeconomic effects of capital account liberalization where we study many variables including a set of macroeconomic variables in the VAR (real interest rates, real effective exchange rates, real GDP, the inflation rate and crises dummies) to better assess the simultaneous effects of capital flows on economic performance during the period 1989–2009. We also take into consideration the crisis point in 2001 and estimate the effects of shocks, using quarterly data during the sub-periods 1989:01–2001:01 and 2001:02–2009:03.

Our findings indicate that capital flows have varying effects on the Turkish economy before and after the crisis in 2001. Indeed, the evidence supports significant effects of freeing financial flows on macroeconomic performance especially during the post-crisis period. Specifically, this period is featured by less inflationary pressures, which helped to stem the appreciation of the real exchange rate and preserve export competitiveness. In addition, the cost of credit was more contained, which helped to sustain credit and investment growth and contributed to real growth. Finally, there is significant evidence of a sterilization policy aiming to curb the effects of capital inflows on the exchange rate and domestic liquidity.

The rest of the paper is organized as follows. Section 2 provides the background of capital account liberalization in Turkey. Section 3 is reserved for descriptive analysis. Section 4 outlines the econometric methodology for investigation. Section 5 provides the empirical evidence, detailing the effects of capital flows on main macroeconomic indicators. Finally, section 6 concludes the paper.

2. Capital Flows and Capital Account Liberalization in Turkey

Before the 1980's, Turkey followed an inward oriented import substitution strategy. However, the 1970's were the years of political conflicts and severe debt crisis. Following the new government in 1980s, Turkey changed its strategy both economically and politically to a policy of openness and liberalization. Quantitative restrictions on trade were lifted and export-oriented growth strategy was accepted.

On the financial and monetary sides, The Central Bank of the Republic of Turkey (CBRT) took important steps to reform the local financial sector by removing interest rate ceilings and freeing bank lending and borrowing. They focused also increasingly on using indirect monetary policy instruments and followed a competitive real exchange rate policy, based on a depreciation of the domestic currency and supported by a repressed real wage regime throughout the period 1981-1988. However, following losses on capital and foreign debt and imbalances in public sector finances, the exchange rate policy was totally abandoned by the government to be replaced later by a broader financial reform package in August 1989 (Berument and Dincer, 2004).

The total financial liberalization removed all kinds of restrictions on capital controls in the economy which allowed residents and non-residents to conduct and engage freely in foreign exchange operations and transactions. The country witnessed significant amounts of capital inflows in the aftermath of capital account liberalization and foreign capital became a substantial source of financing for the current account deficit. Furthermore, the banking sector started to rely on short-term external borrowing from international markets which rapidly increased debt servicing in 1989 and the situation turned into a Ponzi game associated with external financial speculation (Ekinci, 1996). Sudden capital reversals started to be

observed and the economy witnessed a new financial crisis in April 1994 and GDP declined by more than 6% in the same year.

The Turkish economy recovered quickly from the crisis thanks to the new set of adjustments brought into effect as the GDP grew 8% in 1995. With the increase in capital flows in 1996–1997, the capital account surplus helped finance the current account deficit. The increase in the central bank international reserves and the loosening of the monetary policy contributed to the growth of investment and the economy. The exchange rate policy after 1994 was designed to stabilize the real exchange rate and the CBRT depreciated the nominal exchange rate in parallel to inflation expectations. Nominal depreciation increased the burden of servicing external debt and the public debt increased significantly in this period, despite the primary fiscal surpluses.

In December 1999, Turkey adopted another disinflation program with the support of the IMF aiming at decreasing inflation to a single digit at the end of 2002 and adopting a new exchange rate regime that goes with the new hallmarks of the economy. The CBRT declared a crawling peg regime where the exchange rate basket path consisting of one US dollar and 0.77 Deutsche Mark, and announced a daily depreciation rate, which added up to a cumulative of 20% by the end of 2000. The beginning of the program gave positive signals as the nominal Treasury bond auction interest rates fell from 96.4% in November 1999 to 34.1% in January 2000, inflation expectations decreased, high capital inflows were realized and the economy grew by 4.8% in the first half of 2000.

However, with the high cost of imports, the current account deficit rose and that made the system fragile. As the real exchange rate appreciated with the program, the banking sector increased its foreign currency denominated debt to a level that became risky for the system. With the sudden capital outflows in November 2000, the banking sector crisis occurred, which weakened the international reserves of the CBRT by a significant amount. In February 2001, political instability further increased uncertainty that escalated to a financial crisis, and the crawling exchange rate regime was abandoned. The nominal exchange rate depreciated by 94% (the annual increase of the second quarter of 2001) and the output response was detrimental; a decline by 9.4%. In May 2001, a new program based on a floating exchange rate regime, tight fiscal policy and structural reforms was implemented.

The main pillars of the May 2001 program were macroeconomic discipline, rehabilitation of the banking sector, and an ambitious agenda for structural reforms. Next, the government presented an ambitious structural reform agenda focusing on immediate banking sector restructuring, transparent public accounting, enhanced privatization and promoting foreign direct investment. In this respect, fiscal policy was tightened in order to stabilize the increasing debt stock of the public sector, which was also helped by the large amount of the banking sector clean up. Furthermore, the control of the CBRT over the short-term interest rates was strengthened in line with the adoption of the floating exchange rate regime. The program, which was strongly supported by IMF and World Bank credits, put a floating exchange rate regime at the center stage.

Starting from late 2001, the program showed its strength: inflation expectations followed a downward trend, inflation rates have almost continuously declined, the public debt to GDP ratio was significantly reduced, while the Turkish economy started to recover and to show high growth rates. In the 2002-2006 period, due to the disinflation program, tight fiscal policy and structural reforms, the credibility of the Turkish economy increased as risk premia and uncertainty in the economy decreased. The macroeconomic consequences of these policies were high growth rates, decreasing inflation and public debt and increasing confidence, and thereby high investment. During this period, high exports were experienced despite the real appreciation of the currency. However, the current account deficit was still very high due to

the high import dependency of production and exports. This structure made the economy vulnerable to capital inflows and foreign demand.

The financial turbulence in 2006 affected the Turkish economy more than expected. The central bank increased the interest rates significantly to contain capital flight and stem currency depreciation. Furthermore, the elections and the political uncertainty set back economic growth in 2007. The increasing uncertainty around the world, high commodity prices, and decreasing foreign demand were the factors behind the decreasing growth rates in 2008 and 2009 in the Turkish Economy.

3. Descriptive Statistics

Since the objective of the paper is to emphasize the importance of the 2001 crisis as a major structural change in the Turkish economy and to investigate its relationship with external financial reforms and key macroeconomic indicators, Table (1) reports the statistics relative to the mean, maximum, minimum and standard deviation of some key indicators during the pre- and post- 2001 financial crisis periods. The set of indicators include net international reserves as a proxy of capital account liberalization, real GDP growth, inflation rate based on the consumer price index, fiscal deficit, change in the real effective exchange rate, money growth (M1) and the interest rate measured by the overnight interbank rate.

The main feature that emerges from Table 1 is the significant difference in the relevant macroeconomic variables. The Turkish economy is characterized by less volatility in real growth during the post crisis period despite the lower average real growth. We note, likewise, high and persistent inflation during the pre-crisis period whereas in the second sub-period, the inflation rate decreased to single-digit numbers. Such lower inflation may be accounted for by tight monetary policy and structural reforms. Indeed, monetary growth was significantly higher in the pre-crisis period, and the high inflation reflected itself in the much higher interbank rate, compared to the post-crisis period.

Efforts to improve public finances in the post-crisis period have resulted in larger surpluses, which coupled with higher growth, helped put the public debt ratio on a downward trajectory. Indeed, the public debt ratio decreased significantly after 2001 and the debt ratio remained at sustainable levels estimated at 51% of GDP in 2009, despite higher fiscal deficits (-6% of GDP in 2009) even during the height of the global crisis in 2009.

The external position was further boosted by economic liberalization that led to mobilizing exports, as the share of exports to GDP increased from 18.66% to 23.63%, on average between the two sub-periods, resulting in improvement in the current account balance (0.5% of GDP) in the post crisis period. Further, economic reforms have paid off to mobilize investors' confidence and reduce uncertainty which increased the scope to attract financial inflows and high amount of international reserves, relative to imports.

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External stability was further boosted by greater flexibility of the exchange rate in the post-crisis period which resulted in an increase of the local currency in nominal terms from 0.8 to 1.5 per US$. Despite significant reduction in the inflation rate, nominal appreciation of the Turkish lira has resulted in, on average, higher real appreciation of the currency, reflecting stronger external position in the post-crisis period.

4. Econometric Methodology

We use a VAR structure to study the macroeconomic effects of capital account liberalization composed of a capital inflow variable and a vector of key macroeconomic variables as follows:

$$\begin{pmatrix} 1 & a_{12} \\ a_{21} & 1 \end{pmatrix}\begin{pmatrix} x_t \\ w_t \end{pmatrix}=\begin{pmatrix} a_{10} \\ a_{20} \end{pmatrix}\begin{pmatrix} \alpha_{11} & \alpha_{12} \\ \alpha_{21} & \alpha_{22} \end{pmatrix}\begin{pmatrix} x_{t-1} \\ w_{t-1} \end{pmatrix}+\begin{pmatrix} \varepsilon_{xt} \\ \varepsilon_{wt} \end{pmatrix}$$

Where x_t and w_t represent the capital inflows variable and a vector of macroeconomic variables respectively. ε_{xt} and ε_{wt} are orthogonolized disturbances. Equation (1) is also written in the following matrix form:

$$AY_t = B_0 + B_1 Y_{t-1} + \varepsilon_t \quad (2)$$

Since there is under-identification of the VAR in equation (1), we may use a recursive system to identify the model through forming A as a lower triangular and in this case equation (2) is rewritten in a way to identify the structural shocks from the residuals of the recursive VAR model, as follows:

$$Y_t = C_0 + C_1 Y_{t-1} + e_t \quad (3)$$

Where $C_0 = A^{-1}B_0$, $C_1 = A^{-1}B_1$ and $+ e_t = A^{-1}\ \varepsilon_t$. In this case, ε_{xt} and ε_{wt} have a contemporaneous effect on the different components of the vector w_t. The identification of the orthogonolized residuals of the VAR according to a triangular form is known as the Cholesky decomposition.

4.1 Variables and data

The effect of capital account liberalization in Turkey is analyzed using a VAR model and we infer the effects of capital account liberalization and the resulting capital flow shocks on macroeconomic variables, while taking into account the effect of the crisis at the beginning of 2001. The variables included in the VAR are capital account liberalization (*KA*), real interest rate (*INTER*), real effective exchange rate (*REER*), the money stock (*M1*), real output (*y*) and the price index (*CPI*).

The ordering of the variables in the VAR is important and capital account proxy comes first, since the objective is to address its impact on macroeconomic variables. The real interest rate is put second since it is expected that capital flows would increase domestic liquidity, decreasing the nominal interest rate and the effect on the real interest rate would be dependent on accompanying inflationary effects. Similarly, under the prevailing flexible exchange rate regime in Turkey, capital inflow appreciates the nominal exchange rate of the Turkish Lira, which could be further reinforced via the build-up of inflationary pressures, and therefore the real exchange rate is placed third. The money stock and income per capita are put forth and fifth, respectively, as an increase in international reserves contributes to higher growth of the money supply which could be mobilized to increase real growth. Finally, the price level comes last in the ranking because of the direct effect of money growth on inflation. However, capacity constraints could hinder the growth momentum and fuel price inflation in the face of higher capital inflows. The allocation of higher liquidity between real growth and price inflation will be dependent on supply-side constraints and the elasticity to increase the output supply in the face of higher domestic demand.

KA is measured by net international reserves of the Central Bank, *INTER* refers to the real interest rate where the nominal rate is the overnight interbank rate, *REER* is the real exchange rate of the end of period, *M1* is the money stock in circulation, *y* is the real GDP per capita, *CPI* is the consumer price index. Data is collected from the International Financial Statistics CD ROM available from the International Monetary Fund (IMF) (2010), and supplemented it by available data from the Central Bank of the Republic of Turkey (CBRT) (2010). All

variables are expressed in logarithm with the exception of the real interest rate. We also add a constant quarterly dummy variable to take into consideration seasonality and a dummy variable for the late 2000 crisis. The optimal lag of the VAR is determined using the Akaike information criteria.

5. Empirical Investigation

5.1 The impact of capital flows on macroeconomic variables

Table 2 displays the impulse responses with 95 % probability bands for the different variables included in the VAR after one standard deviation in capital flows over 16 quarters or four years[1]. It stands out from Tables (2) and (3) that the effects are different if we consider the two sub-periods. Indeed, the effect of the capital inflow shock on the interest rate is negative during the first five quarters of the first sub-period 1989:01-2001:01, and it becomes insignificant during the second sub-period 2001:02-2009:03. A close inspection of the magnitudes reveals that these effects are more important in the first sub-period. The implication is that higher inflation, coupled with the liquidity effect, dominated, decreasing the real interest rate in the pre-crisis period. In contrast, efforts to control inflation in the post-crisis period resulted in low variations in the real interest rate in the face of higher liquidity on account of higher capital inflows.

Regarding the real effective exchange rate, a capital flow shock led to an appreciation of the local currency during the first quarter of the first sub-period 1989:01-2001:01. Nevertheless, the appreciation seems to be short in time as it was followed by a depreciation phase up to the fifth period, but later the exchange rate seems to converge to its pre-shock level. In contrast, early convergence during the post-crisis period may reflect less inflationary pressures and, therefore, better ability to control real appreciation, compared to the earlier period. During the post-crisis period 2001:02-2009:03, capital shocks do not seem to lead to significant variation of the local currency.

Capital inflows contributed to a short decrease in time (one quarter) of the money stock in the first sub-period 1989:01-2001:01. During the second sub-period 2001:02-2009:03, impulse responses indicate a rather short positive effect followed by a long negative one that lasts up to the eighth quarter after which the responses become insignificant. The difference reflects a deliberate attempt by monetary authorities to sterilize capital inflows in the post-crisis period in an effort to contain further surge in inflationary pressures which dominated the macroeconomic structure and demanded first priority in the design of macroeconomic policies.

To reinforce the previous points, we note that the effect of the shocks on capital flows is also different between the pre- and post-crisis periods. Accordingly, sterilization efforts in the post-crisis period aimed at mitigating the inflationary effects of higher capital inflows. In the same vein, price inflation appears to be more responsive to capital flow shocks in the post-crisis period as it seems to follow the dynamic effect of the money stock. Specifically, an investigation of the consumer price index responses to capital shocks during the following quarters reveals a close evolution in capital flows with the money stock.

Finally, regarding the impulse response function of real GDP to capital flows, the different figures show a general decrease in GDP per capita within the first quarter following the shock for each sub-period. In other words, the dynamic effect of one standard deviation shock in capital flows does not generate significant changes in real GDP per capita starting from the second quarter. Hence, the positive effects of capital flows on real GDP appear short-lived,

[1] We check the effect of capital flows on macroeconomic variables before and after the 2001 crisis. However, for the 1994 crisis it does not seem to affect the results since when we take it into consideration by putting a dummy in the VAR, the output does not show any significant change.

providing scope for further improvement in the intermediation process of capital inflows towards achieving long-lasting positive effects on real growth.

5.2 Sterilization policy

Absent efforts to intervene in the foreign exchange market and sterilize capital inflows, the effects of a surge in inflows will be pronounced on the exchange rate and monetary growth. Intervention would be motivated by concerns about appreciation in the exchange rate in response to massive capital inflows. To stem appreciation, the central bank intervenes to purchase foreign exchange, increasing its holdings of foreign reserves. To sterilize the effect of intervention on domestic liquidity, the central bank may release its holdings of government securities to financial institutions to mop up excess liquidity in the system.

To test the extent of sterilization policy by the monetary authorities in Turkey, we measure the impulse responses of M1, the real exchange rate and the consumer price index with respect to capital inflows before and after the crisis. Sterilized capital inflows would have little effect on money supply while unsterilized intervention is likely to increase money supply.

The results displayed in Tables (2) and (3) are different before and after the crisis. Indeed, the second sub-period seems to be characterized by sterilization practices and foreign exchange intervention following capital inflows. Such intervention may have helped achieve better results for capital inflows during this latter period as it contributed to stem appreciation and contain inflationary pressures while the central bank decreased its holdings of government securities to accommodate the increase in foreign reserves and mop up excess liquidity in the face of capital inflows. In contrast, in the first sub-period, there is evidence of a short appreciation of the real exchange rate, and in parallel there is evidence of a decrease in domestic liquidity and a negative response of the price index which does not seem to support a deliberate sterilized intervention strategy by the central bank.

5.3 Variance decomposition

The variance decomposition analysis is carried out to see the importance of shocks on capital flows in accounting for changes of key macroeconomic variables of the VAR model. Specifically, the variance measures the cumulative fluctuations over different horizons in the forecast error of changes in the capital flows proxy. We perform the forecast error variance decomposition of capital flows during pre- and post-crisis periods with 2, 4 and 8 quarters and the results are displayed in table (4).

The first panel of results, relative to the pre crisis period, indicates that capital account movements are accounted for mainly by their own shocks, which dissipate gradually over time (87% - 44%). Likewise, shocks to the capital account contribute also to the change of the money stock, the consumer price index within a year and the interbank interest rate, after 8 quarters, with 20% of total variability. However, we do not detect any effect of capital account movements neither on the real exchange rate nor on real GDP.

The results, reported in the second panel of the post-crisis period, are quite different from the first set as the autonomous capital account shocks are explaining variations in capital flows with at least 86%. Moreover, with the exception of the money stock after 4 and 8 quarters, the shocks do not have a significant effect on the remainder of key macroeconomic variables as the percentage does not exceed 3% on average. The evidence indicates persistent capital inflows to the Turkish economy, attesting to higher investors' confidence in the economy in the post-crisis period. Moreover, available liquidity through this pool has contributed to the growth of the money supply towards mobilizing investment and real growth.

5.4 Boom-bust cycles

In this section we investigate if the Turkish economy experienced a boom-bust cycle after the capital account liberalization. Generally, in economies with tight control of the capital account and less developed financial sector, liberalization of capital flows is likely to have large marginal returns. Accordingly, the periods following the liberalization of the capital account usually witness an expansion of economic activity with substantial increase in credit for investment and consumption, an appreciation of the real exchange rate and asset price bubbles. However, such resumption is not likely to last indefinitely and the boom phase may tend to reverse itself as the economy reaches its potential and the bubble is bound to burst.

Indeed, continued appreciation of the real exchange rate in the face of persistent capital inflows may generate loss in the international competitiveness of exports, while increasing demand for imports and widening the current account deficits. The loss of competitiveness helps to slowdown the momentum of capital inflows as it reverses expectations about a booming economy that has large capacity to continue attract foreign capital flows. This, coupled with prudent policies including fiscal consolidation and tight monetary growth, usually help to reverse the cycle. If the reversal is managed gradually the adverse effects on the economy could be contained in the form of a gradual return to potential. However, if the reversal cycle is significantly delayed, abrupt and large adjustments in the exchange rate, following a bubble burst, could mark the beginning of a bust cycle that exhibits higher capital outflows and a severe slowdown in economic activity.

To test if a boom-bust cycle happened after the liberalization of the capital account in Turkey, we perform impulse responses to see how demand variables respond to capital shocks. We use the same VAR structure as in equation (1), although the w_t vector includes real demand variables which are real private consumption (*RCP*), real investment (*RINV*) and consumer price index (*CPI*). This latter variable is put last because of the possible effect of a higher domestic demand on price inflation.

As far as the Turkish economy is concerned, a close inspection of the impulse response functions of consumption, investment and the price index in Table (5) clearly demonstrates that the real activity seems to be closely linked to the evolution of aggregate demand during the two sub-periods. In contrast, during the post-crisis sub-period 2001:02-2009:03, the response of real private consumption to capital flows is found to be insignificant (Table (6)). Such findings are different from those of Montiel (1996) and Calvo et *al*. (1993, 1996) for the case of Latin American countries who found evidence of real exchange rate appreciation and consumption booms following capital inflows. The limited effect on consumption indicates the success of policies in Turkey to capitalize on capital inflows towards increasing investment and exports, hence mobilizing real growth and mitigating the corresponding inflationary effects.

5.5 Sensitivity and robustness checks

To check the sensitivity of the results to the different proxies used we performed VAR estimations with different specifications. In the first step, the impulse responses are estimated using foreign direct investment (FDI) as a proxy of capital flows and measured by the net direct investments expressed in logarithm (LFDI). The findings displayed in Tables (7) and (8) reveal that the reaction to a shock of capital flows is different across periods. During the first sub-period, the interest rate responds slightly positively during the first quarter and after that it becomes insignificant. Moreover, there is evidence of a negative response of money stock and price level but only during the first quarter. Finally, regarding GDP per capita, the evidence points to a positive effect within the first quarter of the pre-crisis period.

In contrast, during the post-crisis period the evidence provides a positive short response of the interest rate that does not go beyond one period and it turns to be insignificant along the remaining quarters. The impulse responses point to of a depreciation of the real exchange rate during the four initial quarters of the pre-crisis period. As per the remaining variables, the results show an evidence of a higher price level and a negative response of income per capita within one quarter. Overall, the evidence seems to point to opposite effects between the two sub-periods, which reflects to a certain extent the trend of FDI in Turkey. The ratio of FDI to GDP was generally very low before 2001. Subsequently, it seems that it increased significantly in some periods. However they are one time privatization revenues, in a number of cases. This unstable pattern may have undermined the significance of the FDI variable in the empirical model.

We use, in a second step, the real discount rate, instead of the real interbank interest rate, in estimating the impulse responses. The results, compared to the base case, indicate a relatively short, negative and significant response during the first sub-period in the face of capital flows and a non significant response for the post-crisis period.

The difference attests to movement in the direction of monetary policy instruments over time. In the first sub-period, monetary policy relied on direct instruments and resorted to the change in the discount rate to stem the adverse effects of capital inflows. In contrast, during the second sub-period, the central bank relied on indirect monetary policy instruments, which limited adjustments in the discount rate in the face of capital inflows. In support of this argument, we note that the rest of the variables in the VAR, the responses of the money stock and the consumer price index are negative in response to adjustments in the discount rate in both sub-periods.

We used also a broader measure of the money stock, M2, to replace the M1 stock. In general, the collection of the impulse responses do not change significantly before and after the financial crisis and generally the post-crisis period is characterized by less inflationary pressures, reflecting better efforts by the central bank to control appreciation of the real exchange rate. Finally, the analysis was performed using the wholesale price index as well as the GDP deflator, instead of the consumer price index. The evidence remains robust; the adverse effects of capital inflows are better contained during the post- crisis sub-period, while their effects disappear gradually during the first sub-period.

6. Conclusion and Policy Recommendations

In this paper, we have tried to test the effects of capital account liberalization on macroeconomic variables using a VAR framework with quarterly data covering the period 1989:01-2009:03. We distinguish two sub-periods where the first one corresponds to the nineties period and the second period embraces the years post the 2001 financial crisis.

The general picture that emerges from the analysis of the two sub-periods, and in particular the post-crisis period (after 2001), is increasing effort to control money growth and price inflation in the face of higher capital inflows to avoid the adverse effects on competitiveness, export growth, credit growth, and real growth.

Moreover, the drive to ease capacity constraints and control government spending in the post-crisis period has helped to contain inflationary pressures. As a result, the appreciation in the real exchange rate was less pronounced, which helped to contain the adverse effects on export competitiveness and the current account deficit. In parallel, efforts to contain inflation have paid off to contain the increase in the cost of credit, which helped to mobilize credit growth and sustain the growth momentum.

The sharp contrast in the effects of capital flows on macroeconomic performance before and after the financial crisis in Turkey provides a testament of the need to enforce complementary

domestic policies to maximize the return on capital flows. Efficient mobilization of financial flows requires a healthy financial system that is capable of availing resources for private activity, fiscal consolidation to contain inflationary pressures, and vigilant monetary policy to stem the risk of real exchange appreciation and effectively manage domestic liquidity. Absent these complementary policies, financial flows could be a curse on the economy as they could motivate a lax fiscal policy, fuel price inflation and appreciate the real exchange rate, resulting in loss of competitiveness that hinders private activity and real growth.

Problems are further compounded in the event of a crisis that erodes confidence and motivates capital outflows, resulting in severe imbalances that builds up external debt and increases the risk of sharp currency depreciation. As the recent events surrounding the global crisis have demonstrated, enforcing temporary capital controls may prove to be more prudent to mitigate the adverse effects of capital flows in the short term and the risk of sudden stop that could escalate to a crisis of a large magnitude. However, the success of these short-term measures hinges on complementary adjustment policies to reinforce economic fundamentals in order to sustain growth and mitigate persistent overheating that could jeopardize the growth agenda in the long-term.

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Table 1: Descriptive Statistics

	Before the crisis: 1989:01-2001:01				After the crisis: 2001:02-2009:03			
	Average	**Max.**	**Min.**	**STDEV**	**Average**	**Max.**	**Min.**	**STDEV**
International reserves	20582.97	35924.70	6278.80	9214.29	69173.25	117611.7	29698.3	32457.37
Real GDP growth	2.59	47.64	-21.68	20.82	4.84	21.66	-13.84	11.98
Inflation (CPI)	14.67	40.54	5.76	5.59	4.20	20.53	-0.37	4.46
Fiscal deficit	-5.14	0.90	-12.72	3.39	-5.54	2.63	-18.19	5.47
Change in REER	0.82	12.59	-23.10	6.68	1.51	19.00	-17.86	8.70
Monetary growth (M1)	15.21	46.61	-20.02	13.73	8.27	69.91	-9.66	13.07
Interbank interest rate	73.25	211.46	31.00	34.28	26.64	71.82	8.05	17.34

Source: Authors' calculation

Table 2: Impulse Responses of Macroeconomic Variables to One Standard Deviation of Capital Inflows Before the Crisis: 1989:01–2001:01

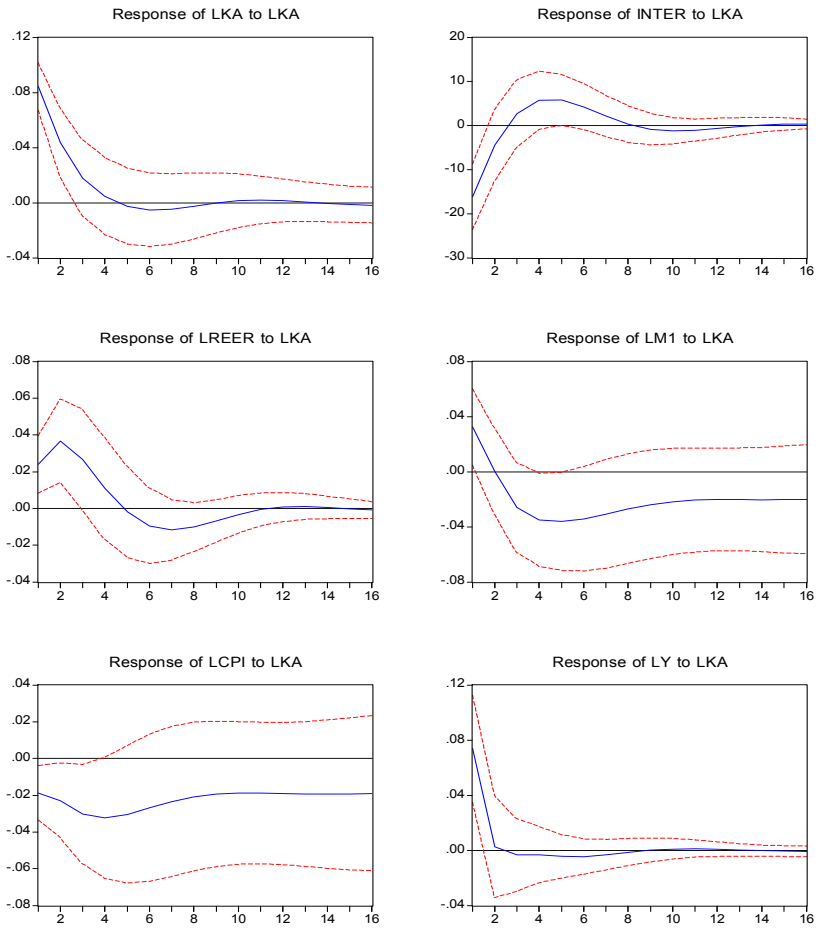
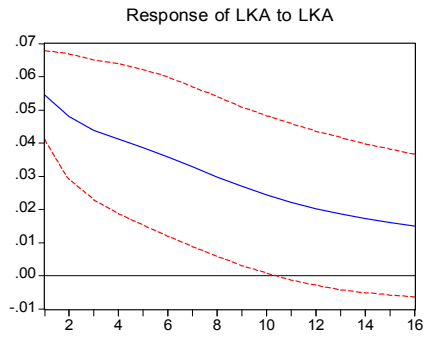
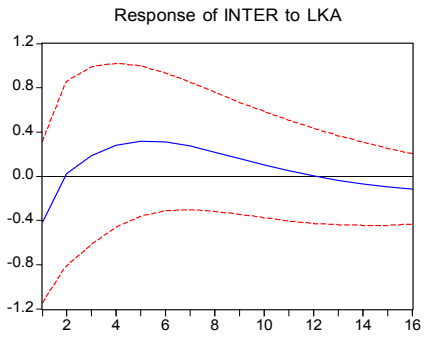
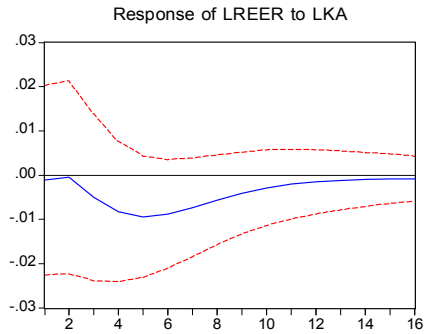
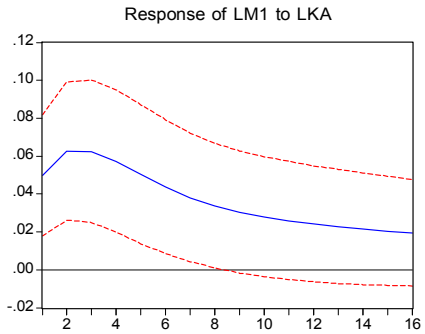


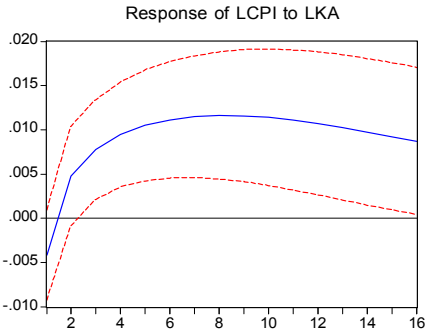
Table 3: Impulse Responses of Macroeconomic Variables to One Standard Deviation of Capital Inflows After the Crisis, 2001:02–2009:03











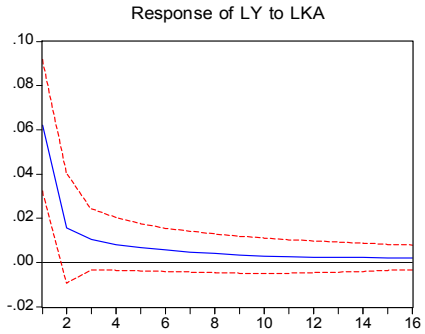


Table 4: Forecast Error Variance Decomposition of the Capital Account, 1989:01–2001:01

Horizon/period	LKA	INTER	LREER	LM1	LCPI	LY
			Pre-crisis period: *1989:01-2001:01*			
2 quarters	87.3	0.06	0.14	8.59	3.70	0.18
4 quarters	63.14	2.72	2.82	18.75	11.29	1.26
8 quarters	44.86	19.18	3.65	17.86	13.11	1.31
			Post-crisis period: *2001:02- 2009:03*			
2 quarters	96.14	0.0001	0.48	3.18	0.02	0.16
4 quarters	90.07	0.54	0.37	8.71	0.03	0.26
8 quarters	85.85	3.09	1.28	9.45	0.03	0.03

Table 5: Impulse Responses of Aggregate Demand Variables to One Standard Deviation of Capital Inflows Before the Crisis: 1989:01-2001:01

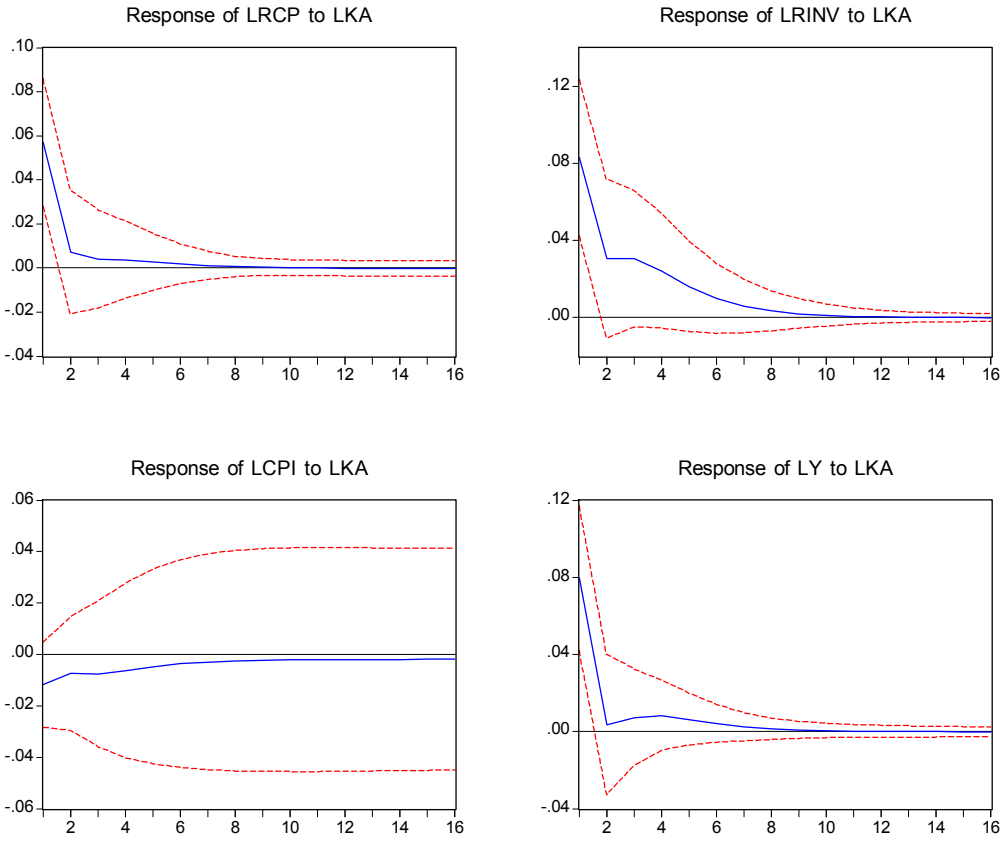


Table 6: Impulse Responses of Aggregate Demand Variables to One Standard Deviation of Capital Inflows After the Crisis: 2001:02-2009:03

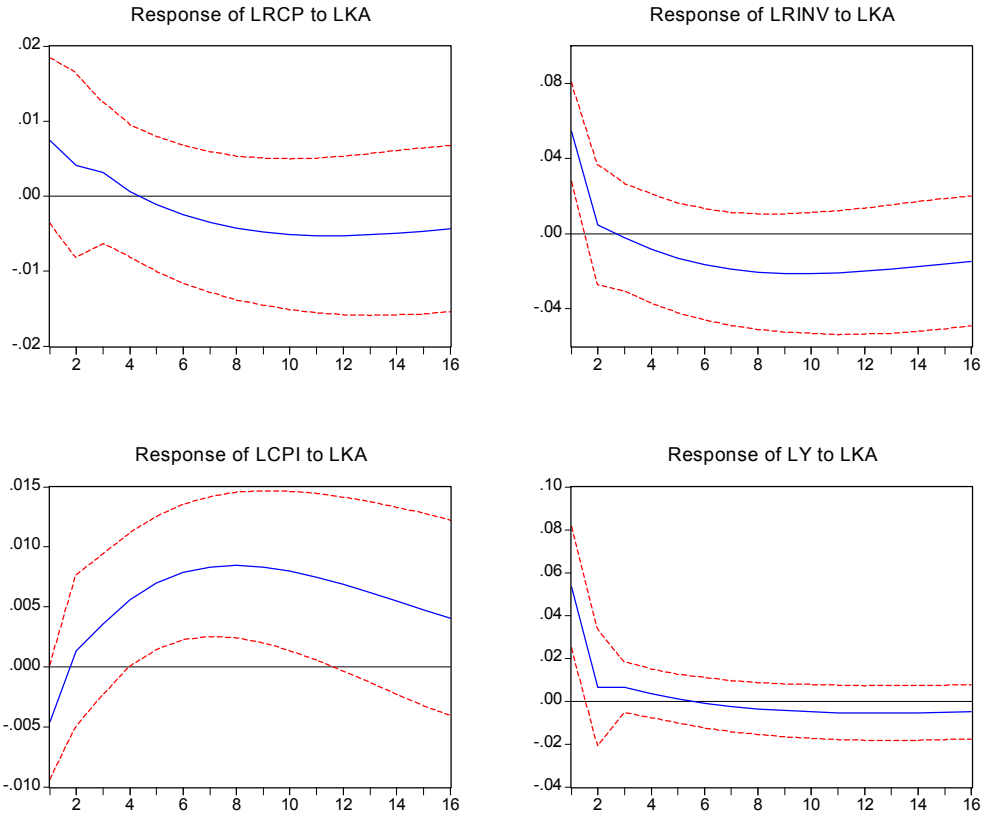


Table 7: Impulse Responses of Macroeconomic Variables to One Standard Deviation of Foreign Direct Investment Before the Crisis: 1989:01-2001:01

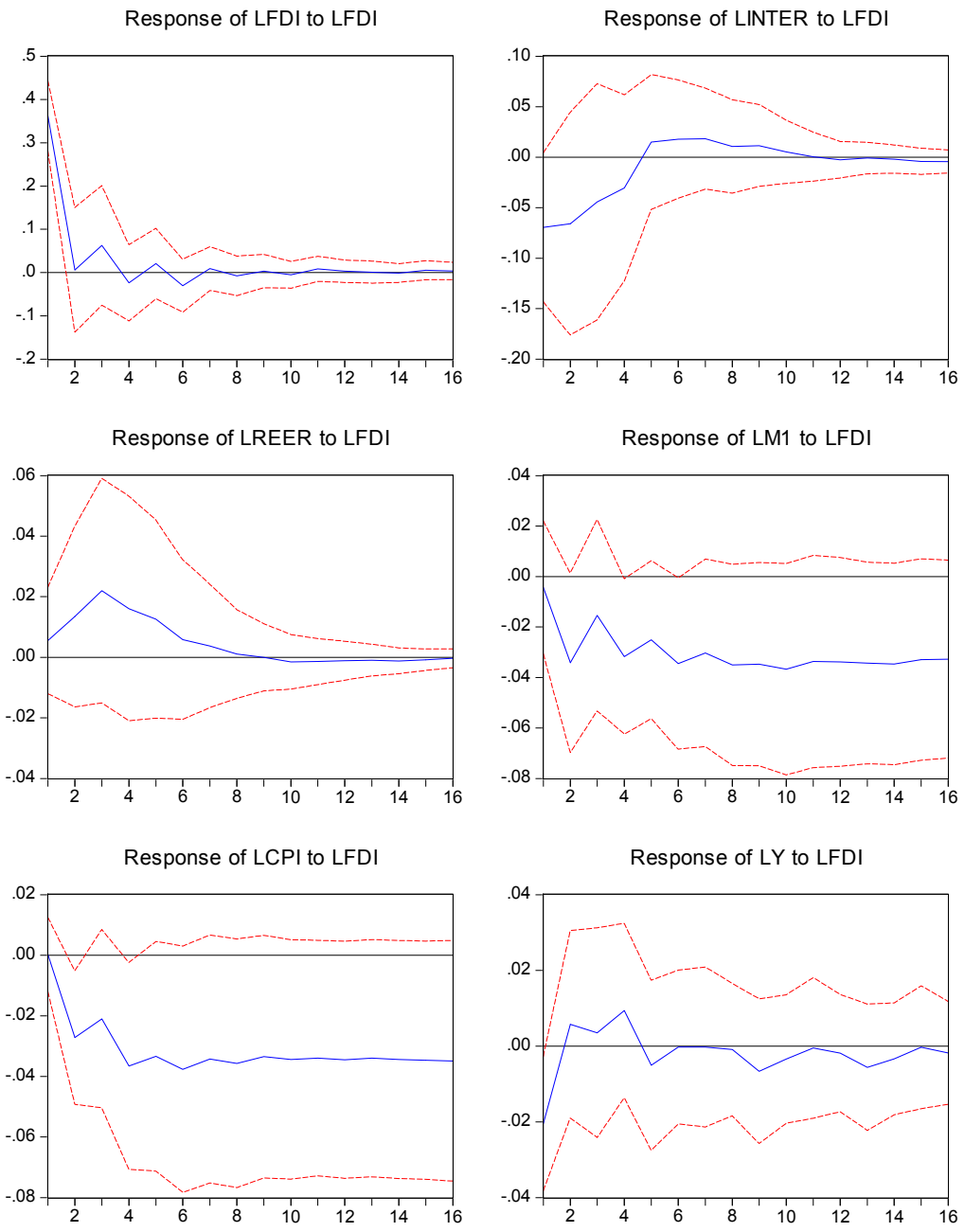


Table 8: Impulse Responses of Macroeconomic Variables to One Standard Deviation of Foreign Direct Investment After the Crisis: 2001:02-2009:03