THE DETERMINANTS OF CAPITAL FLOWS: THE TURKISH EVIDENCE

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ABSTRACT

THE DETERMINANTS OF CAPITAL FLOWS: THE TURKISH EVIDENCE

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This study investigates the domestic and external determinants of net capital flows to Turkey. The results of the Johansen cointegration analyses indicate that capital flows to Turkey increase in response to increases in domestic real interest rate, domestic real income growth, and budget balance; appreciation of domestic currency; and decreases in financial fragility and the US real interest rates. It can be said that, higher domestic real returns and improved country creditworthiness attract more foreign capital flows to Turkey. In addition, the decreases in world interest rates enable Turkey to enjoy higher capital flows. The findings are theory consistent and data-acceptable.

Keywords: Capital flows, Johansen, Cointegration, Balance of Payments, Turkey

ÖZ

SERMAYE HAREKETLERİNİN BELİRLEYİCİLERİ: TÜRKİYE OLGUSU

Kara, Serdar Ufuk

Yüksek Lisans, İktisat Bölümü

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Bu çalışma Türkiye'ye yönelik net sermaye hareketlerinin yurtiçi ve yurtdışı belirleyicilerini incelemektedir. Johansen eşbütünleşme analizinin sonuçları, yurtiçi reel faiz oranı, yurtiçi reel gelir büyümesi, ve bütçe dengesi artışlarının; yerel para birimi değerlenmesinin; mali kırılganlık düşüşlerinin ve ABD reel faizlerindeki düşüşlerin, Türkiye'ye yönelik sermaye hareketlerini arttırdığını göstermektedir. Daha yüksek yurtiçi reel getirilerin ve ilerlemiş kredi itibarının Türkiye'ye daha çok yabancı sermaye çektiği söylenebilir. Bunlara ek olarak, dünya faiz oranlarındaki düşüşler Türkiye'nin daha çok sermaye hareketinden faydalanmasını olanaklı kılar. Bulgular teoriyle tutarlı ve veri kabul edilebilirdir.

Anahtar Sözcükler: Sermaye hareketleri, Johansen, Eşbütünleşme, Ödemeler Dengesi, Türkiye

In Memory of My Mother

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CHAPTER 1

INTRODUCTION

International financial integration and capital mobility present developing countries with both opportunities and challenges. Capital mobility is often thought to promote technology transfer and improve resource allocation. Capital flows may help developing countries in several ways. They can provide extra funds available for investment or be in the form of direct investment, and contribute to national production. In addition, if domestic saving is insufficient, the governments can borrow easier in the presence of foreign capital flows. Moreover, capital flows enable developing country households to smooth out their consumption over time. On the other hand, international investors can benefit from capital flows, such that, their investments bring higher returns in developing countries than in industrial countries. In general, international borrowers use capital flows to finance economic growth, and international lenders use capital flows to make profits. International capital mobility may loosen the external constraint of a developing country as it allows current account deficits (domestic saving–investment gap) to be financed also via foreign saving. Capital mobility, whilst helping the smoothening of shocks, it may, at the same time be the reason of shocks by increasing the risk of financial crisis. Furthermore, as suggested by the "inconsistent trinity" proposition, capital mobility may seriously deprive policy makers' ability of achieving monetary and exchange rate targets simultaneously. In this context, financial market regulation and supervision and the consistency of economic policies with the conditions brought by the prevailing international financial system may be crucially important.

Capital flows may require some structural reforms in the recipient countries. The development of sound monetary institutions is a must for the proper intermediation

of capital flows, especially in the form of portfolio and debt flows. In addition, financial capital is likely to flow to the countries that have liberalized or relaxed the restrictions on their financial accounts. On the other hand, substantially high and sudden capital outflows, enabled by full financial liberalization, may be harmful for developing countries. Depending on the structural characteristics of the domestic economy, the timing of financial liberalization is an important issue.

Developing countries have suffered highly from the debt crises of mid 1980s. Following those turbulent years, international creditors restarted to invest in developing countries, as these countries started to liberalize their financial accounts. Improved information technology and more liberal regulations allowed foreign capital to freely travel across borders. This has coincided with the declining interest rates and recessions in industrial countries in and early 1990s, leading to an increased flow of capital from industrial countries to developing countries. Figure 1 presents the average interest rate in industrial countries and capital flows to developing countries. There is a negative co-movement between international interest rates and capital flows to developing countries, except for late 1980s and mid 1990s.

International Monetary Fund's World Economic Outlook (WEO) 1993 reveals that gross annual external financing of developing countries were about $130 billion in 1985, interestingly, it climbed to $234 billion in 1991 (WEO 1999), $513 billion in 1999, and reached to $1,287 billion in 2006 (WEO 2007). Net external financing of developing countries were $53 billion in 1985 (WEO 1993), $140 billion in 1991 (WEO 1999), $231 billion in 1999, and as high as $786 billion in 2006 (WEO 2007). There is a significant increase in the amount of international capital that is channeled to financing developing countries.

The surge of capital to developing countries had some features that were quite interesting for researchers to assess. First, the total capital flows to the developing world have often been dependent on the economic climate in the industrial countries. Although there still exists "home bias" that keeps industrial country

investors to stay in their home markets (Pinkowitz, Stulz, and Williamson, 2001), in general, the recessions and low returns in industrial countries made it more attractive to invest in physical and financial assets in developing countries that offer higher returns. The total amount of international capital flows increased in developing countries. However, the increases in capital flows to specific groups of developing countries were quite higher than the average, whereas some developing countries experienced a weaker increase in capital flows compared to the average. In 2006, net external financing of Sub-Saharan Africa amounted to $61 billion, lesser than half of the net external financing of Central and Eastern Europe, which is amounting to $162 billion, and lesser than one-third of China and India, which is amounting to $194 billion, in the same year (WEO 2007).

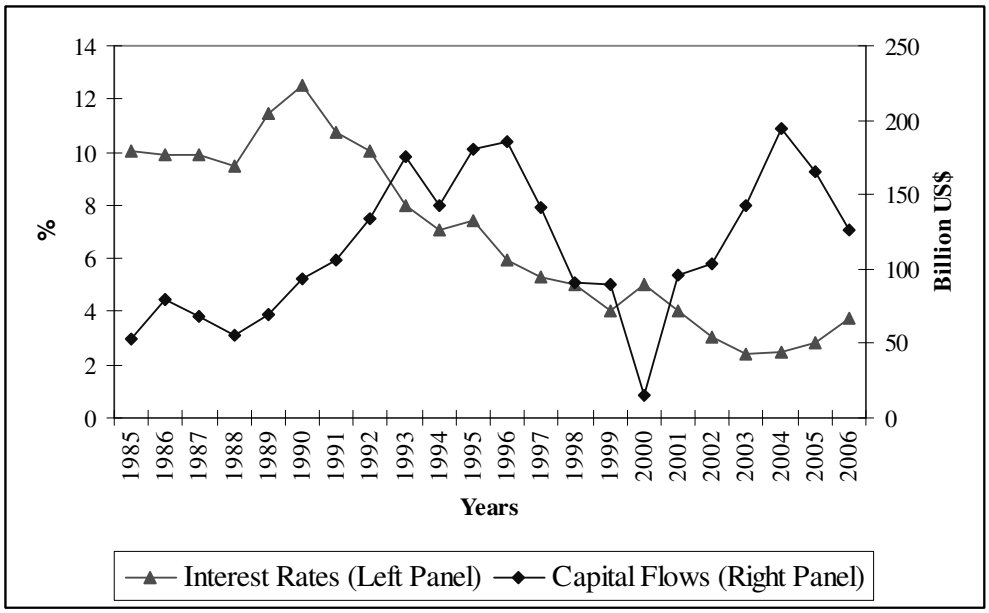

Figure 1[1]: Interest Rates in Industrial Countries and Capital Flows

[1] Data used in Figure 1 is obtained from International Monetary Fund, International Financial Statistics Database and World Economic Outlook (1993, 1999, and 2007). Correlation coefficient between interest rates and capital flows is equal to -0.37.

WEO 2007 reveals that aggregated current account balances of developing countries are at surplus during the 2000 – 2006 period, following the continued current account deficits of late 1980s and 1990s. In 2000s, the developing countries, on aggregate, have surpluses in both the current account and the capital and financial accounts, which enable the accumulation of huge international reserves. To note, in recent years, the emerging countries in Asia, Western Hemisphere, Commonwealth of Independent States, and Middle East have positive current account balances with few exceptions. African countries have positive current account balances (% of GDP) on aggregate, as well. However, Sub-Saharan countries have current account deficits (% of GDP) on aggregate in the 2000s. The emerging European countries face current account deficits in 2000s, reaching to -5.7% of GDP on aggregate in 2006. It is possible to say that, although the majority of developing countries are capital importers, it is the emerging European countries that finance a portion of their current account deficits by capital flows. The majority of the remaining developing countries finances reserve accumulation by capital flows and current account surpluses in 2000s. Recent increase in the current account surpluses of the developing countries - especially Asian - and the OECD countries match the huge current account deficits of the US (OECD Economic Outlook 2004). According to WEO 2007 more than one half of total net capital flows to developing countries channeled to Central and East European countries, and 65% of that half have channeled to Turkey.

The increase in the amount of capital available to developing countries can be attributed to economic conditions of the industrial countries. However, the uneven distribution of total capital flow among developing countries cannot be explained only by international factors. There should be some country specific factors in effect. Some countries implement policies that make it safer or more profitable to invest in that country in the long run. There is a tendency of international capital to flow to countries that are not only profitable but also creditworthy.

Turkey liberalized her financial account in 1989, and has benefited from the surge of capital flows in early 1990s, similar to many other developing countries which had

liberalized their financial accounts at late 1980s. The capital flows to Turkey were mainly composed of public and private borrowing (including the external borrowing of banking sector) and portfolio flows. Foreign direct investment share of capital flows did not increase substantially until recently. Turkey experienced high volatility in her capital account in the past years. Huge inflows were followed by huge outflows that had devastating effects on the economy in some cases. What were the factors that had driven capital flows to Turkey in past years? This thesis investigates the determinants of capital flows to Turkey in 1992 - 2006.

The organization of this study is as follows: Chapter 2 presents a literature review about capital flows to developing countries. The definition, effects, and determinants of capital flows to developing countries, and the relevant policy alternatives are included in the review. In addition, a brief summary of an analytical model (by Fernandez-Arias and Montiel, 1996), which investigates the determinants of capital flows to developing countries is included. This chapter contains also a brief review of the literature on capital flows to Turkey. Chapter 3 discusses the aspects of capital flows to Turkey, and links the Turkish experience of capital flows with the presented analytical model. Chapter 4 investigates the determinants of capital flows to Turkey empirically. Chapter 5 concludes. Additional information and details about the empirical study are presented in Appendix A and Appendix B.

CHAPTER 2

THE DETERMINANTS OF CAPITAL FLOWS: A REVIEW OF THE LITERATURE

Capital flows to developing countries in the last decades have been widely studied. Calvo, Leiderman, and Reinhart (1993) and Fernandez-Arias (1994) provide pioneering studies for the investigation of the determinants of capital flows to developing countries. Calvo, Leiderman, and Reinhart (1994a), Calvo, Leiderman, and Reinhart (1994b), and Calvo, Leiderman, and Reinhart (1996) are among the studies following Calvo, Leiderman, and Reinhart (1993), whilst Fernandez-Arias and Montiel (1995) and Fernandez-Arias and Montiel (1996) followed basically Fernandez-Arias (1994). These two strands of the literature provided a starting point for many studies in investigating the importance, determinants, and the effects of capital flows to developing countries, and the relevant policy implications.

2.1 The Definition, Importance, and the Effects of Capital Flows, and Policy Implications for Developing Countries

There is no strict definition of capital flows in the international economics literature. Definition and measurement of capital flows can have slight differences among the records of international institutions, such as the World Bank and the IMF, through time. Calvo *et al*. (1994a), defines capital flows as the increase in net international indebtedness of a country at a given period of time. Capital flows are calculated as the surplus in the net capital account item of the balance of payments identity. Balance of payments identity indicates that, if errors and omissions are excluded, the capital flows will be equal to the summation of current account deficit and the increase in the net international reserve holdings of the country. With the existence

of minor net errors and omissions, it is rational to expect a strong tie between these three items of the BOP identity[2]. The term "net foreign savings" is used synonymous to capital flows in some studies. Occasionally, the term "net external financing" is used in the literature instead of capital flows, as well. There is no consistent calculation of this term in IMF's WEO publications. In addition, there are differences in the IMF's definitions of capital and financial account. In this study, unless otherwise stated, capital and financial account terms are used interchangeably, such that they refer to the NKA[3] term defined in IMF's Balance of Payments Manual (specifically the 5th edition, 1993).

Calvo *et al.* (1993) argues that capital inflows to developing countries increase the availability of capital. The newly available capital finances investment in developing countries, contributing to their economic growth. In addition, capital flows can enable developing country households to smooth out their consumption over time, increasing their welfare. For the developed countries on the other hand, capital flows enable them to diversify their portfolios, benefit from increased profit opportunities, and moreover, support the pension funds and the retirement accounts of the developed country households (Calvo *et al.*, 1996). In addition, the free mobility of capital enables funds to flow from high-saving countries to low-saving countries. Excess funds from developed countries are supposed to move to high return offering developing countries which have scarce capital, and in the long term this is supposed to work for the global equalization of the interest rates.

Fernandez-Arias and Montiel (1996) argue that, in ideal conditions, net capital inflows can increase welfare in a country which has low or insufficient national savings. That is, a benevolent planner maximizes the discounted utility of the

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[2] However, some countries including Turkey have problems with measuring the items of balance of payments identity. For some observations, Net Errors and Omissions values are far greater than all other items of the BOP identity. This may create problems in the results that will be drawn from BOP data excluding the NEO term, if this error term has systematic components.

[3] NKA refers to net capital and financial account which includes all capital and financial transactions, but excludes reserve asset transactions. Capital account includes capital transfers and acquisition or disposal of nonproduced, nonfinancial assets. Financial account includes portfolio flows, foreign direct investment, and net other investment components.

representative household, by borrowing from international capital markets and increasing current consumption, meanwhile increasing investment until the marginal utility from this investment equals the cost of borrowing. The higher future production will enable higher future consumption, which will be reduced by the payment of the earlier international debt, thus diminishing the increase in future consumption, and smoothing consumption over time.

Capital should move from the countries that have low marginal product of capital to the countries that have high marginal product of capital. Lucas (1990) underlined the fact that capital movements fail to accord with the expectations of the neoclassical models that there should be huge capital flows from rich countries to poor countries, in which marginal product of capital is far above than it is in rich countries. This fact that capital movements from rich to poor countries is below the level that should be under free mobility of capital is known as the "Lucas Paradox". Alfaro, Kalemli-Özcan, and Volosovych (2003) note that this paradox can be explained by: (i) The differences in the economic fundamentals of countries that can affect the production structure, such as, omitted factors of production, government policies, and institutions; and (ii) international capital market imperfections that lead to market failures, such as sovereign risk and asymmetric information. They figure out that international capital channels to countries with higher institutional quality. Since rich countries have well-established institutional structures, they may receive higher flows of capital than the developing countries, which have progressing institutions. Reinhart and Rogoff (2004) argue that it is not a paradox that poor countries receive low levels of foreign capital. Instead, it is a paradox of international economics such that some serial defaulters - mainly the developing countries - continue to receive relatively high amount of foreign capital, especially in the form of debt flows.

There was a resurgence of capital flows to Latin American countries in the early 1990s following the low level of capital flows of late 1980s. In 1984 debt crisis developing countries have witnessed large capital outflows, which led these countries to employ structural reforms that aim to create more reliable environments for foreign investment and external borrowing (Calvo *et al*., 1993). Widespread

financial liberalization policies and structural reforms during 1980s enabled developing countries to receive increasing amounts of capital flows (Fernandez-Arias and Montiel, 1996). Although some countries have not undertaken these reforms, international lenders and investors expected future structural reforms in these countries. In addition, although there were huge differences in the macroeconomic policies and the economic performances of Latin American countries, international creditors treated them alike and these countries have received high levels of capital flows in 1991 (Calvo *et al*., 1993).

Calvo *et al.* (1993) argue that the additional available resources obtained by capital inflows can lead to an increase in domestic absorption. The increased spending on the non-tradable sector result in increases in their relative prices, which is the real appreciation of domestic currency. Since capital flows may lead to an appreciation of the real exchange rate, they create a downward pressure on countries' exports. In addition, improper intermediation of the capital inflows results in a misallocation of resources; leading to higher increase in consumption relative to investment, for example. Furthermore, the short term components of the capital flows are likely to leave the country in case of any financial disturbance, leading to further worsening of the situation (Calvo et al., 1994a). Calvo *et al.* (1996) point out that, historically, capital flows are cyclical in nature that they have the tendency to have booms and busts. With increased capital mobility and financial liberalization capital-importing developing countries became highly vulnerable to these cycles in capital flows.

Fernandez-Arias and Montiel (1996) argue that capital flows can be welfare increasing mostly when the international borrowing decisions are made by a benevolent planner. However, due to some distortions, the ideal conditions may fail. Capital flows may become welfare reducing instead of welfare increasing. In general, if international borrowing decisions are made mostly by private sector – which is the general case under financial liberalization - instead of public sector, the existence of centralized welfare maximizing planner assumption may fail, due to some micro and macro level distortions.

The microeconomic distortions result from the misuse of resources that have been obtained from the flow of international capital. First, fragile and underdeveloped financial markets lead to malevolent financial intermediation. Especially, capital flows lead to booms in real estate and equity markets, attracting further capital flows and increasing prices in these markets. This may lead to increased consumption, which has low social value, in addition to increased investment in projects that offers relatively low social returns (Fernandez-Arias and Montiel, 1996), especially to the non-tradable sectors (Çimenoğlu and Yentürk, 2005). Second, distortions in real sector, like wage rigidity and imperfect competition, may disable private real sector to response to the increased availability of credit. In addition, incredible macroeconomic policies on trade, exchange rate, and inflation rate may result microeconomic distortions. Last, increased borrowing leads to increased country risk, decreasing the country's creditworthiness. Therefore, the lenders expect increased returns, which will be in the form of increased interest rates instead of increased production growth (Fernandez-Arias and Montiel, 1996).

Increased flow of foreign capital may weaken the monetary authority's control on its policy tools, and this is where macroeconomic distortions root from. Increased consumption demand and pressure on asset prices creates a pressure on inflation. Real exchange rate appreciation, which is common in capital receiving countries, produces decreased net exports and increased current account imbalances. In addition, the instability of capital flows leads to macroeconomic instability in case of weakened monetary control (Fernandez-Arias and Montiel, 1996).

Calvo *et al.* (1996) argue that the increased flows of foreign capital enable the debtor countries to increase national investment and decline national saving, which means a deteriorating current account balance. A rise in private consumption is common in capital receiving developing countries, which is mainly a byproduct of increased imports of durable goods. Furthermore, a rapid growth of money supply in both real and nominal terms can be seen in these countries. Capital flows lead to increases in stock market and real estate prices, as well. Surges in capital flows have some different effects on the real exchange rate. Most Asian countries could manage

to increase their investment to GDP ratios considerably higher than Latin American countries, which generally increased their consumption to GDP relatively higher instead. Most Asian countries had fairly stable real exchange rates, whereas most Latin American countries had highly appreciated exchange rates, in the first half of 1990s. If channeled through investment instead of private and government spending, the increase in domestic absorption – which is a result of increased capital inflows – becomes most beneficial for the capital receiving countries.

A decrease in the world interest rates will lead to income and substitution effects for the capital receiving countries, which result in an increase in consumption spending and widening of the current account deficit. The declining interest rates reduces the present value of the foreign debt of the country, a positive income effect; and since borrowing is cheaper consumption increases in response, which is the substitution effect. The negative shock on the interest rate will lead to an increase in investment, and with higher consumption (or lower saving) the combined effect will lead to further increase in the current account deficit. The demands for both traded and non-traded goods increase, and since for non-traded goods it is harder to match sudden increases in demand, the relative price of non-traded goods increases, which means a real appreciation of the exchange rate. However, with different exchange rate regimes capital flows have different effects on the monetary base. In an economy which has a freely floating exchange rate, capital flows are more likely to lead to a nominal exchange rate appreciation, on the other hand, in an economy that has a fixed exchange rate regime, it is the real exchange rate is that is more likely to appreciate (Calvo *et al*., 1996).

Sudden stops of capital inflows may cause serious problems in developing countries, as well. Sudden stops are observed to precede financial crises in developing countries in 1990s. Calvo and Reinhart (2000) argues that sudden declines in capital inflows and huge capital outflows need to be matched by declines in current account deficits or decline in international reserves of the country or both. National accounting imply that, since current account deficit is equal to aggregate demand minus GNP, the decline in the current account deficit needs to be matched by a

decline in the aggregate demand, if the national income does not increase unpredictably. The decline in the demand for tradables creates excess supply in tradables sector witch can be transferred abroad. However, the fall in the demand for non-tradables brings a decline in the prices of the non-tradables sector, which means the depreciation of the real exchange rate. In addition, from the Keynesian point of view, under downward inflexible prices and wages, a fall in aggregate demand brings falls in output and employment. Furthermore, assuming the interest rates are invariant to sudden stops of capital flows, when the prices of non-tradables sector fall, the ex-post interests paid by the producers of non-tradables sector increases, creating more and more nonperforming loans. Increased bankrupts and nonperforming loans may weaken the banking sector, which may even lead to banking crises. The problem of nonperforming loans can be eased by devaluing the domestic currency, and keeping the non-tradables' prices unchanged. However, since both public and private sectors of developing countries have highly dollarized liabilities, the devaluation of the currency may bring up currency crises. Calvo, Izquierdo, and Mejía (2004) show that higher domestic liability dollarization and current account leverage increases the probability of sudden stops. Calvo, Izquierdo, and Loo-Kung (2005) show that higher probability of sudden stops leads to higher volatility in asset returns.

Balkan *et al*. (2002) adds that huge gross capital flows failed to produce sufficiently large net transfers, meaning capital flows were more speculative than balancing in nature. In addition, the volume of international trade does not have any significant impact on the short term capital flows. Moreover, increased capital mobility brought higher stock market and unexpected exchange rate volatility, and thus higher exchange rate risks. It is observed that capital flows are not sufficient to "equalize real interest rates that are denominated in different currencies" (Balkan *et al*., 2002, p. 2).

The negative real effects of capital flows make it important to give appropriate and timely policy responses. Calvo *et al.* (1993) group the main concerns of policymakers in three aspects of the capital flows. First, capital flows lead to real

exchange rate appreciation and high volatility in the exchange rate which harm the exports of the country. Beyond the effects on economic growth, in countries with high foreign debt, total export is an important measure of country creditworthiness. Second, huge capital inflows are hard to intermediate properly, and these new resources are likely to be misallocated. Speculative bubbles in real estate and stock markets emerge in developing countries that receive huge capital flows. Third, short term capital flows can be reversed quickly and huge capital outflows may lead to financial crises especially if the banking sector engages in huge short term borrowing. The fear of quick reversal and the fragility of banking sector towards the volatility in capital flows may create a fear of financial crisis, and the resultant actions of the investors may fulfill this prophecy of the crisis (Calvo et al., 1993).

Calvo *et al.* (1993) consider five interventionist policies towards capital flows. First, taxes on short term external borrowing may help prevent the economy from the side effects of hot money. However, imposing such taxes becomes inefficient in the medium run when domestic agents find new ways of capital imports through parallel financial and exchange rate markets, and over-invoicing of exports or under-invoicing of imports of goods and services. Secondly, trade policy channel can be useful to moderate the effects of real exchange rate appreciation on exports. Increased export subsidies and import taxes may protect the export sectors from the sudden rush of capital flows. However, this policy can be effective only when this action is transitory rather than permanent. Only if the agents perceive that this policy is temporary they can substitute future consumption for present consumption. The result will be a cooling of in the economy and a relief in the pressure on the exchange rate. Of course, this policy has a burden on the budget because of the increased export subsidies. In addition, increasing import taxes is not easy since the countries have to obey some international trade agreements, and the trade liberalization is a process that is hard to reverse. Third, the increase in aggregate demand can be slowed down by a tight monetary policy, which undertakes higher taxes or lower government spending. Once again, the imposition of taxes should be transitory, and should clearly be associated with the current increase in the capital flows. Although it is policymakers can manage to cut down government spending in

response to the surge of foreign capital flows, it is not an easy policy to implement. The issue is political in general, and government spending decisions are made regarding the medium and the long term and are hard to change in shorter terms. Fourth, sterilized and non-sterilized intervention can be useful policies towards capital flows. Sterilized intervention is the sale of government bonds and treasury bills by the central bank in exchange for foreign currencies and securities. It is possible to isolate the exchange rate and the price level from the affects of foreign capital inflow. However, the sale of more government debt instruments is possible only if their rates of returns are increased. This increases the country's interest burden. In addition, the difference between international and domestic interest rates increases as long as the capital flows continue. The difference attracts more foreign capital which requires more sterilized intervention, creating a harmful circle of events. An alternative can be non-sterilized intervention, in which the capital flow is monetized. In general, this is preferred under fixed exchange rate regimes as the monetization of the capital flow can keep the nominal exchange rate unchanged. The domestic and foreign real interest rate differential declines over time. However, the increase in the monetary base boosts inflation, and thereby real exchange rate appreciates. The credibility of the fixed exchange rate regime exacerbates as a result. Floating exchange rate regimes are suggested, in which it is possible to have real exchange rate appreciation with a lower increase in price level compared to the case of complete monetization (Calvo *et al*., 1993). Finally, regulatory changes in banking sector are suggested as a precaution against massive short term capital movements. Significant increases in marginal reserve requirements for short maturity bank deposits can decrease banking sector fragility against capital flight. In addition, bank investment on equity and real estate markets can be regulated to insulate the banking sector from the bubbles created by huge capital inflows

Fernandez-Arias and Montiel (1996) argue that the micro and macro level distortions to the ideal case of capital importing, in which a benevolent planner maximizes utility, require some policy action, otherwise they may become harmful. The design of sound economic policies necessitates a good understanding of the determinants of capital flows. If causes of capital flows are internal, it may be

possible to arrange the internal conditions to achieve desirable outcomes from external financing. However, if those factors are mainly external, there are few direct policies to implement. Compensating or precautionary measures can be taken instead.

Calvo *et al*. (1996) add that explicit and non-explicit capital controls can have some power to insulate the economy from the surge in capital inflows. However, these measures are effective for a limited period of time. They are usually by-passed by the utilization of some means such as, disguise of short term capital as FDI or as trade finance, and usage of financial derivatives (Carvalho and Garcia, 2006). Montiel and Reinhart (1999) and Calvo and Reinhart (2000) add that capital controls fail to affect the overall volume of flows, but change the composition of flows in a way that declines the share of short term flows and increases the share of FDI. An alternative has been introduced by Prasad and Rajan (2005), in which a portion of capital inflows are securitized through closed end mutual funds. These mutual funds will issue shares in domestic currency, and the proceeds will be used to purchase foreign exchange from the central bank. Foreign exchange will be invested abroad afterwards. This is argued to soften the effects of huge capital inflows, eliminate the fiscal costs of sterilization, and offer a diversification alternative for domestic investors.

Árvai (2005) figures out that the Central European countries employ sterilized intervention as a monetary policy tool regarding capital inflows. The fiscal policy choices of these countries are diverse. Some could manage to have tight fiscal policies in response to capital inflows, which generally reduced the effects of large capital inflows. However, larger countries did not react to large capital flows in a manner to tighten government spending. The result was huge budget deficits, and with inflation considerations this led to tighter monetary policies. Portfolio flows increased in response to increased interest rates, worsening the situation. Among the Central European countries under study, only one imposed capital controls, which failed to affect the amount of total capital inflows but decreased the share of short term capital flows.

Regarding the contagion effects on capital flows to developing countries, Hernandez, Mellado, and Valdes (2001) suggest some policy measures. These are the trade diversification, which will reduce the effects of contagion through trade channel, and the employment of informational campaigns, which are built to enable the investors to distinguish among the countries they invest.

2.2 The Determinants of Capital Flows

The determinants of capital flows can be divided into two groups: domestic and external factors. Domestic factors are based on the economic environment of the developing country that receives the flow of foreign capital. These factors are the factors that "pull" capital flows, thus called "pull factors", as well. Pull factors are assumed to be under the control of policy makers. External factors are based on the economic environments of the industrial countries and other developing countries, and are beyond the control of domestic policy makers. If favorable, external factors "push" capital flows to the developing countries, and they are known as "push factors", as well.

Late 1980s and early 1990s are distinctive with increased capital flows to developing countries, especially Latin American, following the low level of capital flows in the earlier debt crisis years. Calvo *et al.* (1993) list four external factors that lead to this increase in capital flows to Latin America. First, the decline in the US short term interest rates improved the solvency of Latin American countries and made it more profitable to invest in these countries for international creditors. Secondly, the recessions in the US and the other industrial countries resulted in larger current account deficits in Latin America that are financed by higher capital flows. Third, the US experienced capital outflows for the first time in the past nine years in 1990, most of the outflow are channeled to Latin America. Lastly, there were important changes in capital market regulations of industrial countries in 1990 that decreased the costs of investing abroad significantly.

Calvo *et al.* (1994a) distinguish the external and internal factors that lead to increases in capital inflows. As external factors, they mention declines in international interest rates and recession in the rest of the world. Successful price stabilization programs, institutional reforms, and policies that increase the rate of return on domestic projects are listed as the internal factors that attract foreign capital. In addition, the countries that have employed such structural changes attract more long-term foreign capital. Besides, non-credible and unsuccessful implementations of the above policies may serve to attract capital flows initially. However, these flows are generally highly "reversible", that they cause a consumption boom and increased international indebtedness in the short run, just before leaving the country.

Fernandez-Arias (1994) introduced an analytical model that assesses the determinants of capital flows to developing countries. The model is later developed by Fernandez-Arias and Montiel (1995) and Fernandez-Arias and Montiel (1996), and contains three broad categories of explanatory variables, which are: Project level domestic factors, country level domestic factors (country creditworthiness), and external factors. The first group of domestic factors, project level factors, is especially to the interest of the domestic investors of each developing country. Returns from domestic projects or other investments can be classified in this group. Foreign investors are concerned with the second group of domestic factors, the country creditworthiness variables, as well. Country creditworthiness depends highly on debt stock, debt sustainability, foreign liabilities to domestic resources ratio, and any other indicator of how total debt of the country can be managed with the given resources to reduce the default risk. Main components of country creditworthiness are the volatility and the default risk. The variability or returns (due to the volatility) and lower than expected or zero returns (due to the default risk) requires some adjustments to be made on project level returns. It can be said that there is an affect of country creditworthiness on project returns; however, this relationship has not been drawn explicitly in Fernandez-Arias (1994) model. External factors that increase the capital flows to developing countries are beyond the control of recipient country. The declining interest rates and the recessions in

industrial countries are the main external determinants of capital flows. External factors affect capital flows trough two channels, one directly and the other through country creditworthiness channel. First channel suggests that, if the returns are too low in industrial countries, the investors who are unhappy of these returns prefer the countries that offer higher returns, namely the emerging markets. Second channel suggests that, falling international interest rates improve creditworthiness of developing countries in general, enabling them to receive higher amounts of foreign capital (Fernandez-Arias, 1994).

Hernandez *et al.* (2001) argue that contagion, which is earlier mentioned by Calvo *et al*. (1993) and Calvo *et al*. (1996), may affect capital flows to developing countries, as well. The contagion is defined as the transmission of shocks from a country leading to economic disturbance in the other countries. Contagion is argued to occur because of real sector linkages, financial sector linkages, and some unidentified channels. Real sector linkages mainly include the trade links. Some countries export similar products and depreciation on one's currency increases its competitiveness relative to the others, leading to an attack on the currency of those countries, as well. Financial linkages are mainly related to the investors' liquidity constraints. To be able to meet their portfolio requirements, investors sell their assets in the non-crisis markets, which lead to financial turbulence in these markets, as well. Unidentified channels are mainly composed of investors' perception of the likeliness of countries. Investors may incorrectly assume that some countries have important common dynamics and the crisis in one country motives the investors to liquidate their investments in the other country, which is expected to have the same fate, leading to the realization of those expectations. For this last channel of contagion, authors note that, there can be some unexplained factors except this herding behavior. In addition to capital outflows, contagion may affect capital inflows. Improvement in one country's capital account enables the financing of higher current account deficits, implying an increase in other developing country exports. This makes the exporting countries more creditworthy, and they start receiving higher flows of international capital. In addition, when well informed, market leader investors invest in one good performing country, less informed investors follows the market leader, also

investing in the similar countries with the expectations of a similar good performance.

Alfaro, Kalemli-Özcan, and Volosovych (2005) argue that institutional quality is an important determinant of capital flows to developing countries, as well. They figure out that the volatility in the flow of international capital declines with higher institutional quality and lower inflation volatility.

2.2.1 An Analytical Model

Fernandez-Arias (1994) investigate the factors that drive capital to developing countries in the early 1990s. Early 1990s are typical with declining interest rates in industrial countries, increasing creditworthiness in developing countries and an increase in the total amount of capital flows to the developing countries. In order to analyze the determinants of capital flows Fernandez-Arias (1994) utilizes an analytical model which is developed by Fernandez-Arias and Montiel (1995) and Fernandez-Arias and Montiel (1996).

Fernandez-Arias and Montiel (1996) model assumes that flow of capital occurs through transactions in n types of assets. In the model, flows of capital to the developing countries are a function of domestic economic climate (operating at the project level), country creditworthiness (factors operating at the country level), and capital exporting country financial conditions relevant for investment in the developing countries. The model is given by:

$$D_s(d, F)\, C_s(c, S_{-1} + F) = W_s(w, S_{-1} + F) \tag{2.1}$$

or explicitly,

$$F = F(d, c, w, S_{-1}) \tag{2.2}$$

where, F is the vector of net capital flows, and d, c, and w, are the shift factors associated with domestic economic climate D, country creditworthiness C, and lending country financial conditions W, respectively. S_{-1} is the stock of liabilities of the end of previous term, such that $F = S - S_{-1}$. Subscript s denotes the type of asset the transaction occurs on, and s = 1, …n. Vector F is increasing with d and c, and decreasing with w and S_{-1}.

Fernandez-Arias, Montiel, (1996) list domestic determinants operating at the project level (through d) as: (i) policies that enhance long-run expected returns, or decreasing risk on real investments, including structural reforms; (ii) successful inflation stabilization policies that goes together with fiscal tightening; (iii) tight monetary policies that increase the expected rate of returns from financial assets; (iv) policies that increase the financial openness of the economy.

Country creditworthiness relies on the expected present value of the resources available for the repayment of country's liabilities. Parameter c is formulated as:

(2.3) $$c = Y/(R-g)$$

where, Y represents the current available resources to the domestic economy, g is the growth rate of these resources, and R is the world financial returns relevant to creditors, which can be employed as the discount rate for the available resources. It is possible to say that, country creditworthiness depends on domestic factors through Y and g, and also to external factors through R. Domestic factors operating at the country level (underlying c) include: (i) debt sustainability; (ii) structural policies that increases the efficiency of resource allocation; (iii) policies that shape the level of domestic absorption and its components relative to national income.

External factors affect capital inflows through w channel. They include: (i) foreign interest rates; (ii) recessions in developed countries; (iii) bandwagon and contagion effects in international capital movement.

The pull factors operate through d and c, and the push factors operate through c (indirectly) and w (directly) in the determination of the net capital flows to an economy. Combinations of internal and external factors work together to affect the flow of capital to a particular developing country, and they are not mutually exclusive (Fernandez-Arias and Montiel, 1996). Fernandez-Arias and Montiel (1995) argues that push factors, especially the falling US interest rates had played a key role in the increase of capital flows to developing countries in the early 1990s. The impact of the changes in the US interest rates, however, differs significantly from one country to another. Taking the total derivative of equation 2.1, and S_{-1} constant, equation 2.4 is obtained:

$$dF = F_d\, dd + F_c\, dc + F_w\, dw \tag{2.4}$$

where, F_d, F_c, and F_w are the partial derivatives of F with respect to d, c, and w. In the right hand side of equation 2.4, the first two components of the summation contain the internal determinants of capital flows and are specific for each developing country, and the last component of the summation contains the external determinants and is uniform across countries. The relative importance of pull and push factors, therefore, depends on the magnitude of these three items in the right hand side of equation 2.4.

2.2.2 The Determinants of Capital Flows: Empirical Findings

Calvo *et al.* (1993) empirically investigate the role of some external factors on capital flows to ten Latin American countries using monthly data for the 1988 – 1991 period employing a structural vector auto regression methodology. Due to the lack of monthly data, international reserves are used as a proxy to capital flows. The study investigates also the behavior of real exchange rate since it is closely related with capital flows. The external and thus exogenous factors are taken as the principal components of the US interest rate, capital gain, and income volatility variables. Since, international reserve accumulation observationally precedes real exchange appreciation and US variables are exogenous to Latin American countries

(they are small countries that are assumed not to affect the US economy), the real exchange rate is defined as a function of its own past, accumulation of international reserves (capital flows), and the principal components. Reserve accumulation, on the other hand, is defined as a function of its own past and the principal components. Empirical results imply that volatility in the real exchange rate can be attributed mostly to the external factors in the countries that have not experienced important policy changes in 1980s. Interestingly, the role of external factors declined in the countries which experienced significant changes in their domestic policies. External factors are accounted for highest share of the volatility in the international reserve accumulation of all most all the countries in the sample. The authors conclude that a decrease in the US interest rates, the main variables of the principal components, leads to an increase in international reserve accumulation and the appreciation of real exchange rate in the Latin American countries.

Fernandez-Arias (1994) defines secondary market price of commercial bank deposits as the country creditworthiness indicator. The nominal interest rates of medium term US government bonds are taken as the external factor. Fernandez-Arias (1994) argues that there is no operational variable common to all developing countries in the sample to proxy the project level domestic factors. Due to high instability in some of the countries, nominal or ex-post real interest rates are interpreted as not being useful proxies for expected real returns. In the same vein, ex-post returns on domestic stock markets are found to be inappropriate, since data contain "more noise than information". Consequently, the equation is solved in a way that the changes in the capital flows will depend only on country creditworthiness and external variables, which are the secondary market price of bank deposits and the US nominal interest rates, respectively. The other domestic factors postulated by their analytical formulation are left to be represented in the residual term. Fernandez-Arias (1994) define portfolio flows as representing capital flows. The results suggest that, on average, around 60 % of the variation in portfolio flows is explained by the US interest rates whilst 25 % of it is explained by country creditworthiness. The remaining unexplained share, around 10%, is attributed to domestic investment climate. The importance of these factors differs significantly

among countries. For Argentina, Mexico, and South Korea the domestic investment climate is the major determinant of portfolio flows in 1989-1992 periods, whereas country creditworthiness are more important for some other countries. However, for the rest of the countries in the sample, the falling US interest rates are the major determinants of increasing portfolio flows. An important drawback of this study is that it measures the theory based project level domestic factors as residuals. However, the residual term may include the effects of some uncontrolled domestic country creditworthiness or external factors.

Chuhan, Claessens, and Mamingi (1996) investigate the factors that affect capital flows to two groups of developing countries, Latin American and Asian. As two separate types of capital flows, gross bond flows and net equity flows are considered. Country (pull) factors are defined as price earnings ratios, rates of return on domestic stock market, country credit ratings, and secondary market debt prices. Global (push) factors are taken as the US interest rates and US industrial production index. Chuhan *et al.* (1996) find out that both global and the country-specific factors are important in the explanation of capital flows to developing countries, and the results are significantly different for each group of countries. For bond flows to Asian countries, credit ratings are the most important domestic factors, whereas the secondary bond market prices are equally important in Latin American countries. When the credit ratings of developing countries increase or the secondary market bond prices respond to the increases in the interest offered in the new issues, the flows of foreign capital to these countries increase, as well. Domestic stock market returns are significant in the explanation of equity flows to both Asian and Latin American countries, however, price earnings ratio are only significant in the Asian countries. The increases in the domestic stock market returns or the price earnings ratios lead to increases in the equity flows. As the external global factors, both the US interest rate and the industrial production are significant with negative signs implying that the capital flows to these developing countries increase with the declines in the US interest rates and the recessions in US. It is noted that foreign interest rates appear to have a greater effect compared to foreign industrial production. Compared to bond flows, equity flows are more dependent on these

global factors. However, the overall effect of the county specific factors on capital flows is found to be stronger than the role of the external variables, in contrast to the findings of Fernadez-Arias (1994) and Calvo *et al.* (1993).

Hernandez *et al.* (2001) controlled for some push and pull factors in order to identify the affects of contagion on capital flows clearly. The push factors include real ex-post US interest rates, and economic activity (GDP) in industrial countries. In addition, a "herding" variable (defined as the net private capital flows to developing countries except the country under investigation, divided by the total GDP of major industrial countries) is included in the push factors. The pull factors contain real GDP growth, budget balance (% of GDP), gross domestic investment (% of GDP), total exports (% of GDP), external debt (% of GDP), real exchange rate appreciation, and growth in banking sector nominal credit to the private sector. Hernandez *et al.* (2001) considers the 1977 – 1984 and 1987 – 1997 periods for a sample of 27 developing countries. The pull factors appear to be more significant compared to the push factors in the explanation of capital flows (in contrast to Fernandez-Arias 1994, and Calvo *et al*., 1993). The contagion variable through the herding channel is found to be significant in most of the estimations. Hernandez *et al.* (2001) note that, capital controls may only change not the total amount but the composition of capital flows. Hernandez et al. (2001) find out that there is a strong evidence of contagion in FDI and portfolio flows through the trade links channel. The contagion effects become stronger even when there is increased financial integration between countries. Country similarities increase the contagion effects and the regional contagion is more obvious in FDI and portfolio flows.

Ying and Kim (2001) employ a structural VAR model to investigate the internal and external causes of capital flows (the change in foreign reserve holdings minus the current account balances is used as a proxy) in Korea and Mexico. The Authors argue that, for both countries capital flows show a more volatile pattern after 1980s compared to the early sample period of 1960 – 1980 for the sample covering 1960:1 to 1996:4. Both countries are found to have structural breaks in the early 1980s empirically by the Chow test. Therefore the sample period is divided to two sub-

periods as 1960:1 – 1979:4 and 1980:1 – 1996:4. Capital account is modeled as a function of shocks on foreign output, foreign interest rate, domestic productivity, domestic money, and the own past of capital account. Ying and Kim (2001) consider a five-variable VAR model containing capital account, changes in foreign output, foreign interest rate, domestic output and domestic money. Their identification restrictions on the VAR are, (i) foreign output is affected by its own shocks only, (ii) foreign interest rate is affected by shocks to foreign output and itself, (iii) foreign shocks and domestic output shocks have a long run effect on domestic output only, (iv) all shocks affect domestic money except the shocks to the capital account. Ying and Kim (2001) employ also Johansen cointegration analysis and find that there is one cointegration relationship for each country in the earlier period. However, there is no evidence of cointegration in the later period for both countries. Variance decompositions reveal that, foreign output shocks are the most important determinants of capital flows for each country in the first period. In the second sub-period, the importance of foreign output shocks diminish for Mexico and foreign interest rate becomes more explanatory. The importance of foreign interest rate is significantly higher for Korea in the second period, as well. This implies that under liberalized financial accounts, higher trade openness, and some other structural reforms, the share of foreign interest rates increases in the explanation of capital flows to developing countries.

Mody, Taylor, and Kim (2001) mainly base their capital flow forecasting study on Fernandez-Arias and Montiel (1996), and introduce a cost-of-adjustment model. Factors such as market imperfections, informational asymmetries, and entry and exit costs to emerging markets lead to a distinction of desired and actual level of capital flows. They argue that the changes in the amount of capital flows may be resulting from the difference between the actual and the desired levels of capital flow in the previous period, and changes in the factors that determine the desired level of capital flow. The factors that affect the desired level of capital flows are classified as the pull and the push factors similar to those in Fernandez-Arias and Montiel (1996). Mody *et al.* (2001) postulate consumer price index, the level of domestic credit, short term debt to reserves ratio, the level of industrial production, short term

interest rate, credit ratings, the reserves to import ratio, and the stock market index are relevant in explaining capital flows as pull factors. In addition, US output growth, US short term and long-term interest rates, the EMBI, the US swap rate and the US high-yield spread are the relevant push factors. Employing these pull and push factors, the authors forecast capital flows, composed of bond flows, equity flows, and syndicated loan flows, to 32 developing countries using a VAR framework. On contrary to Fernandez-Arias and Montiel (1996), they find out that although the push factors have effects on capital flows, the pull factors are more important in the explanation of foreign capital flows and they explain a higher degree in forecast variance.

Kang, Kim, Kim, and Wang (2001) investigate the internal and external determinants of capital flows in Korea, employing a VAR method. Among the push factors international interest rates, international production growth, and the capital flows to the neighboring economies (to proxy contagion effect) are mentioned. The US ex-post real interest rate and real GDP growth rate are used as the proxies for world interest rates and the US world real GDP growth rate, respectively. In addition, it is argued that some developing country markets can be considered as complements of Korean market in terms of capital exporters' investment areas, and some markets are substitutes of the Korean market. The crisis in one market may affect capital flows to Korea in two ways depending on its being substitute or complement. Therefore, some dummy variables are included to investigate the effects of the recent crisis periods to investigate if there are any contagion effects. The internal factors included in Kang *et al.* (2001) are; domestic interest rates, financial condition, price changes, exchange rate volatility, national income growth, current account balance, and policies towards the liberalization of the financial account. Country credit ratings and the financial liberalization policies are not considered in the empirical model as there is no readily available data. Current account balance to GDP ratio, real ex-post domestic interest rate, CPI inflation rate, real GDP growth rate, stock exchange index growth rate, and exchange rate volatility, which is measured by the standard deviation of the daily Won-US Dollar exchange rate for the quarter, are used as the pull variables.

Kang *et al.* (2001) considers also six other capital flow definitions: financial account over GDP, foreign direct investment over GDP, net portfolio investment over GDP, net other investment (including bank lending) over GDP, short term liabilities over long term liabilities (in the balance of payments statistics), and finally, short term assets over long term assets (in the balance of payments statistics). The results by Kang *et al.* (2001) appear not to be invariant both to the definition of the capital flow, the sample period and the set of the independent variables. In general, real interest rate variable is significant but with an incorrect (negative) sign, implying that higher interest rates lead to lower capital inflows. There are some justifications of this finding. First, authors argue that the negative sign may imply a counter causality running from financial account to interest rates, that the increase in the supply of funds may decrease the price of loans so the interest rates. The authors argue that the insignificance of the lagged real interest rate variable is consistent with their controversial finding. It is also argued that the bond market in Korea is not well-developed and there is a high level of international capital market restriction. This causes the link between higher return and higher demand to perish. Finally, higher interest rates declines the profitability and attractiveness of the corporate sector due to its having high debt to equity ratios, which may reduce the capital inflow. In other words, the increased interest rates represent the increased risk of the country. US real interest rates, on the other hand, are found to be significant but with a positive (incorrect) coefficient. The finding is associated with US monetary policy, that the interest rates are increased as a response to the increased economic activity in US, and the boom in the economy may lead the investors to invest overseas. The effects of the financial crises in other developing countries are insignificant in the explanation of financial account, whereas the relationship becomes significant when the dependent variable is net FDI and net portfolio flows. The pull factors are jointly significant for all the periods, and for all dependent variables, whereas the push factors fail to be jointly significant for pre-financial liberalization period. Portfolio investment items are more sensitive to both internal and external variables compared to the other components of the capital account, and the capital account itself.

Powell, Ratha, and Mohapatra (2002) investigate the inter-relationship between capital inflows and outflows along with their determinants and consequences. For a large sample of countries, Powell *et al.* (2002) investigated the cumulated outflows (% of GDP), along with several variables including GDP growth, debt to GDP ratio, M2 to GDP ratio as a measure for financial deepening, trade to GDP ratio (sum of absolute values of imports and exports over GDP) as a measure of trade openness, fiscal deficit, real effective exchange rate, per capita income, and finally Gini index as a measure of wealth discrepancy. The results from a panel-VAR containing capital inflows, private capital outflows, real exchange rate, GDP growth, fiscal balance variables suggest that there is a negative relationship between outflows and growth. Capital inflows are found to be positively affected by capital outflows, as an effect of capital repatriation; and by fiscal balance, as a consequence of healthier financial condition of the country. Furthermore, private inflows are found to positively affect economic growth. Powell *et al.* (2002) also divide the sample into two groups as countries with having positive and negative inflows. Their results suggest that "countries with lower debt, lower inflation, less corruption and lower contract repudiation risk" are more likely to benefit from capital inflows and less likely to suffer from capital leaving the country (Powell, et al. 2002, p.41). This finding is consistent with the importance of country creditworthiness on the explanation of capital flows by Fernandez-Arias (1994).

2.3 Empirical Literature on Capital Flows to Turkey: A Brief Review

Fry, Claesssens, Burridge, and Blanchet (1995) investigate the relation between capital flows and current account deficit in developing countries. Granger Causality methodology is employed to find out the direction of causality between the capital account balance and the current account balance for a group of developing countries. Four distinct scenarios are evident among these developing countries, which are: current account causes capital account, capital account causes current account, both causes each other, and none causes the other. Specifically for Turkey between 1970 and 1992 current account causes capital account. The same methodology is used to investigate the interrelation between components of capital account and their

relation with the current account. In Turkey, FDI is interdependent with the other forms of capital flow. Authors argue that when FDI is not independent from the rest of the capital flows, it is less likely to assist capital formation compared to when FDI is independent. In case of no independence, FDI crowds out more of the domestic investment. In addition, in Turkey current account mainly causes net other investment item of capital account, which includes the borrowings of central bank, general government, domestic commercial banks, and other sectors.

Balkan *et al*. (2002), utilize a monthly a time series study to investigate the relationship between short-term capital inflows into Turkey and some macroeconomic variables. As the measure of capital inflows, the dependent variable, gross inflows of short-term financial capital is taken. Istanbul Stock Exchange-100 (ISE-100) index, real exchange rate, real interest rate, ratio of public sector borrowing requirement (PSBR) to GNP (which is argued to be a relatively better measure than budget balance to GNP ratio), industrial production index, the degree of trade openness (sum of the absolute values of imports and exports to GNP), and the ratio of short-term debt to foreign reserves of the central bank (as a measure of fragility) are the explanatory variables. Furthermore, three dummies are included to examine the impacts of the 1994, 1998, and 2001 crises on the real exchange rate variable.

Balkan *et al*. (2002) found out that the best-fit model contains the ISE-100 index, real exchange rate, PSBR to GNP ratio, the dummies of real exchange rate for the three crisis years, real interest rate, fragility ratio, and the industrial production index variables with various lag lengths, in addition to the dependent variable's own past. Real interest rate variable has a positive coefficient, which failed to be significant at 10% level. One reason why real interest rate variable appears to be insignificant is argued to be the exclusion of negative real interest rate observations (for the months with high increases in inflation) that cannot be in logarithmic form. The stock exchange (ISE-100) and the real exchange rate variables both have positive and significant coefficients. Therefore, increase in stock market prices or real exchange rate appreciation will cause an increase in capital flows. Although PSBR to GNP

ratio is expected to positively affect the capital flows, it is found out to be insignificant, which may be resulting from two conflicting effects of PSBR on capital inflows. First, higher PSBR leads to higher interest rates offered by government debt instruments and higher interest rates attract higher flows of foreign capital. On the other hand, increased PSBR is a sign of increased fragility that may decrease the international investors' desire to buy securities issued in Turkey. Industrial production is found to affect capital flows negatively. This implies that, after the financial liberalization, the free capital markets encourage industrialists to take part in non-industrial arbitrage seeking activities that are directly unproductive profit seeking in nature. Fragility variable has an insignificant positive coefficient, although it had been expected to be negatively affecting capital flows. Balkan *et al.* (2002) emphasize that, large ratios of short-term debt to foreign exchange reserves of the central bank, in other words high fragility ratio, is the common problem of the countries that experienced financial crises in the last decade. Trade openness variable is found out to be positively and significantly affecting the capital flows in accordance with the expectations. Dummy variables of the real exchange rate variable for the crisis years 1994 and 1998 are positive and significant, although they had been expected to be negative. The positive relationship is considered to be a consequence of the lag-structure of the exchange rate variable. Dummy variable for the 2001 crisis is insignificant.

Çulha (2006) employs a structural VAR analysis to investigate the determinants of capital flows into Turkey. Capital inflow measures are built to be the sum of portfolio and short-term capital flows. The US interest rate and industrial production index are employed as the push factor variables. As pull factor variables, real interest rate offered by Turkish Treasury Bills, ISE price index, budget balance, and current account balance are employed. The period under study 1992:01 – 2005:12 is both studied as a whole and as two sub-periods of 1992:01 – 2001:12 and 2002:01 – 2005:12 that would enable the assessment of 2001 financial crisis as a structural breakpoint. Capital inflows to Turkey are found to be positively affected by the increase in US interest rate for the whole period. However, for two sub-periods, it is conversely observed for post 2001 crisis period that US interest rates have negative

effect on the capital flowing to Turkey. From the second push factor, the US industrial production, capital flows to Turkey has been positively affected. This finding is in contrast to the expectations of earlier studies, such as Calvo *et al*., (1993), that the recessions in developed countries should lead to an increase in capital flows, not the recoveries. However, this finding is inline with Kang *et al.* (2001) findings for Korea. Their justification that better world conditions may have increased the funds available for investment, which led to an increase in the amount of capital flowing to the developing countries, is acceptable.

Çulha (2006) states that domestic real interest rate has been found to negatively affect the capital flows for the whole period. Post-2001 crisis period findings reveal that the increase in real interest rate enhances the capital flows, whereas pre-2001 crisis has the same characteristic with the entire period. This figure out that the increase in Turkish Treasury Bill rates is a reflection of the increased risk on holding Turkish assets in the first sub-period, while the increase in capital flows into Turkey due to higher interest rates in the second sub-period is the reflection of the "normalization Turkish economy"(Çulha, 2006). As a response to a shock on ISE index, the capital flows are negatively affected initially, but this effect turns out to be positive after the first month of shock. Therefore, there is a positive relationship between stock market prices and capital flows with one lag. Further, capital flows are negatively affected by budget deficit and current account deficit. The findings are almost the same for the last three variables for the model with two sub-periods.

Ulengin and Yentürk (2001) found out that foreign savings (capital flows) cause private consumption which causes private investment. The increase in investment is found to be mainly in the non-tradable sectors. It is argued that counting on foreign savings to attain long term growth in tradables sector is not feasible.

Balkan *et al*. (2002) have constructed a quarterly model to investigate the impacts of real interest rate, gross capital flows, real wages, and national income on the real private fixed investment. Gross capital flows are found out to positively affect real private investment. However, likewise Ulengin and Yentürk (2001), Balkan *et al.*

(2002) argues that the increase in private investment, due to the increase in capital flows, is mainly in non-tradable sector. Capital flows lead to an appreciation on the exchange rate. This appreciation of domestic currency decreases the costs of imports of tradable products, capital goods and intermediate products, which enables the rise in investment demand in non-tradable sectors. It is argued that any sudden stop of capital flows may lead to a halt in private fixed investment. The real wage rate in manufacturing sector variable has a negative significant coefficient. This implies that the manufacturers had to decline the wages as capital flows to the country, appreciating the domestic currency and declining the competitiveness of domestic manufacturing firms.

Çimenoğlu and Yentürk (2005) investigate the effects of capital flows on Turkish economy. Turkish net external financing is found to be highly volatile, that in 1994 it was at the record low level of -4% of GNP, interestingly it increased sharply to 7.9% in 1997, the record high level up to that time. Compared to some emerging market economies of Eastern Europe, Southeastern Asia, and Latin America, Turkey had relatively lower external financing as a share of GNP, and significantly higher volatility in capital flows. One main reason of high volatility in capital flows is argued to be the poor share of foreign direct investment contributed by the capital flows. To be able to investigate the main effects of capital flows on the Turkish economy, Çimenoğlu and Yentürk (2005) employ a VAR model with quarterly data for the period 1987 - 2002. The estimated variables are; (i) capital account to GDP ratio as a proxy for capital flows, (ii) annual growth rate of private real consumption (iii) private investment expenditure, and (iv) real exchange rate. It is found out that net capital flows have a positive effect on real exchange rate and private consumption. To note, private consumption is found out to affect private investment in the same direction. The increase in real exchange rate along with capital flows implies relative increase in non-tradable sector prices. It is argued that private investments increase more in favor of non-tradable sector compared to tradable sector as capital flows lead to the appreciation of domestic currency. The increase in non-tradable sector investments does not contribute to export – so to the foreign currency earning - capacity of the country.

CHAPTER 3

CAPITAL FLOWS: THE TURKISH EXPERIENCE

Turkish financial account has been liberalized in 1989. Similar to many developing countries that have liberalized their financial accounts, Turkey has benefited from the rush of capital flows of the early 1990s and the mid 2000s. However, with her fragile financial system, capital account liberalization and the consequential capital mobility have not been always beneficial growth and macroeconomic stability in Turkey. The surge of huge capital flows are followed by substantial sudden stops or reversals, disturbing macroeconomic stability and increasing uncertainty. Unsuccessful structural reforms, incredible stabilization policies, and weak fiscal discipline made it impossible to protect the economy from the side-effects of international financial liberalization. During the last two decades, Turkey experienced two financial crises (1994 and 2001) with severe output costs in which huge capital outflows had played remarkable roles.

Financial account balance, current account balance, and the change in international reserves have cyclical patterns during the last two decades[4]. As presented by Figure 2, Turkey generally enjoyed net positive financial account balances, in other words capital inflows, during the 1984 – 2006 period, with the exception of five years. There are net capital outflows for the financial crisis years of 1994 and 2001. Turkey witnessed current account deficits except for six years of current account surpluses, the two of which are the financial crisis years of 1994 and 2001. In general, there is international reserve accumulation during the period, and in only five years there were net decreases in international reserves, two of them belonging the crisis years.

[4] Turkish balance of payments statistics are presented in Table A1 of Appendix A.

Net errors and omissions (NEO) item ranges between -1.38% and 2.05% of GDP, which can hardly be assumed as minor. At some observations, NEO item is greater than all the other items of BOP. It is possible to attribute the existence of this error term to the difficulties faced in the measurement of the elements of financial account and the current account. A broader discussion is presented in Appendix C.

By definition, the current account and financial account moves in opposite directions in the Balance of Payments (BOP) accounting identity. In addition, capital inflows accompany international reserve accumulation. In 1990, following the financial account liberalization of 1989, there were a record high level of - $4 billion – foreign capital inflow, reversed by the following year's capital outflow of $2.4 billion. Likewise 1991, the crisis years of 1994 and 2001 are distinctive with huge capital outflows, current account surpluses, and declining international reserves. Furthermore, similar to 1990, pre-crisis years of 1993 and 2000 are remarkable with substantial current account deficits and financial account surpluses.

It can be seen from Figure 2 that there are remarkable differences between the balances of the 1980s and the 2000s. First, there are substantially high increases in the dollar amounts of the items of BOP. In addition, there are significant increases in the current account deficit, financial account surplus, and increase in international reserves to GDP ratios during the 2001 – 2006 period. In 2005, there were $43.6 billion net flows of foreign capital to Turkey, equal to the record high 12% of GDP, accompanying a record high level of accumulation of international reserves amounting a 6.4% of GDP. In 2006, Turkey received net capital flows amounting 11.3% of its GDP, financing a record high level of current account deficit equivalent to 7.9% of its GDP.

The components of financial account are net foreign direct investment, net portfolio flows, and net other investment. Net foreign direct investment is calculated as the difference between foreign direct investment in Turkey and the direct investments of Turkish enterprises abroad. To note, purchase of 10% or more of the common stock of a firm is considered as direct investment, due to the obtained ownership and

control by the foreigners (Appleyard and Field, 1998). Therefore, privatizations of SEEs, with the sale of at least 10% of common stock to foreigners, are considered as foreign direct investments. Net portfolio investment is calculated as the difference between the foreign purchases of Turkish debt and equity instruments and Turkish purchases of foreign debt and security instruments. Net other investment is built to be the difference between the foreign borrowing and foreign lending of monetary authority, general government, banking sector, and other sectors.

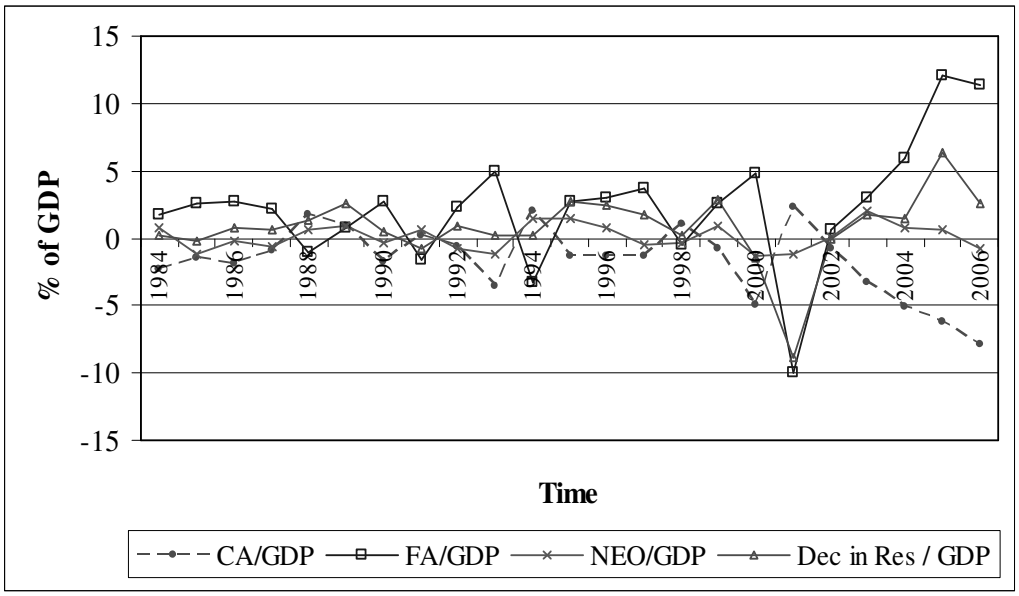

Figure 2[5]: Turkish Balance of Payments Statistics as a Percentage of GDP

The components of Turkish financial account balance as a percentage of GDP are presented in Figure 3 and Table A2 of Appendix A. It may be argued that net other investment (NOI) item is the major item of financial account balance due to high public and private external borrowing. NOI is highly negative in the crisis years of 1994 and 2001, which were preceded by high foreign borrowings of 1993 and 2000, respectively. The NOI tends to be increasing in last five years (2002-2006). Net

[5] Source: CBRT

portfolio investment to GDP ratios are higher at the post-financial liberalization period compared to the pre-financial liberalization period. There are remarkable portfolio outflows in 1998 and 2001 coinciding with the Russian and Turkish financial crises respectively. Net foreign direct investment is positive at all observations, implying that Turkey is a net productive capital importer. FDI was notably high in the years 2001, 2005, and 2006. FDI is high in 2001, mainly due to the entrance of a foreign technology and telecommunications corporation into domestic mobile telecommunication sector. In 2005 and 2006, FDI reaches to 2.4% and 4.8% of GDP, respectively, mostly due to increased privatizations enabled by new Public Procurement Law and foreign sales of domestic private firms especially in the sectors of banking, manufacturing, petroleum and mining, and telecommunication. It can be said that, as a component of capital account, foreign direct investment is the one with the least variation over time, and it appears to be the least responsive item to the negative shocks to the financial system. The record high foreign capital inflow of 2005 can be attributed to record high net other investment – high external borrowing of public and private sectors- and record high net portfolio investment – sales of debt and equity instruments in remarkable amounts. High 2006 foreign capital flow can be attributed to record high FDI along with high net other investment.

Financial account is the measure of capital flows to a country. It is already shown that capital flows to Turkey have been remarkably volatile both in levels and as percentages of national income. These changes in the amount of capital flows and portion of capital flows out of GDP need some further investigation. Leaving the separate investigation of the determinants of the components of capital and financial account to a future research, this study mainly utilizes a data based empirical methodology – the Johansen cointegration procedure - to assess the long run determinants of capital flows to Turkey.

It may be useful to categorize the factors that affect capital flows to Turkey. Real interest rates offered by government debt instruments can be a good measure of real returns that are gained by domestic financial investors and also by foreigners who

export their capital to Turkey. Since real interest rate represents project specific returns to creditors, its effect - if there is any - on capital flows should be through F_d channel. An increase in domestic real interest rates is expected to lead to an increase in capital flows to Turkey. Fernandez-Arias and Montiel (1996) argue that inflation stabilization policies accompanied by fiscal discipline improve domestic factors operating at the project level (underlying *d*). Therefore, capital flows can be expected to increase with lower budget deficits, or higher budget balances. Since Turkey have been fighting with inflation at the last decades and fiscal discipline plays an important role in this campaign, the effects of budget balance on capital flows can be tested.

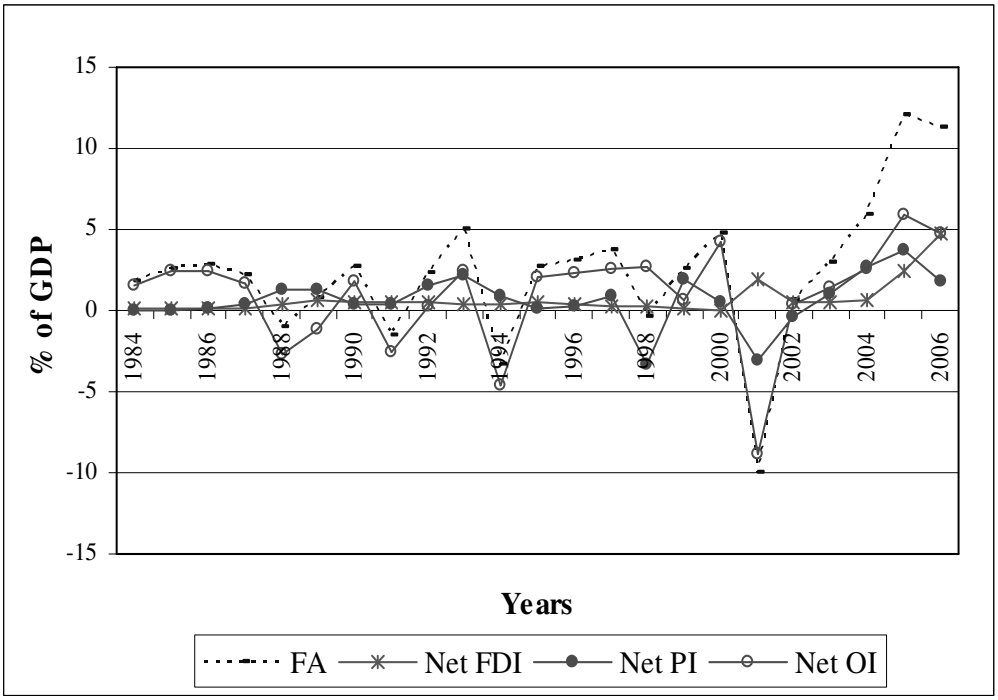

Figure 3[6]: Components of Turkish Financial Account

[6] Source: CBRT

Several economic variables can be used as indicators of country creditworthiness. Fernandez-Arias and Montiel (1996) emphasize the link between country creditworthiness and debt sustainability. An increase in the perceived debt sustainability increases the country's creditworthiness. The country's capacity to pay its future debt and ability to make the required interest payments rooting from the current borrowing are very important for international lenders. Any increase at the factors that enhances the borrowers debt repayment capacity, increases the international creditors willingness to invest their capital in that country. For a developing country, which has a high debt stock denominated in foreign currencies instead of domestic currency, such as Turkey, it is rational to expect higher capital inflows when the total debt to international reserves ratio declines over time. To note, even domestic debt of Turkey includes a significant portion of foreign currency debt. In addition, due to the total debt stock that is denominated in foreign currencies, a real appreciation of domestic currency increases the country's ability to meet its future requirements with its given resources. Since Turkey has a highly dollarized debt structure (Özmen and Arinsoy, 2005) it is possible to expect an increase in creditworthiness, thus an increase in capital flows, with a decline in total debt to international reserves ratio, and/or a real exchange rate appreciation. Furthermore, lower budget deficits require lower borrowing, declining the required increase in government borrowing. Therefore, budget balance is expected to affect the capital flows through creditworthiness channel positively, in the same direction it is expected to affect capital flows through domestic returns channel.

Given by Fernandez-Arias and Montiel (1996) model, country creditworthiness factor c is increasing with g, the growth rate of domestic resources. It is possible to employ GDP growth rate as the growth rate of domestic resources, and it makes sense to expect an increase in country creditworthiness with the increases in national real income. Therefore, it is rational to expect an increase in capital flows to Turkey accompanied by the increases in GDP growth. According to the model, shift factor c is decreasing with R, the world financial returns. Therefore, when world interest rates are increasing, a decline in Turkish creditworthiness may be expected, leading to lower capital inflows to the country.

Foreign real interest rates affect the exogenous shift factor *w*, as well. Increases in developed country real interest rates, such as US real interest rates, make it relatively less profitable to export capital to the developing countries. Therefore, an increase in US real interest rates on treasury bills leads to a decline in capital flows to Turkey. The US interest rate works in the same way as it works through the creditworthiness channel.

To sum up; in the long run, net capital flows to Turkey can be expected to increase with an increases in Turkish real interest rates, a real appreciation of TL, an increase in Turkish real GDP growth, a higher budget balance, a lower debt to international reserves ratio, and a decrease in US real interest rates. Next chapter investigates these expectations empirically.

CHAPTER 4

THE DETERMINANTS OF CAPITAL FLOWS TO TURKEY: EMPIRICAL INVESTIGATION

This chapter empirically investigates the determinants of capital flows to Turkey. In the end of the previous section, it has been concluded that it is possible to expect an increase in net capital flows to Turkey, in the long run, with the increase in Turkish real interest rates, a real appreciation of TL, an increase in Turkish real GDP growth, a higher budget balance, a lower debt to international reserves ratio, and a decrease in US real interest rates. Johansen cointegration methodology is utilized, to test whether the mentioned factors explains net capital flows to Turkey in the long run, or not. The study employs quarterly data for the period 1992:1 – 2006:4. Due to unavailability of quarterly (or monthly) balance of payments data, this study does not investigate the years before 1992. The data sources and definitions are presented in Appendix B.

As an econometric model, equation 4.1 will be estimated to test the validity of the expectations discussed in the previous chapter.

$$(4.1) \quad CAPF = \beta_1 LNTRIR + \beta_2 LNREER + \beta_3 GDPGR + \beta_4 BB + \beta_5 FRAG + \beta_6 LNURIR$$

In this model, β_1, β_2, β_3, and β_4 are expected to be positive and β_5 and β_6 are expected to be negative, where: (i) CAPF, the capital flows variable, is calculated to

be the financial account to GDP (in current prices) ratio at each quarter[7]. (ii) LNTRIR, the Turkish ex-post real interest rate variable, is calculated to be the natural logarithm of the summation of 1 and the Turkish ex-post real interest rate in decimal form. (iii) LNREER, the real effective exchange rate variable, is calculated to be the natural logarithm of Turkish real effective exchange rate index. To note, an increase in this measure implies a real appreciation of TL. (iv) GDPGR, the real annual income growth variable, is calculated to be the difference between natural logarithm of GDP (in 1987 prices) at quarter t and natural logarithm of GDP at quarter t - 4, as suggested by Maddala and Kim (1998). (v) BB, the budget balance variable, is calculated to be the ratio of annualized budget balance of the quarter to the GDP (in current prices) ratio. (vi) FRAG, the fragility variable, is calculated to be the total central government debt to international reserves of CBRT ratio. (vii) LNURIR, the United States real interest rate variable, is calculated to be the natural logarithm of the summation of 1 and the United States real interest rate in decimal form. The graphs of the series and their first differences are presented in Figure 4.

Johansen cointegration methodology employs I(1) variables. Therefore, prior to cointegration analysis, it is essential to identify the variables' order of integration. There are a broad variety of unit root tests that are used to identify the orders of integration of the variables. However, these tests may conclude on contradicting orders of integration. In other words, depending on the choice of unit root test, some variables may be treated as stationary although they are non-stationary, and vice versa. In order to be consistent, it may be reasonable to stick to one unit root testing methodology, and do not employ any other tests. Alternatively, it can be useful to employ two unit root tests of different types in their choice of null hypothesis. First type tests the stationarity of the variable against the null of non-stationarity, and the second type tests the non-stationarity of the variable against the null of stationarity. This type of confirmatory analysis makes the conclusion on the order of integration of the variables more reliable (Maddala and Kim, p.126, 1998).

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[7] CAPF variable does not include the balance on the Net Errors and Omissions term of the balance of payments statistics, under the assumption that the source of this error term is uncertain or it results mainly from the measurement difficulties faced in the calculation of the current account instead of the capital account. A brief discussion is given in Appendix C.

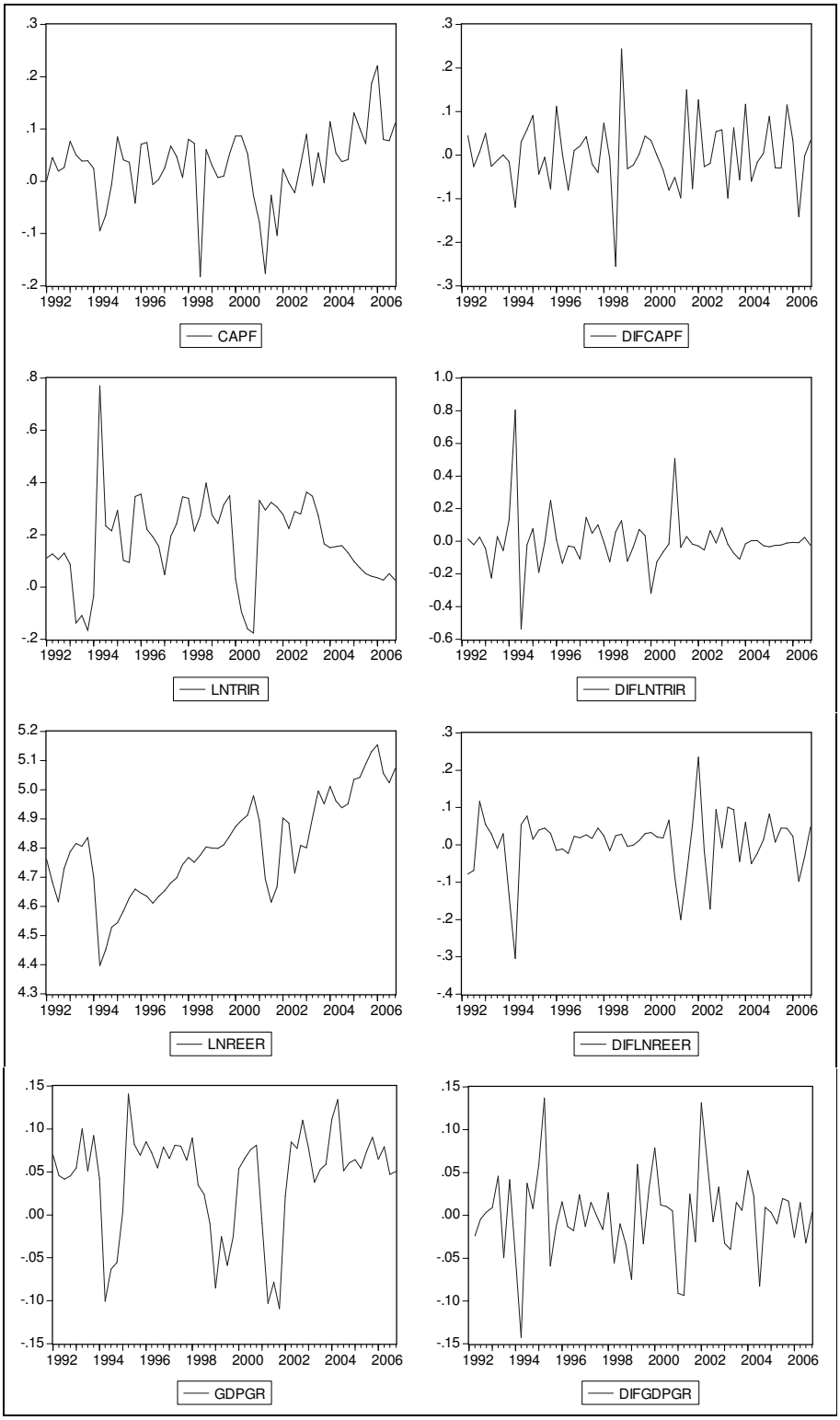

Figure 4: Graphs of Series and Their First Differences

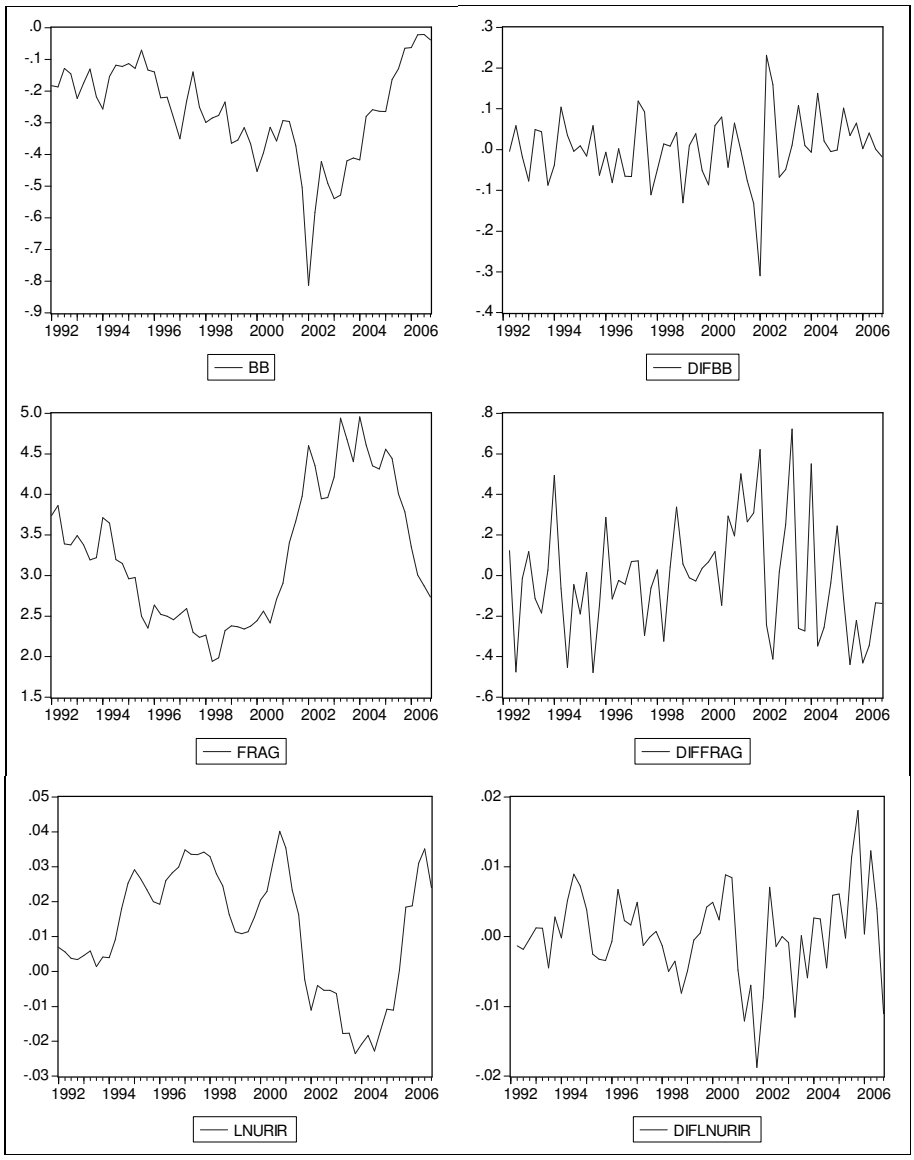

Figure 4 (continued)

Augmented Dickey-Fuller (ADF) test, which takes the non-stationarity as the null, and Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test, which takes the stationarity as the null, are employed to test for the order of integration of the variables. Table 1 and Table 2 present the results for ADF and KPSS unit root tests, respectively. The numbers in parentheses represent the lag lengths employed in the

regressions. Schwarz Information Criterion is used for automatic lag length selection, with a maximum of five lags, if not otherwise stated. AR spectral – OLS method is employed as the spectral estimation method for KPSS.

Table 1: ADF Unit Root Test Statistics

	Levels		**First Differences**
Series	λ_t	λ_m	λ_m
CAPF	-5.17* (0)	-4.91* (0)	-8.24* (1)
CAPF	-2.72 (4)	-2.35 (4)	-4.35* (4)
LNTRIR	-2.76 (4)	-2.81 (4)	-9.14* (0)
LNREER	-3.49 (4)	-1.46 (0)	-7.01* (1)
GDPGR	-2.48 (4)	-2.40 (4)	-7.52* (3)
BB	-1.65 (0)	-1.86 (0)	-7.66* (1)
FRAG	-1.35 (0)	-1.25 (0)	-6.45* (0)
LNURIR	-1.82 (4)	-1.54 (4)	-4.83* (3)

Notes: The equations for λ_m include a constant term, and for λ_t a linear trend and a constant term. MacKinnon (1996) 5% critical values are -3.49 for λ_t and -2.92 for λ_m. The values with "*" indicate that H_o is rejected at the 5% level. The numbers in parentheses are the lags used in the ADF regressions.

Table 2: KPSS Stationarity Test Statistics

	Levels		**First differences**
Series	κ_t	κ_m	κ_m
CAPF	0.34* (0)	0.77* (0)	0.01 (1)
CAPF	0.31* (4)	0.83* (4)	0.01 (4)
LNTRIR	0.22* (4)	0.44 (5)	0.02 (0)
LNREER	0.67* (4)	18.07* (0)	0.04 (1)
GDPGR	0.47* (4)	0.61* (4)	0.04 (3)
BB	2.68* (0)	4.71* (0)	0.06 (1)
FRAG	2.94* (3)	18.00* (0)	0.22 (0)
LNURIR	2.13* (4)	6.32* (4)	0.00 (3)

Notes: The equations in the calculation of Lagrange multiplier κ_m include a constant term, and κ_t include a linear trend and a constant term. Kwiatkowski, Philips, Schmidt, and Shin (1992) 5% level critical LM values are 0.15 for κ_t and 0.46 for κ_m. The values with "*" indicate that H_o is rejected at the 5% level. The numbers in parentheses are the lags used in the KPSS regressions.

ADF and KPSS tests produce consistent results for BB, FRAG, GDPGR, LNREER, and LNURIR variables, that all are I(1). CAPF variable is I(0) with 0 lag length according to ADF test, whereas it is found to be non-stationary by KPSS test with the same lag length. If the lag length is increased to 4, an imposition that is meaningful to make with quarterly data, ADF test concludes that CAPF are not I(0), in consistence with the KPSS test. The first difference of CAPF series is found out to be stationarity by both tests, implying that CAPF is an I(1) variable. On the other hand, LNTRIR variable is found out to be non-stationary by ADF test, but stationary by KPSS test in 95% confidence level (however, stationarity can be rejected in 90% confidence level; the critical value is 0.347, lower than the calculated LM statistic of 0.439). KPSS test with trend and intercept implies non-stationarity as well. These imply that, LNTRIR variable can be treated as integrated of order one similar to all the other variables.

4.1 Estimation of the Model

Preceding discussions argue that capital flows to Turkey (CAPF) may increase with higher domestic real interest rate (LNTRIR), more valuable domestic currency (LNREER), higher national real income growth (GDPGR), more favorable budget balance (BB), lower fragility (FRAG), and lower US real interest rates (LNURIR), in the long run. These can be tested by employing Johansen procedure (see Johansen and Juselius, 1990, and Johansen, 1991). All the regressions in this study are run via E-views 5.0 program.

Prior to Johansen cointegration analysis, it is essential to clarify the optimum lag length in the VAR based on the variables CAPF, LNTRIR, LNREER, GDPGR, BB, FRAG, LNURIR. The optimum lag length is found to be 1 according to Schwarz Information Criterion. In addition, the trend term is found to be insignificant in the regression.

The trace and maximum eigenvalue statistics obtained by Johansen estimation with 1 lag indicate that there is only one cointegrating relationship among these variables.

Table 3 shows the trace and maximum eigenvalue statistics. The p-values are obtained in accordance with MacKinnon, Haug, and Michelis (1999).

Table 4 shows the cointegrating vector that is normalized for the dependent variable CAPF – capital flows – with the standard errors and t statistics for the normalized coefficients of the independent variables. In addition, the adjustment coefficients of the first differences of the variables – the components of the α matrix – and their standard errors and t-statistics are given in the table. The coefficients of the cointegrating vector are presented in their form as they have entered the VAR. The cointegrating equation will therefore be:

CAPF = 0.08 LNTRIR + 0.20 LNREER + 0.46 GDPGR + 0.18 BB - 0.03 FRAG - 1.23 LNURIR.

Table 3: Unrestricted Cointegration Rank Test

Trace Statistic				
H_0: *r*	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.
0	0.697	161.549*	125.615	0.000
1	0.423	92.290	95.754	0.085
2	0.321	60.402	69.819	0.223
3	0.257	37.959	47.856	0.304
4	0.179	20.709	29.797	0.376
5	0.116	9.254	15.495	0.342
6	0.036	2.114	3.841	0.146
Maximum Eigenvalue				
H_0: *r*	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.
0	0.697	69.259*	46.231	0.000
1	0.423	31.888	40.078	0.309
2	0.321	22.443	33.877	0.573
3	0.257	17.250	27.584	0.559
4	0.179	11.455	21.132	0.602
5	0.116	7.140	14.265	0.473
6	0.036	2.114	3.841	0.146

Note: * denotes the significant tests at 5% level.

CAPF variable does not include the Net Errors and Omissions term of BOP statistics. Çıplak (2005) argues that NEO term can be mainly attributed to the omissions made in the measurement of the financial account of Turkey, since it is more correlated with the financial account compared to the current account. The investigation of the main source of this error term is beyond the aims of this study. However, it is essential to examine whether the results differ significantly when the NEO term is included in the dependent variable. Appendix C presents the estimations that employ CAPFE as the dependent variable, which includes the NEO term in addition to the financial account. The explanatory power of the model does not diminish and the findings for CAPFE variable are robust, as well.

Table 4: Cointegrating Vector and Adjustment Coefficients

Cointegrating vector normalized for CAPF						
CAPF	LNTRIR	LNREER	GDPGR	BB	FRAG	LNURIR
1	-0.08	-0.20	-0.46	-0.18	0.03	1.23
	(0.03)	(0.03)	(0.08)	(0.03)	(0.01)	(0.42)
	[-2.62]	[-7.34]	[-5.95]	[-5.65]	[3.16]	[2.93]
Adjustment coefficients						
D(CAPF)	D(LNTRIR)	D(LNREER)	D(GDPGR)	D(BB)	D(FRAG)	D(LNURIR)
-1.08	-0.27	0.25	0.39	0.50	-2.08	0.03
(0.23)	(0.63)	(0.29)	(0.17)	(0.27)	(0.94)	(0.02)
[-4.67]	[-0.42]	[0.85]	[2.25]	[1.87]	[-2.21]	[1.51]

Notes: The values in parentheses are the standard errors, and in brackets are the t values. 5% critical t value is 1.96.

All the coefficients are significant in 95% level of confidence. It can be seen that in the lung run there exists a relationship such that capital flows to Turkey are positively effected by the increases in Turkish real interest rate, real exchange rate appreciation, increase in GDP growth, increase in budget balance, and negatively effected by the increase in fragility (total central government debt over international reserves) and the US real interest rate. To note, the constant term, -0.81, is found to be significant in this cointegrating vector. The inclusion of the constant term does not change the coefficients or their significance levels in the cointegrating vector.

For this system of seven variables, long run exclusion and weak exogeneity tests can be employed for assessing the roles of the variables individually. The long run exclusion test is formulated to figure out if the variable under question can be excluded from the cointegrating system or not. It is built to test if the *i*th row of the β (or *i*th column of β') matrix is zero. The null are H_o: $\beta_{ij} = 0$ (or $\beta'_{ji} = 0$), where i = 1,…,7, the number of variables in the system, and j = 1, since there is only one cointegrating vector. If the null is failed to reject, then the variable in the corresponding row *i* can be excluded from the long run equation. The results for the long run exclusion tests for the corresponding seven variables are summarized in Table 5. The p-values are given below the calculated χ^2 values, indicating that none of the variables can be excluded from the cointegration space with 95% confidence.

Table 5: Long Run Exclusion and Weak Exogeneity Tests

		CAPF	LNTRIR	LNREER	GDPGR	BB	FRAG	LNURIR
Long run	χ^2 (1)	35.571	3.927	31.156	17.520	15.473	7.871	6.310
exclusion test	Prob.	0.000	0.048	0.000	0.000	0.000	0.005	0.012
Weak exogeneity	χ^2 (1)	15.363	0.163	0.728	4.304	3.627	4.394	2.283
test	Prob.	0.000	0.686	0.393	0.038	0.057	0.036	0.131

Note: χ^2 (1) 5% critical value is 3.84.

The weak exogeneity test figures out if the variable under investigation affects the other variables but is not affected by them. It is formulated to test whether all the components of *i*th row of α matrix are zero. The null are H_o: $\alpha_{ij} = 0$, where i = 1,…,7, the variables in the system, and j = 1, since there is only one cointegrating vector. If the null is failed to reject, then the variable in the corresponding row *i* is weakly exogenous, and it can be said that the variable affects the other variables but it is not affected by them. The results for seven weak exogeneity tests for the corresponding variables are summarized in Table 5.

The p-values indicate that CAPF, GDPGR, and FRAG variables are rejected to be weakly exogenous in 95% confidence level. On the other hand, LNTRIR, LNREER, BB, and LNUNIR are failed to reject for being weakly exogenous. Therefore, it can

be said that they are not affected by the other variables but they affect them at this cointegration space. These findings are in line with the adjustment coefficients of the cointegrating vector and their significances. We see that only the coefficients of D(CAPF), D(GDPGR), and D(FRAG) variables are different from zero in 95% significance. D(BB) is significantly different than zero in 90% confidence, likely weak exogeneity of BB can be rejected in 90% significance level.

4.2 Implications of the Results

Empirical results are in accordance with the argument in the previous chapter based on Fernandez-Arias and Montiel (1996) analytical model. The capital flows to Turkey increase in response to increases in Turkish real interest rate, real effective exchange rate, real GDP growth, budget balance to GDP ratio, and decreases in total central government debt to international reserves ratio and the US real interest rates.

The adjustment coefficient of the dependent variable is found to be -1.08. This implies that capital flows adjust quite fast (around one quarter) for the deviations from the long run equilibrium

Turkish real interest rate is the proxy for project level domestic determinants of capital flows to Turkey. According to the analytical model, capital flows are expected to increase in response to increases in real returns offered by the domestic projects. In Turkish case, increases in domestic real returns make Turkey more attractive for foreigners to export their capital in the long run. One might argue that increases in real interest rates make it harder to meet future interest payment requirements, leading to a decline in country creditworthiness. This possible effect of real interest rate increases may need to be investigated in future studies. However, even there exist such negative effects of increased interest rates on capital flows through creditworthiness channel, their positive effect on capital flows through project level returns channel seems to be more robust. In brief, positive effects of real interest rates on capital flows are found to dominate any possible negative

effects of that increase. These finding is similar to the earlier findings of Çulha (2006).

Real appreciation of TL is found to positively affect capital flows to Turkey in the long run. This affect can be established through country creditworthiness channel. Since Turkey has a debt stock that is highly denominated in foreign currencies (Özmen, Arinsoy, 2005), the real appreciation of TL decreases its debt stock in TL terms. The debt repayment capacity of the country increases with the given resources, and this leads to an increase in country creditworthiness. In addition to this balance sheet effect one explanation of this relationship between real exchange rate and capital flows are given by Balkan *et al*. (2002). It is argued that real exchange rate appreciation leads to an increase in capital flows because it enables speculative gains for arbitrage seeking investors, and they invest more in Turkish markets. One might argue that the continued appreciation of the domestic currency may lead to increasing current account imbalances, which may lead to a decline in country creditworthiness, and in capital flows as a result of it. Although this argument may be correct, the overall effect of real appreciation of domestic currency is found to be positive on country creditworthiness. In addition, real exchange rate is found to be weakly exogenous in this cointegration space, implying that it affects the other variables in the system but it is not affected by them.

Increases in real GDP growth are found to attract more capital flows to Turkey in the long run. According to Fernandez-Arias and Montiel (1996) analytical model, the growth in resources increases country creditworthiness, and this increase in creditworthiness attracts more capital flows. This finding is in line with the previous findings of Powell *et al*. (2002) regarding national income growth and capital outflows from developing countries.

An increase in budget balance to GDP ratio is found to increase the capital flows to Turkey in the long run. The increase in the balance is equivalent to a decline in the budget deficit. A shrinking budget deficit requires less borrowing, and as a result, it requires less future debt repayment and interest payment. Its effect on country

creditworthiness will be positive. In addition, declining budget deficits is a sign of fiscal discipline, and fiscal discipline that accompanies inflation stabilization policies improve domestic project level factors according to Fernandez-Arias and Montiel, (1996). However, one might argue that the increase in budget deficits requires higher public sector borrowing. This increase in public sector borrowing requirement can be compensated by higher capital inflows (Balkan *et al*. 2002). Therefore, capital flows need to increase if the budget balance worsens. This argument may be correct. However, the estimated positive coefficient of the budget balance to GDP ratio implies that the positive effects of the budget balance are dominant to its negative effects in the long run.

An increase in total central government debt to international reserves of CBRT ratio is found to lead a decrease in net capital flows to Turkey in the long run. This ratio is a proxy for financial fragility. Turkey's total central government debt stock contains significant amounts of foreign currency denominated debt. If the increase in central government debt stock is proportionally higher than the increase in international reserves of the country, the debt repayment capacity of the country worsens. In other words, country's fragility increases. Country creditworthiness decreases as a result of higher fragility.

The decline in the US real interest rate is found to positively affect the net flows of foreign capital to Turkey. Fernandez-Arias and Montiel (1996) argues that industrial country real returns affect capital flows to developing countries through two channels in the same direction. First, decreasing industrial country real returns increase country creditworthiness, and increases capital flows indirectly. Second, directly as an external factor, such that lower real interest rates in the industrial countries encourage investors to export capital to developing countries. The US real interest rate is found to be weakly exogenous, in consistence with the expectations. This finding is in line with Çulha (2006).

CHAPTER 5

CONCLUSION

This study investigated the determinants of capital flows to Turkey in 1992:1-2006:4 period. As pull factors, real interest rate, real appreciation of TL, real GDP growth, budget balance, and central government debt to international reserves ratio have been investigated. The real interest rate offered by US treasury bills is the one and the only push factor under investigation. The capital flows variable is chosen to be the net financial account item of balance of payments.

Johansen cointegration analysis is employed for empirical investigation. One cointegrating equation is discovered to exist between the variables. Increases in domestic real interest rate, appreciation of TL, increases in real GDP growth, lower budget deficit, lower debt to reserves ratio, and lower US real interest rates are found to lead to increases in Turkish net financial account, in the long run. Capital flows to Turkey adjusts fast to the deviations from the long run equilibrium, at about one quarter.

The findings imply that net capital flows to Turkey is positively affected by increases in domestic real returns and country creditworthiness, and favorable international interest rate conditions. In this study, the domestic real interest rate is used as the proxy for project level domestic factors. Capital flows are expected to increase in response to increases in real returns offered by the domestic projects. The findings of this study are in line with these expectations. The argument that the continued increase in real interest rates leads to a decline in country creditworthiness may be correct. However, it is found out that the positive effects of increases in real

interest rates seem to dominate their negative effects, such that the overall effect of interest rate increase is positive on net capital flows.

Real exchange rate appreciation, real GDP growth, higher budget balance and lower debt to reserves ratio are the factors that represent country creditworthiness. To note, similar to domestic real interest rate, these factors may work through other channels, as well. It is found out that the real appreciation of domestic currency attracts higher foreign capital flows to Turkey. This finding is understandable given that Turkey has a highly foreign currency denominated debt stock. The appreciation of TL declines the total debt stock to total national income, so improves country creditworthiness. This effect is dominant compared to possible negative effects of exchange rate appreciation on capital flows. Net capital flows increase in response to higher national income growth. The justification is straightforward: the growth in country's resources increases its creditworthiness, and this increase in creditworthiness attracts more capital flows. Lower budget deficits and lower debt to international reserves ratios attract more capital flows since they improve country creditworthiness, as well.

Turkish evidence supports that the decline in developed country interest rates is a condition that increases capital flows to developing countries. It works trough two channels in the same direction. First, a decline in developed country interest rates makes it more attractive to invest in developing countries. Second, this decline in interest rates makes developing countries more creditworthy since they are highly indebted. The increase in country creditworthiness leads more capital flows.

APPENDICES

APPENDIX A: TURKISH BOP STATISTICS

Table A1: Turkish Balance of Payments Statistics

	Current Account Balance		**Financial Account Balance**		**Net Errors and Omissions**		**Increase in International Reserves**	
Years	**Million US$s**	**% of GDP**	**Million US$s**	**% of GDP**	**Million US$s**	**% of GDP**	**Million US$s**	**% of GDP**
1984	-1439	-2.36	1075	1.76	462	0.76	98	0.16
1985	-1013	-1.50	1741	2.58	-837	-1.24	-109	-0.16
1986	-1465	-1.92	2124	2.79	-118	-0.15	541	0.71
1987	-806	-0.93	1891	2.18	-505	-0.58	580	0.67
1988	1596	1.77	-958	-1.06	515	0.57	1153	1.28
1989	938	0.87	780	0.73	1007	0.94	2725	2.54
1990	-2625	-1.74	4037	2.68	-583	-0.39	829	0.55
1991	250	0.17	-2397	-1.59	924	0.61	-1223	-0.81
1992	-974	-0.61	3648	2.29	-1190	-0.75	1484	0.93
1993	-6433	-3.58	8903	4.96	-2156	-1.20	314	0.17
1994	2631	2.03	-4257	-3.28	1911	1.47	285	0.22
1995	-2339	-1.38	4565	2.69	2459	1.45	4685	2.76
1996	-2437	-1.34	5483	3.02	1499	0.83	4545	2.50
1997	-2638	-1.39	6969	3.68	-987	-0.52	3344	1.76
1998	1985	0.99	-840	-0.42	-698	-0.35	447	0.22
1999	-1336	-0.73	4829	2.62	1713	0.93	5206	2.83
2000	-9823	-4.92	9584	4.80	-2758	-1.38	-2997	-1.50
2001	3393	2.33	-14557	-10.00	-1760	-1.21	-12924	-8.88
2002	-1521	-0.83	1194	0.65	115	0.06	-212	-0.12
2003	-8036	-3.34	7192	2.98	4941	2.05	4097	1.70
2004	-15601	-5.15	17752	5.86	2191	0.72	4342	1.43
2005	-22603	-6.22	43687	12.02	2116	0.58	23200	6.38
2006	-31896	-7.92	45621	11.33	-3100	-0.77	10625	2.64

Source: CBRT

Table A1 shows the Turkish balance of payments statistics for the period 1986 – 2006, each balance is given in million US dollars and as a percentage of GDP. Financial account balance includes the capital account balance for 1986 – 1991, and it is redefined in 1992 to include all the items of capital account, and the capital account balance is set to zero after then. The terms "capital account" and "financial account" can be used interchangeably for 1992 to present. 1984 – 2006 annual data are available in Central Bank of Republic of Turkey (CBRT) database.

Table A2 presents the Turkish financial account and its components as a percentage of GDP. 1984 – 2006 annual data are available in CBRT database.

Table A2: Components of Turkish Financial Account (% of GDP)

Years	Financial Account Balance	Net FDI	Net Portfolio Investment	Net Other Investment
1984	1.76	0.18	0.00	1.57
1985	2.58	0.15	0.00	2.43
1986	2.79	0.16	0.19	2.43
1987	2.18	0.12	0.32	1.73
1988	-1.06	0.39	1.30	-2.76
1989	0.73	0.62	1.29	-1.18
1990	2.68	0.46	0.36	1.85
1991	-1.59	0.52	0.41	-2.52
1992	2.29	0.49	1.51	0.29
1993	4.96	0.35	2.18	2.43
1994	-3.28	0.43	0.89	-4.60
1995	2.69	0.45	0.14	2.10
1996	3.02	0.34	0.31	2.37
1997	3.68	0.29	0.86	2.52
1998	-0.42	0.29	-3.35	2.65
1999	2.62	0.07	1.86	0.68
2000	4.80	0.06	0.51	4.23
2001	-10.00	1.96	-3.10	-8.86
2002	0.65	0.52	-0.32	0.45
2003	2.98	0.52	1.02	1.44
2004	5.86	0.67	2.65	2.55
2005	12.02	2.40	3.70	5.92
2006	11.33	4.76	1.83	4.74

Source: CBRT

APPENDIX B: DATA

B.1 Data Sources and Definitions

Capital Flows Data:

Financial account balance data is used as the capital flows variable. Financial account data are obtained from the CBRT database. Original data are monthly and in million US Dollars. The financial account data is converted to quarterly data by simply summing the corresponding three months' values to reach the quarterly values. The balance of payments data are not cumulative and do not need to be averaged. Using quarterly YTL/US Dollar data, which is obtained from CBRT database, financial account units are converted in TL.

Turkish Nominal Interest Rate:

Quarterly nominal interest rate is calculated as the weighted average of the compounded interest rates offered by the TL (and YTL) denominated Turkish treasury bills and government bonds sold via auctions. The weight of the each auction is calculated as the amount of TL income gained from a particular auction in a quarter over the total amount of TL income (excluding switching) produced in that corresponding quarter. The calculation excludes observations, which produce 0TL net income or which offer 0 percent average interest rate. The weight of each auction is multiplied by the compounded interest rate offered by the instrument sold; the multiples of weights and compounded interest rates are added to obtain the quarterly annualized nominal interest rates.

Central Bank of Republic of Turkey (CBRT) database lacks the compound interest rate data for 1992 – 1994Q2. Compounded interest rates for that period are derived from the average interest rates using the following formula:

$$i_{compounded} = (1 + i_{simple} / m)^m - 1$$

where; $i_{compounded}$ is the compounded nominal interest rate, in decimal form, i_{simple} denotes the simple nominal interest rate at a particular auction, in decimal form, m denotes the number of compounding periods in a year, calculated as, 12 divided by months to maturity, or 365 divided by days to maturity.

Turkish CPI Inflation Rate:

There is no complete consumer price index covering the periods 1991 and 2007. Therefore, monthly CPI for 1991-2004 with base year 1987 and CPI from 2003 to today with base year 2003 data are obtained from CBRT web database. There are 24 matching observations between the two data sets. A common index is created by utilizing two different methods, with the assumption that the consumption goods baskets used for the derivation of both price indices are competent in the measurement of the corresponding periods' price changes. First, a regression for those 24 observations is run to obtain a common index. Monthly CPI (1987=100) is regressed on the monthly CPI (2003=100) for the period January 2003 – December 2004. The model is found out to be significant with an R-square of 0.999 and have a significant coefficient for the explanatory variable. CPI (2003=100) values are divided by the coefficient of the regression to estimate the CPI (1987=100) values for 2005:1 2006:12. Second, direct ratio is used to convert the May 2003 index value of 367551.8 based on CPI (1987=100) to May 2003 index value of 100.04 based on CPI (2003=100). Each observation is multiplied in the 1987=100 index with 100.04 and divided by 367551.8 and obtained 1991- 2003 data for 2003=100.

The two methods produce almost the same results except for only four observations for the year 2003, for which the readily available 2003=100 base data is used. After obtaining a complete quarterly data set for 1991:1 – 2006:4 CPI, the annual inflation rates at each quarter are calculated to be the difference between the CPI of the *i*th quarter of year t+1 and the CPI of the *i*th quarter of year t, divided the difference by the CPI of the *i*th quarter of year t.

Turkish Ex-post Real Interest Rate:

Ex-post real interest rate data are calculated with the help of the Fischer equation as follows:

$$1 + i_t = (1 + r_t)\,(1 + \pi_{t+1})$$

where; i_t is the nominal interest rate at period t; r_t is the realized return, so the real interest rate, at period t; π_{t+1} is the realized price level increase (inflation rate) between the periods t and t+1.

The weighted average compounded rate offered by the TL (and YTL) denominated Turkish treasury bills and government bonds are used as the annual nominal interest rate, and CPI inflation as the measure of inter period price level change. The above equation is solved for r_t to obtain the ex-post real interest rate, for each observation. Usage of ex-post real interest rates instead of ex-ante real interest rate is compulsory due to lack of inflation expectations data for the sample period. The next section of Appendix B discusses this issue.

Real Effective Exchange Rate Index:

Data for monthly real effective exchange rates based on CPI are obtained from the CBRT database. CBRT had calculated the CPI based real effective exchange rate using the IMF weights for 19 countries including Germany, USA, Italy, France, United Kingdom, Japan, Netherlands, Belgium, Switzerland, Austria, Spain, Canada, Korea, Sweden, Taiwan, Iran, Brazil, China, and Greece (1995=100). An increase in this index denotes a real appreciation of TL (or YTL). The monthly rates are averaged to obtain quarterly real effective exchange rates.

National Income:

Quarterly GDP with buyer prices data are obtained from the CBRT database. All data are in 1987 prices, and are in thousand YTLs. In addition, quarterly GDP with current prices data are obtained.

Budget Balance:

Budget balance data is obtained from CBRT (1992-2003) and Republic of Turkey Prime Ministry Undersecretariat of Treasury (2004-2006) databases. The existing (end of) monthly data for budget balance had been built to represent the cumulative budget balance from the beginning of the year. First, the data have been rearranged to obtain the quarterly change in the cumulative balance. This calculation is simple, such that, budget balance for any year's March is the budget balance for that year's first quarter, and budget balance for June minus the budget balance for March is the budget balance for the second quarter, and so on.

Secondly, to eliminate the possible effects of seasonality (which may root from the requirements of accounting calendar, such as distinct tax collection months) on the quarterly balances, the balances for the last four quarters have been added up. For example, to find the end of June 2001 balance, the quarterly balances of September 2000, December 2000, March 2001, and June 2001 have been summed up. This way, the yearly budget balance for each quarter is obtained.

It is assumed that the changes in the definition of the budget items and the resultant differences in the budget balances are minor, and do not need further attention. Data are in thousand YTL.

Public Debt Stock and Central Government Debt Stock:

Gross outstanding external debt stock is composed of public sector debt stock, private sector debt stock, and central bank debt stock. Public debt stock data are available at Turkish Treasury database in detail; however, there are no monthly or quarterly data available for central bank debt stock or private sector debt stock for the complete period 1992 – 2006.

Public debt is the summation of: (i) *total general government debt stock,* which includes central government debt stock (Treasury), local administrations, and the extra budgetary funds; (ii) *public financial institutions' debt stock*, which includes public deposit banks, and public development and investment banks; (iii) *public*

non-financial institutions' debt stock, which includes the debt stocks of SEEs, public corporations, and regulatory institutions and organizations.

Central government debt stock (debt stock of the Treasury) item is the major item of total public debt stock, composing almost 80 percent of public debt in 1992, having an increasing share up to 96 percent in 2006. Total central government debt stock data are obtained from Turkish Treasury database. Data are in million US dollars.

Net International Reserves of CBRT:

The net international reserves data have been obtained from the CBRT database. Data are monthly and in million US dollars. Data represent the point in time net international reserve of the central bank. Monthly data have been converted into quarterly averages by taking arithmetic averages of each three months.

The United States Data:

The US Treasury Bill rate and the US CPI (2000=100) data are obtained from the IMF International Financial Statistics web database. Data are quarterly. The US CPI inflation rate and the US real interest rate are obtained similar to the derivation of Turkish CPI inflation rate and Turkish real interest rate, respectively.

B.2 Ex-ante and Ex-Post Real Interest Rates

As a measure of real return on financial investments in Turkey, I have used the real interest rate derived from the nominal interest rate offered by the TL denominated Turkish treasury bills and government bonds. Those who purchase these assets focus on the nominal return they will receive. To calculate the real interest rate they will gain at the end of the term, investors solve the Fisher equation for the real interest rate. The Fisher equation is defined as:

$$1 + i_t = (1 + r_t)\,(1 + \pi^e_{t+1})$$

where; i_t is the nominal interest rate at period t, r_t is the real interest rate at period t, and π^e_{t+1} is the expected inflation rate between time t and t+1, in which the nominal

interest will be gained. The real interest rate calculated with the usage of expected inflation rate is called the ex-ante real interest rate.

There are no complete data for expected Turkish and US inflation rates for the 1992:1 – 2006:4 period. Therefore, it is not possible to derive the ex-ante real interest rates. Instead of ex-ante real interest rates, it is possible to utilize ex-post real interest rates, by using the observed inflation (π) instead of the expected inflation. However, this can bring in errors and variable bias unless i and π are both I(1) and are cointegrated. It is possible to get consistent estimates of the parameters with the existence of a cointegrating relationship (Maddala and Kim, 1998).

In order to use ex-post real interest rates, first, it is essential to find out the orders of integration of Turkish nominal interest rate, Turkish observed inflation rate, US nominal interest rate, and US observed inflation rate. I have taken the natural logarithms of all the variables and employed both the ADF and the KPSS tests to identify the orders of integration, employing SIC for the determination of lag length with a maximum of 5 lags. The two tests produced consistent results, it is found out that all the four variables are I(1).

Next, it is necessary to test whether the Turkish inflation rate and the Turkish nominal interest rate are cointegrated. Same is required for US data, as well. Employing VAR estimations and SIC for lag length criteria, I have found out that 1 lag is optimal for Turkish data and 2 lags are optimal for US data. Employing Johansen procedure with these lags, I have found out that there is one cointegrating relationship between Turkish interest rate and inflation rate, and there are two cointegrating relationships between US interest rate and inflation rate. To conclude, it is possible to use ex-post real interest rates instead of ex-ante rates, and still get consistent estimates of parameters.

APPENDIX C: NEO INCLUDED IN THE CAPITAL FLOWS VARIABLE

Balance of payments identity contains three main components; current account balance, capital and financial account balance, and the change in international reserves. These balances do not sum up to zero due to measurement errors, differences in sources, timing of recording, omitted accounts, and the like, and the imbalance is closed by the net errors and omissions (NEO) term. In general, for a well-established accounting system these error terms are expected to be minor. However, some developing countries face problems in measuring the components of balance of payments identity, both in the current and the capital and financial account items, leading to high imbalances, and to high NEO terms. Even for some observations, the NEO term is far greater than the other items in the BOP statistics of these countries. For Turkey, for 6 observations out of 60, NEO is greater than all the there items of BOP in absolute values. In addition, for 11 observations, NEO is greater than any two of these items, during 1992:1-2006:4 period. Besides the magnitude of the NEO term, its main source, the current or the capital and financial account, is important. During this time period, NEO term has been resulted mainly from the measurement difficulties in current account in some observations, but it has also been a result of measurement difficulties in capital and financial account in some other observations.

Depending on the main source of this error term, the balance on NEO term can be added to the current account or to the capital and financial account balances. The investigation of the sources of this error term at each observation is beyond the aim of this study. In the main text, the capital flows variable is constructed with the assumption that the NEO term are resulting mainly from the measurement errors in the items of current account. Therefore, the capital flows variable CAPF excludes the balance on NEO term. It is also reasonable to assume that the primary source of

NEO term is the measurement errors in the capital and financial account. To note, the correlation coefficient between the capital and financial account balance and the NEO term is higher than correlation coefficient between the current account balance and the NEO term in absolute value (-0.23 vs. -0.07). In fact, one CBRT investigation booklet prepared by Çıplak (2005) figures out that Turkish NEO term is highly correlated with capital flows. It is noted that NEO term is more likely to result from the omissions made in the calculation of capital and financial account.

Given that the NEO term is materially high for some observations and assuming that it mainly results from the difficulties faced in the measurement of the capital and financial account, it can be meaningful to use financial account plus the NEO term as the measure of net capital flows to Turkey. Financial account and NEO term for each observation are summed up, and divided the total by GDP. The division is named as CAPFE. The same econometric analyses that were employed for CAPF variable are employed for CAPFE variable, as well. First, CAPFE is found out to be I(1) both by ADF and KPSS unit root tests. Second, only one cointegrating vector is found with the same explanatory variables, same lag length, and same coefficients signs. All the coefficients are significant. The results are presented in Table A3.

Table A3: Cointegrating Vector and Adjustment Coefficients

Cointegrating vector normalized for CAPFE						
CAPFE	LNTRIR	LNREER	GDPGR	BB	FRAG	LNURIR
1	-0.17	-0.19	-0.48	-0.21	0.02	1.01
	(0.03)	(0.03)	(0.08)	(0.03)	(0.01)	(0.42)
	[-5.46]	[-7.04]	[-6.34]	[-6.81]	[2.19]	[2.42]
Adjustment coefficients						
D(CAPFE)	D(LNTRIR)	D(LNREER)	D(GDPGR)	D(BB)	D(FRAG)	D(LNURIR)
-0.84	0.12	0.29	0.36	0.60	-1.25	0.04
(0.19)	(0.57)	(0.27)	(0.16)	(0.26)	(0.91)	(0.02)
[-4.51]	[0.21]	[1.08]	[2.21]	[2.33]	[-1.37]	[2.01]

Notes: The values in parentheses are the standard errors, and in brackets are the t values.
5% critical t value is 1.96.

Since the output is given in the form as the variables have entered the VAR estimation, the cointegrating equation will be as follows:

CAPFE = 0.17 LNTRIR + 0.19 LNREER + 0.48 GDPGR + 0.21 BB - 0.02 FRAG
- 1.01 LNURIR.

The adjustment of the capital flows variable, CAPFE, adjusts quickly for the deviations from the long run equilibrium. It takes slightly more than one quarter for the CAPFE to return to the long run equilibrium in response to the shocks on other variables. To note CAPF variable has found to adjust slightly earlier than a quarter year time. The long-run exclusion and weak exogeneity tests are employed for each variable. The results of these tests can be summarized in Table A4.

Table A4: Long Run Exclusion and Weak Exogeneity Tests

		CAPFE	LNTRIR	LNREER	GDPGR	BB	FRAG	LNURIR
Long run	χ^2 (1)	42.089	17.772	30.920	20.204	22.623	3.979	4.234
exclusion test	Prob.	0.000	0.000	0.000	0.000	0.000	0.046	0.040
Weak								
exogeneity	χ^2 (1)	16.418	0.044	1.225	4.503	5.536	1.866	3.983
test	Prob.	0.000	0.835	0.269	0.034	0.019	0.172	0.046

Note: χ^2 (1) 5% critical value is 3.84.

The long run exclusion is rejected for all of the variables at the 95% confidence level. It is possible to say that none of the variables can be excluded from the cointegrating equation. In 95% confidence level, weak exogeneity for LNTRIR, LNREER, and FRAG are failed to reject, so that each of these variables affects all the other variables, but are not explained by them. On the contrary, weak exogeneity for CAPFE, which is the dependent variable, GDPGR, BB, and LNURIR are rejected. The finding for LNURIR – the US real interest rate – is interesting, because theoretically Turkey is a small country and the changes in its macroeconomic variables should have no effect on US –big country- interest rates. The results for weak exogeneity tests are in line with the significances of adjustment coefficients of the cointegrating vector.

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