

**Volatility of Short Term Capital Flows, Financial Anarchy and Private
Investment in Emerging Markets: A Panel Data Approach**

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Abstract

In this paper, by using bi-annual micro-level panel data for Argentina, Mexico and Turkey, we analyse the impacts of volatility of short-term capital inflows on real investment behaviour under financial liberalization. The empirical results suggest that increasing volatility of capital inflows has a significantly negative effect on new investment spending of private real sector firms. The most worrisome conclusion of the paper is that even if developing countries avoid public sector imbalances or external debt mismanagements they are still exposed to significant instabilities through changes in the investor moods aggravated by self-fulfilling prophecies or through changes in the international financial markets.

1. Introduction

[Latin American experience] makes one sceptical that private markets alone will generate a flow of financial intermediation high enough to support a rate of long term fixed capital formation which fully exploits available high social rates of return to long term investments. Private uncertainties and scepticism of all sorts, which will not disappear by freeing interest rates, reduce the scope for private long-term finance... (Diaz Alejandro, 1985, p.381).

The 1990s witnessed the return of international capital flows to the crises ridden countries of the developing world. The revival of international capital flows together with domestic economic reform programs along the “Washington Consensus” led to a strong shift of mood among economists, policy makers and investors regarding the long-term outlook of the so-called *Emerging*

Markets. In this respect, recovery of capital inflows and accompanying neo liberal reform programs were expected to release foreign exchange and credit bottlenecks, decrease domestic and international interest rate differentials, generate financial sector deepening and capital market development, minimize moral hazard and rent seeking in the public and private spheres and finally support long-term investment and growth prospects of these economies.

Nevertheless, after more than a decade of liberalization experience some serious questions remain over the capacity of capital flows in achieving the initial policy projections. In addition to unmet expectations, there is a growing debate in the literature over the direct role of such flows in generating the consecutive financial crises episodes in Mexico, South East Asia, Russia, Brazil, Argentina and Turkey, during the course of 1990s and early 2000s.

On the other hand, despite a growing research on the determinants of international capital flows very little is written on their volatility. Instead, the discussion so far has focused on the so-called pull/push literature of international capital flows and their impacts on the domestic macro variables. Apart from a few empirical studies at the macroeconomic level, there is a lack of in-depth analysis of the effects of the volatility of these flows on domestic investment performance of developing countries using microeconomic and high frequency data.

What the present article argues is that financial liberalization not only failed to realize its initial policy objectives such as capital market deepening and increased credit generation for private investment but also created a volatile macroeconomic environment resulting from increasing exposure of domestic macro variables to the whims of international capital markets. As a result, increasing volatility of capital flows has become a major destabilizing force for investment growth in developing countries.

Given the lack of in-depth analysis of developing country experiences, the paper focused on three countries by using micro-level company panel data methods; Argentina, Mexico, and Turkey (AMT from here onwards), each of which at one point was presented as the poster child of financial

liberalization and the experiences of which have formed the theoretical as well as ideological basis of arguments (either for or against) on globalisation and liberalization of markets in the developing world.

The empirical results we present support our key hypothesis of interest and suggest that increasing volatility of short-term capital flows have a both economically and statistically significant negative effect on new fixed investment spending of real sector firms.

The next section presents a brief discussion of the determinants of international capital flows and is followed by an analysis of the effects of the volatility of capital flows on domestic macroeconomic environment and private investment. The third section presents the key hypothesis of interest. The fourth section introduces the empirical model followed by methodology, data and measurement issues. The fifth section presents the empirical results. The final section provides an overall discussion of the findings and concludes the paper.

2. Determinants of International Capital Flows and Volatility

In order to evaluate potential long-term effects of capital flows, we need understand the underlying forces behind their type, direction and increasing volume as well as volatility for the last two decades. Yet, despite the radical increase in the volume and volatility of international capital flows since 1980s¹, there is no consensus over their determinants. For simplification, we divided the arguments on the determinants of capital flows under two subgroups, which are *the pull* and *the push* factors.

2.1 The Pull View

The pull factors literature emphasizes the role of investors' awareness, knowledge and past experiences regarding country specifics and fundamentals in determining the type, direction and volatility of international capital flows as well as country risk in the developing countries. Accordingly, the pull view, which puts the main emphasis on domestic factors can be summarized

under: a) the bad memories and policy failures literature and *firesale* FDI argument, and b) the second-generation reforms and the sequencing debate.

2.1.1 Bad Memories and Policy Failures

According to this view, past mistakes and policy failures are the primary cause of high-risk overhang and the following volatility of capital flows in the developing countries. In other words, investors' reluctance to make long-term commitments to developing country markets results from *experience* and is a sign of continuing risk aversion and awareness of international investors (Rojas-Suarez and Weisbrod, 1996 in the case of Latin America-LA from here on).

In this respect, to support this view it is argued that capital flows are becoming less volatile as investors become more informed and understand that there are significant differences across regions and countries. Edwards (1998), for example, based on the 1994 Mexican crisis argued that the contagion and volatility in LA have decreased. Similarly, Frankel and Schmukler (1996) found that investors differentiated among countries to a greater extent after the 1994 crisis than after its 1982 predecessor. Furthermore, as a further proof it is also suggested that the countries experiencing high capital inflows have higher domestic saving rates, lower indebtedness, fiscal deficits and inflation rates, have larger foreign exchange reserves and higher rates of growth as well as lower levels of volatility of inflation and real exchange rate together with low levels of political risk than the ones experiencing low levels of capital inflows (Hernandez and Rudolf, 1994; Fedderke and Liu, 2002).

However, even in the aftermath of wide-ranging structural adjustment programs involving liberalization of current and capital accounts of balance of payments, public sector restructuring and privatisation schemes, high country risk continued to persist in these markets. The term structure and the type of capital flows can be seen as a sign of continued investor cautiousness towards these markets. In the case of AMT, net FDI inflows to AMT has remained at around 15, 28 and 8 per cent of gross short-term capital inflows between 1990 and 2003 (Table 1). Following the explicit failure

of the reform programs in stabilizing the domestic economies and achieving projected growth trends, the discussion this time shifted to policy mistakes arguments as a part of the *pull view* stressing the deviations from reform programs, public sector mistakes, moral hazard problems and political instabilities as the primary cause of the failure.

In this debate, the first generation currency crisis models à la Krugman (1979) are often used to provide theoretical support to such views where financial markets punish those countries with unsustainable and inconsistent domestic economic policies. In this narrative, a speculative attack, which deserves “three cheers”, becomes inevitable once the investors realize the unsustainable nature of the economic policies implemented in the host countries (Dornbush, Goldfajn and Valdes, 1995, p.255).

2.1.2 Firesale FDI: gain in the midst of pain?

The return of short-term capital flows was accompanied by the revival of FDI during the course of 1990s. Net annual real FDI inflows to developing countries increased from around \$34 billion in 1990 to 166 in 2003 with a net total of \$2,031,206 million during this period (in constant 2000 prices). According to the *pull view* increasing investor confidence resulting from the reform programs in these markets as well as downsizing of the state and the ensuing privatisation programs combined with the lifting of restriction on foreign ownership of domestic firms are the primary cause for this development.

The increase in FDI inflows to AMT throughout the 1990s, which totalled to \$90, 158 and 15 billions in constant 2000 prices (in net terms between 1990-2003) respectively was seen as a more positive development than the revival of portfolio flows for long term growth and stability in these markets. Unlike the case for short-term capital flows, there is a broad consensus on the positive effects of FDI flows in the developing countries. Accordingly, FDI is a more secure source of financing because of its stability and counter cyclical nature and may help

decrease country risk by improving investor confidence and knowledge on these markets and by enabling domestic producers to share some of the risk they face with the international investors in the face of any market fluctuations (among other benefits such as technology transfers, modern management techniques, and so forth). In addition, when comparing different effects of short-term and long-term capital flows on the risk of having a currency crisis, several papers found that a higher share of long term capital flows vis-à-vis short-term ones help reduce the risk of a financial crisis (Frankel and Rose, 1996; Rodrik and Velasco, 2000).

More recently especially the counter-cyclical nature of FDI flows has been pointed out to show its benevolence compared to short-term flows (UN, 2005). Accordingly, FDI flows continued to pour into developing countries even during times of crisis when other investors (mostly portfolio investors) were pulling out their portfolios from these markets.

However, stylised facts suggest that the counter-cyclical behaviour of FDI results from different motivations of international investors in their portfolio allocations. While during times of crisis and financial distress, short-term capital investors pull out their holdings from these markets, long term capital investors might be increasing their holdings by purchasing domestic firms at *firesale* prices. Accordingly, increasing instability and/or financial crisis provide foreign companies with generous incentives to buy local firms at low prices. Such reasoning may help explain the puzzle observed during 1994 Mexican, 1995 Argentine and 1997 Asian crises where FDI followed a counter-cyclical pattern in these markets despite serious economic crisis and increasing country risk levels.

In particular, Krugman (1998) argued that foreign investors and multinationals perceived the Asian crisis of 1997 and the following devaluation of the domestic currencies as an opportunity to expand their acquisitions of domestic firms at sale prices (for a similar point see

WB, 2001). Thus, despite the stability arguments, the apparent contrast in investment decisions may result from different motivations of investors. What Krugman (1998) called the “firesale” of devalued assets after the crisis may explain the reason behind such opposite investment decisions of internationals.

According to UNCTAD FDI database, between 1990 and 2003, 46% of total net FDI inflows to Latin America was in mergers and acquisitions while it was 30% in the case of all developing countries. In the case of AMT, 76, 33 and 21 per cent of all FDI inflows that arrived between 1990-2003 went on purchasing existing assets (Table 1).

Consequently, unlike Greenfield FDI (the determinants of which can be explained by the pull and/or push factors), *firesale* FDI is motivated by a different set of pull factors, most notably the firesale opportunities created by domestic financial instabilities or crisis that reduce the value of domestic assets for foreign investors.

2.1.3 Sequencing Debate and Second Generation Reforms

Similar to the policy mistakes arguments, the sequencing debate suggests that there are differences between developed and developing country markets in their capacity to digest the reform programs at the same speed and challenges the efficiency gains arguments from a shock-therapy style complete liberalization of markets. As a result of such differences, investors’ reactions to bad news and market rumours from developing countries are not the same as those from developed countries. Thus, international investors remain more short-termist in their investments and reduce their risk exposure to market fluctuations by remaining in more liquid forms of investments rather than long term assets (except for *firesale* opportunities). Such differences in reactions may also explain the high volatility of capital flows to developing countries.

The central concern in this debate is that premature liberalization of markets and downsizing of state may create serious distortions in the economy. One of the common questions in this debate is

whether the capital account liberalization should be carried out simultaneously with other reforms or should it be postponed until fiscal stabilization, trade reform, and prudential regulation of banking and financial system are completed (McKinnon, 1982; Edwards, 1984, 1994). Accordingly, opening up of external financial accounts before domestic macro imbalances have been eliminated might create economic instabilities and distortions in the developing countries.

A closely related issue with the sequencing debate is the second-generation reforms argument, which suggests that first generation reforms (including trade and financial liberalization, privatisation, and so forth as outlined in the Washington Consensus) were necessary but not sufficient to attain initial policy targets. Accordingly, one of the main reasons behind the high-risk overhang, high share of hot money flows vis-à-vis long term ones, and the disappointing economic performances during the 1990s in the developing countries is a lack of necessary institutional infrastructure and prudential regulation (Kuczynski and Williamson, 2003). In this respect, Beck (2001) also found that rule of law has a statistically significant negative effect on the volatility of net capital flows in the case of 56 emerging markets over the period of 1990-1998. As a result, unless the institutional reforms are realized it is not possible to fully reap the expected benefits of the first generation reforms.

Thus, both the sequencing debate and the institutional reform arguments suggest that part of the explanation for the failure of the reform programs and for the high share of short term flows with high volatility vis-à-vis long term ones lies with the improper sequencing and/or incompleteness of the reforms.

2.2. The Push View: Asymmetric Information and External Shocks

In contrast to the pull view, the push factors literature explains the type and direction of international capital flows by exogenous factors. Accordingly, the changes in the international capital markets, or a herd-move caused by shifts in the investors' expectations are the main forces

behind the direction of international capital flows and can have direct effects on developing country markets independent of changes in their domestic economic structures.

Accordingly, it is suggested that as business portfolios become more and more diversified in the highly integrated international capital markets, the marginal benefit of acquiring expensive country specific in-depth information decreases which in return discourages investors from obtaining detailed information on each country they invest in. (Calvo, 1998; Calvo and Mendoza, 2000), Therefore, it is quite plausible and indeed *rational* for investors to react even to small news. As a result, “small bad news” even if there is no fundamental change in the main economic indicators can generate a speculative attack and reversal of international flows. Consequently, foreign investors may not be as responsive to real sector changes in the short-run as they are to news and market rumours and therefore good fundamentals may not be sufficient to decrease country risk or to avert a currency crisis (Fitzgerald, 2001). This makes the investors more vulnerable to herd behaviour and can cause major instabilities in domestic markets.

In comparison to the Pull factors, the existing evidence (without dismissing the importance of domestic factors) provides strong support to the Push factors view (except the firesale type FDI flows). Accordingly, the external factors are the determining force behind changes in the direction and volume of international capital flows as well as domestic macroeconomic variables. In this respect, Chuhan, Claessens and Mamingi (1993) showed that external factors explained almost one-half of the bonds and equity flows from the US to six LA countries. Similarly, in the case of portfolio inflows to 13 developing countries, Fernandez-Arias (1994), found that changes in international interest rates explain up to 60 per cent of deviation of such flows from their 1989 levels. Furthermore, the pro-cyclical behaviour of country risk ratings (upgrading countries in good times and downgrading them in bad times) may also help increase the volatility of capital flows and the boom-boost pattern in developing countries’ stock markets (Kaminsky and Schmukler, 2002).

When turning to the second-generation reforms and the sequencing debate, the empirical evidence is inconclusive at best. In a cross-country analysis Arteta, Eichengreen and Wyplosz (2001), for instance, failed to find any evidence that capital account openness hampers growth in economies with underdeveloped financial markets, weak institutions, severe macroeconomic imbalances or closed current accounts. Likewise, several papers found little support for the argument that capital account liberalization affects developed and developing countries differently despite disparities in the financial and institutional infrastructures (Kraay, 1998; Arteta, Eichengreen and Wyplosz, 2001). When looking at the role of institutional infrastructure, Barth, Caprio and Levine (2001) showed that there is no clear-cut correlation between bank performance and/or stability and stringency of capital regulations. The results shed serious doubts on the validity of the arguments, which explain the persistence of high systemic risk and financial crisis experiences of the developing countries with lack of prudential regulation and supervision. Similarly, Alfaro, Kalemli-Ozcan and Volosovych (2004) failed to find any significant impact of institutional quality on the volatility of total capital flows in a cross-country analysis between 1970-2000.

In the case of bad memories and domestic policy failures argument, the stylised facts in AMT during the course of 1990s contradict with the predictions of this view. First of all, the revival of capital flows and the sudden decline in country risk ratings following the capital account liberalization wave of 1989 in all three countries suggest that international investors were quick enough to return to these markets and to adjust their risk perceptions following the reform programs despite bad memories of the past.² In addition, the continuation of high levels of FDI inflows to Argentina and Mexico even during times of crisis refutes the investor scepticism about the reversibility of the reform programs in these countries.

Consequently, increasing empirical evidence on the over-sensitivity of investors to news and rumours from developing countries led to a renewed attention on economic models in the literature trying to explain the channels through which the financial crises broke up. Accordingly, early first

generation crisis models à la Krugman (1979) with public sector imbalances at the core of the problem lost their credibility in explaining sources of currency crises especially after the experience of Europe in 1992, Mexico in 1994-95 and South-East Asia in 1997.

Second generation currency crisis models (where investor expectations play a major role) with their self-fulfilling prophecy arguments filled an important gap in this respect. According to this wave of models, over-optimism, which is followed by over-pessimism, is mostly explained by changes in investor behaviour, which itself depends on investor expectations. The presence of asymmetric information and herd behaviour, hence, play a key role in these models.

Second-generation crisis models, as a result, by arguing for the possibility of multiple equilibria depending on investor expectations, introduced low growth traps and financial anarchy into the policy discussions. In these models (developed by for example, Obstfeld, 1986,1994; Eichengreen, Rose and Wyplosz, 1996) the possibility of multiple equilibria becomes a reality when market participants (speculators) take into account the post-attack fundamentals given that an attack takes place rather than the current economic fundamentals in calculating their expected returns.

In conclusion, investors make their investment decisions and risk evaluations based on short-term news or external factors rather than looking at country specifics despite comprehensive reform programs and limit their investments with more liquid forms of investments that would allow exiting the market in a very short span of time if anything goes wrong. Thus, the overwhelming importance of external factors in the direction of capital flows and short-termist decision-making on the part of investors create major problems regarding their sustainability and stability in the long run.

3. Financial Liberalization, International Capital Flows and Private Investment

3. 1. Capital Market Deepening

Given the presence of capital market imperfections in developing countries, domestic and external financial liberalization were expected to generate financial market deepening, reduce agency costs and asymmetric information, eliminate rent-seeking caused by directed and subsidized credit

programs, and increase efficiency while directing limited resources to more efficient investment projects at lower costs. Likewise, increasing foreign presence was assumed to increase competition, introduce new technologies, products and more efficient management techniques and hence to increase the overall efficiency of the financial sectors. In this picture, foreign banks were expected to increase the stability of the sector during times of financial distress or instability (Lilavic and Saez, 2001). Increased credit availability, decreased cost of capital, capital market deepening and a more efficient financial sector, in return, was expected to boost private investment and promote growth in the long run (Bakaert and Harvey, 2000).

Despite such optimism, the stylised facts shed serious doubts over the success of liberalization programs in achieving the initial policy objectives. In the case of AMT the majority of papers fail to provide any evidence of efficiency gains for real sector firms as suggested by the pro-liberalization literature. Regarding credit availability, despite comprehensive reform programs and increased market share of foreign banks (in Argentina and Mexico foreign banks accounted for 53 percent and 82 per cent of total bank assets as of 2002 up from 18 and 1 percent in 1994) strict credit rationing continues to persist with lack of long term credit availability for real sector firms in AMT. In contrast to expectations, the existing evidence also suggests an increase in the volatility of stock markets, which were expected to be more stable and become a reliable source of financing for private firms after financial liberalization (Gabel, 1995; Balkan and Yeldan, 1998). Furthermore, in these economies there is no evidence of any difference between domestic and foreign owned banks' loan behaviour and the composition of loan portfolios (Fanelli, Rozenwurcel and Simpson, 1998; Goldberg, Dages and Kinney, 2000; Sancak, 2002; EIU, 2003a, p.8-13; EIU2003b, p.37).

On the other hand, in the case of capital market deepening, several LA countries (especially Mexico) have developed money markets mostly in short-term government papers, while capital

markets in private securities remained underdeveloped (Rojas-Suarez and Weisbrod, 1996). Similar developments are observed in the case of Turkey where around 98 per cent of secondary market transactions were of government securities as of 2004 (SPK, 2004).

In addition to increased credit generation as well as capital market deepening, a decline in both real interest rates and in the spread between lending and borrowing rates were among expected outcomes of financial liberalization. The results, however, are far from spectacular: higher real interest rates and persistent large spreads (Brock and Rojas-Suarez, 2000). As a result, as also argued by Ffrench-Davis (2000), capital markets appear to have failed to provide the real sectors of the economy with necessary funds for financing long-term productive investment.

3.2. Short Term Capital Flows and Macroeconomic Instability

In addition to unmet expectations there is growing evidence, which shows that unregulated international short-term capital flows create serious problems for long-term investment and growth prospects of developing countries.

In developing countries (including AMT), financial liberalization has been accompanied by sharp fluctuations in key macro prices together with increasing uncertainty regarding future prospects of the economy. During this time, domestic markets became increasingly dependent on international market developments, which (under a liberalized capital account) made it impossible for domestic markets to control monetary and exchange rate policies or fiscal policies by way of public spending.

In this respect there is substantial and still-growing evidence that following financial liberalization external factors started accounting for most of the volatility and instability in real exchange rates, reserve movements, stock prices and the direction of capital flows in developing countries (Calvo, Leiderman and Reinhart, 1993; Chuhan, Claessens and Mamingi, 1993; Fernandez-Arias, 1994; Balkan and Yeldan, 1998).

In this background, the findings of Gabriele, Boratav and Parikh (2000) also highlight increasing volatility of capital flows in the age of financial globalisation. Accordingly, when analysing the changes in instability and volatility of capital flows to developing countries between late 70s and 90s with three sub periods, they found that “capital flows to developing countries are characterized by high, rising and unpredictable volatility” (p.1051). Furthermore, as Weller (2001) pointed out emerging economies appear to be systematically becoming more vulnerable to both currency and banking crisis after financial liberalization.

In this respect, from a Keynesian perspective, increasing volatility following financial liberalization may also be self-exacerbating as the investors shorten their time horizons either to benefit from speculative gains or to avoid excess risk, which in turn further increases volatility. As a result, increasing macro volatility may lead to a slow down of investment in the real sectors (Keynes, 1964, Ch. 12; Grebel, 1995)

Likewise, following financial liberalization international capital flows led to a bias against *tradable goods* sectors in the recipient countries as a result of changes in relative prices. In this respect, it is argued that appreciation of the currency is one of the factors hurting exportables and in general traded goods vis-à-vis nontradables by causing a profitability squeeze in the real sectors, which might explain the decreasing business savings and contraction of employment in these markets. (Berg and Taylor, 2000; Frenkel and Rozada, 2000; Ros and Lustig, 2000). UNCTAD (1998, cp.III) also argued that many of the weaknesses in economic fundamentals such as currency appreciation together with the resulting deterioration of the current account and increasing exchange rate risk is directly or indirectly related with the capital flows themselves.

When looking at the impacts of uncertainty and instability in macroeconomic environment in developed countries, Federer (1993) found a significantly negative effect of uncertainty on US equipment investment. In similar studies, Driver and Moreton (1991) and Price (1996) also found negative impact of uncertainty/instability on UK manufacturing investment. Furthermore, based on a

panel of non financial US firms Galeotti and Schiantarelli (1994) discovered that firms' investment decisions are affected as much by optimist/pessimist mood of market participants as by fundamentals. Similarly, Darby et al. (1998), in a sample of five OECD countries, found a significantly negative effect from real exchange rate variability to investment.

In the case of developing countries, Aizenman and Marion (1993, 1996), Hausmann and Gavin (1995), and Serven (1998) found a negative relationship between private investment and several economic instability measures (including different measures of uncertainty in real GDP growth, real exchange rate, relative prices of capital goods, and inflation). In addition, real exchange rate instability is found to have a both economically and statistically significant negative effect on investment and growth in both developed and developing countries (Edwards, 1989; Pindyck and Solimano, 1993).³ Likewise, based on a panel of 16 LA countries using macro data, Moguillansky (2002) found that volatility of short-term capital flows has a statistically and economically significant negative effect on investment.

In the case of AMT, when we look at the macroeconomic performance for the last two decades we see an oscillation between three sub periods: The investment growth dropped from 10 and 15% in 1979-1981 to -5% and 1% between 1982-1989 and recovered to around 7 and 4% after the debt crisis during the 90s respectively in Argentina and Mexico. In Turkey, we see an opposite cycle with -12% in the first period followed by 12 and 6% on average respectively.⁴ In all three cases the neoliberal era coincided with increasing boom-bust cycles yet overall with lower investment rates.

Furthermore, following capital account liberalization we also see an increase in the volatility of capital flows as measured by gross short-term capital inflows by nonresidents and its standard deviation. Thus, in order to capture the magnitude of the shock caused by external capital inflows, we compared gross capital inflows (that is the sum of the absolute value of monthly net capital inflows by nonresidents) with the net inflows using the US treasury data (where monthly transactions

between the US and corresponding countries are recorded). According to Table 1 below, between 1984 and 2003, the net inflows to gross inflows ratio is 0.36 per cent for Argentina, 2.7 per cent for Mexico and 4 per cent for Turkey. When looking at the breakdown of the flows during this period, not surprisingly we see that the majority of inflows took place following the capital account liberalization of 1989. Between 1990 and 2003, gross inflows increased 50 times in Argentina, 21 times in Mexico and 42 times in Turkey compared to the 1984-1989 period. On the other hand the increase in net inflows remained much smaller. While gross inflows stand around 592, 553 and 188 billion US dollars in AMT, the net inflows remained at US\$5, \$27 and 7\$ billion respectively between 1990 and 2003. Figure 1 highlights the discrepancy between the gross and net inflows by looking at the ratio between net capital inflows and gross inflows in AMT using the Hodrick-Prescott Filter (HP), which is used to obtain a smooth estimate of the long-term trend component of the series.⁵ Accordingly, there is a sudden jump in the volatility of capital inflows to AMT following the capital account liberalization of 1989 as seen from the increase in gross inflows vis-à-vis net inflows.

<Figure 1 here>

<Table 1 here>

As a result, increased volatility of capital flows has affected domestic investment through micro and macroeconomic transmission channels in the form of fluctuations in: a) domestic interest rates and credit availability, b) real exchange rates and expectations regarding currency devaluation or appreciation, c) domestic absorption, d) systemic risk from uncertainty regarding future profitability and macro environment, and e) liquidity premium and opportunity cost of fixed investment.

4. Hypothesis Testing

Following the above discussion, we have estimated the following model that explores the effects of capital flow volatility on private investment performance. Accordingly, we expect to

uncover the presence of a negative relationship between volatility of capital inflows and private fixed investment spending in AMT.

In terms of estimation, there is a vast literature on the determinants of investment and in particular on the specification of investment functions (see for example, Roma, 1993; Blundell, Bond and Meghir, 1992; Mairesse, Hall and Mulkey, 1999). The empirical studies that are based on investment models can be grouped under q-model of investment, Euler estimations, the accelerator model of error correction methods, and the synthesis approach and include a set of standard control variables including past investment rates, capital-output ratio, relative cost of capital, economic growth, real wages, cash flow (and/or operating profit) and volatility in macroeconomic variables (in the case of measurement of uncertainty). In this respect we follow Serven (1998), Mairesse, Hall and Mulkey (1999) and Agrawal (2004) in our model specification. The relationship is tested with the following dynamic investment equation for each country separately:

$$I_{it} = \alpha_1 I_{it-1} + \alpha_2 I_{it-2} + \alpha_3 KO_{it-1} + \alpha_4 KO_{it-2} + \alpha_5 SCFV_{it} + N_t + \varepsilon_{it} \quad (1)$$

where I_{it} is the real net fixed investment of firm i in period t and is measured by the logarithmic difference of net fixed capital stock at constant prices (Δk_{it}) that is $\Delta k_{it} = \log[K_{it} / K_{i,t-1}] = \log[1 + \Delta K_{it} / K_{i,t-1}] \cong \Delta K_{it} / K_{i,t-1} \cong I_{it} / K_{i,t-1} - \delta$ where δ is the depreciation rate and K_t is Net Fixed Assets and includes end of period fixed capital stock net of depreciation and land.⁶

KO_{it} is Capital/Output ratio and is based on the assumption that output and capital are proportional in the long run with dynamic short-run fluctuations. Hence, a decreasing KO ratio is expected to increase new investment. The lags in the response of investment spending to capital/output ratio result from the following: a) the role of expectations given that new investment depends on expected future sales which themselves rely on current and past sales, b) adjustments

costs and delivery lags (Abel and Blanchard, 1986). Here net sales are used as a proxy for the value of output.

$SCFV_{it}$ is the volatility of real Short-term Capital Inflows, which is discussed in the data and measurement section. Increasing volatility is expected to have a negative effect on new fixed investment through the channels discussed in the previous section.

N_t is a vector of control variables including a dummy variable for time effects and KP , which is the relative price of fixed investment goods with an expected negative coefficient⁷. It also includes real GDP growth rate (RGDPG)⁸ suggesting that increasing economic growth stimulates new fixed investment through changes in aggregate demand and expectations for the future.⁹

ε is the error term.

We have excluded such variables as real exchange rates, credit generation, or macroeconomic volatility variables given that they are endogenously and closely dependent on our main control variable that is the volatility of capital flows.

4.1 Methodology

Given that (1) is a dynamic investment equation, for equation 1, in order to correct for parameter endogeneity as well as the correlation between the lagged I and the firm specific effects and the error term, we used a Generalized Method of Moments (GMM) estimator by Arellano and Bover (1995)'s orthogonal deviations transformation that is widely applied to have a consistent estimate for dynamic panel equations. Accordingly, we apply the following transformation to the variables estimated:

$$x_{it}^* = [(T-t)/(T-t+1)]^{1/2} [x_{it} - (1/(T-t))(x_{i,t+1} + x_{i,t+2} + \dots + x_{iT})] \quad (2)$$

for $t=1, 2, \dots, T-1$ where T is the firm specific number of time series observations on firm i . In other words, we subtract the mean of the remaining future observations from the first $T-1$ observations (Arellano and Bover, 1995, p.41). In this transformation, if x_i is serially uncorrelated then $x_{i, t-s}$ will

be uncorrelated with x_{it}^* for $s \geq 2$. This means that if the error term in the investment equation is serially uncorrelated, lagged values of the transformed (or untransformed) dependent variable¹⁰ and other right-hand side variables dating $t-s$ will be uncorrelated with the transformed error term as long as $s \geq 2$. As discussed by Bond and Meghir (1994, p.210), remote lags are not likely to provide much additional information and therefore we did not include all moment restrictions in my calculations (we used $2 \leq t \leq 3$ lagged values of transformed right hand side variables and time dummies at levels as instruments¹¹). Likewise, we could have formed another estimator based on difference transformation, which would be equivalent to orthogonal deviations transformation when all moment restrictions are used. However, based on Monte Carlo experiments, which suggest that the latter is more efficient when all moment restrictions are not met, the former method is used in the final estimations (Bond and Meghir, 1994, p.210).¹²

4.2 Data and Measurement

The datasets are from the audited financial accounts of publicly traded industrial firms in AMT and are unbalanced. The period analysed is biannual and cover 1991:1-2001:2 for Argentina, 1990:1-2003:2 for Mexico and 1992:1-2003:2 for Turkey. The primary reason for using biannual data is to capture the real impact of the volatility of capital flows on the fixed investment decisions of private sector firms. Given the high velocity with which short term capital travels in and out of countries, annual flow measures (as is commonly used by other papers) do not capture the real magnitudes of these flows (see Table 1 and Figure 1). As a result, when trying to capture the volatility of capital flows using annual data or a moving average series there would be a significant bias in the calculations.

The firm level data used in the calculations for Argentina and Mexico mostly came from Economica, a commercial database providing detailed financial statement data for publicly traded Latin American companies.¹³ For Turkey the dataset was obtained from the Istanbul Stock Exchange

Market online database. In some cases Worldscope International database, Datastream, individual stock-market web sites, and original firm financial statements are also used for robustness and/or completeness. We have also eliminated those firms with less than 8 time series points from the dataset for robustness and efficiency. The firms included are all industrial firms with majority of them in manufacturing related activities. For Argentina there are 59 firms in the final dataset with 48 in manufacturing (ISIC 15-37), 3 in construction (ISIC 45), 4 in mining (ISIC 10-14) and 4 in electricity power generation and distribution (ISIC 40) related activities. In the case of Mexico, there are 79 firms in the dataset with 63 in manufacturing (ISIC 15-37), 4 in mining (ISIC 10,12,13,14) and 12 in construction (ISIC 45) related activities. For Turkey there are 181 firms with 2 in electricity and gas distribution (ISIC 40, 41) and 179 in manufacturing (ISIC 15-37) related activities. A detailed description of the data, accounting principles as well as measurement issues is available from the author upon request.

Regarding Short-term Capital Flows, the available data from domestic sources of AMT are not uniform and cover different time periods for different frequencies. As a result, in constructing the volatility variable for Argentina and Mexico, we have used the US Treasury International Capital Reporting System that provides monthly cross border investment transactions of short term and long term securities vis-à-vis the US and foreign countries.¹⁴ The data coverage goes as far as 1977 and includes all countries (based on nationality) that are reported to have transactions with the US. Given the close proximity of Argentine and Mexican markets to the US the data series are assumed to be close estimates of the total capital inflows to these countries. Also, given the locomotive effect of capital flows from the US, the volatility of these flows is not expected to deviate significantly from the total flows. In the case of Turkey, monthly balance of payments data, which is available from the Central Bank of Republic of Turkey starting from 1992, is employed instead (Table 1 and Figure 2). Given that Turkey is not in close proximity to the US market as Argentina and Mexico, possible biases caused by the way US treasury data are recorded will be avoided this way.¹⁵ As the measure of

capital inflows, we have used real net monthly inflows (deflated by US Producer Price Index with base year 2000). However, gross inflows (in absolute values) are also calculated to capture the total size of capital moving in and out of the economy by the nonresidents (Table 1 and Figure 1).

As for the volatility measure, the biannual standard deviations of net monthly inflows are used (Figure 2).¹⁶ The net inflows variable is equal to Net sale of long-term [Argentine, Mexican, Turkish] stock and bonds¹⁷ plus changes in the sum of total US banks' claims on foreign public borrowers and unaffiliated foreigners and on own offices. For Turkey, the net short-term capital inflows variable is calculated as the sum of equity securities liabilities, debt securities liabilities, other investment liabilities-loans-banks and other sectors, other investment currency deposits-banks and other investment other liabilities from monthly balance of payments statistics.

<Figure 2 here>

5. Empirical Results

The results provide strong support to our key hypothesis by uncovering a significantly negative relationship between the volatility variable and private fixed investment in all three countries. Furthermore, the relationship is economically significant as revealed by the elasticity analysis: a one-percent increase in the capital flow volatility causes a 0.328, 1.375 and 0.189 per cent decrease in I_t in AMT respectively.

In the case of capital-output ratio variable, as suggested by the model we have found a significantly negative relationship in all three countries. We have also discovered a both economically and statistically significantly positive effect of real GDP growth on private investment suggesting the positive effects of economic growth on expectation formation as well as on aggregate demand. In the case of KP variable, we failed to detect robust and significant effect (in the following results, standard errors in parenthesis are heteroskedasticity consistent. I_t refers to real net fixed investment. (*), (**), (***) refer to significance at 1, 5 and 10 percent level respectively. Sargan is

Sargan test for overidentifying restrictions. Wald-a is wald test of joint significance for main variables excluding time dummies. Wald-b is Wald-test for time effects. All statistical test results are displayed by their p-values. All regressions include a set of unreported time dummies).

-Argentina

$$I_t = -0.576^* I_{1,t} - 0.132^* I_{2,t} - 0.042^* KO_{1,t} - 0.029^* KO_{2,t} - 0.0008^{***} SCFV + 8.711^* RGDPG_{1,t}$$

$$(0.015) \quad (0.007) \quad (0.002) \quad (0.001) \quad (0.0004) \quad (0.859)$$

$$- 24.529^* KP_{1,t}$$

$$(2.169)$$

Sargan Test=0.29, Wald χ^2 test-a= 0 Wald χ^2 test-b= 0

-Mexico

$$I_t = -0.373^* I_{1,t} - 0.022 I_{2,t} - 0.029^* KO_{1,t} - 0.051^* KO_{2,t} - 0.002^* SCFV + 12.725^{**} RGDPG_{1,t}$$

$$(0.026) \quad (0.022) \quad (0.008) \quad (0.008) \quad (0.0006) \quad (5.590)$$

$$+ 3.067^* KP_{1,t}$$

$$(0.677)$$

Sargan Test=0.31, Wald χ^2 test-a= 0 Wald χ^2 test-b= 0

-Turkey

$$I_t = -0.085^{**} I_{1,t} - 0.095^* I_{2,t} - 0.092^* KO_{1,t} - 0.115^* KO_{2,t} - 0.0002^{***} SCFV + 1.285^* RGDPG_{1,t}$$

$$(0.034) \quad (0.019) \quad (0.003) \quad (0.027) \quad (0.0001) \quad (0.489)$$

$$+ 0.726 KP_{1,t}$$

$$(0.701)$$

Sargan Test=0.13, Wald χ^2 test-a= 0 Wald χ^2 test-b= 0

6. Conclusion

One of the main arguments favouring liberalization of capital markets was to provide the necessary underpinnings for directing domestic (and international) savings to long-term investment, and hence to enable developing countries to achieve a stable long-run growth path. However, if one to judge the degree of success of the reform programs of the 80s and 90s with the level of divergence between the policy targets and realized outcomes, the results have been quite disappointing in all three countries.

Overall, the results suggest that under a liberalized financial system it is not possible to analyse the determinants of private investment independent of changes in the volatility of international capital flows. Accordingly, financial liberalization when accompanied by increasing volatility of short-term capital flows becomes instrumental in reducing real sector investment spending and as a result may alter the pattern of capital accumulation in the real sectors of the economy.

According to the results the policy makers in all three countries did not (or could not) consider any strategy to link financial liberalization programs and accompanying short-term distortions with the medium and long-term domestic development objectives of these countries. In this respect, there was (and is) an incomplete concern regarding determinants of productive investment under a liberalized capital account.

Finally, our most worrisome conclusion is that even if developing countries avoid public sector imbalances or external debt mismanagements they are still exposed to significant instabilities by way of changes in the investor moods aggravated by self-fulfilling prophecies. Given that reform programs failed to reduce instabilities or to stabilize capital flow volatility, the question becomes what are the policy options to reduce such instabilities?

Thus, we suggest that there is an urgent need to reform both the domestic and international financial system so that domestic and foreign savings are directed towards productive investment

rather than speculative and highly reversible financial ones. To achieve this our main policy recommendation includes macro and microeconomic stability through the prevention of sudden fluctuations in capital flows and use of more counter-cyclical macro policies.

For further research, we need to point out some limitations of the current research: the time span we analysed is relatively short and limited to post liberalisation era in Argentina, Mexico and Turkey which make it difficult to make a long term analysis of the effects of these bottlenecks for future investment behaviour. Secondly, in order to see whether the findings are applicable to other developing countries, the research needs to be expanded with a more comprehensive dataset.

Endnotes

¹ Total FDI inflows to developing countries increased from USD 8.4 billion in current prices in 1980 to 37 billion in 1990 and 209 billion in 2001 while total world FDI inflows increased from USD 55 billion to 209 billion and 824 billion during the same period. Net Private capital flows to developing countries, on the other hand, increased from around USD41 billion in 1980 to 38 billion and 146 billion in 1990 and 2001 (UNCTAD, 2004). Average daily turnover in traditional FX markets increased from USD 590 billion in 1989 to 1880 billion in 2004 while global daily world trade increased from 21 billion in 1989 to 52 billion dollars in 2003 (BIS, 2005)

² The country risk rating measured by International Country Risk Guide Composite Risk rating improved by 33 per cent, 13 per cent and 41 per cent for AMT from 49, 63 and 46 in December 1989 to 65, 71 and 65 in December 1992 (higher index number representing lower risk with a maximum of 100).

³ Likewise, Ramey and Ramey (1995) reported a significant negative relationship between real GDP volatility and the average growth rate of GDP. In contrast, Easterly, Islam and Stiglitz (2001) found no significant effect of either financial openness or volatility of capital flows on output volatility in a sample of 74 countries between 1960 and 1997.

⁴ In Argentina Investment growth is measured by real gross fixed capital formation growth, in Mexico with industrial production index growth and in Turkey with gross real private fixed investment growth.

⁵ By default, we set the penalty parameter that controls the smoothness of the series equal 400.

⁶ For Argentina and Mexico the variables are corrected for inflation accounting. When calculating real prices, we adopted Producer Price Index based on end of period values for K_t . We kept the lags at 2 for investment spending given that it may take more than one-period (half year) to adjust for adjustment costs and delivery lags. For the measurement of K_t please see the appendix.

⁷ It is measures as producer price index/ GDP deflator for Argentina and Mexico and manufacturing price Index/Wholesale Price Index for Turkey.

⁸ The GDP growth (calculated as annualised log difference of Real GDP) and KP variables are from the IMF's International Financial Statistics and World Bank's World Development Indicators.

⁹ Oliva and Rivera-Batiz (2002) and Blomstrom and Kokko (1996) found that growth drives investment rather than the other way around.

¹⁰ On this issue, see for example Greene (1997, p.641).

¹¹ In the GMM estimation, the White period based on Arellano and Bond (1991) 2-step method is used for GMM weighting matrices. The reported coefficient covariances are robust and corrected using White period weights from final iteration. The validity of the instruments is checked by the Sargan-test of over-identifying restrictions.

¹² Blundell, Bond and Meghir (1992) provide a comparative analysis of different panel data techniques in econometric models of firm investment based on micro data.

¹³ There are certain problems with the Economatica database that researchers need to be aware of. An appendix including a detailed list of problems and corrections is available from the author upon request.

¹⁴ For an analysis of the data on the US system for measuring cross-border securities investment see for example, Grier, Lee and Warnock (2001). Also for information on data coverage and measurement issues see the treasury web site at <http://www.ustreas.gov/tic/index.html>.

¹⁵ For a discussion of such limitations see for example. Grier, Lee and Warnock, 2002, p.640.

¹⁶ Two other alternatives to measure the volatility of capital inflows are the coefficient of variation and normalization using GDP weights. While both methods are widely used in cross-country analysis, they don't affect the results in single country regressions. Also, an important drawback of the second method is that it is biased upwards during and after any economic turmoil where GDP contracts.

¹⁷ From Foreign Purchases and Sales of Long-Term Domestic and Foreign Securities by Type tables of the treasury, Data column titles correspond to column titles in Treasury Bulletin Table CM-V-4, excluding CM-V-4 columns (1) and (8).

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Appendix. Measurement of K_t

Argentina: K_t : Includes net property, plant and equipment. The land is not disclosed in the balance sheets separately and therefore is not included in the net fixed assets calculations. All values are at fixed 1995 prices by Producer Price Index (PPI).

Mexico: K_t : Includes net property, plant and equipment together with the land given that it is not disclosed separately in the Economatica database. The data are at replacement cost till 1997 and at current prices since then. During the estimation, several methods, which are available from the author upon request, are applied to test for the consistency of this variable because of the change in its measurement. All values are at fixed 1995 prices by Producer Price Index (PPI).

Turkey: K_t : Includes all existing capital stock net of depreciation excluding land (which is not subject to depreciation and is recorded at historical cost without revaluation). This includes all the fixed assets that are subject to revaluation at the end of each period. Under Turkish GAAP, fixed assets are recorded at historical cost and revalued each period according to the pre-announced official rate. The data are converted to fixed prices by using Manufacturing Whole Sale Price Index (WPI) at 1995 January prices.

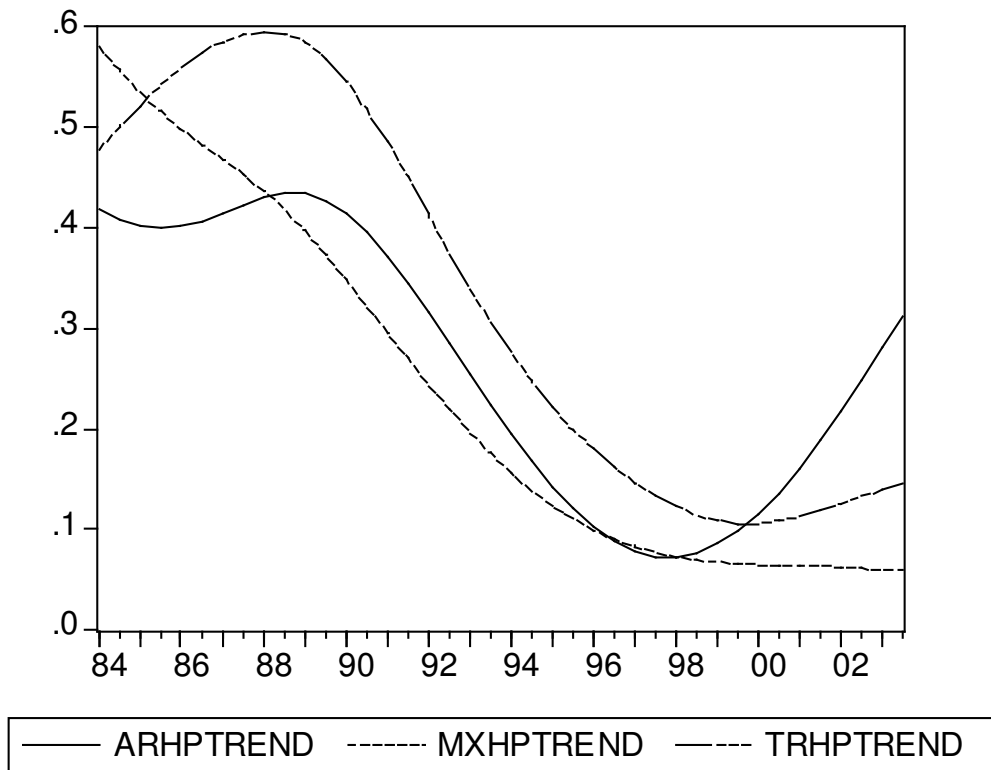


Figure 1: HP Filtered Net Capital Inflows/Gross Inflows Ratio, 1984:1-2003:2

SOURCE: Author's calculations using the US Treasury International Capital Reporting System.

NOTE: ARGHPTREND, MXHPTREND and TRHPTREND stand for HP Trend of net short-term capital inflows/gross short term capital inflows ratio for Argentina, Mexico and Turkey respectively. The ratio is calculated using biannual data and is based on gross inflows that are the biannual sum of the absolute value of monthly net capital inflows, and net inflows that are the biannual sum of the monthly net capital inflows. For simplicity, net inflows are in absolute value. A decrease in this ratio reflects increasing volatility.

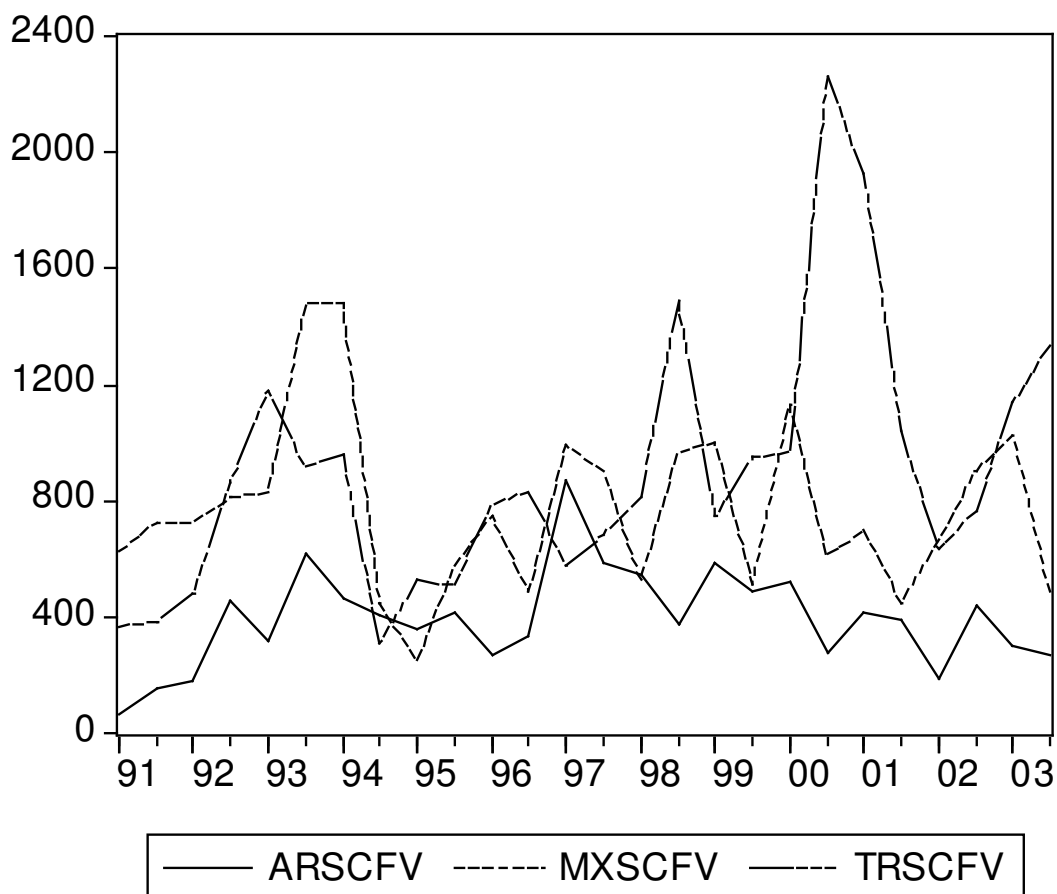


Figure 2: Volatility of Real Short-Term Capital Inflows in AMT 1991:1-2003:2

NOTE: A, M, T refers to Argentina, Mexico and Turkey respectively.

RSCFI: ARSCFV, MXSCFV and TRSCFV are biannual standard deviation of real Short Term Capital Inflows in AMT measured as discussed in Section 4.2.

Source: Author's calculations using the US Treasury International Capital Reporting System for Argentina and Mexico and for Turkey using the monthly BOP statistics of Turkey.

| Millions of US Dollars in Current Prices | | | | | | | | |
|--|---------|--------|---------|---------|---------|--------|---------|--------|
| Short-Term Inflows | ARG | | MX | | TR | | TR* | |
| | Gross | Net | Gross | Net | Gross | Net | Gross | Net |
| 1984-1989 | 11,685 | -2,803 | 26,497 | -11,921 | 4,511 | 295 | | |
| 1984-2003 | 603,528 | 2,192 | 579,636 | 15,380 | 192,990 | 7,678 | | |
| 1990-2003 | 591,843 | 4,995 | 553,139 | 27,301 | 188,479 | 7,383 | 198,895 | 48,449 |
| 1990-2003 | | | | | | | | |
| -FDI | | 85,540 | | 152,264 | | 14,781 | | |
| -M&A | | 65,154 | | 50,282 | | 3,074 | | |
| -M&A/FDI | | 76% | | 33% | | 21% | | |
| -FDI/Gross | | 15% | | 28% | | 8% | | 7% |

Table 1: Gross and Net Capital Inflows to Argentina, Mexico and Turkey, 1984-2003

SOURCE: The US Treasury International Capital Reporting System, Central Bank of Republic of Turkey, UNCTAD FDI/TNC database.

NOTE: Gross stands for gross short-term capital inflows, which are the sum of the absolute value of monthly net capital inflows from the US. Net stands for net short-term capital inflows, which are the sum of the monthly net capital inflows from the US. FDI is net FDI inflows, M&A is net Merger and Acquisition type FDI, M&A/FDI is M&A divided by FDI, FDI/Gross is FDI divided by Gross short term capital inflows.

*The data are for the 1992-2003 period based on Central Bank of Republic of Turkey (CBRT) database.

Summary Statistics (not to be published)

| Argentina | | | | | |
|--|--------|--------|----------|--------|-------|
| Time Period: 1991:1-2001:2; Number of Firms: 59 | | | | | |
| | I_t | KO | SCFV | RGDPG | KP |
| Mean | -0.019 | 2.378 | 415.529 | 0.026 | 0.999 |
| Median | -0.007 | 1.579 | 412.966 | 0.021 | 0.997 |
| Maximum | 2.120 | 30.810 | 874.992 | 0.236 | 1.070 |
| Minimum | -2.333 | 0.009 | 64.186 | -0.118 | 0.966 |
| Std. Dev. | 0.263 | 2.837 | 172.392 | 0.082 | 0.023 |
| Observations | 1062 | 1061 | 1474 | 1474 | 1474 |
| Mexico | | | | | |
| Time Period: 1990:1-2003:2; Number of Firms: 79 | | | | | |
| | I_t | KO | SCFV | RGDPG | KP |
| Mean | 0.015 | 1.990 | 754.233 | 0.015 | 1.082 |
| Median | 0.000 | 1.570 | 728.530 | 0.021 | 1.073 |
| Maximum | 2.150 | 16.561 | 1478.967 | 0.060 | 1.216 |
| Minimum | -1.289 | 0.032 | 251.519 | -0.123 | 0.987 |
| Std. Dev. | 0.250 | 1.677 | 297.529 | 0.032 | 0.069 |
| Observations | 1659 | 1658 | 2240 | 2240 | 2240 |
| Turkey | | | | | |
| Time Period: 1992:1:2003:2; Number of Firms: 181 | | | | | |
| | I_t | KO | SCFV | RGDPG | KP |
| Mean | 0.012 | 0.651 | 946.290 | 0.034 | 0.985 |
| Median | -0.002 | 0.417 | 850.925 | 0.057 | 0.989 |
| Maximum | 3.237 | 43.763 | 2259.630 | 0.094 | 1.045 |
| Minimum | -3.480 | 0.000 | 307.838 | -0.097 | 0.930 |
| Std. Dev. | 0.284 | 1.330 | 440.564 | 0.056 | 0.031 |
| Observations | 3366 | 3329 | 4344 | 4344 | 4344 |