Volatility of short term capital flows, financial anarchy and private investment in emerging markets

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ABSTRACT

Using micro-level panel data, the paper analyses the impacts of short-term capital flow volatility on new fixed investment spending of publicly traded real sector firms in three major emerging markets that are Argentina, Mexico and Turkey. The empirical results including comprehensive sensitivity tests suggest that increasing volatility of capital inflows has an economically and statistically significant negative effect on new investment spending of private firms. Accordingly, a 10 per cent increase in capital flow volatility reduces fixed investment spending in the range of 1-1.7, 2.3-15.1, and 1 per cent in Argentina, Mexico and Turkey respectively.

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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: 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 *Emerging Markets*. In this respect, recovery of capital inflows and accompanying neoliberal reform programs were expected to release foreign exchange and credit bottlenecks, generate capital market deepening, minimize moral hazard and rent seeking and finally support long-term investment and growth prospects of these economies.

Nevertheless, after two decades of liberalisation experience some serious questions remain over the capacity of capital flows in achieving initial policy projections. In addition to unmet expectations, there is a growing debate 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 the increasing volume and volatility of international capital flows during the 1990s very little has been written on their volatility. Apart from a few descriptive studies at the macroeconomic level, there is an apparent lack of in-depth analysis of the long-term effects of capital flow volatility on domestic investment performance in developing countries.

What the present article argues is that financial liberalisation not only failed to realise its initial policy objectives such as capital market deepening and increased credit generation but also

created a volatile macroeconomic environment resulting from increasing exposure of domestic economies to the whims of international capital markets. As a result, increasing volatility of capital flows has become a major destabilizing force for fixed capital formation in developing countries.

Given the lack of comparative in-depth analysis of developing country experiences, the current research has focused on three major developing countries that are Argentina, Mexico, and Turkey (AMT from here onwards), each of which at one point was presented as the poster child of financial liberalisation by the International Monetary Fund (IMF) and the World Bank (WB). In retrospect, the experiences of these three countries have formed the theoretical as well as ideological basis of arguments (either for or against) on globalisation and liberalisation of markets in the developing world. [1]

The following figures also help emphasize the relative importance of these three countries among other emerging markets: Argentina and Mexico attracted 42 per cent of total FDI flows, 56 per cent of total IMF credit and 43 per cent of total portfolio flows to Latin America between 1980-2000. Furthermore, between 1990-1994 and 1990-2000 Argentina, Mexico and Turkey received 53 and 38 per cent of total portfolio flows to middle and lower income countries in the world. In fact, Turkey itself received 23 cents out of every dollar invested in middle income countries in the form of portfolio investment in 2000. Moreover, Turkey is not only the largest debtor of IMF accounting for 46 per cent of the total outstanding credits and loans from the General Resources Account, but also has the highest quota/usage ratio from this account with 1011 per cent of its quota as of April, 2006.

Employing micro level company panel data for each country separately, the empirical findings of this research suggest that increasing volatility of short-term capital flows have an economically and statistically significant negative effect on new fixed investment spending of private real sector firms. Accordingly, a 10 per cent increase in capital flow volatility reduces fixed investment spending in the range of 1-1.7, 2.3-15.1, and 1 per cent in Argentina, Mexico and Turkey

respectively. Given that industrial investment is increasingly accounting for a larger share of employment and output in emerging market economies, the negative effects of capital flow volatility is of significant importance.

The next section presents a brief review of the recent liberalisation experience of Argentina, Mexico and Turkey followed by a discussion of determinants of international capital flows and the effects of their volatility on domestic macroeconomic environment and private investment. The fourth section presents the key hypothesis of interest. The fifth section introduces the empirical model followed by methodology, data and measurement issues. The sixth section presents the empirical results. The final section discusses the findings and concludes the paper.

2. A BRIEF HISTORY OF LIBERALISATION EXPERIENCE

Argentina, Mexico and Turkey adopted the Ten Commandments of Washington Consensus starting from early 80s and together with Chile were the forerunners of neo-liberal economic restructuring among developing countries. However, despite being portrayed as a *success story* by the IMF and WB at the early stages of reforms, the ensuing economic performances were far from initial expectations (Kuczynski and Williamson, 2003; Unctad, 2003). In retrospect, their experiences highlight some of the inherent contradictions and limitations of the neo-liberal economic model at least as it is applied in developing countries.

Starting from late 1950s to mid and late 1970s, the economic landscapes of all three countries were characterized by an Import Substituting Industrialisation regime the main features of which included strict quantitative controls on international trade, repressed financial markets, overvalued exchange rates, and severe rationing in both foreign exchange and credit markets. Among the trio, Turkey was the first that embarked on the stabilisation and structural adjustment program of IMF and WB starting from early 80s in the aftermath of a serious Balance of Payments (BOP) crisis (Demir,

2004). The final stage of restructuring was in 1989 with the complete liberalisation of its capital account of BOP.

On the other hand, Argentina and Mexico entered the 1980s with a more unfavourable environment resulting from the debt crisis of 1982 and the ensuing fall in external financing. Both countries were cut from international financial community and faced large contraction in their economies accompanied by hyperinflation. The unorthodox Pacto agreement in 1987 for inflation stabilisation and debt restructuring under Brady Plan in 1989 helped release the external constraints for Mexico (Table 1). The accompanying liberalisation program under Washington Consensus and the related pro-foreign investment legislative changes (including capital account liberalisation in 1989) combined with the signing of NAFTA in 1993 led to a strong change of mood towards Mexico. As a result of the change in investor expectations combined with favourable external conditions (such as low interest rates in the US) led to a surge of capital flows to Mexico. Between 1990-93 net real short-term capital inflows by non-residents (RSCF) totalled $105 billion compared to –$63 billion between 1982-89. Overall, the net RSCF and real Foreign Direct Investment (RFDI) inflows have reached $146 and $203 billion between 1990 and 2005 (Table 1). Similarly, Argentina also embarked on this new wave by restructuring its debt in 1993 under Brady agreement. In addition, with the approval of IMF it started a semi-currency board system to control inflation and stabilise the economy under Convertibility regime by fixing exchange rate to dollar and abolishing all exchange and capital controls in 1991. The official date of capital account liberalisation was in 1989 when restrictions on the movement of capital to and from Argentina were lifted. Comparatively, Argentina was also successful in attracting RSCF, which increased from a net of –$9 billion between 1982-89 to $27 billion between 1990-93. Moreover, the total RSCF and RFDI inflows have reached $50 and $97 billion between 1990-2005. Similarly, Turkey attracted large sums of short term inflows after capital account liberalization that reached $120 billion between 1990-2005 although with a much limited inflows of FDI that totalled $26 billion for the same period (Table 1).

<Insert Table 1 Here>

Among the expected benefits of reform programs were more efficient allocation of domestic savings, increasing credit generation for fixed investments, financial stability, and higher fixed capital formation and GDP growth rates. The performance of all three countries during the 90s is, however, far from achieving these objectives (Unctad, 2003:XI). Instead, in addition to major financial crisis episodes in 1994 (Mexico and Turkey), 1995 (Argentina), 2001 (Argentina and Turkey), the macro indicators regarding investment and growth performance is also lagging behind other emerging markets such as those in East Asia (Unctad, 2003).

Although in Argentina and Mexico the semi-orthodox stabilisation and orthodox structural adjustment programs were successful in bringing the high inflation rates down from an average of 159 and 80 per cent between 1982-89 to 4 and 7 per cent by 1994, they were not as successful on other accounts. In particular, the most visible fault lines ones are the comparatively low growth rates and steadily declining fixed capital formation in the economy that led Unctad (2003) to include AMT in the group of deindustrilisers among other developing countries. While the gross fixed capital formation as a percentage of GDP fell from an average of 20 and 21 per cent to 17 and 19 per cent between 1980-89 and 2000-05 in Argentina and Mexico, it stagnated at the same level of 22 per cent in Turkey (Table 1). These rates are well below the 25 per cent minimum that Unctad (2003:61) identified as the required threshold to generate high and sustained growth in middle-income developing countries. Furthermore, the real interest rates remained well above those in developed counties (Table 1).

In this paper we focused on one key element of the recent AMT experience that is of significant importance in explaining their disappointing investment performances during the 90s: namely, the increasing uncertainty and volatility in macroeconomic environment caused by the rising volatility of short-tem capital flows. An in-depth analysis of these three major emerging markets, we

believe, will also help explain the reasons behind divergent outcomes in developed and developing countries following financial liberalisation.

3. DETERMINANTS OF INTERNATIONAL CAPITAL FLOWS AND VOLATILITY

In order to evaluate potential long-term effects of short-term capital flows, we need to understand the underlying forces behind their type, direction *and* volatility for the last two decades. At this point, despite the radical increase in the volume and volatility of global capital flows since 1980s[2], there is no consensus over their determinants. For a brief review, we divided the arguments on their determinants under two subgroups, which are the pull and the push factors.

3.1 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 capital flows. According to this view, past mistakes, policy failures, and lack of institutional infrastructure (such as prudential regulation or well functioning capital markets, as argued by Kuczynski and Williamson, 2003) are the primary cause of high-risk overhang and high volatility of capital flows in 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 by international investors (Rojas-Suarez and Weisbrod, 1996). Accordingly, countries with high capital inflows are argued to have higher domestic saving rates, larger foreign exchange reserves and higher rates of growth as well as lower levels of volatility of inflation and real exchange rate, lower indebtedness, fiscal deficits and inflation together with lower levels of political risk than the ones experiencing low levels of inflows (Hernandez and Rudolf, 1994; Fedderke and Liu, 2002). Therefore, capital flows are expected to become 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 Latin America 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. 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, international investors are agued to remain short-termist in their investments in developing countries and reduce their risk exposure to market fluctuations by remaining in more liquid forms of investments. Such differences in reactions can also explain the high volatility of capital flows to developing countries.

On the other hand, the empirical evidence on the importance of pull factors is inconclusive. In a cross-country analysis for 1970-2000, Alfaro, Kalemli-Ozcan and Volosovych (2004) failed to find any significant impact of institutional quality on the volatility of total capital flows. Similarly, several others 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 (Kraay, 1998; Arteta et al., 2001).

Nevertheless, regardless of the controversy over the weight of domestic variables in investor decisions, the term structure and the type of capital flows can be interpreted as a sign of continued investor cautiousness towards emerging markets. That is why the increase in FDI inflows in AMT throughout the 1990s was seen as a much more positive development than the revival of portfolio flows for long-term growth and stability. Yet, according to Unctad FDI database, 76, 33 and 21 per cent of all FDI inflows that arrived in AMT between 1990-2003 went on purchasing existing assets in the form of Mergers and Acquisitions rather than on Greenfield investment (Table 2). Furthermore, net FDI inflows to AMT have remained at only around 15, 28 and 8 per cent of gross short-term capital inflows during the same period (Table 2).

<Insert Table 2 Here>

3.2. The Push View: Asymmetric Information and External Shocks

The push factors explain the determinants of international capital flows by exogenous/external factors. Accordingly, changes in international capital markets and investor expectations are the main forces behind the direction of capital flows with significant effects on developing country markets independent of changes in their domestic economic fundamentals.

It is argued that as business portfolios become more and more diversified in the highly integrated international capital markets, the marginal benefit of acquiring expensive country specific information decreases that discourages investors from obtaining detailed information on each country they invest in (Calvo and Mendoza**,** 1996; Calvo, 1998). As a result, it becomes quite *rational* for investors to react even to small news. That is why, 'small bad news' even if there is no fundamental change in key economic indicators can increase the volatility of capital flows and trigger a financial crisis. In other words, since foreign investors are not be as responsive to real sector changes in the short-run as they are to news and market rumours, good fundamentals may not be sufficient to decrease country risk, reduce capital flow volatility, or to avert a financial crisis (Fitzgerald, 2001). This makes the investors more vulnerable to herd behaviour and can cause major instabilities in domestic markets. In such an environment, it is of little surprise that liquid short-term investments appear to be the best way of hedging against uncertainty.

The existing empirical evidence provide ample support to this view and suggest that following financial liberalisation 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 et al., 1993; Grabel, 1995). Furthermore, Chuhan et al. (1993) showed that external factors explained almost one-half of the bond and equity flows from the US to six Latin American countries. Similarly, Fernandez-Arias (1994) found that changes in international interest rates explain up to 60 per cent of deviation of portfolio inflows to 13 developing countries

from their 1989 levels. Furthermore, the pro-cyclical behaviour of external 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).

One common conclusion of pull and push factors literature is that foreign investors limit their portfolios in developing countries to liquid forms of investments that not only allow them to quit the market in a very short span of time but also increase the capital flow volatility. The debate is more on the underlying reasons behind this result. The overwhelming evidence, however, supports the push factors (without denying the importance of pull factors) and suggests that short-termist decision-making on the part of investors create major problems regarding the stability of capital flows and therefore of domestic investment and growth in developing countries, which we discuss in the next section.

4. SHORT TERM CAPITAL FLOWS AND PRIVATE INVESTMENT

4.1. Capital Market Development

Given the presence of capital market imperfections in developing countries, financial liberalisation was expected to generate financial market deepening, reduce agency costs and asymmetric information, and to increase efficiency while directing limited resources to more efficient investment projects at lower costs. These transformations, in return, were expected to provide macro and microeconomic stability and to boost private investment and growth in the medium and long run.

Nevertheless, the empirical facts shed serious doubts over the success of liberalisation programs and accompanying capital flows in achieving the initial policy objectives. In the case of Argentina, Mexico and Turkey, the majority of papers fail to provide any evidence of efficiency gains for real sector firms. Regarding credit availability, despite comprehensive reform programs and increased market share of foreign banks[3] strict credit rationing continues to persist with a lack of long

term credit availability for real sector firms (Fanelli et al., 1998; EIU, 2003a: 8-13, b: 37). Furthermore, there is no evidence of any difference between domestic and foreign owned banks' loan behaviour and the composition of loan portfolios (Goldberg et al., 2000). For example, similar to Turkey where the short-term to total debt ratio of top 500 manufacturing firms was around 70 per cent in 2005, in Argentina it was around 73 per cent for both tradable and nontradable goods sectors as of 1995 (ISO; Fanelli et al., 1998: 41). Table 1 further shows that total bank credit to the private sector as a share of GDP actually declined in Argentina from 26 per cent between 1980-89 to 19 per cent in 1990-99 and further to 16 per cent in 2000-2005. In the case of Mexico and Turkey, it was 15 and 18 per cent between 1980-89, 25 and 20 per cent in 1990-99 and back to 16 and 20 per cent in 2000-2005, which are all well below the high income OECD average of over 160 per cent or South Korea's 100 per cent (WDI). Moreover, regarding capital market deepening, several Latin American 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). Likewise, around 98 per cent of secondary market transactions in Turkey were of government securities as of 2004 (SPK, 2004). Lastly, high real interest rates and large spreads between borrowing and lending rates have continued to persist (Table 1; Brock and Rojas-Suarez, 2000). In this picture, increasing capital flow volatility with sudden reversals cause significant distortions in the capital markets given the supply constrained nature of financial markets in developing countries with a disproportionate share of short term liabilities.

4.2. Capital Flow Volatility and Investment Performance

There is growing evidence, which shows that unregulated short-term capital flows have created serious problems for long-term investment and growth in developing countries. In most emerging markets, financial liberalisation has been accompanied by sharp fluctuations in key macro and micro prices together with increasing uncertainty. Kose et al. (2003), for example, found an

increase in consumption volatility in emerging markets during the 1990s. Furthermore, Gabriele et al. (2000: 1051) pointed out the 'high, rising and unpredictable" volatility of capital flows to developing countries during the 1990s compared to late 70s and 80s. The empirical evidence also shows an increase in the volatility of stock markets as well as in the sales and earnings of firms in both developed and developing country markets for the last three decades (Grabel, 1995; Comin and Mulani, 2006; Wei and Zhang, 2006). In this respect, increasing volatility following financial liberalisation 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. (Keynes, 1964, Ch. 12; Grebel, 1995)

As a result, it is of little surprise that emerging economies appear as systematically becoming more vulnerable to both currency and banking crisis after financial liberalisation (Weller, 2001). At this point there is a general consensus that points out Short-term Capital Flows (SCFs) rather than Foreign Direct Investments (FDI) as the main culprit behind increasing volatility and financial instability. Besides well known examples of potential positive effects of FDI, several papers also 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).

In addition to the above channels, volatility of capital flows also directly affect investment and growth performance by distorting price signals through changing relative goods prices. It is well documented that capital inflows lead to a bias against *tradable goods* vis-à-vis nontradables by causing a profitability squeeze in the real sectors that partly explains decreasing business savings and contraction of employment in these markets. (Berg and Taylor, 2000; Frenkel and Ros 2006). Unctad (1998, Chp.3) 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.

Regarding the effects of increasing macro and microeconomic uncertainty and volatility on investment and growth performance, there is no controversy in the current empirical research. In both developed and developing countries, uncertainty and volatility in key macro and micro prices (including different measures of uncertainty in real GDP growth, real exchange rate, relative prices of capital goods, and inflation) are found to have an economically and statistically investment and growth reducing effect (Edwards, 1989; Driver and Moreton, 1991; Aizenman and Marion, 1993, 1996; Federer, 1993; Pindyck and Solimano, 1993; Hausmann and Gavin, 1995; Ramey and Ramey, 1995; Price, 1996; Darby et al., 1998; Serven, 1998). Similarly, Lensink and Morrissey (2006), found a significantly negative effect of FDI volatility on economic growth for a panel of 87 countries. Surprisingly, however, the direct effects of short-term capital flow volatility on private investment have been completely neglected. The only exception is Moguillansky (2002) who, using macro data for a panel of 16 Latin American countries, found that volatility of short-term capital flows has a statistically and economically significant negative effect on fixed capital formation.

The volatility of SCFs in AMT has also increased following capital account liberalisation and appears to be driven not only by the investors' preference to remain liquid but also by the availability of large arbitrage opportunities. Using the uncovered interest parity condition the net arbitrage gain is calculated as the difference between domestic interest rates deflated by the next period average depreciation of domestic currency, and the international interest rates (Table 1). Accordingly, while monthly arbitrage gain has increased from negative numbers during pre-liberalisation era to as high as 156, 259 and 482 per cent in AMT in March 2003, March 1995, and May 1994 respectively, annual average gain has been two and sometimes three digit numbers (Table 1). The real interest rates also remained very high in international standards at 6.2, 4.2 and 9.4 per cent on average between 1991-2005 with annual average peaks being at 23, 9.4 and 23.8 per cent in 2001, 1999, and 2002 in Argentina, Mexico and Turkey respectively. The simple correlation coefficient (in absolute values) between RSCF and net financial arbitrage has been .58, .36 and .65 between 1990-2000 and

.60, .91 and .44 during 2000-2005 in AMT respectively. The latest of such cycles is most visible in the case of Turkey in the aftermath of 2001 crisis (Table 1). Similarly, the correlation between CAB and financial arbitrage has been .86, .74 and .63 between 1990-2000 and .29, .46 and .21 between 1990-2005 respectively.

During this period, Table 1 also shows an increase in the volatility of GDP growth with an increasing dependence on private short-term capital inflows as the engine of growth. The simple correlation coefficient between current account balance (CAB) and real GDP growth (RGDPG) rate (in absolute values) has been .73, .70, and .75 between 1990-93 while that of RSCF and RGDPG were .43, .97 and .62 for the same period. The overall correlation for 1990-2005 between CAB and RGDP has been .23, .26 and .70 while that of RSCF and RGDP has been .32, .40 and .62 respectively. In all three cases the neoliberal era coincided with increasing boom-bust cycles yet overall with lower investment rates.

In order to capture the magnitude of the shock caused by external capital inflows in AMT, 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). The motivation for this is that the main challenge to developing countries comes not only from the size of net flows but more importantly from the gross flows vis-à-vis domestic stock variables. Therefore, focusing only on net flows will give a distorted or at best incomplete picture of the real shock faced by the recipient countries. According to Table 2, between 1984 and 2003 the net inflows to gross inflows ratio has been 0.36 per cent in Argentina, 2.7 per cent in Mexico and 4 per cent in Turkey. When looking at their periodical breakdown, not surprisingly the majority of inflows took place following the capital account liberalisation 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. The figures using total net inflows data from IMF in Table 1 also show this radical surge in inflows after

1989. 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 (Table 2). Figure 1 highlights the discrepancy between the gross and net inflows by looking at the ratio between net and gross capital 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.[4] Accordingly, there is a sudden jump in the volatility of capital inflows to AMT following the capital account liberalisation of 1989 as seen from the increase in gross inflows vis-à-vis net inflows.

<Insert Figure 1 here>

5. HYPOTHESIS TESTING

To sum up, increasing volatility of capital flows affects 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 nominal exchange rate expectations, c) domestic absorption, d) systemic risk from uncertainty regarding future profitability and macro environment, and, e) liquidity premium and opportunity cost of fixed investment.

Regarding model specification for empirical estimation, there is a vast literature on the determinants of investment and in particular on the specification of investment functions (see for example, Blundell et al., 1992; Roma, 1993; Mairesse et al., 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. While the structural models are derived from standard optimization problems, the synthesis approaches including the error correction methods and distributed lag models rely less on structural equations but more on stylized facts regarding model specification with the help of the flexibility of distributed lags.[5] Both groups of models 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 volatility in

macroeconomic variables (in the case of measurement of uncertainty). In this respect, similar to Serven (1998) and Chirinko et al. (1999), given its better empirical tract record we adopt the synthesis approach loosely following Serven (1998), Mairesse et al. (1999) and Agrawal (2004) in our model specification. The relationship is tested with the following dynamic investment equation for each country separately:

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

where *i=1, …, N and t=1, …, T* respectively refer to the cross section and time series elements of the data. ε is the error term. 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}).[6] We kept the lags at *2* for I_{it} and KO_{it} given that it may take more than one-period (half year) to adjust for adjustment costs and delivery lags. A detailed discussion of the variable definitions is provided in the appendix.

KO_{it} is Capital/Output ratio and is based on the proportionality of output and capital in the long run with short-run fluctuations. The lags in the response of investment spending to *KO* 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). Hence, a decreasing *KO* ratio is expected to increase new investment. Here net sales are used as a proxy for the value of output.

$SCFV_{i,t-1}$ is the volatility of real Short-term Capital Inflows the measurement of 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 sections. We used one-period lagged values given that the data are bi-annual and we expect the volatility to show its effects on investment spending not in the current period for which it was already planned and undertaken but for the following periods' investments.

N_t is a vector of control variables including:

Real GDP growth rate (*GDP*) suggesting that increasing economic growth stimulates new fixed investment through changes in aggregate demand and investor expectations.[7] Given the negative effect of volatility on economic growth, the *SCFV* coefficient might lose its significance once controlled for GDP growth if that were the main channel through which it affects investment.

Operating profits to capital ratio (*OK*) to control for the effects of internal funds on investment decisions under credit constraints. It is well established in the literature that in markets with credit constraints internal cash flow is a significant determinant of investment spending. Also, capital flow volatility affects fixed investment through its effect on firm's cash flow. We expect cash flow to have a positive coefficient reflecting the presence of capital market imperfections (consistent with Gelos and Werner, 2002; and Leaven, 2003). If the capital flow volatility affects investment performance only through its impact on firm profits, then we expect the volatility coefficient to lose its significance once controlled for cash flow.

Total credit from the banking to the private sector as a share of GDP (*Cr*). We expect that increasing credit availability enables new investment projects and thus is expected to have a positive coefficient. Given the procyclical nature of credit generation, increasing volatility affects investment also through its effect on total supply of credits. If this is the key channel, then volatility coefficient may lose its significance after controlling for the credit generation in the market.

Real interest rate (*Rint*) to control for the effect of domestic interest rates on investment spending. Increasing real interest rates negatively affect new investments through: a) raising the discount rate (and the opportunity cost) that is used to calculate the net present value of new investment projects, and b) raising the cost of external borrowing. Capital flow volatility may also lead to higher interest rates through higher risk premium and higher expected nominal exchange rates and therefore reduce fixed investments.

We also explore the differences between small and large firms' reaction to capital flow volatility using D^{small}, which is a size dummy that takes that takes the value of one if net sales of firm

i at time *t* are smaller than the sample median. *SCFV* may have asymmetric effects on small and large firms especially given the better access of large firms to capital markets with more diversified portfolios.

And finally, a set of time dummies.

5.1 Methodology

The datasets consist of non-random stock market quoted firms, which may receive market listing only if they satisfy certain conditions. Therefore, in order to correct for parameter endogeneity resulting from the presence of unobserved firm-fixed effects as well as to correct for the correlation between the lagged I_{it} and firm specific effects and the error term, we used a Generalised Method of Moments (GMM) estimator by Arellano and Bond (1991)'s first differencing transformation that is widely used to have a consistent estimate for dynamic panel equations.[8] Accordingly, we applied the following first-difference transformation using Arelano and Bond (1991) GMM estimation. The first differencing is assumed to remove the individual firm-specific effects while the GMM estimation corrects for any remaining endogeneity as well as the correlation between Δv_{it} and Δy_{it}.

$$\Delta y_{it} = \alpha \Delta y_{it-1} + \beta' \Delta x_{it} + \Delta v_{it} \qquad (2)$$

In this transformation, if x_{it} 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 variable[9] 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: 210), remote lags are not likely to provide much additional information and therefore we did not include all moment restrictions in our calculations (we used $2 \leq t \leq 3$ lagged values of right hand side variables and time dummies at levels as instruments[10]). The validity of the instruments and the estimation are tested by two specification-tests as suggested by Arellano and Bond (1991). The first one is the Sargan-test of over-identifying restrictions for testing the validity of

instruments used. The second one is the usual m_2 test that is a second-order serial-correlation test of the residuals from the first-difference equation. The reason for this is that the use of endogenous *t-2* dated variables is valid only if there is no serial correlation in the error term of order 2.

5.2 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 1991:2-2001:2 for Argentina, 1990:2-2003:2 for Mexico and 1993:1-2003:2 for Turkey. The primary reason for using biannual data is to capture the real impact of the volatility of capital flows on fixed investment decisions of private sector firms. Given the high velocity with which financial capital travels in and out of any country, annual flow measures do not capture the real volatility of these flows (see Table 1 and 2, and Figure 1). As a result, when trying to capture the volatility of capital flows using annual data or a moving average series, there might be a significant bias in the calculations.

The firm level data for Argentina and Mexico is mostly from *Economatica*, a commercial database providing detailed financial statement data for publicly traded Latin American companies.[11] For Turkey the dataset is from the Istanbul Stock Exchange Market online database. In some cases Worldscope International database, Datastream, and original firm financial statements are also used for robustness and/or completeness. For Mexico and Turkey, we have dropped those firms with less than eight consecutive data points from the dataset. For Argentina, we kept the minimum threshold level at five because of its smaller number of cross section firms.[12] The firms included are all industrial firms with majority of them in manufacturing. For Argentina there are 61 firms in the final dataset with 50 in manufacturing (ISIC 15-37), three in construction (ISIC 45), four in mining (ISIC 10-14) and four in electricity power generation and distribution (ISIC 40). In the case of Mexico, there are 79 firms in the final dataset with 63 in manufacturing (ISIC 15-37), four in mining (ISIC 10,12,13,14) and 12 in construction (ISIC 45). For Turkey, there are 172 firms all in manufacturing (ISIC 15-37).

Regarding Short-term Capital Flows, the available data from national 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.[13] 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 2 and Figure 2). Given that Turkey is not in such 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.[14] As the measure of capital inflows, we have used real net monthly inflows (deflated by US Producer Price Index with base year 2000). However, for sensitivity analysis gross inflows (in absolute values) are also calculated to capture the total size of capital moving in and out of the economy by nonresidents (Table 2 and Figure 1).

<Insert Figure 2 here>

The net inflows variable is equal to net sale of long-term [Argentine, Mexican, Turkish] stock and bonds[15] 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 of banks and other sectors, other investment currency deposits of banks and other investment other liabilities from monthly balance of payments statistics. As for the volatility measure, the biannual standard deviations of real net monthly inflows are used (Figure 2).[16]

6. EMPIRICAL RESULTS

The results from Table 2 uncover a significantly negative relationship between the volatility variable and private fixed investment in all three countries. The results are robust to sensitivity tests with alternative model specifications. In particular, in columns (1), (2) and (3) of Table 3 we analyzed the effects of capital flow volatility (*SCFV*) on fixed investment performance after controlling for other important determinants of private investment including real GDP growth (*GDP*), operating profits (*OK*), total domestic credit to the private sector as a share of GDP (*Cr*), and real interest rates (*Int*). Regardless of specification, the capital flow volatility variable have an economically and statistically (at 1% level) significant negative effect on new fixed investment spending of real sector firms in all three countries. Accordingly, a 10 per cent increase in capital flow volatility reduces fixed investment spending in the range of 1-1.7, 2.3-15.1, and 1 per cent in Argentina, Mexico and Turkey respectively. Using our point elasticities, we can then estimate, for instance, the impact of the most serious economic crisis in Turkish history during 2000:2 and 2001:1 on private investment. In 2000:2 and 2001:1, the *SCFV* increased by 87 and 69 per cent compared to the same period of previous year that implies an 8.7 and 6.9 per cent decline in private fixed investment rates that are quite close to the stylized facts given that the economy contracted by 7.6 per cent in 2001 with a sharp fall in fixed capital formation rate (Table 1).

In columns (1) to (4) of Table 3, the results show that the volatility of capital flows significantly reduce fixed investments even after controlling for the significantly positive effects of real GDP growth[17], operating profits and credit availability. As discussed before, one of the key channels *SCFV* affects developing country markets and investment performance is through its impacts on economic growth, firm profitability and credit generation due to pro-cyclical nature of these key variables. Furthermore, domestic interest rates are also highly procyclical with capital flows. As shown on column (4), after controlling for the negative effect of increasing real interest rates, *SCFV* still appears to have an economically and statistically significant negative effect on new

investments. In the case of capital-output ratio variable, as expected we have found a significantly negative relationship in all three countries.

<Insert Table 3 Here>

Furthermore, in order to explore any differences between small and large firms in their investment response to capital flow volatility, we have divided the sample into two groups using firm size based on the median sales for each country. We then constructed a small-firm dummy (D^{Small}) that took the value of one if real net sales at time *t* were smaller than the sample median. Table 4 shows the regression results using the specification in column (4) of Table 3 with the addition of this dummy variable. Accordingly, we have found that capital flow volatility has a significantly larger investment reducing effect in small firms in Mexico and Turkey. There may be several reasons for this: a) large firms having better diversification of their investment portfolios may be able to shield sudden capital flow reversals better, b) large firms with better access to capital markets may be able to find external credits easier and at better rates during sudden reversals of capital flows (that lead to lower internal cash flow and lower external supply of loanable funds with higher interest rates) than small firms. In the case of Argentina, however, *SCFV* appeared to have a larger investment depressing effect in large firms. This result may be due to the special situation of Argentina during the 1990s when the country adopted a virtual currency board system and fixed its exchange rate to dollar that led to high levels of dollarisation of the economy and encouraged firms to have significant open positions. As a result, increasing capital flow volatility might have affected large firms more than small firms. However, the exact factors behind this finding are beyond the scope of current research.

<Insert Table 4 Here>

Finally, in both Table 3 and 4 the Sargan specification test confirms the validity of instruments used and the AR(2) test indicate no sign of second-order serial correlation in the model estimations.

7. CONCLUSION

One of the main arguments in favour of liberalisation of capital markets was to direct 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 realised outcomes, the results have been quite disappointing in all three countries.

At the global scale, the post-Breton Woods era has been characterised with increasing macro and micro volatility and uncertainty, higher frequency and magnitude of financial crisis and boom bust cycles, lower investment and growth rates, and perverse flow of funds from developing to developed countries. The US alone imported 65 per cent of all world savings to finance its over $850 billion Current Account deficit in 2006. On the other hand, developing countries are trying to self-insure themselves against the increased volatility in financial markets by accumulating large sums of unproductive, idle and in fact quite costly foreign exchange reserves that offer very low rates of return. According to the IMF data, total reserve accumulation in the world has increased from $1.9 trillion in 1997 to $5.1 trillion in 2006, 72 per cent of which has been held by developing countries. During this period, for example, the foreign exchange reserves of China has increased 9 folds from 140 billion in 1997 to $1.2 trillion in 2006 while that of Korea has increased 12 folds from 20 billion to $242 billion.

Using the recent liberalization experiences of three major emerging markets, the findings of this research show one key reason why developing countries are increasingly accumulating large sums of reserves: that is to avoid the significantly negative effect of short-term capital flow volatility on domestic investment rates.[18] Overall, the results suggest that under a liberalised 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 liberalisation 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. In retrospect, the policy makers in all three countries appear to have failed to consider any strategy to link financial liberalisation programs and accompanying short-term distortions with the medium and long-term domestic development objectives. In this respect, there has been an incomplete concern regarding determinants of productive investment after financial liberalisation.

Given that the annual FX trading to world trade ratio has increased from 2/1 in 1973 to 90/1 in 2004, the increasing volatility in capital markets is in fact of little surprise (BIS, 2005). What is surprising, however, is the lack of long-term credit for investment in developing countries despite $1.8 trillion daily foreign exchange turnover in world capital markets. Furthermore, it is equally surprising that despite major instabilities caused by SCFs for private investment, there is no international mechanism to curb the excess volatility in global financial markets. Thus, we suggest that there is an urgent need to reform both domestic and international financial system so that domestic and foreign savings are directed towards productive investment rather than speculative and highly volatile financial ones. To achieve this, the main policy recommendation of this paper is to realise macro and microeconomic stability through reducing capital flow volatility and through the use of counter-cyclical macro policies.

APPENDIX: DATA DEFINITIONS AND SOURCES

Cr: Total credit to the private sector as a share of GDP (for Argentina it is measured as the growth rate of total real credit to the private sector).

KO: Capital-output ratio measured as beginning fixed capital stock (K_{t-1}) /net sales at constant prices.

RGDPG: Real GDP growth measured as log difference of real GDP deflated by GDP deflator.

OK: Operating Profits (net-operating revenues minus cost of goods sold, minus operating expenses) /$K_{i,t-1}$

RSCF: Real Short-term Capital Inflows defined as annual portfolio investment liabilities (equity plus debt securities) plus other investment banks liabilities plus other investment other sector Liabilities from International Financial Statistics of IMF.

Rint: Biannual average real interest rate calculated as ln[(1+T-Bill Rate)/(1+Producer Price Inflation)]

SCFV: Short-term capital inflow volatility calculated as the biannual standard deviations of real net monthly capital inflows. The net inflows variable (Table 2 and Figure 1) is equal to net sale of long-term [Argentine, Mexican, Turkish] stock and bonds 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 inflows variable is calculated as the sum of equity securities liabilities, debt securities liabilities, other investment liabilities-loans of banks and other sectors, other investment currency deposits of banks and other investment other liabilities from monthly balance of payments statistics.

Argentina

In converting to real prices, Producer Price Index (at 1995 prices) period averages are used for net sales and operational profits while end-of-period values are used for net fixed assets. The

macro data are from IFS, and Central Bank of Argentina. Overall, the manufacturing firms in the dataset represent 23 per cent of total manufacturing sales in Argentina.

K_t: Net fixed assets and includes net property, plant and equipment. The land is not disclosed in the balance sheets separately and therefore is included in the calculations. Also, resulting from new accounting standards in 2002, the comparison of fixed assets and investments before and after 2002 became impossible, which is why our dataset stops in 2001:2.

Mexico

In converting to real prices, Producer Price Index (at 2003 December prices) period averages are used for net sales and operational profits, while end-of-period values are used for net fixed assets. The manufacturing firms in the dataset represent 36 per cent of total manufacturing sales in 2003. The macro data are from IFS and Banco de Mexico.

K_t: Includes net property, plant and equipment together with the land given that it is not disclosed separately. 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.

Turkey

All data are converted to fixed prices using Manufacturing Price Index at 1995 January prices from the Central Bank of Turkey. The macro data are from Central Bank of Turkey and IFS. The firms in the dataset accounted for 22 per cent of total sales in manufacturing sectors in Turkey in 2003.

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.

ENDNOTES

[1] The commonalities in the liberalisation experience of AMT have recently been highlighted by several other comparative analyses (see for example Onis, 2004).

[2] Total FDI inflows to developing countries increased from $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 $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 41 billion in 1980 to 38 billion and $146 billion in 1990 and 2001 (UNCTAD, 2004). Average daily turnover in traditional FX markets increased from 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)

[3] In Argentina and Mexico foreign banks accounted for 53 per cent and 82 per cent of total bank assets as of 2002 up from 18 and 1 per cent in 1994

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

[5] Chirinko et al. (1999) provides a detailed discussion of the advantages of distributive lag models over structural ones.

[6] 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_{it} is end of period net fixed assets.

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

[8] Blundell et al., (1992) provide a comparative analysis of different panel data techniques in econometric models of firm investment based on micro data.

[9] On this issue, see for example Greene (1997:641).

[10] 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 (1980) period weights from final iteration.

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

[12] There is only one firm with five and four firms with six data points. The rest of the firms have at least 10 consecutive time series.

[13] For an analysis of the data on the US system for measuring cross-border securities investment see for example, Griever et al. (2001). Also for information on data coverage and measurement issues see the treasury web site at http://www.ustreas.gov/tic/index.html.

[14] For a discussion of such limitations see for example. Griever et al., 2001:640.

[15] 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).

[16] Two other alternatives to measure the volatility of capital inflows are the coefficient of variation and normalisation using GDP weights. While both methods are 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] The only anomaly in our results is from Mexico where in columns (1) and (4) of Table 3 real GDP growth appeared with a negative coefficient.

[18] To give an example, after 10 years since the 1997 crisis neither the manufacturing employment nor the percentage share of GDP devoted to fixed capital formation is back to its pre-crisis levels in S. Korea.

BIBLIOGRAPHY

Agrawal, P. (2004) Interest rates and investment in East Asia: an empirical evaluation of various financial liberalisation hypotheses. *The Journal of Development Studies,* 40(3), pp. 142-173.

Aizenman, J. and Marion, N. (1993) Policy uncertainty, persistence and growth. *Review of International Economics,* 1(2), pp. 145-163.

Aizenman, J. and Marion, N. (1996) Volatility and the investment response. NBER Working Paper No: 5841, Cambridge, MA: National Bureau of Economic Research.

Alfaro, L., Kalemli-Ozcan, S. and Volosovych, V. (2004) Volatility of capital flows: bad policies or bad institutions? Paper Presented at the NBER Conference on International Capital Flows, December 17-18, 2004, Cambridge, MA.

Arellano, M. and Bond, S.R. (1991) Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *Review of Economic Studies,* 58, pp. 277-297.

Arellano, M. and Bover, O. (1995) Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics,* 68, pp.29-51.

Arteta, C., Eichengreen, B. and Wyplosz, C. (2001) When does capital account liberalisation help more than it hurts. Paper Presented at the conference celebrating Assaf Razin's 60th Birthday, March 25-26, Tel Aviv University.

Beck, R. (2001) Volatility of capital flows to emerging markets and the financial services trade. *Russian and East European Finance and Trade*, 37(3), pp. 5-24.

Berg, J. and Taylor, L. (2000) External liberalization, economic performance, and social policy. CEPA Working Paper 12, New School University: Center for Economic Policy Analysis.

BIS (Bank for International Settlements) (2005) *Triennial Central Bank Survey: Foreign Exchange and Derivatives Market Activity in 2004* (Basel: BIS).

Blundell, R., Bond, S. and Meghir, C. (1992). Econometric models of company investment, in L. Matyas and P. Sevestre (eds) *The Econometrics of Panel Data*, (Netherlands: Kluwer Academic Publishers), pp. 388-413.

Bond, S. and Meghir, C. (1994) Dynamic investment models and the firm's financial policy. *Review of Economic Studies,* 61, pp. 197-222.

Brock, P.L. and Rojas-Suarez, L. (2000) Understanding the behaviour of bank spreads in Latin America. *Journal of Development Economics,* 63(1), pp. 113-134.

Calvo, G. (1998) Varieties of capital-market crises, in: G. Calvo and M. King (eds) *The Debt Burden and its Consequences for Monetary Policy,* (New York: St. Martin's Press), pp. 181-202.

Calvo, G.A. and Mendoza, E. (1996) Mexico's balance of payment crisis: a chronicle of a death foretold. *Journal of International Economics,* 41(3-4), pp. 235-264.

Calvo, G.A., Leiderman, L. and Reinhart, C. M. (1993) Capital inflows and real exchange rate appreciation in Latin America: the role of external factors. *IMF Staff Papers,* 40(1), pp. 108-151.

Chuhan, P., Claessens, S. and Mamingi, N. (1993) Equity and bond flows to Latin America and Asia: the role of external and domestic factors. Mimeo, May, Washington D.C.: World Bank.

Darby, J., Hughes, H., Andrew, I. J. and Piscitelli, L. (1998) The impact of exchange rate uncertainty on the level of investment. Discussion Paper no.1896, Center for Economic Policy Research.

Chirinkoa, R.S., Fazzari, S.M. and Meyer, A.P. (1999) How responsive is business capital formation to its user cost? an exploration with micro data, *Journal of Public Economics*, 74, pp. 53-80.

Diaz Alejandro, C. (1985) Good-bye financial repression, hello financial crash. *Journal of Development Economics,* 19(1-2), pp. 1-24.

Driver, C. and Moreton, D. (1991) The influence of uncertainty on UK manufacturing investment. *Economic Journal,* 101(409), pp. 1452-1459.

Economist Intelligence Unit (EIU) (2003a) *Country Finance, Mexico.* EIU.

Economist Intelligence Unit (EIU) (2003b) *Country Finance, Turkey*. EIU.

Edwards, S. (1989) Real exchange rate in the developing countries: concepts and measurement. NBER Working Paper no. 2950, Cambridge, MA: National Bureau of Economic Research.

Edwards, S. (1998) Capital inflows into Latin America: a stop-go story? NBER Working Paper no. 6441, Cambridge, MA: National Bureau of Economic Research.

Fanelli, J. M., Rozenwurcel, G. and Simpson, L. M. (1998) Financial reform in developing countries: Argentina, in: J. M. Fanelli and R. Medhora (eds) *Financial Reform in Developing Countries,* (New York: St. Martin's Press), pp. 31-56.

Fedderke, J.W. and Liu, W. (2002) Modelling the determinants of capital flows and capital flight with an application to South African data from 1960 to 1965. *Economic Modelling,* 19(3), pp. 419-444.

Federer, J. (1993) The impact of uncertainty on aggregate investment spending. *Journal of Money, Credit and Banking,* 25(1), pp. 30-48.

Fernandez-Arias, E. (1994) The new wave of private capital inflows: push or pull? World Bank, IECIF Policy Research Working Paper no. 1312 (June), The World Bank.

Ffrench-Davis, R. (2000) *Reforming the Reforms in Latin America: Macroeconomics, Trade, Finance*, (St. Martin's Press).

Fitzgerald, E.V.K. (2001) Short term capital flows, the real economy and income distribution in developing countries, in: S. Griffith–Jones, M.F. Montes and A. Nasution (eds) *Short Term Capital Flows and Economic Crisis,* (UNU/WIDER: Oxford University Press), pp. 29-51.

Frankel, J.A. and Schmukler, S. (1996) Crisis, contagion and country funds: effects on East Asia and Latin America. Pacific Basin Working Paper Series no. 96-04, Federal Reserve Bank of San Francisco.

Frankel, J.A. and Rose, A.K. (1996) Currency crashes in emerging markets: an empirical treatment. *Journal of International Economics,* 41(3), pp. 351-366.

Frenkel, R. and Ros, J. (2006). Unemployment and the Real Exchange Rate in Latin America, *World Development* 34(4), 631-646.

Gabriele, A., Boratav, K. and Parikh, A. (2000) Instability and volatility of capital flows to developing countries. *The World Economy*, 23(8), pp. 1031-1056.

Goldberg, L., Dages, B.G. and Kinney, D. (2000) Foreign and domestic bank participation in emerging markets: lessons from Mexico and Argentina. NBER Working Paper no.7714. Cambridge, MA: National Bureau of Economic Research.

Grabel, I. (1995) Assessing the impact of financial liberalisation on stock market volatility in selected developing countries. *The Journal of Development Studies*, 31(6), pp. 903-917.

Griever, W.L., Lee, G.A. and Warnock, F.E. (2001) The U.S. system for measuring cross-border investment in securities: a primer with a discussion of recent developments. In *Federal Reserve Bulletin*, Federal Reserve Bank, pp. 634-650.

Hausmann, R. and Gavin, M. (1995) Overcoming volatility. Special Report, Economic and Social Progress in Latin America. Washington D.C.: Inter-American Development Bank.

Hernandez, L. and Rudolph, H. (1994) Domestic factors, sustainability, and soft landing in the new wave of private capital inflows. Mimeo, The World Bank.

Kaminsky, G. and Schmukler, S.L. (2002) Emerging market instability: do sovereign ratings affect country risk and stock returns? *The World Bank Economic Review,* 16(2), pp. 171-195.

Keynes, J.M. (1964) *The General Theory of Employment, Money and Interest*, (New York: Harcourt Inc.).

Kraay, A. (1998) In search of the macroeconomic effects of capital account liberalization. Mimeo, The World Bank.

Kuczynski, P.P. and Williamson, J. (2003) *After the Washington Consensus: Restarting Growth and Reform in Latin America*, (Washington D.C.: Institute for International Economics).

Lensink, R. and Morrissey, O. (2006) Foreign direct investment: flows, volatility, and the impact on growth. *Review of International Economics*, 14(3), pp. 478-493.

Mairesse, J., Hall, B.H. and Mulkay, B. (1999). Firm level investment in France and the United States: an exploration of what we have learned in twenty years. NBER Working Paper no. 7437. Cambridge, MA: National Bureau of Economic Research.

Pindyck, R. and Solimano, A. (1993) Economic instability and aggregate investment, in: O.J. Blanchard and S. Fischer (eds) *NBER Macroeconomics Annual,* (Cambridge and London: MIT Press), pp. 259-302.

Price, S. (1996) Aggregate uncertainty, investment and asymmetric adjustment in the UK manufacturing sector. *Applied Economics,* 28(11), pp. 1369-79.

Rama, M. (1993) Empirical investment equations for developing countries, in: L. Serven and A. Solimano (eds) *Striving for Growth after Adjustment: The Role of Capital Formation*, (Washington DC.:The World Bank), pp. 107-143.

Ramey, G. and Ramey, V.A. (1995) Cross country evidence on the link between volatility and growth. *American Economic Review,* 85(5), pp. 1138-1151.

Rodrik, D. and Velasco, A. (2000) Short term capital flows, in: B. Plescovic, and J.E. Stiglitz (eds) *Annual World Bank Conference on Development Economics 1999,* (Washington, D.C.: World Bank), pp. 59-70.

Rojas-Suarez, L. and Weisbrod, S. (1996) Building stability in Latin American financial markets. Working Paper no.320 (February), Washington, D.C.: Inter-American Development Bank.

Serven, L. (1998) Macroeconomic uncertainty and private investment in LDC: an empirical investigation. Mimeo, The World Bank.

SPK (Capital Markets Board of Turkey) (2004) *Trading Volume in Secondary Markets*. Monthly Bulletin, December, Ankara. Available at: http://www.cmb.gov.tr/news/news.htm?tur=monthlybulletin

UNCTAD (1998) *Trade and Development Report*, (Genova: United Nations Conference of Trade and Development).

UNCTAD (2004) *Development and Globalization: Facts and Figures*, (Genova: United Nations Conference on Trade and Development).

United Nations (2005) World *Economic and Social Survey 2005, Financing for Development*, (New York: United Nations).

Weller, C.E. (2001) Financial crises After financial Liberalisation: exceptional circumstances or structural weakness? *The Journal of Development Studies*, 38(1), pp. 98-127.

World Bank (2001) *Global Development Finance: Building Coalitions for Effective Development Finance*, (Washington, DC: The World Bank).

Table 1: Basic Economic Indicators

		Average 1979-81	Average 1982-89	Average 1990-93	1994	1995	Average 1996-2000	2001	2002	2003	2004	2005	Net 1982-89	Net 1990-94	Net 1995-2000
RSCF	A	3,538	-2,393	6,654	15,640	12,491	8,338	-6,252	-13,309	-11,336	-10,621	-4,681	-19,142	42,255	54,180
	M	19,812	-7,988	26,219	12,639	-12,850	7,865	2,919	-4,538	-1,333	495	4,847	-63,902	117,515	26,477
	T	-1,058	959	6,797	-6,733	5,295	8,171	-14,701	2,370	9,513	22,883	32,895	959	20,456	46,150
STDRSCF	A	1,431	830	4,969	1,748	1,953	2,980	2,066	1,448	1,556	1,558	1,504			
	M	2,083	1,504	1,761	7,052	6,201	3,679	2,999	2,557	2,364	3,206	2,579			
	T		314	933	767	1,025	2,729	741	1,468	1,978	794	1,852			
RFDI	A	828	681	3,253	4,005	5,968	12,064	2,142	2,175	1,587	3,868	3,988	5,445	17,016	66,287
	M	3,168	2,493	4,547	12,091	10,135	13,679	26,845	19,278	14,660	17,141	15,829	19,940	30,278	78,528
	T	94	243	842	670	942	880	3,315	1,151	1,684	2,567	8,163	1,943	4,040	5,342
CAB	A	-1.84	-2.95	-0.64	-4.26	-1.98	-3.77	-1.41	9.25	6.22	2.27	3.23			
	M	-5.34	0.18	-5.02	-7.05	-0.55	-2.52	-2.85	-2.18	-1.39	-0.98	-0.61			
	T	-3.04	-1.08	-1.44	2.03	-1.38	-1.48	2.33	-0.83	-3.34	-5.16	0.00			
Arbitr	A	48.12	62.55	206.68	4.58	6.38	2.68	11.41	16.55	31.23	1.04	-1.85			
	M	6.73	-3.55	11.64	-16.04	42.37	15.25	17.31	-7.31	6.49	3.55	13.67			
	T	-29.86	-0.48	0.27	47.21	23.83	12.18	45.28	43.73	84.74	15.67	16.38			
Int	A	11.66	41.82	64.25	3.47	11.56	8.23	23.59	11.20	7.35	-4.09	-6.86			
	M	-2.61	-2.60	4.77	4.00	-0.41	5.87	6.38	1.87	2.03	2.27	5.14			
	T	-22.99	4.65	0.83	11.23	8.72	12.65	-1.11	23.76	22.15	12.12	7.20			
Cr	A	30.52	25.33	15.48	20.28	19.96	23.01	20.83	15.33	10.76	10.50	11.67			
	M	19.63	13.48	24.53	38.74	29.27	20.60	14.12	15.69	15.31	14.63	15.82			
	T	14.85	18.60	17.48	15.94	18.49	23.69	20.67	14.79	16.26	20.49	26.15			
Inf	A	78.86	159.19	112.67	4.09	3.32	-0.10	-1.07	23.01	12.61	4.32	9.21			
	M	24.01	79.49	18.64	6.97	35.00	19.40	6.36	5.03	4.55	4.69	3.99			
	T	79.17	45.85	65.64	106.19	88.14	74.10	54.40	44.96	25.30	8.60	8.18			
GFCF/GDP	A	23.55	18.92	16.09	19.94	17.94	18.32	14.18	11.96	15.14	19.15	21.46			
	M	25.64	18.94	18.67	19.35	16.15	20.17	20.00	19.25	18.93	19.63	19.30			
	T	21.06	21.88	24.21	24.62	23.84	24.06	18.17	16.59	15.46	17.82	19.56			
RGDPG	A	12.75	-0.42	5.74	5.67	-2.89	2.54	-4.51	-11.54	8.47	8.64	8.78			
	M	8.30	0.65	3.64	4.32	-6.36	5.31	-0.03	0.77	1.43	3.92	2.91			
	T	0.23	4.67	5.84	-5.58	6.94	3.83	-7.61	7.51	5.78	8.55	7.12			

Notes: RSCF is Real short-term capital inflows by non-residents in 2000 prices-millions of USD (for details see the Appendix). RFDI is Real FDI inflows in 2000 prices - millions of USD. STDRSCF is annual standard deviation of quarterly RSCF. CAB is Current Account Balance as a percentage of GDP. Arbitr is annual average of monthly net financial arbitrage measured as $[(1+R)/(1+\hat{E})]-(1+R^*)$ where R is 3-month domestic t-bill rate or its equivalent, $\hat{E}$ is average depreciation of domestic currency-end of period values- against US dollar, R* is 3-month US T-bill rate. Int is annual average of monthly real interest rate deflated by next period's realized consumer inflation. Cr is domestic credit to the private sector as a share of GDP. Inf is consumer price inflation. GFCFG/GDP is the Gross fixed capital formation to GDP ratio in percentages. RGDPG is Real GDP growth in constant 2000 domestic prices.

Source: International Financial Statistics of IMF, WDI and author's calculations.

Table 2: Gross and Net Capital Inflows to Argentina, Mexico and Turkey, 1984-2003

Millions of US Dollars in Current Prices								
	Argentina		Mexico		Turkey		Turkey*	
Short-Term Inflows	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%

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.

Source: The US Treasury International Capital Reporting System, Central Bank of Republic of Turkey, Unctad FDI database.

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

**The ratio is biased upwards given that FDI inflows are multilateral while Gross inflows are bilateral between US and AMT.

Table 3: Private Investment and Capital Flow Volatility, dependent variable I_{it}

	Argentina				*Mexico*				*Turkey*			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
I_{t-1}	-0.31***	-0.31***	-0.31***	-0.3***	-0.20***	-0.24***	-0.2***	-0.24***	-0.14***	-0.11***	-0.11***	-0.15***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.004)	(0.002)	(0.004)	(0.003)
I_{t-2}	-0.15***	-0.15***	-0.15***	-0.14***	-0.01	-0.05**	-0.01	-0.05**	-0.03**	-0.02***	-0.03***	-0.01***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.002)	(0.002)	(0.002)	(0.002)
KO_{t-1}	-0.01***	-0.01***	-0.01***	-0.01***	-0.04***	-0.03***	-0.04***	-0.03***	-0.06***	-0.08***	-0.06***	-0.07***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.004)	(0.002)	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)
KO_{t-2}	-0.01***	-0.01***	-0.01***	-0.004***	-0.03***	-0.03***	-0.03***	-0.04***	-0.04***	-0.04***	-0.03***	-0.05***
	(0.0004)	(0.001)	(0.0004)	(0.001)	(0.004)	(0.004)	(0.004)	(0.004)	(0.001)	(0.001)	(0.001)	(0.002)
$SCFV_{t-1}$	-0.0004***	-0.0003***	-0.0003***	-0.0002***	-0.0004*	-0.0003***	-0.0003***	-0.002***	-0.0001***	-0.0001***	-0.0001***	-0.0001***
	(0.0002)	(0.0001)	(0.0001)	(0.0001)	(0.0003)	(0.00004)	(0.00004)	(0.0003)	(0.000001)	(0.000001)	(0.000001)	(0.000001)
GDP_{t-1}	0.19			0.10	-1.73			-17.82***	0.63***			0.46***
	(0.21)			(0.12)	(3.18)			(4.31)	(0.01)			(0.01)
OK_{t-1}		0.11***		0.11***		0.11***		0.11***		0.02***		0.03***
		(0.003)		(0.003)		(0.02)		(0.02)		(0.001)		(0.001)
CR_{t-1}			0.02				0.43				0.32***	
			(0.02)				(0.78)				(0.02)	
$Rint_{t-1}$				-0.1				-0.60***				-0.002***
				(0.09)				(0.31)				(0.00003)
Sargan	1	1	1	1	1	1	1	1	1	1	1	1
m1	0.10	0.11	0.10	0.1	0	0	0	0	0	0	0	0
m2	0.26	0.32	0.26	0.32	0.42	0.48	0.42	0.48	0.19	0.25	0.12	0.19

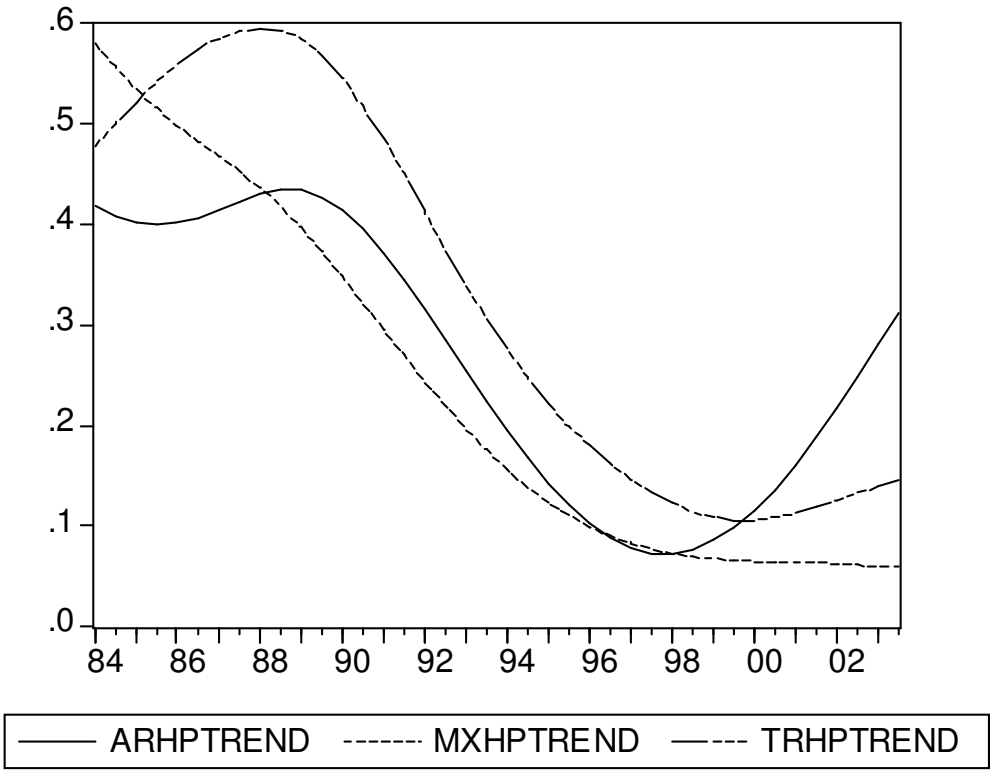
Notes: *t-1*, *t-2* refers to the first-and second lags. *KO* is capital-output ratio, *SCFV* is capital flow volatility, *GDP* is real GDP growth rate. *OK* is operating profits to capital stock ratio, *Cr* is credit to private sector as a share of GDP (except for Argentina where it is measured as the real credit to private sector growth). *Rint* is the real interest rate in natural logs. All regressions initially included a set of (unreported) time dummies. *Sargan* is Sargan-test for overidentifying restrictions. *m1* and *m2* are first and second-order serial correlation tests. All test statistics are given by their p-values. Standard Errors (in parenthesis) are heteroskedasticity consistent. (***), (**), (*) refer to significance at 1, 5 and 10 per cent level respectively.

Table 4: Private Investment and Capital Flow Volatility, Small vs. Large Firms

	Argentina	*Mexico*	*Turkey*
I_{t-1}	-0.25***	-0.19***	-0.15***
	(0.03)	(0.03)	(0.004)
I_{t-2}	-0.11***	-0.04	-0.01***
	(0.03)	(0.03)	(0.003)
KO_{t-1}	-0.01***	-0.03***	-0.07***
	(0.002)	(0.01)	(0.003)
KO_{t-2}	-0.003	-0.03***	-0.05***
	(0.003)	(0.01)	(0.002)
$SCFV_{t-1}$	-0.0003***	-0.003***	-0.0001***
	(0.0001)	(0.0001)	(0.000002)
$(SCFV*D^{Small})_{t-1}$	0.0001***	-0.00002*	-0.00004***
	(0.00001)	(0.00001)	(0.000001)
GDP_{t-1}	0.18	-29.41***	0.45***
	(0.12)	(1.69)	(0.01)
OK_{t-1}	0.09***	0.07*	0.03***
	(0.02)	(0.04)*	(0.001)
$Rint_{t-1}$	0.02	1.97***	-0.002***
	(0.18)	(0.15)	(0.00003)
Sargan	1	1	1
m1	0.08	0	0
m2	0.34	0.69	0.2

Notes: D^{small} is a size dummy that takes that takes the value of one if net sales at time *t* are smaller than the sample median. SCFV* D^{small} is an interaction term. For other variable definitions refer to Table 3.

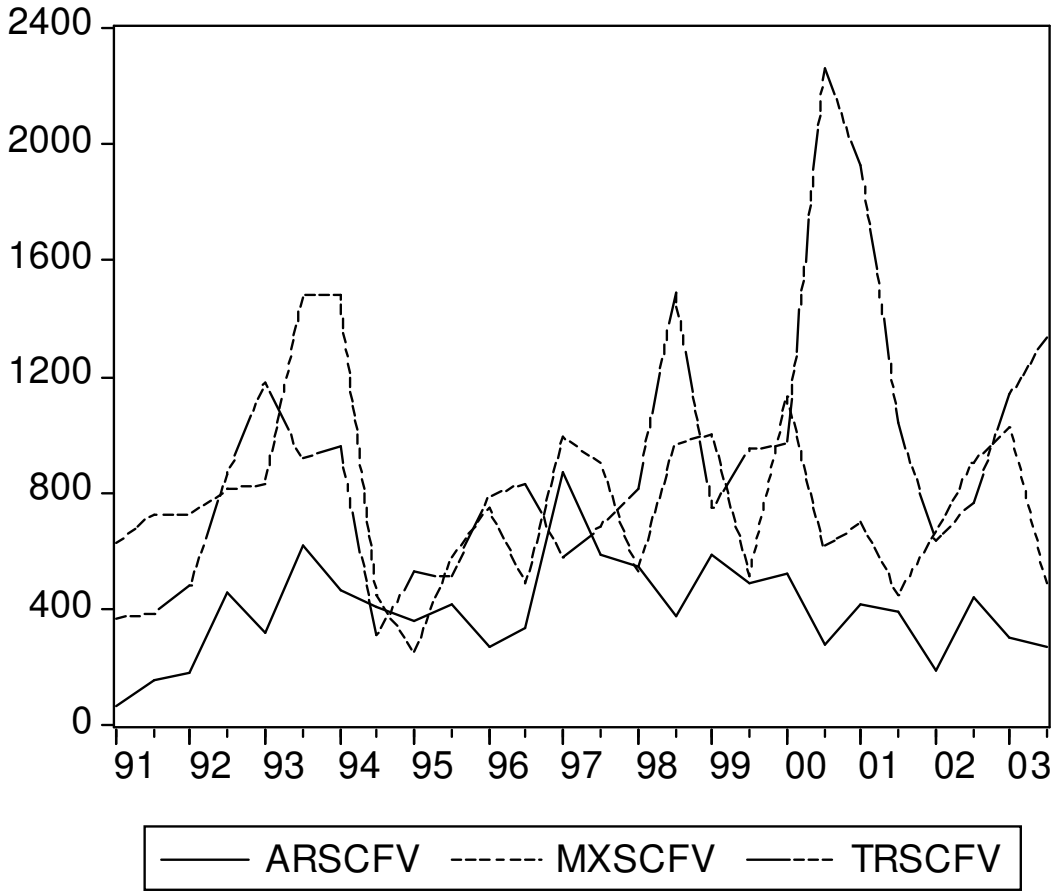
Figure 1: HP Filtered Biannual Net Capital Inflows/Gross Inflows Ratio, 1984:1-2003:2



Notes: 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 comparison, net inflows are in absolute value. A decrease in this ratio reflects increasing volatility.

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

Figure 2: Volatility of Real Short-Term Capital Inflows in Argentina, Mexico and Turkey 1991:1-2003:2



Notes: RSCFI: ARSCFV, MXSCFV and TRSCFV are biannual standard deviation of real Short Term Capital Inflows in Argentina, Mexico and Turkey 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.