

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.

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 a radical increase in private capital flows to developing countries that led to a strong shift of mood among economists, policy makers and investors regarding the long-term outlook of *Emerging Markets*.¹ In this respect, capital inflows and accompanying neoliberal reform programs along the Washington Consensus 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 serious questions remain regarding the capacity of capital flows in achieving the initial policy projections. In addition to unmet expectations, there is a growing debate over the direct role of such flows in generating the financial crisis episodes in Mexico (1994), East Asia (1997), Russia (1998), Brazil (1994, 1999, 2002), Argentina (1995, 2001) and Turkey (1994, 2000-2001) during the course of 1990s and early 2000s. On the other hand, despite the increasing volume of capital flows very little has been written on their

volatility. In particular, apart from a few descriptive studies at the macroeconomic level, there is a lack of in-depth analysis of the effects of capital flow volatility on domestic investment performance in developing countries.

Given the lack of comparative analysis of developing country experiences, the current research has focused on three major developing countries, Argentina, Mexico, and Turkey (AMT from here onwards), each of which at one point was lauded as the poster child of financial liberalisation by the International Monetary Fund (IMF) and the World Bank (WB). The following figures also help emphasise 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 AMT 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 (WB, 2007). 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.

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 1990s; namely, the increasing uncertainty and instability in macroeconomic environment caused by the rising volatility of short-term capital flows. An in-depth analysis of these three major emerging markets, we believe, will also help explain the reasons behind the heterogenous reactions to financial liberalisation in developed and developing countries.

Employing firm level panel data for each country separately, the empirical analysis suggests 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 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 per cent in Argentina, 2.3-15.1 per cent in Mexico, and 1 per cent in Turkey.

The next section presents a brief review of the recent liberalisation experience of AMT followed by a discussion of the macroeconomic effects of the volatility of capital flows. The fourth section discusses the main hypothesis of interest and introduces the empirical model followed by methodology, data and measurement issues. The fifth section presents the empirical results. The final section discusses the findings and concludes the paper.

2. A BRIEF HISTORY OF THE LIBERALISATION EXPERIENCE

Argentina, Mexico and Turkey adopted the Ten Commandments of Washington Consensus starting from early 1980s and together with Chile were the forerunners of neo-liberal economic restructuring among developing countries.² 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.³

Starting from late 1950s to mid and late 1970s, the economic landscapes of all three countries were characterised 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 embarked on the stabilisation and structural adjustment program of the IMF and WB starting from early 1980s in the aftermath of a Balance of Payments (BOP) crisis. The final stage of restructuring was in 1989 with the full liberalisation of its capital account of BOP.

On the other hand, Argentina and Mexico entered the 1980s with a less favourable 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 substantial contraction in their

economies accompanied by hyperinflation. Accordingly, average annual short term capital inflows were -\$2.4 billion in Argentina and -\$8 billion in Mexico during 1982-1989 compared to a positive \$1 billion in Turkey. Likewise average real GDP growth was 4.7 per cent in Turkey as opposed to -0.4 per cent in Argentina and 0.7 per cent in Mexico during the same period. The unorthodox Pacto agreement in 1987 for inflation stabilisation, and the debt restructuring under Brady Plan in 1989 helped release the external constraints for Mexico. The accompanying liberalisation program 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, and partly thanks to favourable external conditions (such as low interest rates in the US) net real short-term capital inflows by non-residents (RSCF) totalled \$105 billion⁴ between 1990-93 compared to -\$64 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. Similarly, Argentina also embarked on this new wave by restructuring its debt in 1993 under Brady agreement. In addition, with the approval of IMF Argentina started a semi-currency board system to control inflation and stabilise the economy under the Convertibility regime by pegging its currency to the US dollar and abolishing all exchange and capital controls in 1991.⁵ Comparatively, Argentina was also successful in attracting RSCF, which increased from a net of -\$19 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 liberalisation that reached \$120 billion between 1990-2005, although with a much limited inflows of FDI that totalled \$26 billion for the same period.

Although the semi-orthodox stabilisation and orthodox structural adjustment programs in Argentina and Mexico 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 respectively, they were not as successful on other accounts. In particular, the most visible fault lines were the comparatively low

growth rates and steadily declining fixed capital formation 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 per cent to 17 per cent in Argentina and from 21 per cent to 19 per cent in Mexico between 1980-89 and 2000-05 respectively, it stagnated at the same level of 22 per cent in Turkey. 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.

3. SHORT TERM CAPITAL FLOWS AND PRIVATE INVESTMENT

3.1. Capital Market Development

Given the presence of capital market imperfections in developing countries, financial liberalisation was expected to generate capital market deepening, reduce agency costs and asymmetric information, and increase efficiency while directing domestic and foreign savings to more efficient investment projects. These transformations, in return, were expected to provide macro and microeconomic stability and 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 AMT, majority of research fail to provide any evidence of efficiency gains for real sector firms. Regarding credit availability, despite increased market share of foreign banks⁶ strict credit rationing continues to persist with a lack of long term credit for real sector firms (Fanelli et al., 1998; Economist Intelligence Unit, 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). As a result, the short-term to total debt ratio of top 500 manufacturing firms in Turkey stood around 70 per cent in 2005 while it was around 73 per cent for both tradable and nontradable goods sectors in Argentina in 1995 (Istanbul Chamber of Industry (ISO); Fanelli et al.,

1998: 41). In fact, the total bank credit to the private sector as a share of GDP did actually decline in Argentina from an average of 26 per cent in 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 respectively, which are all well below the high income OECD average of over 160 per cent or South Korea's 100 per cent (WB, 2007). 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 (Capital Markets Board (SPK), 2004). Lastly, high real interest rates and large spreads between borrowing and lending rates have continued to persist (Brock and Rojas-Suarez, 2000). In this picture, increasing capital flow volatility causes significant distortions in the capital markets especially given the supply-constrained nature of financial markets in developing countries.

3.2. Capital Flow Volatility and Investment Performance

There is growing evidence showing that unregulated short-term capital flows have created serious problems for long-term investment and growth prospects 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. Consumption volatility, for example, has increased in emerging markets during the 1990s (Kose et al., 2003). Furthermore, capital flows to developing countries during the 1990s compared to late 70s and 80s are found to be 'high, rising and unpredictable' (Gabriele et al., 2000: 1051). The stylised facts also show 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 (Gabel, 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; Grabel, 1995).

Furthermore, 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, which discourages investors from obtaining detailed information on each country they invest in (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 or trigger a financial crisis (Fitzgerald, 2001).⁷ As a result, it is of little surprise that emerging economies are systematically becoming more vulnerable to both currency and banking crises 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 affects investment performance through changing relative goods prices, which in turn distorts price signals. It is well documented that capital inflows lead to a profitability squeeze and a substantial bias against tradable goods vis-à-vis nontradables by causing currency appreciation, which partly explains decreasing business savings and contraction of employment in these markets. (Frenkel and Ros, 2006). UNCTAD (1998, Chp.3) also argued that many of the weaknesses in economic fundamentals such as currency appreciation, deterioration of the current account and increasing exchange rate risk is related with the capital flows. Excess volatility in exchange rates resulting from increasing capital

flow volatility also raise inflation uncertainty and encourage speculative financial investments by financial and real sector firms alike (Felix, 1998; UNCTAD, 2006; Demir, 2007).

Regarding the net effects of macro and microeconomic uncertainty and volatility on investment and growth performance, there is a general consensus in the current empirical research. Accordingly, 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, inflation, and so forth) are found to have an economically and statistically significant investment and growth reducing effect (Pindyck and Solimano, 1993; Ramey and Ramey, 1995; Aizenman and Marion, 1996; Serven, 1998; UNCTAD, 2006). Similarly, Lensink and Morrissey (2006) found a significantly negative effect of FDI volatility on economic growth in 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 annual RSCFs in AMT has also substantially increased following capital account liberalisation. Accordingly, the average coefficient of variation of RSCFs in AMT has increased by 3, 2 and 3 folds from 1982-1989 to 1990-2005 respectively. The increasing volatility 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 we calculated the net arbitrage gain as the difference between domestic interest rates deflated by the average depreciation of domestic currency, and the corresponding U.S. interest rates.⁸ As a simple proxy, it shows the net rate of return on investing in domestic short-term financial assets as opposed to foreign ones. Accordingly, the annual average gain has been two and sometimes three digit numbers reaching an average of 9, 11, and 22 per cent during 1991-2005 respectively. 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 average annual peaks at 23 per cent in 2001, 9.4 per cent in 1999, and 23.8 per cent in 2002 in AMT respectively.

In order to underline the magnitude of the shock caused by 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 in AMT using the US Treasury data (where monthly transactions between the US and corresponding countries are recorded). The motivation for this exercise 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. Although the gross flows may overstate certain components of short-term capital flows such as lending to domestic banks (because of separate recording of rolled-over credits, that are registered as new lending), we argue that it is a useful measure especially given that “the rollover of short-run debts is not neutral in financial terms” (Ocampo, 2001:17). Therefore, focusing only on net flows will give a distorted or at best an incomplete picture of the real shock faced by the recipient countries. According to Table 1, 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, the majority of inflows, not surprisingly, 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. On the other hand the increase in net inflows remained much smaller. While gross inflows stood around \$592, \$553 and \$188 billion in AMT, the net inflows remained at \$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 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.⁹ 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 Table 1 and Figure 1 Here>

4. 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 rate, and nominal exchange rate expectations (and thus inflation 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; Rama, 1993; Mairesse et al., 1999). The empirical studies 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 optimisation problems, the synthesis approaches, including the error correction methods and distributed lag models, rely less on structural equations but more on stylised facts with the help of the flexibility of distributed lags.¹⁰ 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 and uncertainty in macroeconomic variables. In this respect, given its better empirical track record we adopted the synthesis approach 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:

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

where $i=1, \dots, N$ and $t=1, \dots, T$ refer to the cross section and bi-annual 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}).¹¹ 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 the Capital/Output ratio 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 in turn, rely on current and past sales, b) adjustments costs and delivery lags. 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 spending. 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.

$N_{i,t-1}$ 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. Given the negative effect of volatility on economic growth, the $SCFV$ coefficient may lose its significance once controlled for GDP growth if that is the main channel through which volatility affects investment.

Operating profits to capital ratio (OK) to control for the effects of internal funds on investment decisions under credit constraints. We expect OK to have a positive coefficient reflecting the presence of capital market imperfections (Laeven, 2003). In addition, if $SCFV$ 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 investments, and b) raising the cost of external borrowing. Capital flow volatility may lead to higher interest rates through higher risk premium, higher expected nominal exchange rates, and more restrictive monetary policy (as in AMT) both to continue attracting capital inflows, and to fight against inflation because of excess exchange rate volatility (UNCTAD, 2003).

We also explore the differences between small and large firms' reaction to capital flow volatility using a size dummy (D^{small}) 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 given the better access of large firms to capital markets with more diversified portfolios.

And finally, a set of time dummies.

4.1 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 I term, we used a Generalised Method of Moments (GMM) estimator by Arellano and Bond's (1991) first differencing transformation that is widely used to derive a consistent estimate for dynamic panel equations.¹² The first differencing is

assumed to remove individual firm-specific effects while the GMM estimation corrects for any remaining endogeneity as well as the correlation between Δv_{it} and Δy_{it} .

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

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 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 instruments¹³). 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 (which is asymptotically distributed as chi-square with $(m-n)$ degrees of freedom, where m is the number of instruments and n is the number of explanatory variables) with the null hypothesis that the instruments used are not correlated with the residuals. 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.

4.2 Data and Measurement

The datasets are from the audited financial accounts of publicly traded industrial firms 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 of international capital flows, annual measures do not reveal the

real volatility 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 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. For Turkey the dataset is from the Istanbul Stock Exchange Market online database. In some cases Worldscope International database, Datastream, and firm financial statements are also used for robustness and/or completeness. For Mexico and Turkey, we have dropped those firms with less than nine consecutive time series data points from the dataset. For Argentina, we kept the minimum threshold level at five because of its smaller number of cross section firms.¹⁴ 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 the measurement of Short-term Capital Flows, the available data from national sources of AMT are not uniform and cover different time periods for different frequencies. In the case of Argentina and Mexico, there is no monthly data from the national accounts or from other sources, such as IMF. As a result, in constructing the bi-annual 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.¹⁵ The data coverage includes all countries that are reported to have transactions with the US. Given the close proximity of Argentine and Mexican capital 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, thanks to its availability, we have employed monthly balance of payments data from the Central Bank of Republic of Turkey starting from 1992. 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 also be avoided this way.¹⁶ As the measure of capital inflows, we have used real net monthly inflows by nonresidents (deflated by US Producer Price Index with base year 2000).

<Insert Figure 2 here>

The net inflows variable is equal to net sale of long-term [Argentine and Mexican] stock and bonds plus changes in the sum of total US banks' claims on foreign public borrowers and unaffiliated foreigners and on own offices.¹⁷ Therefore, the capital flows variable for Argentina and Mexico include some long-term flows including trade credits. Although ideally trade credits need to be dropped from the estimates, in the case of Argentina and Mexico there are no reliable monthly or even annual estimates of trade credits. Also, as shown by Rodrik and Velasco (2000), trade credits play an insignificant role in driving short term capital flows; therefore no significant effect on our volatility measure is expected. Thirdly, the distinction between short and long term financial flows (except FDI flows)¹⁸ is increasingly becoming blurred especially given that during times of crisis long term financial assets can easily be converted to cash and taken out of the country. And lastly, given that there are problems in the correct reporting of what constitutes short term vs. long term capital flows in developing countries, taking just what is reported as short term may lead to biased results.

For Turkey, the net short-term capital inflows variable is calculated from the monthly balance of payments statistics as the sum of equity securities liabilities, debt securities liabilities, other investment liabilities-short-term loans of banks and other sectors, and other investment currency

deposits of banks.¹⁹ As for the volatility measure, the biannual standard deviations of real net monthly inflows are used for all three countries (Figure 2).²⁰

5. EMPIRICAL RESULTS

The results from Table 2 uncover a significantly negative relationship between capital flow volatility 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 2 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 has 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 one of the most serious economic crisis in Turkish history in 2000:2 and 2001:1 on private investment. In 2000:2 and 2001:1, the *SCFV* increased by 99 and 87 per cent compared to the same period of previous year that implies a 9.9 and 8.7 per cent decline in private fixed investment spending that are close to the stylised facts given that the GNP contracted by 9.5 per cent and industrial sector output growth fell to a negative 7.5 per cent in 2001 with a sharp fall in fixed capital formation rate. Furthermore, if the *SCFV* fell from an average of 946 in Turkey or 754 in Mexico to the Argentine average of 416, the fixed investment rates would increase by 5.6 per cent in Turkey or (taking the lower bound) 10 per cent in Mexico.

In the columns (1) to (4) of Table 2, the results also show that the volatility of capital flows significantly reduce fixed investments even after controlling for the significantly positive effects of real GDP growth²¹, operating profits and credit availability. As discussed before, some of the key

channels *SCFV* affects developing country markets and investment performances are 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, we have found, as expected, a significantly negative relationship in all three countries.

<Insert Table 2 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 3 shows the regression results using the specification in column (4) of Table 2 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 currency board system and fixed its exchange rate to the US dollar that led to high levels of dollarisation in 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 3 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.²²

6. CONCLUSION

One of the key arguments in favour of liberalisation of capital markets was to direct domestic (and international) savings to long-term investment, and 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 1980s and 90s, the results have been quite disappointing in all three countries.

At the global scale, the post-Bretton 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 reverse flow of funds from developing to developed countries. The US alone imported 65 per cent of all world savings to finance its over \$800 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 increased from \$1.9 trillion in 1997 to \$5.1 trillion in 2006, 72 per cent of which was held by developing countries.

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 and distortions caused by SCFs for private investment, there is no international mechanism to curb the excess volatility in global financial markets.

Overall, the results suggest that financial liberalisation, when accompanied by increasing volatility of short-term capital flows, is instrumental in reducing real sector fixed investments.²³ In retrospect, the policy makers in all three countries appear to have failed to consider any strategy to link financial liberalisation programs and the accompanying short-term distortions with medium and long-term development objectives. In this respect, there has been a lack of concern regarding the determinants of productive investment after financial liberalisation. Thus, we suggest that there is an urgent need to reform both the domestic and the 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, we suggest the following policy recommendations: a) reduce the excess volatility in short term capital flows using capital controls as recommended by UNCTAD (2006). This will not only help reduce boom-bust cycles, but also decrease economic uncertainty and volatility in key macro and micro prices including the inflation rate and the exchange rate. Also, having eliminated key source of uncertainty in domestic macroeconomic environment, the governments can utilise excess amounts of precautionary foreign exchange reserves for development and investment financing, b) utilise counter-cyclical macro policies, c) reduce real interest rates and increase long term credits to real sector firms. One precondition for this, especially in the case of Argentina and Turkey, is to reduce high public sector borrowing requirement that crowds out private savings and leads to high interest rates. This policy change would also eliminate wrong incentives for private real sector firms to invest in short-term government debt securities rather than long term fixed investments, d) avoid misalignment of exchange rate that hurt the competitiveness of real sector firms and overall trade performance, e) avoid excessive exchange rate volatility that discourages long term investment.

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 ($K_{i,t-1}$)/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 $\ln[(1+\text{T-Bill Rate})/(1+\text{Producer Price Inflation})]$

SCFV: Short-term capital inflow volatility calculated as the biannual standard deviations of real net monthly capital inflows. The net inflows (Table 1 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-short term loans of banks and other sectors, and other investment currency deposits of banks from monthly balance of payments statistics.

Argentina

In converting to constant 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 constant 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

In converting to constant prices, Manufacturing Price Index (at 1995 January 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 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 Total FDI inflows to developing countries increased from \$10.3 billion in current prices in 1980 to \$260 billion in 2005 while net portfolio flows (debt and equity) increased from around \$1.2 billion to \$111.5 billion during the same period (World Bank, 2007).

² Like Frenkel and Simpson (2003), we separate the early liberalisation experiences of Argentina and Mexico during the 1970s from the ones they adopted during late 1980s and early 90s. The reason is that the Southern Cone experiences together with their wave effects are close-ended stories and do not form a continuity to be seen as the early steps of the liberalisation wave of late 1980s and early 90s.

³ For a comprehensive review of the liberalization experience in AMT see Demir (2004) and Frenkel and Simpson (2003).

⁴ For the definition of RSCF, see the appendix.

⁵ The official date of capital account liberalisation was in 1989.

⁶ 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

⁷ Regarding the increasing importance of external factors in developing countries in explaining the volatility and instability in real exchange rates, reserve movements, stock prices and capital flows, see Fernandez-Arias (1994) and Grabel (1995).

⁸ That is $[(1 + R)/(1 + \hat{E})] - (1 + R^*)$ where R is 3-month domestic T-bill rate, \hat{E} is the monthly average rate of change of domestic currency per unit of U.S. dollar, R* is 3-month US T-bill rate (IMF, 2007).

⁹ By default, we set the penalty parameter that controls the smoothness of the series equal 400.

¹⁰ Chirinko et al. (1999) provides a detailed discussion of the advantages of distributive lag models over structural ones.

¹¹ 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.

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

¹³ In the estimation, Arellano and Bond (1991) 2-step method is used for GMM weighting matrices.

¹⁴ 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.

¹⁵ For an analysis of the data on the US system for measuring cross-border securities investment see 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>.

¹⁶ For a discussion of such limitations see for example. Griever et al., 2001:640.

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).

¹⁸ UNCTAD (2003b, 2006) argued that because of innovations in financial market instruments that allow for hedging FDI flows, the difference between FDI and other types of capital flows in terms of their stability and volatility has increasingly become blurred.

¹⁹ The relevant codes in Turkish Central Bank's BOP statistics are 221, 222, 32232, 32242, and 3232. Alternatively we also experimented with broader coverage including both short term and long term portfolio flows (codes 3223 and 3224) due to problems in the classification and reporting of short and long term flows as well as the easiness with which long term financial flows can be converted to short term. The two series were highly similar with a 0.97 correlation. The regression estimations were also very similar with no significant difference.

²⁰ 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.

²¹ One anomaly in our results is from Mexico where in columns (1) and (4) of Table 3 real GDP growth appeared with a negative coefficient.

²² Given that the p-value in the Sargan test is 1 in Table 2 and Table 3, we do not reject the hypothesis that the instruments are uncorrelated with the residuals. However, given the high p-values we applied a robustness test by

reducing the matrix of possible instruments to a minimum. The tests statistics indicate that additional restrictions in the fully estimated model are valid.

²³ 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 South Korea.

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

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

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. For detailed accounts see endnote 17 and the appendix.

Source: The US Treasury International Capital Reporting System.

Table 2: 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*** (0.01)	-0.31*** (0.01)	-0.31*** (0.01)	-0.3*** (0.01)	-0.20*** (0.02)	-0.24*** (0.02)	-0.2*** (0.02)	-0.24*** (0.02)	-0.14*** (0.004)	-0.11*** (0.002)	-0.10*** (0.004)	-0.14*** (0.003)
I_{t-2}	-0.15*** (0.01)	-0.15*** (0.01)	-0.15*** (0.01)	-0.14*** (0.01)	-0.01 (0.02)	-0.05** (0.02)	-0.01 (0.02)	-0.05** (0.02)	-0.03** (0.002)	-0.01*** (0.002)	-0.02*** (0.002)	-0.005*** (0.002)
KO_{t-1}	-0.01*** (0.001)	-0.01*** (0.001)	-0.01*** (0.001)	-0.01*** (0.001)	-0.04*** (0.002)	-0.03*** (0.004)	-0.04*** (0.002)	-0.03*** (0.004)	-0.06*** (0.002)	-0.07*** (0.002)	-0.06*** (0.002)	-0.07*** (0.002)
KO_{t-2}	-0.01*** (0.0004)	-0.01*** (0.001)	-0.01*** (0.0004)	-0.004*** (0.001)	-0.03*** (0.004)	-0.03*** (0.004)	-0.03*** (0.004)	-0.04*** (0.004)	-0.04*** (0.001)	-0.04*** (0.001)	-0.03*** (0.001)	-0.05*** (0.002)
$SCFV_{t-1}$	-0.0004*** (0.0002)	-0.0003*** (0.0001)	-0.0003*** (0.0001)	-0.0002*** (0.0001)	-0.0004* (0.0003)	-0.0003*** (0.00004)	-0.0003*** (0.00004)	-0.002*** (0.0003)	-0.0001*** (0.000001)	-0.0001*** (0.000001)	-0.0001*** (0.000001)	-0.0001*** (0.000001)
GDP_{t-1}	0.19 (0.21)			0.10 (0.12)	-1.73 (3.18)			-17.82*** (4.31)	0.6*** (0.01)			0.41*** (0.01)
OK_{t-1}		0.11*** (0.003)		0.11*** (0.003)		0.11*** (0.02)		0.11*** (0.02)		0.02*** (0.001)		0.03*** (0.001)
CR_{t-1}			0.02 (0.02)				0.43 (0.78)				0.27*** (0.02)	
$Rint_{t-1}$				-0.1 (0.09)				-0.60*** (0.31)				-0.002*** (0.00003)
<i>Sargan</i>	1	1	1	1	1	1	1	1	1	1	1	1
<i>m1</i>	0.10	0.11	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>m2</i>	0.26	0.32	0.26	0.32	0.42	0.48	0.42	0.48	0.13	0.18	0.10	0.13

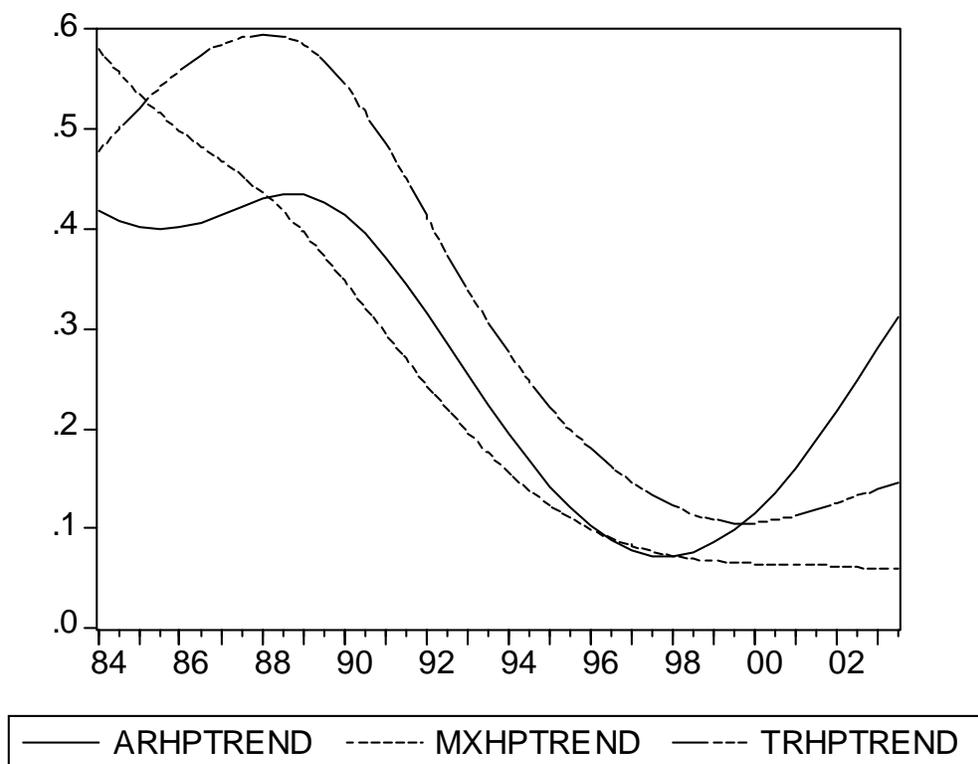
Notes: $t-1$, $t-2$ refers to the first-and second lags. KO is capital-output ratio, $SCFV$ is capital flow volatility, GDP is real GDP growth rate. OK is operating profits to capital stock ratio, Cr is credit to private sector as a share of GDP (except for Argentina where it is measured as the real 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 3: Private Investment and Capital Flow Volatility, Small vs. Large Firms

	<i>Argentina</i>	<i>Mexico</i>	<i>Turkey</i>
I_{t-1}	-0.25*** (0.03)	-0.19*** (0.03)	-0.15*** (0.006)
I_{t-2}	-0.11*** (0.03)	-0.04 (0.03)	-0.005 (0.004)
KO_{t-1}	-0.01*** (0.002)	-0.03*** (0.01)	-0.07*** (0.003)
KO_{t-2}	-0.003 (0.003)	-0.03*** (0.01)	-0.05*** (0.003)
$SCFV_{t-1}$	-0.0003*** (0.0001)	-0.003*** (0.0001)	-0.0001*** (0.000001)
$(SCFV * D^{Small})_{t-1}$	0.0001*** (0.00001)	-0.00002* (0.00001)	-0.00004*** (0.000001)
GDP_{t-1}	0.18 (0.12)	-29.41*** (1.69)	0.40*** (0.01)
OK_{t-1}	0.09*** (0.02)	0.07* (0.04)*	0.03*** (0.001)
$Rint_{t-1}$	0.02 (0.18)	1.97*** (0.15)	-0.002*** (0.00004)
<i>Sargan</i>	1	1	1
<i>m1</i>	0.08	0.00	0.00
<i>m2</i>	0.34	0.69	0.15

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 2.

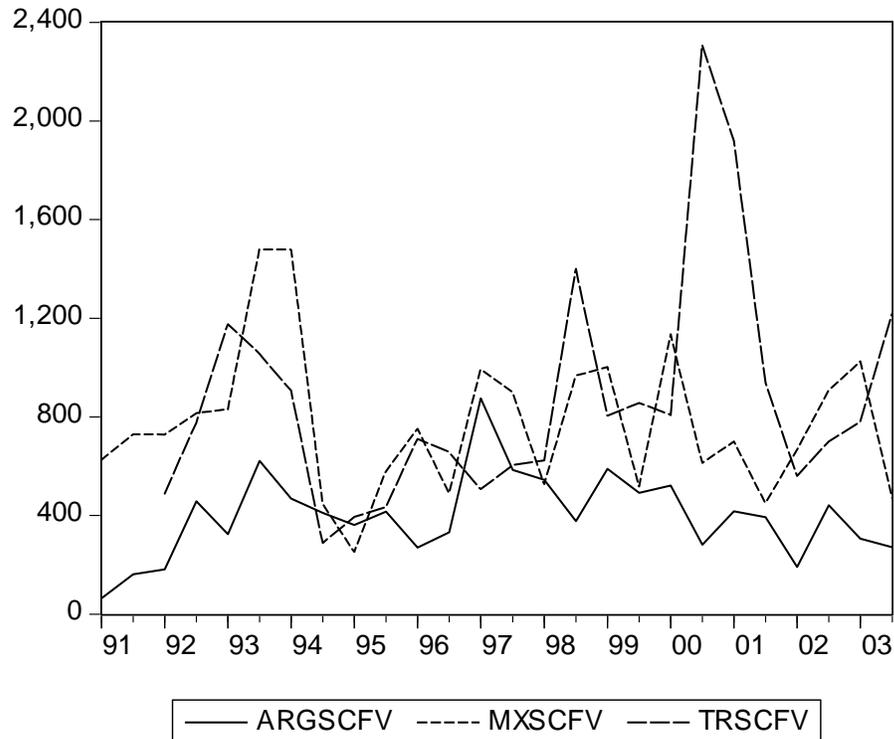
Figure 1: HP Filtered Biannual Net Capital Inflows/Gross Inflows Ratio, 1984:1-2003:2



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.