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The Effectiveness of Capital Controls on Capital Inflows in Emerging Markets

Kathleen A. Davis
Colby College

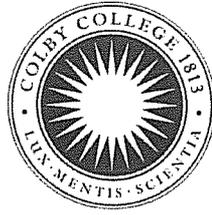# The Effectiveness of Capital Controls on Capital Inflows in Emerging Markets

Kathleen Davis

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Advisor: Prof. Andreas Waldkirch

Reader: Prof. Guillermo Vuletin

Abstract: Capital flows have become increasingly more volatile over the past decade, causing growing concern in emerging markets over the potential damages large sudden capital inflows and outflows can cause those economies. Capital controls have been used since World War I as a way to try to control these flows. After being abolished nearly everywhere, they have recently been reintroduced in a number of countries. The main analysis of this paper looks at the effect of the capital controls on capital inflows from 2000 through 2010 in an 8 country sample of emerging markets who have recently implemented changes in their capital control policies: Brazil, Colombia, Indonesia, South Korea, Peru, South Africa, Thailand and Turkey. The paper adds to the current literature by contributing a cross-country analysis, as well as by using a more sophisticated measure of capital controls. Despite these measures, this paper finds that there is no robust evidence that capital controls significantly reduce short-term or long-term inflows, confirming the results of previous literature. Thus, this paper concludes that the use of capital controls as one way to control the volatile capital flows cannot be supported.

Colby

The Effectiveness of Capital Controls on Capital Inflows in Emerging Markets

Kathleen A. Davis has completed the requirements
for Honors in Economics
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_____
Andreas Waldkirch
Associate Professor of Economics
Advisor

_____
Guillermo Vuletin
Assistant Professor of Economics
Reader

I.   Introduction

Due to the recent economic crises around the world, many countries, especially emerging markets, have adopted capital controls as a way to protect their economies from large, potentially damaging capital inflows. While capital inflows can be helpful to a less developed economy, by financing investment and stimulating economic growth, they can also have a negative effect on an economy, especially when the capital is withdrawn shortly after entering. These damaging capital flows can lead to high inflation, real exchange rate appreciation, and the widening of capital account deficits (Calvo, Leiderman, and Reinhart 1996). The goal of capital controls today is to curb the large short-term capital inflows in order to protect emerging markets from the negative effects associated with the reversal of those flows.

The use of capital controls to protect against negative effects from large short-term capital inflows is a change from the original use of capital controls. When capital controls were first introduced during WWI, they were usually in the form of taxes that helped to support government revenue during the war effort. These types of controls continued through the signing of the International Monetary Fund (IMF) Articles of Agreement in 1944 and were popular with almost all countries, developed or developing. However, in the 1970s and 1980s, the IMF and World Bank encouraged countries to remove their capital controls with the goal of achieving free capital mobility. They claimed that capital controls, like tariffs on goods, were detrimental to the gains from capital mobility (comparable to free trade) (Neely 1999). However, in the aftermath of financial crises, such as the Asian financial crisis in the late 1990s and the current world economic crisis, capital controls have again been instituted in some countries, especially

in emerging markets, as protective measures. Currently, the IMF even goes as far as to recommend capital controls as one policy, among others such as sterilized intervention and exchange rate appreciation, to slow unwanted capital flows (Moghadam 2011).

One example of the kind of crisis that capital controls are trying to prevent is the balance of payments crisis in Mexico in the 1980s. This crisis followed a period of large capital inflows in the late 1970s. The episode highlights how developing capital importing countries, as measured by net capital inflows being positive, are extremely vulnerable to abrupt reversals in capital flows (Calvo, Leiderman, and Reinhart 1996). It is this type of reversal and subsequent economic crisis that the current round of capital controls are trying to prevent.

There are still different opinions pertaining to the usefulness of capital controls. While some economists claim that capital controls are still more harmful than helpful, others see capital controls as a justifiable measure to stabilize capital inflows (Neely 1999). However, there is a lack of studies done to evaluate the recent surge of capital controls; most focus on the 1990s and earlier (see Magud, Reinhart, and Rogoff, (2011)). Most of the papers on this topic focus on a theoretical approach to the problem (see Reinhart and Smith (2001)), an empirical approach with only one country (Clements and Kamil (2009)), or a qualitative approach with no empirical study (see Epstein, Grabel, and Jomo (2003) and Ostry et al. (2010)). Baba and Kokenyne (2011) looked at capital inflows in the 2000s for multiple countries, but their analysis stopped before the financial crisis in 2008 and analyzed the countries individually. This paper attempts to fill some of these gaps by doing an empirical analysis on multiple countries over the years 2000 to 2010.

Additionally, there are multiple capital control measures used in previous studies. Indices (Miniane (2004), binary dummy variables (Clements and Kamil (2009)), and measures of capital openness (Edison and Warnock (2001)) are all used to measure capital controls. This paper, though, creates a more sophisticated approach, by combining an index and a binary dummy control to more fully capture the effects of changes in capital controls.

To that effect, this paper measures if capital controls significantly change the levels of capital inflows, both in terms of short-term and long-term flows. The short- and long-term flows need to be treated separately due to their different natures. Short-term flows are vehicles for investors to earn a return, and are therefore much more volatile than long-term flows, which are production oriented. Therefore, the changes in capital control policy can affect short-term and long-term flows differently.

If flows were significantly affected, that would suggest that capital controls are a useful policy approach, at least in the short run, to protecting an economy against the reversal of capital flows. Using panel data, this paper identifies any effects from changes in capital controls from time series variation, like previous papers, as well as from differences across countries. As there is frequently little variation in the capital control index within a country, the cross sectional analysis gives additional evidence that otherwise would be unobserved. The policy implications of these results will also be discussed.

This paper finds that capital controls do not significantly decrease the levels of either short-term or long-term capital flows. This result holds even with a more sophisticated measure of capital controls, as well as across multiple measures of flows.

The short-term flows are a good fit with the model, as measured by the Wald statistic, but the long-term flows do not fit the model well. While all explanatory variables contribute to the model, expected exchange rate appreciation, business cycles, and the depth of the equity market are found to be the primary drivers of the variation in the capital flows.

The next section reviews the different types of capital flows, followed by a discussion of relevant literature. The measurement issues associated with capital controls are then discussed. Next, the model and the results are presented, followed by their policy implications. Lastly, areas of further research are discussed.

II.   Types of Capital Inflows

The two main types of capital flows are Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI). Foreign Direct Investment refers to a foreign company or individual who invests in a domestic enterprise and gains some sort of controlling share, whether it is complete or minority ownership. An example of this would be a U.S. company buying or building a factory in Brazil. Foreign Portfolio Investment is when a foreign investor buys an interest in a domestic company or bond of some sort, but the interest is not controlling. An example of this would be a U.S. mutual fund or individual investor buying stocks or government bonds in Brazil[1].

Potential investors have different concerns when considering FDI versus FPI, as laid out in the 2004 Economic Report of the President. FDI is more permanent, and therefore country characteristics that signal long term stability are more important. These include factors such as political and legal stability. If a company fears that the

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[1] A third category of capital flows is "other investment", which comprises flows that are not FDI or FPI. Examples of this type of investment include trade credits, loans, and currency deposits.

government might expropriate its foreign affiliate, it would be less likely to invest[2].

Similarly, if a company fears that labor restrictions or environmental standards might become stricter, it might choose to invest elsewhere. However, once the decision is made to invest in FDI, it is more likely that a company, and its capital, will remain in the country for a longer period of time. Therefore, the decision to invest in FDI in a country is not based purely on the short-term yields of the investment.
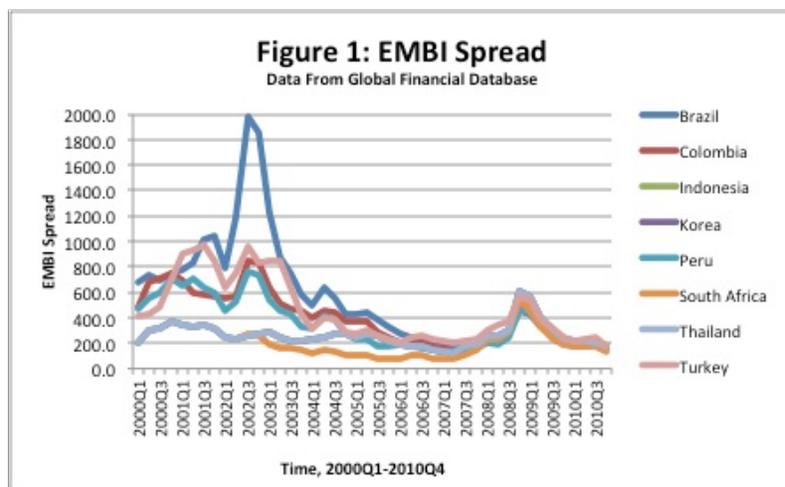
The short-term yield is much more important in for FPI, in most cases. There are many more alternatives with similar risk and yield in the rest of the world as opposed to FDI. For example, there are only certain countries with low minimum wages and environmental standards for a company to build a factory at very low costs, while there are a vast amount of types of financial instruments globally for someone to invest their money in, even at a given risk and yield. Therefore, if a certain country is not giving a yield that an investor desires, or the investor expects the yield to decrease in the future, the investor can simply liquidate their assets and invest somewhere else. The greater liquidity in the FPI market, as compared to the FDI market, allows investors to quickly enter and exit different global markets. This is shown in the example above, where it is much harder to sell a factory than it is to sell shares of stock or government bonds.

Due to the liquid nature of FPI, it is far more speculative than FDI. If an investor is considering building a factory, it will be a long-term investment, and therefore the investor is less likely to be swayed by fads in the market or short-term economic conditions. However, the ease of selling FPI assets allows investors to be speculative. Investors can easily liquidate their assets if their speculations are wrong or conditions,

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[2] This is a legitimate concern for foreign firms in emerging markets. One example is the recent expropriations of firms in Venezuela, who received no compensation for their loss (Economist 2010).

such as expected yields, interest rates, or inflation, change. As a consequence, FPI flows are much more volatile and potentially dangerous to an economy, especially to a developing country with weaker financial institutions.

FPI flows are one of the largest concerns of emerging markets today during the financial crisis. The high spread between government bonds and stocks as compared to developed economies make emerging markets an attractive choice for FPI. As shown below, the Emerging Market Bond Index (or EMBI spread), which is a weighted average of the percent difference between US and foreign government bonds of multiple lengths, is quite large. This is a proxy for the yield spread between the emerging market and

Figure 1: EMBI Spread
Data From Global Financial Database

the developed markets as a whole, not just the US. At a value of 100, the EMBI spread is interpreted as the yield on a comparable length emerging market bond being twice as much as the yield on the same US Treasury bond. Brazil's values in the 1800s in 2002 indicate that the yield is eighteen times more on a Brazilian government bond than a US treasury bond. While the spreads at the end of the decade are lower than they were at the beginning, the spread is still quite large, at around 200 for most countries. Even if the risk were substantially higher for these emerging markets, that yield would tempt a lot of investors. However, if news came out that would indicate potential instability of the Brazilian government or a potential of Brazil not being able to pay off its debt, most of

those investors would probably flee very quickly, as they would feel that the risk is greater than the reward. This illustrates not only how speculation and changes in market conditions can greatly affect FPI, but also how quickly news of instability can cause very large capital outflows.

Another reason for potential instability of capital flows is the uncertainty in the recovery of the developed world. If the recession continues to last for multiple years, or if there is a very slow recovery, these large yield spreads between developing and developed countries are most likely going to be sustained over an even longer period of time. This could mean that FPI stays in these developing countries for a longer period of time. However, if the developed world recovers quickly, this spread could close quickly, and again these capital flows could leave, as the risk of developing countries' investments is no longer coupled with a much larger yield (Moghadam 2011).

This risk of capital flight once the rest of the world recovers from the financial crisis is a legitimate concern, due to past evidence on the matter. In the April 2011 World Economic Outlook Report, published by the IMF, an entire chapter is dedicated to using historical evidence of capital flows and their compositions to estimate how capital flows will react in the coming years. One main result is that net flows to emerging market economies have been higher during times of low global interest rates, low global risk aversion, and higher growth in emerging markets relative to developed economies. These conditions are all met during the current financial crisis. While this trend only explains part of the volatility in capital flows, it indicates that emerging markets could see a reversal of flows when the economic crisis is over.

The capital controls used today are trying to make it harder for these reversals of flows to happen. Since the volatility is coming from the short-term flows, the controls are more focused on limiting FPI and other short term flows than longer term FDI flows. The continuing uncertainty for the emerging markets is a problem, especially since it is not only affected by internal factors. If it only was affected by domestic factors, the central bank and government could try to control these. Instead, they are forced to use capital controls, among other things, to protect the domestic economy and limit the damage if a large reversal of flows occurs. Currently, the main tactic being used is to limit the potential for a sudden reversal of flows by controlling the capital inflows into the country.

Countries today are controlling inflows with capital controls due to the failure of policies in preceding decades that attempted to control capital outflows with capital controls. There are greater incentives to evade controls on outflows than controls on inflows (Neely 1999). Evading controls on inflows generally only slightly increases the return on an investment, while evading controls on outflows can prevent a severe decrease in the value of an investment if, for example, a large currency devaluation is expected in the near future. Therefore, as Obstfeld (1998) shows, limiting inflows in order to prevent damaging outflows has a greater potential for success than trying to limit damaging outflows directly.

This paper separates flows into categories besides the typical FPI and FDI, using short-term and long-term flows instead. These categories are more comprehensive than FDI and FPI, as long-term flows include FDI and other non short-term investments, while short-term flows include FPI, derivatives, and other short-term investments, like short-

term trade credits, currency and deposits, and short-term loans[3]. These classifications were used in previous studies, such as Baba and Kokenyne (2011). As FDI is the main component of long-term flows and FPI is the main component of short-term flows, the differences between the two types mentioned above are directly applicable to these different classifications of flows.

III.   Literature Review

Due to the abundance of capital control usage in the 1990s, especially in South America and South East Asia, most of the literature on capital controls is centered on this period. Calvo, Leiderman, and Reinhart (1996) discuss the problems large capital inflows can cause and possible policy solutions. Some of the problems mentioned include: rapid monetary expansion, inflationary pressures, real exchange rate appreciation, and increasing current account deficits. All of these problems can cause economic crises if the problem escalates enough. For example, an increase in the current account deficit translates into the increasing need for foreign capital to finance the gap between domestic saving and domestic investment. Generally, increasing investment leads to growth in GDP, which in turn leads to growth in consumption. This is good for an economy, until the foreign financing disappears (a large and sudden reversal of flows). The reversed flows can lead to a financial crisis and a recession.

As the paper discusses, some problems caused by capital inflows might be better solved with policies other than capital controls. Some of these policies include sterilization, which protects the money supply in order to slow down inflation and/or real exchange rate appreciation, and tightening fiscal policy, which diminishes real exchange

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[3] In some cases, flows besides FDI and FPI were not available, so FDI and FPI were used as long term and short term flows, respectively.

rate appreciation and prevents the economy from overheating. While this paper is extremely useful in exploring policy options outside of capital controls, it does not fully explore capital controls as a policy option.

Epstein, Grabel, and Jomo (2003) take another approach, qualitatively analyzing the effects of capital controls on developing countries in the 1990s. In addition to outlining the measures used and the results of those measures, the authors also lay out the objectives of each of the case studies. They demonstrate that different measures can be used to achieve different outcomes, and therefore that "effectiveness" of the controls can mean different things for different countries. These potential goals include: promoting financial stability, promoting desirable types of investment/ discouraging undesirable types of investment, and enhancing the autonomy of economic and social policy. Therefore, if the goal of a country is to promote financial stability, then success might be seen in the lack of a financial crisis. However, if the goal were to decrease short-term capital inflows, then success would be a decrease in these inflows. The authors' measurement of the success of capital controls by examining different policy goals is a complimentary approach to the one used in this paper.

Reinhart and Smith (2001) focus on the capital flows in the 1990s that were very large relative to the size of the country's economy. Their theoretical analysis looks at how temporary capital controls can be used effectively to reduce and limit temporary, or short-term, capital inflows. The paper also discusses how controls on outflows and inflows were effective in different ways and on different levels. However, they do not provide any empirical evidence in support of their hypotheses.

The recent re-emergence of capital controls has been the subject of some literature on the effectiveness of these controls. Magud, Reinhart, and Rogoff (2011) discuss episodes of capital control effectiveness across multiple countries in the 1990s and early 2000s. The paper attempts to find a uniform measure for capital controls. The use of a capital control index allows them to standardize the results of multiple previous papers, on multiple different countries and types of controls, in order to determine if controls are effective. The paper finds that, on average, controls are effective in making monetary policy more independent, changing the composition of flows towards longer maturities, and reducing exchange rate pressures, but are ineffective in reducing the volume of net flows.

Ostry et al. (2010) also discuss the recent uses of capital controls through qualitative analysis, especially focusing on the rationales behind the controls. The paper presents a straightforward "guide" as to when capital controls should be implemented. The authors suggest that the controls should only be implemented as a last resort, after policies such as allowing exchange rates to appreciate, accumulating reserves, lowering interest rates, sterilizing the economy, and tightening fiscal policy. One important point, though, is that capital controls might be a good way to control inflows when banking and other financial regulations are not strong and are unable to be strengthened in the short run. Furthermore, the paper reasons that capital controls lose their effectiveness over time, as more loopholes and ways to evade the controls are found. Finally, the paper discusses which types of capital inflows are potentially the most and least hurtful, with portfolio flows having the most potential to harm an economy.

Baba and Kokenyne (2011) look at capital inflows in four countries, Brazil, Colombia, South Korea, and Thailand, over the 2000s. The authors find that controls are associated with lengthening maturities of flows and that there is some association between controls and decreasing flows, but those results were not significant in all cases. They also find that the impact of the controls is not uniform across different countries, but instead depend on the extensiveness of the policy, the sophistication of the capital market, and the persistence of the capital flows. For example, the authors found that Brazil's recent increase in the foreign exchange tax and South Korea's recent outflow liberalization did not significantly change the volume of flows, but that Colombia and Thailand's increases in their respective unremunerated reserve requirements did help create significant changes in flows. One of the paper's strengths is the multiple measures of capital controls used, incorporating not only the strength of the policy but also the coverage of the controls (in terms of number of asset types covered).

There is also considerable literature that looks at the history of capital controls, especially pertaining to the changing international view of capital controls. While international policy has always allowed individual countries to determine their own capital controls, there have been overarching trends as to the use and approval of capital controls. Goodman and Pauly (1993) lay out the history behind the approval and usage of capital controls up to the mid 1990s. The paper shows how the 1960s were dominated by fixed exchange rates under the Bretton Woods Agreement, and therefore capital controls were used as a way to maintain both the fixed exchange rates and monetary autonomy. In the 1970s, the general opinion shifted when the Committee of Twenty of the IMF Board of Governors concluded that capital controls had a potentially negative impact on trade

and investment, and therefore should only be used temporarily. This, coupled with a movement towards flexible exchange rates worldwide, helped to liberalize international capital markets. Furthermore, the changing international financial markets and the emergence of more and more multinational corporations in the 1980s and 1990s made restricting capital controls more hurtful than beneficial to most countries (Goodman and Pauly 1993).

During this period, the disapproval of capital controls stemmed from the losses that capital controls can cause an economy and the gains that free capital mobility can bring. One of the largest reasons for free capital mobility is the idea that capital flows provide opportunities for countries with limited domestic financing options to attract investors for their productive investment needs. These investments as a whole can increase GDP, stimulate the economy, and provide gains for the entire country (Ostry et al. 2010). Furthermore, these investments can trigger consumption increases as well as help developed countries diversify their portfolios, especially in regards to pensions and retirement accounts (Calvo, Leiderman, and Reinhart 1996). On a global level, there are also gains from increased capital flows, such as the further development of emerging market financial sectors, which can also decrease the risk of a financial crisis and increase investment opportunities in the future (Economic Report of the President 2004).

The 2004 Economic Report of the President outlines the direct costs of capital controls. The controls take time and money to monitor and enforce, especially in terms of closing loopholes as time goes on. From the beginning of the 2000s, these loopholes have been more easily exploitable due to the start of online transactions. This, in turn, increases the costs of closing and monitoring the loopholes. Controls also can decrease

the transparency of companies who try to evade the controls, which in turn can lead to larger compliance issues. Furthermore, controls decrease incentives for investment in that country, which would reduce all of the positive effects of capital flows, listed above.

A recent report by the IMF, however, indicates that international opinion has changed again, as the increasing volume and volatility of flows are seen to be dangerous, especially to emerging markets. Moghadam (2011) discusses recent experiences with capital inflows, and how they can migrate out of a country extremely quickly. The empirical analysis shows that while capital inflows can be staggered in their arrivals into different emerging markets, their exits are generally synchronized throughout those markets. The IMF sees these abrupt and volatile reversals of flows as a serious concern to emerging market economies (Moghadam 2011). One of the reasons for these quicker reversals of flows in recent years is the changing composition of capital inflows. Portfolio flows have become a larger part of overall inflows in the recent financial crisis. This can be seen in Figure 2.

Figure 2. Gross Capital Inflows, by Type of Flows (percent share)
Source: Moghadam 2011

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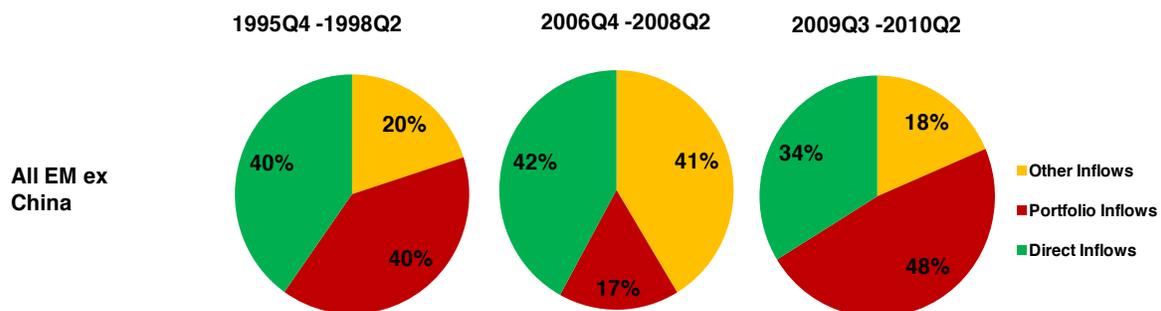
As shown above[4], there is a large increase in the amount of FPI relative to FDI in the composition of 2009Q3 – 2010Q2 flows relative to 2006Q4 – 2008Q2 flows. FPI increases from around 17% to 48% of total flows. This increase in FPI substantially increases the volatility of the flows, and as these flows are far less permanent and more liquid than FDI, the flows can be reversed very quickly.

Not only is FPI much more volatile than FDI, but the volatility of FPI flows has also been increasing over the past decade. In the table below, it is clear that the volatility in FPI, as measured by the standard deviation of the flows, in the second half of the decade is far greater than the first half of the decade.

Figure 3: Volatility of FPI (as Std. Dev.), 2000-2010[5]

Country	2000Q1-2005Q2	2005Q3-2010Q4	% Change
Brazil	3773.01	15284.21	305.09%
Colombia	625.27	1201.55	92.16%
Indonesia	700.45	2398.58	242.43%
South Korea	18069.14	36024.44	99.37%
Peru	56.18	461.69	721.80%
South Africa	1809.84	4010.21	121.58%
Thailand	773.90	1668.08	115.54%
Turkey	2730.76	5134.95	88.04%

In all of the countries, the volatility in FPI flows increased significantly from the beginning to the end of the decade. The increase was over 200% for three countries and over 700% for Peru, with all countries experiencing increases of at least 80%[6]. This volatility was one of the main catalysts of the capital control implementation.

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[4] All EM ex China means all emerging markets excluding China. This emerging markets classification includes all countries listed as "emerging and developing economies" by the IMF's World Economic Outlook as of 1995. Additionally, see footnote (1) for which types of investments are included in other investment.

[5] These are the author's calculations based on data on FPI flows. For sources of FPI flows, please see Appendix A.

[6] For comparison, other emerging market countries that have not recently implemented capital controls have also seen increasing volatility in their FPI flows, but the increases are smaller. The volatility in Ecuador's FPI increased 73.4% from a value of 374.49 in the first half of the decade to a value of 653.91 in the second half of the decade. Likewise, the volatility in the Philippines'

The IMF's policy recommendations for controlling the large and volatile inflows and outflows are laid out in Moghadam (2011), and do include capital controls. The paper does mention that the policies might not work in all country specific cases, but are instead given as general guidelines. Either way, these policy recommendations clearly show that the IMF is again moving towards approval of capital controls as a legitimate policy response to large capital inflows.

IV.   Measuring Capital Controls

The largest challenges with measuring the effectiveness of capital controls are determining which policies are considered capital controls and which are not and, more importantly, how to measure those capital controls relative to one another. The first issue is discussed in multiple papers, including Neely (1999), Magud, Reinhart, and Rogoff (2011), and Ostry et al. (2010). These papers all illustrate different types of capital controls, and help to differentiate what is and is not considered a capital control. Neely (1999) differentiates between capital controls and exchange controls. While exchange controls, such as requiring importers to buy domestic currency for a stated purpose, may limit capital inflows, they are not considered a capital control since controlling capital is not its primary purpose. According to Ostry et al. (2010), capital controls include any type of restriction on the ownership of domestic capital by foreigners, unremunerated reserve requirements[7] on foreign exchange debt, and any tax applied to foreign financial transactions. This can also include restrictions on the ability of investors to repatriate

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FPI increased 70.59% from a value of 884.15 in the first half of the decade to a value of 1508.80 in the second half of the decade.

[7] An unremunerated reserve requirement is when a portion of a capital inflow is required to be temporarily deposited into a non-interest earning central bank account (Economic Report of the President 2004). This effectively decreases the yield the investor can earn on their investment, therefore decreasing the incentive to invest in that market or with that type of investment vehicle.

their capital gains (Economic Report of the President 2004). Magud, Reinhart, and Rogoff (2011) also point out the large heterogeneity of the measures applied by different countries at different points in time, indicating that different types of capital controls are not only theoretically possible but also used in multiple cases.

The second challenge is the larger and more important issue. In any model used, it is hard to quantify such qualitative measures as capital controls. One approach used is the measure of portfolio and direct investment as a percent of GDP. This measure is analogous to the measure of trade openness, given by imports and exports as a percent of GDP. This measure, though, is only indicative of long run changes in openness, as it is too affected by other factors besides capital controls to be a good short term measure (Edison and Warnock 2001). Edison and Warnock (2001) tried a different approach: using the ratio of market capitalizations of two indices, one capturing a country's equity market as a whole and the other adjusting the market capitalization for restrictions of foreigners, as a measure of financial openness. While this only captures the equity market, the ability to calculate concrete values for the country over multiple years is a large advantage. However, this measure cannot be used for the present paper since recent data on capital market capitalization are unavailable for the countries studied.

Another possible solution is to use a binary dummy variable for capital controls, where the value 1 is used for any type of capital control and the value 0 is used for the complete absence of capital controls. This measure is used in papers such as Magud, Reinhart, and Rogoff (2011) and Clements and Kamil (2009). While this is a relatively easy measure to use, its effectiveness is limited as there is no differentiation between very strict capital controls and very mild capital controls. Likewise, there is no differentiation

between different types of controls, such as price controls (taxes) versus quantity controls (restrictions).

The IMF proposes a more sophisticated measure, which assigns 6 categories with 1/0 values in the pre-1996 Annual Reports on Exchange Arrangements and Exchange Restrictions (AREAER), and then further expands the categories to 13 in the post-1996 reports (Miniane 2004). These new classifications of 13 categories are relatively easy to derive given capital control measures for any country or time period, and still provide a better measure than the binary dummy variable. However, the index still does not capture all changes in capital controls[8]. Miniane (2004) also used a similar method, using the IMF's 13 categories with slight adjustments, and adding another category if a country has significant exchange restrictions. As discussed below, this paper will use the 13-category index, as well as additional binary dummy variables to capture changes in capital controls that are not captured in the index.

V.   The Model

Capital flows are affected by a multitude of different factors, some domestic and some global. This model captures both types of these factors and isolates the effects of capital controls on capital inflows. It is derived from Clements and Kamil (2009) and Baba and Kokenyne (2011):

$$Flow_{i,t} = \beta_0 + \beta_1 CapControls_{i,t} + \beta_2 EMBI_{i,t} + \beta_3 IntRateSpread_{i,t} + \beta_4 FX_{i,t}$$
$$+ \beta_5 \ln(GDP)_{i,t} + \beta_6 CapMktDepth_{i,t} + \beta_7 Recession_t + \beta_8 Flow_{i,t-1} + \varepsilon_{i,t}$$

Here, *Flow* represents the net inflows into a country for a given category as the dependent variable. These include short-term flows, as both the change in flows and the

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[8] For example, if a country increased their tax on inflows from 5% to 10%, the value in the category would remain constant at "1", as there are capital controls present in that category under both circumstances.

levels of flows, and long-term flows. The levels of flows will be analyzed as given as well as with a three quarter moving average, which will control for some of the high volatility in the flows. The lag of the dependent variable is also included in some specifications. Using GMM allows for the inclusion of the lag without introducing bias. The capital flows of a country are indicative of capital flows in the future, as even with the considerable volatility in flows, so there is still a positive trend through the time period. This would indicate that the expected sign of β_8 is positive.

The first domestic factor is *CapControls*, the vector of variables that measures the level of capital controls. This includes an index constructed with the AREAER classifications as well as a variable that indicates any change in a given time period that is not picked up by the index. The expected sign of β_1 is negative, as more restrictive capital controls would create a smaller amount of capital flows. This is the key variable of interest in the model, as it will test the effectiveness of capital controls.

The log of a country's real GDP, *ln(*GDP), a measure of a country's business cycles, is the next domestic factor. As laid out by Baba and Kokenyne (2011), investors are attracted to strong economic growth, so the expected sign of β_5 is positive. The *CapMktDepth* vector of variables is also a domestic factor. The *DebtMkt* and *EquityMkt* variables, measured by the World Bank Financial Structure Database (Alfaro et al 2004), measure the capital market sophistication in each country. Both variables are expected to have positively signed coefficients, as more sophisticated capital markets are expected to yield higher flows.

The other variables in the model are measures of the domestic economy relative to the rest of the world, in terms of how attractive investments in the domestic economy

are relative to the rest of the world. *EMBI* is the average yield spread on a sovereign

foreign currency bond over a comparable U.S. treasury bond in percent per year and

IntRateSpread is the average interest rate differential between the domestic interbank rate

and the U.S. Fed's fund rate, in percent per year. The expected signs of the interbank

interest rate spread coefficient, β_3, and the government bond yield spread coefficient, β_2,

are unclear, although they should move together. On one hand, an increase in the spread

of interest rates and bond yields indicate that investors can earn a higher yield on their

investment in that domestic economy relative to the developed world, which would

induce investors to increase their investments in that emerging market. This theory would

lead both coefficients to have a positive sign. On the other hand, that increased yield also

represents the risk of the investment. If investors respond to the risk instead of the yield,

the expected sign of the coefficients would be negative.

The exchange rate vector, *FX*, measures changes in the exchange rate, in the past

as well as through expectations in the future. It contains two exchange rate measures,

FXVol and *FXExApp*, which also are international factors. *FXVol* is the volatility of daily

changes in the nominal exchange rate, over the previous three-month period, and

FXExApp is a proxy for the expected appreciation in the exchange rate, which is

calculated as the percentile difference between the spot rate and three month forward rate

at the beginning of each quarter.

FXVol is a measure of the stability of the economy, on a day-to-day basis. A

higher volatility of the exchange rate over the last three months would indicate greater

instability, and therefore make investors less likely to invest in that country. Therefore,

the expected sign of the *FXVol* coefficient is negative.

FXExApp reflects investors' expectations of the world economy in the future. All else equal, an expectation of appreciation in the future would indicate that the investment in domestic currency would be worth more, relative to the rest of the world, in the future. This would in turn increase the amount of capital flows into that economy. However, since the forward rate and spot rate are measured relative to USD, as XXX/USD, expected appreciation in the currency is seen as a smaller forward rate as compared to the spot rate. This causes the expected sign of *FXExApp* to be negative, as a negative differential (which is an indication of expected appreciation) would correspond to larger inflows.

Lastly, the *Recession* variable is a binary dummy variable that controls for the effects of the current recession. It is defined by the National Bureau of Economic Research's dates on US recessions, where the variable takes on the value of 1 during a recessionary quarter and 0 otherwise. The coefficient on *Recession*, β_7, is also ambiguous. Investors are more likely to decrease their capital flows during bad economic times (which is analogous to the reasoning of the positive sign on the *ln(GDP)* coefficient), leading to a negative sign of β_7. However, especially in the most recent recession, the worldwide economy was not equally affected. The developed countries, where more of the flows are originating from, were harder hit than the developing world. Therefore, the current recession could have actually increased the flows to emerging markets, as investors are looking for higher return on their investment than they are able to find in the developed world. If this were the case, then β_7 would be negatively signed. Note, that if this were true, then the signs of the *EMBI* and *IntRateSpread* coefficients would also have to be positive, indicating that investors indeed prefer return to risk.

1. Capital Control Index Construction

An important difference between this paper and Clements and Kamil (2009) is the measure of capital controls. Clements and Kamil focus on one particular capital control for a very short period of time, and use a binary dummy variable to measure the effects on capital flows into Colombia after the implementation of the policy. This paper, however, focuses on a larger time span across more countries, so the binary dummy variable is not a good measure. It does not capture the different types of capital controls, nor does it differentiate between different levels of restrictiveness.

Here, a capital control index is created using data from the IMF's Annual Reports on Exchange Arrangements and Exchange Restrictions. Controls are separated in 13 categories[9]:

- Controls on:
    i. Capital Market Securities
    ii. Money Market Instruments
    iii. Collective Investment Securities
    iv. Derivatives and other instruments
    v. Commercial Credits
    vi. Financial Credits
    vii. Guarantees, Sureties, and Financial Backup Facilities
    viii. Direct Investment
    ix. Liquidation of Direct Investment
    x. Real Estate Transactions
    xi. Personal Capital Transactions
- Provisions Specific to:
    xii. Commercial Banks and other Credit Institutions
    xiii. Institutional Investors

A value of 1 is given to each category where there is any control, and a value of 0 is given to any category where there are no controls. Since quarterly data is being used and AREAER only reports on a yearly basis, the detailed descriptions of each control in each category given in the back of the report are used to put any change in the index in the

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[9] Detailed descriptions of these categories can be found in Appendix B.

appropriate quarter of the year. If no explicit detail is given as to why or when the index was changed, it is assumed that the change happened during the first quarter of the year.

One example of a change that occurred is in Brazil's index from 2004Q4 to 2005Q1. As the AREAER report states, "The requirement to deposit long positions exceeding the equivalent of US$6 million, including all currencies and all of each of the bank's branches, with the CBB in dollars was abolished". This causes the index to move from 1 to 0 in the "Guarantees, Sureties, and Financial Backup Facilities" category. As this change in law happened on March 14, 2005, the change is reflected in Quarter 1 of 2005.

Since capital controls might take longer to implement and be effective than the quarter in which they are passed into law, the lag of this index is also used as a potential measure of capital controls. This may pick up more effects from changes in the index than the index would.

A potential shortcoming even with this detailed index is that it still does not capture any changes within the categories as long as there is still some sort of control before and after. Therefore, another variable is added to the regression: *Change*. This variable is a binary dummy variable that is given a value of 1 when there is a change in any category of capital controls that is not reflected in the index and a value of 0 otherwise. For example, if a tax rate is increased, the category in the index would be a "1" for both before and after the increase, so the *Change* variable would also be a "1". However, if a tax was introduced, therefore changing the category in the index from "0" to "1", then the *Change* variable would be a "0", as the change is reflected in the index.

While this measure is an improvement over just the index, it does not differentiate between the direction of the changes, therefore dampening its interpretation power. Two alternative measures of changes not captured in the index are used to solve this problem. First, *Change2* differentiates the direction of the changes by giving more restrictive changes[10] a value of 1 ("increasing" the index) and more open changes[11] a value of -1 ("decreasing" the index), with no changes continuing to be measured as 0. Second, using *PosChange* and *NegChange* variables is an alternative way to measure the direction of the changes not in the index, where both are binary dummy variables measuring more restrictive and more open changes, respectively. While the expected sign of the *Change* variable is unclear, the other two measures' signs are clearer. For *Change2*, the expected coefficient is negative, as a decrease in the measure (the index moving to -1) would be an increase in the openness of the capital control policy, which should correspond to an increase in flows. Likewise, an increase in the measure (the index moving to 1) would be an increase in the restrictiveness of the controls, which would in turn correspond to a decrease in flows. The rationale for *PosChange* is the same, where a value of 1 indicates more restrictive controls and therefore less flows, causing the coefficient to be negatively signed. For *NegChange*, however, the rationale is reversed, where a value of 1 indicates more open controls and therefore more flows, causing the coefficient to be positively signed.

2. Data

The data were collected from a variety of sources. The main sources are the countries' central bank statistical databases, along with multi-country databases such as

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[10] Example: a tax increases from 5% to 7%, or its coverage expands to include more asset types.
[11] Example: a tax decreases from 5% to 3%, or its coverage decreases to include fewer asset types.

the IMF's International Financial Statistics database and the Global Financial Data

database[12]. Summary statistics of the variables used are listed in Table 1.

One potential problem is the large range of values for multiple variables,

especially for the flows and FX volatility. This can create heteroskedasticity in the model.

Therefore, standard errors corrected for heteroskedasticity (robust standard errors) are

reported throughout.

There are some missing data points for countries or specific quarters for specific

variables. Data are not available for either capital market depth measure for 2010 for any

country. Additionally, the EMBI spread is not available for South Africa until 2002Q2,

and the *IntRateSpread* is not available for South Africa until 2001Q2 and for Colombia

until 2002Q2.[13]

The inclusion of additional countries requires other adjustments to the variable

calculations. Because the EMBI spread is not calculated for South Korea or Thailand, the

EMBI for Developing Asia[14] is used as a proxy, as done in Baba and Kokenyne (2011).

Additionally, this paper measures the volatility of the exchange rate with the variation, or

the (standard deviation)/(mean), of a three-month period. This standardizes the standard

deviations of exchange rates across countries, a problem that Clements and Kamil (2009)

did not have to deal with given they only study one country. The *FXExApp* is also

constructed differently. Due to lack of available forwards data, the observed FX rate three

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[12] See Appendix A for more details about data sources.

[13] Other papers used higher frequency data, such as Clements and Kamil (2009) who use weekly data. However, this paper will use quarterly data as higher frequency data are not available for all countries or variables, notably for the long term flows, the capital market depth variables, the EMBI spread, the recession variable, GDP, and for the short term flows for all countries except Colombia.

[14] Developing Asia includes People's Republic of China; India; Indonesia; Republic of Korea; Malaysia; Pakistan; Philippines; Taipei, China; and Thailand. For more details, please see http://asianbondsonline.adb.org/documents/abm_sep_2011.pdf.

months out is used as a proxy for the three-month forward rate. Furthermore, as mentioned above, this paper uses a three quarter moving average of the flows, as well as the given levels of the flows, in order to smooth the flows, which are rather volatile, especially the short-term flows.

VI.   Results

1.   Estimation

Using the above model, multiple regressions are estimated using the Generalized Method of Moments technique. While other capital control models, like Clements and Kamil (2009), used Ordinary Least Squares, the potential endogeneity of some of the explanatory variables, especially the interest rates, is a concern. It is reasonable to believe that interest rates are set in conjunction with capital control policies, and therefore that they are not exogenous in this model. The GMM method allows for endogeneity in the model without finding specific instruments for endogenous variables, alleviating the problem of finding a suitable instrument. Additionally, the GMM method allows for more efficient estimators than simply using the 2SLS approach, as the coefficients are jointly determined (Wooldridge 2010).

Although multiple instruments were investigated, the regressions below all use the fourth lag of *ln(GDP)* as the instrument. It is the least likely to be endogenous in the short run, and provides a better fit than other instruments tried, such as the fourth lag of the *DebtMkt* and *EquityMkt* variables and the first lag of *ln(GDP)*. Additionally, all the results include time and country fixed effects as further controls.

2. *Short Term Flow Results – Absolute Flows*

The results in Table 2 show that capital controls do not have a consistently significant effect on the volume of flows into emerging markets. Table 2 presents results with the dependent variable as the given volume of short-term flows. There is some significance of the capital control variables (either *CapControl* or *LagCapControl*), as seen in specification (1), as well as borderline significance in specifications (2) and (3). Additionally, there is significance seen in the *Change* variables, but not in the variations with easy interpretations. Only *Change* has significance, the variable with an unclear expected sign, instead of the other two measures (*Change2* and *PosChange* have a negative expected sign and *NegChange* has a positive expected sign). Other significant variables across the multiple specifications are *ln(GDP)*, *EquityMkt*, and *FXExApp*. In multiple specifications, there are significant correctly signed coefficients of these variables. This would suggest that business cycles, expected exchange rate appreciation, and the depth of the equity markets are important for determining the flow of short term capital. Not surprisingly, the great volatility in the short-term flows made the lag of the dependent variable insignificant across all specifications where it is included.

When the *EMBI* and *IntRateSpread* variables are included, their negative signs suggest that investors are responding more to the risk of the emerging markets than their potential higher returns. This is also in line with the negatively signed *Recession* variable, as investors are decreasing their risk tolerance during worse economic times and decreasing their capital flows to emerging markets.

Comparing specifications (5) and (6) allows the measures of capital controls to be directly compared. Both specifications use the *CapControl* measure, but the change

measure varies. As there is little variation in some of the capital control index values within a country, even across 11 years, the change variables might provide better insight into the actual effects that a change in capital control policy will have on capital flows. While the *Change2* variable is used in specification (5) and the *PosChange* and *NegChange* variables are used in specification (6), there is little difference in the results. Even though all the change variables are correctly signed, none are significant. The *Change2* variable does increase the significance of the *CapControl* variable, but only slightly and not enough to make it significant.

Specifications (4) and (6) similarly allow for a judge of the *EMBI* variable. While the addition of the *EMBI* variable decreases the observations, the fit of the model does not suffer. Instead, the addition of the correctly signed and borderline significant variable increases the significance of the *CapControl* variable, as well as corrects the sign of the *FXVol* and *Recession* variables.

3. *Short Term Flow Results – Moving Averages and Differences*

The short-term flow results are also calculated with the dependent variable of the three quarter moving averages of the flows, as a way to control for some of the volatility in the short-term flows, as well as with the change in the flows between periods as the dependent variable. These results are shown in Table 3 and Table 4. Table 3 shows the same specifications as Table 2, but with new dependent variables[15]. The few specifications shown do not fit the data as well as with the absolute flows. This is particularly true with specification (6), as all the variables combined do not have significance at even the 35% level.

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[15] The exact same specifications are not always shown since the specifications did not converge (the variance matrices were nonsymmetric or highly singular). Therefore, slightly different specifications are shown instead.

The moving average estimations also exhibit some signs of significant decreases in capital flows coming from capital controls, but not consistently across all specifications. In specification (2), the capital control index is negative and significant at almost the 10% level. For the change in flows, there is not any significant negative capital control effect, with only a borderline positive effect in specification (4).

There are also many specifications that are significant for the moving average flows and the changes in flows that are not significant for the given flows. These are shown in Table 4. Specifications (1) and (2) show that the addition of *EMBI* spread and the absence of *ln(GDP)* made the capital control index go from insignificant to positive and significant. While this is not the expected sign, the lack of variation in the capital control index could be driving this result. When the lag flows are added in specification (3), however, that positive and significant result disappears. Additionally, the lag flows, even though they are insignificant, add to the overall explanatory power of this model, as expressed by the Wald test statistic. While the Wald test statistic decreases with the introduction of *EMBI* and the loss of *ln(GDP)*, it increases again with the addition of the lag flows.

In the fourth specification, the signs of the coefficients are mostly correct, but the lack of significance of any of the explanatory variables, even with the overall significance of the model, might have been the result of the dropping observations. This specification saw a large drop in the observations compared to other specifications, which went under 300 for the first time down to 290. Additionally, specification (4) also shows no significance of capital controls on capital inflows. These models also confirm the

investors' preferences for risk over reward in terms of the *EMBI* and *IntRateSpread* variables, as once again these are both negatively signed.

The change in flows specifications do not differ much from the previous results, but do confirm the findings with the given and moving average flows. Capital controls do not significantly impact these flows either, with the exception of a borderline negative significance in specification (6). The expected currency appreciation is again one of the most important drivers of short-term flows, as seen in specifications (5) through (8). *FXExApp* is significant in three out of the four specifications and negatively signed in all four of the models. The preference of investors towards risk is also confirmed again with the negative *EMBI* and *IntRateSpread* coefficients.

   4. Long Term Flow Results

The results for long-term flows can be seen in Table 5. First, capital controls have no significant effect on these flows. This is the expected result, as the recent controls were made to target short-term, and not long-term, flows. Additionally, as seen in the extremely low Wald statistics, this model is not a good fit for the long-term flows. This is because, as described above, the flows have different determinants than short term flows, as they are mostly comprised of FDI instead of FPI.

VII. Conclusions and Areas of Further Research

Capital controls have been widely debated for the past half century, and have only recently been given by the IMF as a potential policy suggestion to attempt to either change the composition of capital inflows or to reduce the amount of net capital inflows. However, the results show that capital controls do not significantly reduce capital flows. As a result, capital controls are not shown to be an effective policy for reducing the

volume of capital flows. Therefore, emerging markets should consider other potential policies to control the potential instability that may arise from their capital flows in the coming years.

This paper is by no means exhaustive in its research, and therefore more research can be done on the topic to provide a more conclusive result. This study only focuses on a 10-year snap shot that includes periods before and during a financial crisis. One area to expand the research is to examine a longer period of time, with possibly more capital control policy changes. A particularly useful time period would be one that included the lead-up to a recession, the recession, and the post recessionary period, where countries might be reacting to similar threats of sudden outflows. Additionally, the effect of capital controls on long-term flows can be expanded further. This would mean developing a better model for what effect capital controls have on long-term flows. Even though the controls are targeted towards short-term flows, there could still be a detrimental effect on the long-term flows. Furthermore, in any area of capital control research, further work can be done on improving on and finding new measures of capital controls, especially across countries. The index and binary dummy variables used in this paper are a good proxy, but a more descriptive measure that can better pick up smaller changes in existing policies would greatly enhance the research.

In summary, this paper finds that capital controls are not effective in decreasing the volume of capital flows. This result holds across multiple measures of the flows and even with the inclusion of a complex measure of capital controls, and confirmed the findings of Baba and Kokenyne (2011) and Magud, Reinhart, and Rogoff (2011). As a

result, the lasting policy implication is that with the ease of worldwide capital mobility today, inhibiting capital flows with capital controls no longer appears feasible.

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Table 1. Summary Statistics

Variable	Unit of Measure	Observations	Mean	St. Dev.	Min	Max	Expected Sign
ST Flows	Millions USD	352	2720.42	11417.99	-77220	69900	----
LT Flows	Millions USD	352	3940.12	11106.02	-79410	81950	----
Cap Control	Index	352	9.51	3.35	2	13	-
Change	Binary	352	0.34	0.48	0	1	?
Change2	Index	352	-0.45	0.57	-1	1	-
PosChange	Binary	352	0.14	0.35	0	1	-
NegChange	Binary	352	0.19	0.39	0	1	+
FXVol	----	352	0.02	0.01	0.00	0.18	-
FXExApp	Percent	352	0.44	7.87	-19.23	57.27	-
ln(GDP)	ln(Millions USD)	352	11.36	0.90	-5.41	104.71	+
Recession	Binary	352	0.20	0.40	0	1	-
EquityMkt	Index	320	0.71	0.68	0.12	3.38	+
DebtMkt	Index	320	0.50	0.24	0.20	1.13	+
EMBI	Index	343	345.75	239.96	74.25	1984.5	+ or -
IntRateSpread	Percent	338	8.03	13.42	-5.41	104.71	+ or -

Table 2. Short Term Flows: *Quarterly Flows*

Explanatory Variables:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
CapControl	-3708.97 (0.07)		-3989.56 (0.18)	-8760.15 (0.37)	-1363.87 (0.81)	-1864.93 (0.73)	-1186.62 (0.58)	-2061.34 (0.38)
LagCapControl		-7140.06 (0.18)						
Change		5322.74 (0.63)	8585.13 (0.09)				-16148.5 (0.22)	-6255.12 (0.59)
Change2				29281.18 (0.29)		-6051.87 (0.56)		
PosChange	13475.33 (0.05)				-11130.75 (0.71)			
NegChange	18878 (0.19)				3498.78 (0.84)			
FXVol		50575.77 (0.63)		-267452.4 (0.24)	275294.5 (0.76)	115962.1 (0.57)	444087.7 (0.44)	471664.3 (0.56)
FXExApp				-1187.01 (0.16)	-469.64 (0.17)	-438.06 (0.08)		9.83 (0.98)
ln(GDP)	-82782.56 (0.34)	196722.4 (0.18)	-92815.58 (0.24)				136612.1 (0.06)	164176.6 (0.08)
Recession				-6181.06 (0.76)	-1473.98 (0.91)	622.33 (0.93)	-1956.59 (0.69)	-4529.23 (0.69)
EquityMkt		83533.09 (0.25)	8557.10 (0.07)				19760.07 (0.04)	38163.47 (0.05)
DebtMkt	458413.4 (0.04)	-419015.8 (0.27)						
EMBI				-50.26 (0.19)				
IntRateSpread	-966.79 (0.29)							
LagFlows			-0.47 (0.45)	-1.96 (0.49)	-0.26 (0.81)	-0.15 (0.89)		
Wald test statistic	104.06	101.82	44.41	61.27	20.40	352.04	13.05	15.61
Prob>chi^2	0.0000	0.0000	0.0000	0.0000	0.0048	0.0000	0.0423	0.0289
Observations	306	312	312	336	344	344	320	320
Instruments	37	37	37	41	41	41	37	37

Source: Author's Estimates

Notes: 1) P-values are listed under the coefficient estimates, and are calculated using heteroskedasticity corrected standard errors. 2) All models are estimated using GMM with the 4th lag of *ln(GDP)* as the instrument. 3) Year and country fixed effects are included in all specifications.

Table 3. Short Term Flows: *Moving Averages and Changes*
(Quarterly Flow Specifications)

Dependent Variable	(1) Moving Avg	(2) Moving Avg	(3) Moving Avg	(4) Change	(5) Change	(6) Change
Explanatory Variables:						
CapControl		-4735.88 (0.11)	1331.81 (0.64)	693223.7 (0.13)	86150.36 (0.34)	-221193.4 (0.28)
LagCapControl	-6000.89 (0.28)					
Change	1699.47 (0.90)	-7167.36 (0.03)	-5819.82 (0.07)		1126.85 (0.85)	71995.91 (0.14)
Change2				13743.01 (0.46)		
FXVol	395978 (0.25)	188732 (0.22)	147632.7 (0.21)	-2147378 (0.11)	231492.9 (0.57)	-624403.1 (0.04)
FXExApp			-315.01 (0.76)	-1029.35 (0.18)	582.94 (0.54)	-750.73 (0.17)
ln(GDP)	40189.56 (0.68)	-22923.53 (0.54)	60729.44 (0.25)		-146266.5 (0.08)	-63566.99 (0.41)
Recession				39475.2 (0.12)		13775.1 (0.24)
EquityMkt	67427.09 (0.13)	41558.27 (0.01)	25094.21 (0.58)	-499993.2 (0.13)	52785.84 (0.08)	7362.14 (0.94)
DebtMkt	-535225.1 (0.36)					
LagFlows				-1.72 (0.21)		
Wald test statistic	13.19	10.55	48.00	27.16	34.95	7.78
Prob>chi^2	0.0402	0.0611	0.0000	0.0003	0.0000	0.3521
Observations	312	312	312	304	312	312
Instruments	37	37	37	37	37	37

Source: Author's Estimates

Notes: 1) Specifications (2) and (3) are not identical to those of the absolute flows due to highly singular or nonsymmetric variance matrices. These specifications omit the *Recession* variable. 2) P-values are listed under the coefficient estimates, and are calculated using heteroskedasticity corrected standard errors. 3) All models are estimated using GMM with the 4th lag of *ln(GDP)* as the instrument. 4) Year and country fixed effects are included in all specifications.

Table 4. Short Term Flows: *Moving Averages and Changes*
(New Specifications)

Dependent Variable	(1) Moving Avg	(2) Moving Avg	(3) Moving Avg	(4) Moving Avg	(5) Change	(6) Change	(7) Change	(8) Change
Explanatory Variables:								
CapControl					-11091.88 (0.41)		-22365.26 (0.53)	
LagCapControl	3914.18 (0.17)	30944.17 (0.05)	-7358.781 (0.59)	25825.01 (0.23)		-4193.32 (0.12)		-9500.42 (0.24)
Change	-6980.40 (0.25)	-3124.08 (0.37)	-23329.67 (0.35)			6039.48 (0.49)	4829.91 (0.53)	7795.96 (0.76)
Change2				102188 (0.27)				
PosChange					68565.51 (0.25)			
NegChange					-31395.74 (0.26)			
FXVol	8344.13 (0.95)	47189.77 (0.63)	87319.5 (0.51)					425801.1 (0.06)
FXExApp	-687.11 (0.05)	-338.97 (0.12)	-201.98 (0.65)		-1843.62 (0.09)	-831.25 (0.14)	-521.51 (0.18)	-911.05 (0.03)
ln(GDP)	121750.3 (0.10)			-624927.4 (0.26)	6442.57 (0.98)	-68673.21 (0.17)	-90920.48 (0.48)	
Recession	-5263.80 (0.31)	-3975.59 (0.22)	-3825.17 (0.40)					5772.36 (0.33)
DebtMkt				6225477 (0.28)				
EMBI		-4.44 (0.64)	-68.77 (0.32)	-273.70 (0.29)	-6.24 (0.88)			-38.08 (0.33)
IntRateSpread				-8505.83 (0.27)		-84.22 (0.97)		
LagFlows			-1.46 (0.59)	-6.61 (0.39)	-2.78 (0.25)	0.16 (0.82)	0.03 (0.97)	
Wald test statistic	97.80	16.25	88.58	63.25	27.33	72.84	14.86	15.37
Prob>chi^2	0.0000	0.0125	0.0000	0.0000	0.0003	0.0000	0.0110	0.0176
Observations	336	328	321	290	329	326	336	336
Instruments	40	40	40	37	41	41	41	41

Source: Author's Estimates

Notes: 1) P-values are listed under the coefficient estimates, and are calculated using heteroskedasticity corrected standard errors. 2) All models are estimated using GMM with the 4th lag of *ln(GDP)* as the instrument. 3) Year and country fixed effects are included in all specifications.

Table 5. Long Term Flows

	(1)	(2)	(3)	(4)	(5)
Explanatory Variables:					
CapControl	-12499.69 (0.38)	827.75 (0.46)	-3093.69 (0.41)	-3124.83 (0.39)	-272058.9 (0.40)
LagCapControl					
Change					-18777.91 (0.23)
Change2		3462.65 (0.50)		6586.80 (0.42)	
PosChange	68425.32 (0.37)		5288.63 (0.67)		
NegChange	-20397.5 (0.47)		-8345.20 (0.66)		
FXVol		-40385.16 (0.87)	81300.06 (0.76)	48782.85 (0.69)	-1635065 (0.17)
FXExApp		-188.28 (0.53)	-199.53 (0.61)	-175.83 (0.59)	319.57 (0.66)
ln(GDP)	-418528.8 (0.42)				-883272.5 (0.18)
Recession					-11233.56 (0.51)
EquityMkt					-117638.1 (0.54)
DebtMkt	697449.6 (0.43)				
EMBI		-11.63 (0.47)			
IntRateSpread	-2541.48 (0.45)				
LagFlows		-0.10 (0.87)	-0.85 (0.63)	-0.73 (0.47)	
Wald test statistic	0.96	11.74	0.76	0.83	4.20
Prob>chi^2	0.9656	0.0680	0.9931	0.9749	0.7566
Observations	306	336	344	344	320
Instruments	37	41	41	41	37

Source: Author's Estimates

Notes: 1) Specifications (2), (3), and (4) are not identical to those of the absolute flows due to highly singular or nonsymmetric variance matrices. These specifications omit the *Recession* variable. 2) P-values are listed under the coefficient estimates, and are calculated using heteroskedasticity corrected standard errors. 3) All models are estimated using GMM with the 4th lag of *ln(GDP)* as the instrument. 4) Year and country fixed effects are included in all specifications.

Appendix A: Data Source Summary

Table A1. Data Source Summary

Variable/Country	Brazil	Colombia	Indonesia	South Korea	Peru	South Africa	Thailand	Turkey
ST Flows	Banco Central do Brasil	Banco de la Republica Colombia	Bank Indonesia	Bank of Korea	Central Reserve Bank of Peru	South African Reserve Bank	Bank of Thailand	Central Bank of the Republic of Turkey
LT Flows	Banco Central do Brasil	Banco de la Republica Colombia	Bank Indonesia	Bank of Korea	Central Reserve Bank of Peru	South African Reserve Bank	Bank of Thailand	Central Bank of the Republic of Turkey
Cap Control	Annual Report on Exchange Arrangements and Exchange Restrictions. IMF. 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011							
Change	Annual Report on Exchange Arrangements and Exchange Restrictions. IMF. 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011							
Change2	Annual Report on Exchange Arrangements and Exchange Restrictions. IMF. 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011							
PosChange	Annual Report on Exchange Arrangements and Exchange Restrictions. IMF. 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011							
NegChange	Annual Report on Exchange Arrangements and Exchange Restrictions. IMF. 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011							
FXVol	Banco Central do Brasil	Banco de la Republica Colombia	Bank Indonesia	Board of Governor of the Federal Reserve System	Central Reserve Bank of Peru	South African Reserve Bank	Board of Governor of the Federal Reserve System	Central Bank of the Republic of Turkey
FXExApp	Banco Central do Brasil	Banco de la Republica Colombia	Bank Indonesia	Board of Governor of the Federal Reserve System	Central Reserve Bank of Peru	South African Reserve Bank	Board of Governor of the Federal Reserve System	Central Bank of the Republic of Turkey
ln(GDP)	----------IMF IFS Database----------							
Recession	----------NBER: the National Bureau of Economic Research----------							
EquityMkt	----------World Bank Financial Structure Database----------							
DebtMkt	----------World Bank Financial Structure Database----------							
EMBI	----------Global Financial Data----------							
IntRateSpread[2]	Banco Central do Brasil	Banco de la Republica Colombia	Bank Indonesia	Bank of Korea	Central Reserve Bank of Peru	South African Reserve Bank	Bank of Thailand	Central Bank of the Republic of Turkey

Notes: 1) The IMF IFS database is the International Monetary Fund's International Financial Statistics Database. 2) The US Money Market rate is also used to calculate *IntRateSpread*, and that data is found through the Board of Governor of the Federal Reserve System. 3) FPI data for Ecuador and the Philippines related to Figure 3 is from the IMF Balance of Payments Statistics database.

Appendix B: IMF AREAER Capital Control Categories

The IMF AREAER categories are detailed in the front of each report, along with further breakdowns. The following descriptions follow very closely those given in the reports.

i.   *Controls on Market Securities*: Refers to shares and other securities of a participating nature, and bonds and other securities with an original maturity of more than one year.

ii. *Controls on Money Market Instruments*: Refers to securities with an original maturity of one year or less and includes short-term instruments, such as certificates of deposit and bills of exchange. The category also includes treasury bills and other short-term government paper, bankers' acceptances, commercial paper, interbank deposits, and repurchase agreements.

iii. *Controls on Collective Investment Securities*: Includes share certificates and registry entries or other evidence of investor interest in an institution for collective investment, such as mutual funds, and unit and investment trusts.

iv. *Controls on Derivatives and Other Instruments*: Refers to operations in other negotiable instruments and nonsecured claims not covered under the above subsections. These may include operations in rights; warrants; financial options and futures; secondary market operations in other financial claims (including sovereign loans, mortgage loans, commercial credits, negotiable instruments originating as loans, receivables, and discounted bills of trade); forward operations (including those in foreign exchange); swaps of bonds and other debt securities; credits and loans; and other swaps (e.g., interest rate, debt/equity, equity/ debt, foreign currency, and swaps of any of the instruments listed above). Controls on operations in foreign exchange without any other underlying transaction (spot or forward trading on the foreign exchange markets, forward cover operations, etc.) are also included.

v.   *Controls on Commercial Credits*: Covers operations directly linked with international trade transactions or with the rendering of international services.

vi. *Controls on Financial Credits*: Includes credits other than commercial credits granted by all residents, including banks, to nonresidents, or vice versa.

vii. *Controls on Guarantees, Sureties, and Financial Backup Facilities*: Includes guarantees, sureties, and financial backup facilities provided by residents to nonresidents and vice versa. It also includes securities pledged for payment or performance of a contract—such as warrants, performance bonds, and standby letters of credit—and financial backup facilities that are credit facilities used as a guarantee for independent financial operations.

viii. *Controls on Direct Investment*: Refers to investments for the purpose of establishing lasting economic relations both abroad by residents and domestically by nonresidents. These investments are essentially for the purpose of producing goods and services, and, in particular, in order to allow investor participation in the management of an enterprise. The category includes the creation or extension of a wholly owned enterprise, subsidiary,

or branch and the acquisition of full or partial ownership of a new or existing enterprise that results in effective influence over the operations of the enterprise.

ix. *Controls on Liquidation of Direct Investment*: Refers to the transfer of principal, including the initial capital and capital gains, of a foreign direct investment in the *Controls on Direct Investment* definition.

x. *Controls on Real Estate Transactions*: Refers to the acquisition of real estate not associated with direct investment, including, for example, investments of a purely financial nature in real estate or the acquisition of real estate for personal use.

xi. *Controls on Personal Capital Transactions*: Covers transfers initiated on behalf of private persons and intended to benefit other private persons. It includes transactions involving property to which the promise of a return to the owner with payments of interest is attached (e.g., loans or settlements of debt in their country of origin by immigrants) and transfers effected free of charge to the beneficiary (e.g., gifts and endowments, loans, inheritances and legacies, and emigrants' assets).

xii. *Provisions Specific to Commercial Banks and other Credit Institutions*: Describes regulations that are specific to these institutions, such as monetary, prudential, and foreign exchange controls. Inclusion of an entry in this category does not necessarily signify that the aim of the measure is to control the flow of capital. Some of these items (e.g., borrowing abroad, lending to nonresidents, purchase of locally issued securities denominated in foreign exchange, investment regulations) may be repetitions of entries under respective categories of controls on capital and money market instruments, on credit operations, or on direct investments, when the same regulations apply to commercial banks as well as to other residents.

xiii. *Provisions Specific to Institutional Investors*: Describes controls specific to institutions, such as insurance companies, pension funds, investment firms (including brokers, dealers, or advisory firms), and other securities firms (including collective investment funds). Incorporates measures that impose limitations on the composition of the institutional investors' foreign or foreign currency assets (reserves, accounts) and liabilities (e.g., investments in equity capital of institutional investors or borrowing from nonresidents) and/or that differentiate between residents and nonresidents. Examples of such controls are restrictions on investments because of rules regarding the technical, mathematical, security, or mandatory reserves; solvency margins; premium reserve stocks; or guarantee funds of nonbank financial institutions. Inclusion of an entry in this category does not necessarily signify that the aim of the measure is to control the flow of capital.