Capital Controls: Gates and Walls

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Abstract: This paper examines the pattern of controls on capital inflows, and the association of these controls on financial variables, GDP, and exchange rates. A key point of the paper is the distinction between long-standing controls on a broad range of assets (walls) and episodic controls that are imposed and removed, and tend to be on a narrower set of assets (gates). The paper presents a new data set that differentiates between controls on different categories of assets. The imposition of episodic controls is found to not follow the prescriptions of theories that suggest first imposing controls on international asset inflows that are most likely to contribute to financial vulnerability. Empirical results are presented that show a significant differences between long-standing and episodic controls in terms of their association with GDP growth and financial variables, but these differences disappear once one controls for the fact that long-standing controls are found in poorer countries and neither type of controls is associated with a significant partial correlation with these aggregate variables. These preliminary results are important because, in the wake of the Great Recession, much of the policy discussion focuses on the imposition of episodic controls but the motivation for this discussion may arise from the effects of long-standing controls.

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I. Introduction

Before 2008, the prevailing (albeit not universal) view was that a country generally benefitted from allowing the free flow of assets across its borders. This was thought to be especially true of middle-income emerging market nations. These countries tended to have an abundance of funding opportunities relative to domestically-generated savings. International asset diversification could benefit people in these countries, where there was a relatively limited range of domestic productive activities. Capital flows to emerging markets were also considered a means for the transfer of financial know-how that could spur development in countries hobbled by rudimentary financial markets. Theoretical and empirical research supported these views, and they were also reflected in practice; a wave of countries dismantled controls on capital flows in the 1980s and 1990s, and few re-imposed controls by the turn of the century.

This decades-long trend has shifted. Some countries that had liberalized their capital accounts began to re-introduce controls in the early 2000s. This retrenchment increased after the onset of the Great Recession, when new controls on capital inflows were imposed by both emerging market and advanced countries, including Brazil, Iceland, Ireland, Peru and Turkey. These measures were put in place to address concerns about inflow-fueled exchange rate appreciations, and potentially destabilizing asset price booms.

These shifts in practices have been accompanied by shifts in opinions. As early as 2002, the IMF had begun to soften its preference for unfettered international asset movements. In that year, Kenneth Rogoff, then serving as Chief Economist and Director of Research of the IMF, wrote in the December issue of the IMF’s publication Finance and Development “These days, everyone agrees that a more eclectic approach to capital account liberalization is required.”

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More recently, the IMF staff published position papers that accept a role for capital controls. While the current IMF position is that capital controls become an option only after other policy choices have been exhausted, Jeanne, Subramanian and Williamson (2012) argue that they should not be a last resort, rather “…properly designed they might even be a regular instrument of economic policy.” (p. 95) This argument is bolstered by recent theory that highlights the prudential role of capital controls, whereby temporary, pro-cyclical, well-targeted controls contribute to financial stability.

Evolving practices and prescriptions make this an opportune time to reconsider the role of capital controls. This paper analyzes experience with controls on capital inflows for 44 countries over the period 1995 – 2010. The analysis uses a new data set that, unlike earlier cross-country capital control data, differentiates between controls on inflows and outflows. This distinction is of obvious importance when considering the association between capital controls and exchange rates or financial variables. This data set also includes separate measures of inflow controls on six categories of assets, which is especially important for considering the prudential role of capital controls because of differences in the perceived vulnerabilities from inflows of different types of assets (e.g. short-maturity debt as compared to long-term direct investment).

A central theme of this paper is the distinction between the effects of long-standing and episodic controls on capital flows. This distinction may have been less apparent fifteen years ago than today because, in general, there were few instances of the re-imposition of controls up through the mid-1990s. Currently some countries, such as China, continue to have long-standing capital controls, but other countries have re-introduced controls when events seem to warrant their use. For example, the Brazilian government imposed a 2 percent tax on investment in

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3 For example, see Korinek (2010), Jeanne and Korinek (2010), Bianchi and Mendoza (2011) and Jeanne (2012).
existing Brazilian equities on October 20, 2009 (the Imposto sobre Operações Financeiras, known by its acronym IOF), which was then raised to 4 percent on October 5, 2010, and to 6 percent less than two weeks later. This is a particularly prominent example since it was immediately preceded by a declaration of a “currency war” in September 2009 by the Brazilian finance minister, Guido Mantegna, in response to a 30 percent appreciation of the real against the dollar from the beginning of that year that, he claimed, was a direct result of United States monetary policy.

Long-standing capital controls are like walls that attempt to protect against the vicissitudes of international capital markets. As will be shown below, the walls of long-standing controls tend to be wide as well as high, limiting all manner of capital flows, including those that could provide cheap capital, financial development, and opportunities to diversify risk. In contrast, episodic capital controls open like gates during tranquil times, to enable an economy to benefit from international capital, but swing shut in the face of capital inflows that threaten to cause an unwanted appreciation or a destabilizing asset market boom. These episodic controls, transitory and targeted towards particular categories of assets, make them less distortionary and inefficient than broad, long-standing controls.

But one problem with gates is that they might not latch shut tightly. Episodic controls are likely to be less efficacious than long-standing controls because evasion is easier in a country that already has experience in international capital markets than in a country that does not have this experience. Countries with long-standing controls are likely to have incurred the sunk costs required to establish an infrastructure of surveillance, reporting and enforcement that makes those controls more effective. Furthermore, countries with pervasive capital controls also tend to

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4 Some argue that countries like China and India, which had long-standing controls in place, were spared the financial upheavals that roiled more open economies. See Ostry, et al. (2010).
have fewer options for evasion because they have less developed financial markets and also impose controls on a wider set assets than countries with episodic controls. Another problem with gates is that they may shut too late. It may be difficult to gauge the appropriate moment to implement episodic capital controls, and implementation itself may take some time. Finally, there may be political reasons that make it difficult to shut gates on capital flows. As with monetary policy, the role of prudential controls on capital inflows is to take away the punch bowl just as the party gets going, but revelers may not want their drinks removed.5

The next section of this paper begins with a brief discussion of the role of capital flows in international macroeconomics and an overview of the long history of capital controls. This section also introduces the capital controls data set used in the subsequent analysis, presents the division of the set of 44 countries into the three categories of those persistently open to inflows, those persistently closed to inflows, and those with episodically imposed controls on inflows. Section II closes with a discussion of the pattern of inflow controls across categories of assets. Section III presents empirical results that show the association of both long-standing and episodic capital controls with financial variables that could presage a boom-bust cycle, GDP growth, and the real exchange rate. The final section offers some concluding remarks.

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5 The punch bowl analogy for monetary policy is from William McChesney Martin, Chairman of the Federal Reserve from 1951 to 1970.
II. Capital Controls in Theory and Practice

Capital controls are rules, taxes or fees associated with financial transactions that discriminate between domestic residents and those outside the country (OECD 2009). Capital controls can be administrative or market-based measures. Administrative controls include outright prohibitions on foreign borrowing or lending, quantitative limits on these transactions, and the requirement that international capital transactions first receive government approval. Market-based measures include taxes on cross-border capital transactions, differential bank reserve requirements for resident and non-resident accounts, and the requirement that some proportion of capital inflows be deposited in a non-interest bearing account at a central bank (an unremunerated reserve requirement) which effectively serves as a tax on inflows. Unlike tariffs on goods and services, which are subject to the multilateral General Agreement on Tariffs and Trade (GATT), countries are generally free to remove or impose capital controls without reference to international agreements.6

This section provides a context for the consideration of capital controls by first describing the ways that, in theory, capital flows affect an economy, and the corresponding implications regarding the effects of capital controls. The discussion then turns to the history of capital controls. This is followed by the introduction of the data set used in the analysis in this paper. The first use of this data set is in the concluding part of this section that discusses whether the pattern of the imposition of controls on capital inflows follows the prescriptions of the theory of the prudential role of capital controls.

6 An exception is that some countries face restrictions on imposing capital controls because of Bilateral Investment Treaties (BITs) with the United States. Spillover effects, which arise when one country’s imposition of capital controls affect another country, perhaps by diverting funds to that economy, are one reason for international cooperation on capital controls. Jeanne, Subramanian and Williamson (2012) argue for international cooperation on capital controls. Forbes, Fratzcher, Kostka and Straub (2012) study spillover effects.
Capital Controls in Theory

Long-term international borrowing and lending offers several distinct economic benefits.\(^7\) Foreign investment, through international equity or debt sales, can both increase the amount of productive capital in the host country and raise returns earned by investors in the source country. These international transactions also afford diversification opportunities to domestic savers, and this could have potentially large effects on welfare by allowing for a smoother path of consumption as well as by raising the willingness of domestic producers to undertake risky projects (Obstfeld 1994). Foreign direct investment, like the building of factories or the establishment of foreign financial subsidiaries, may also foster technology transfer and promote financial development. The converse of these arguments is that long-lasting capital controls hamper growth, development, and economic welfare.

Shorter-run capital flows are at the heart of the analysis of business cycles in international macroeconomics. The equalization of expected returns to short-maturity bonds denominated in different currencies (uncovered interest parity) is central to the policy trilemma, whereby economic policy makers can choose two of the following three; monetary policy independence, exchange rate management, and international capital mobility.\(^8\) With free capital mobility, monetary authorities must choose whether to target the interest rate or the exchange rate, with a freely floating exchange rate and a fixed exchange rate representing the two polar cases. Capital controls, however, could provide scope for policy to independently achieve both monetary and exchange rate targets by preventing capital flows that respond to domestic interest rates and influence the value of the exchange rate. This would enable monetary authorities to address

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\(^7\) Obstfeld and Rogoff (1996).
\(^8\) A risk premium could drive a wedge between expected returns, and, in theory, the equalization of expected returns could be achieved through incipient capital flows rather than actual capital flows. Shambaugh (2004) provides evidence supporting the empirical relevance of the policy trilemma.
“internal” goals, such as low unemployment and low and stable inflation, while at the same time addressing the “external” goal of a sustainable current account. In theory, long-standing capital account restrictions could help achieve this external goal by enabling its government to manage its real exchange rate (Jeanne 2011). Episodic controls on capital inflows could, theoretically, enable monetary authorities to fight inflation by raising interest rates without simultaneously facing the exchange rate appreciation that would occur with unrestricted capital flows.

Episodic capital controls could also confer benefits through another means, by promoting financial stability. The recent crisis began in financial markets, and financial markets were a key vector through which the economic distress spread from one country to another. This experience has highlighted general questions about financial market policies, including the potential role for prudential capital controls. Capital controls may be a viable alternative to other prudential policies, such as bank regulation and supervision, in an economy that lacks resources to engage in this type of supervision or regulation (but, presumably, can enforce capital controls). Also, capital controls are more broad-based than bank regulation, which is important in economies in which capital flows in through channels other than regulated financial institutions (Ostry, Ghosh, Chamon and Qureshi, 2011).  

Recent theoretical research has considered the manner in which episodic capital controls could contribute to financial stability and prevent boom-bust cycles. The starting point for this work is the recognition that the response to inherent characteristics of financial markets, such as

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9 There is overlap between policies that could be construed as capital controls, and those that may be considered macroprudential regulations, as discussed in detail in Ostry, Ghosh, Habermeier, Laeven, Chamon, Qureshi and Kokenyne (2011). For example, higher bank reserve requirements for accounts held by non-residents than those held by residents is both a capital control (because it treats residents and non-residents differently) and a macroprudential policy (because it represents an effort to foster financial stability through regulating the banking sector). This policy is more finely gauged than a general reserve requirement and may accurately reflect the greater predilection for non-residents to engage in a bank run. In practice, there could be political reasons for distinguishing between macroprudential policies, which could be justified for promoting financial stability, and capital controls, which may be decried as interfering in the operation of international asset markets.

10 Korinek (2011) surveys this theoretical work.
asymmetric information, is the introduction of constraints, such as collateral requirements, that limit borrowing. Asset price booms and exchange rate appreciations can relax these constraints and contribute to increased borrowing. For example, an asset price boom or a currency appreciation can raise the value of assets used as collateral. A subsequent collapse in asset prices, or a currency depreciation, then has cascading effects as the negative feedback loop of a decline in collateral value, a reduction in loans, a decrease in aggregate demand, and a further decline in asset prices and the value of collateral, plays out. Korinek (2011) discusses how increased borrowing by individuals raises asset values and loosens collateral constraints, thereby collectively contributing to financial fragility, and compares this to the familiar externality that arises when drivers do not consider their contribution to air pollution. Just as a tax on gasoline could force drivers to internalize the pollution externality, a tax on capital inflows could be employed to limit foreign borrowing and make the financial system more resilient.

This theoretical work emphasizes that optimal controls on capital inflows would be episodic, and more precisely, procyclical, strengthening as capital flows increased. Optimal capital controls would also target inflows that present particular concerns about financial vulnerability, for example foreign-currency denominated debt rather than direct investment, rather than being broad-based. But the size of the optimal tax suggested by model calibrations is typically quite small. Korinek (2010) uses data from Indonesia and calculates an optimal tax of 0.44 percent on Rupiah debt and 1.54 percent on dollar debt. Bianchi and Mendoza (2011) calibrate a model using United States data and find an optimal prudential tax on debt of 1 percent. Bianchi (2011),

\[1\] The consideration of relative riskiness of assets gives rise to a “pecking order” of capital controls (Ostry, Ghosh, Habermeier, Chamon, Qureshi, and Reinhardt 2010). In the next section, we consider whether controls were imposed in a manner consistent with this pecking order.
using Argentine data in his calibration, calculates an average optimal state-contingent tax of debt of 5 percent, and, alternatively, an optimal fixed tax on debt of 3.6 percent.  

**Capital Controls in Practice: A Brief History**

Interest in imposing capital controls tends to emerge, naturally enough, when events call into question the desirability of unfettered capital movements. Capital moved freely across national borders during the pre-World War I gold standard period, a time when, according to John Maynard Keynes, “The inhabitant of London could order by telephone, sipping his morning tea in bed, the various products of the whole earth … he could at the same moment and by the same means adventure his wealth in the natural resources and new enterprises of any quarter of the world.” (Keynes 1920, pp. 11 – 12) But, about a dozen years after he penned these words, during the depths of the Great Depression, Keynes’ focus turned towards the instability arising from volatile capital flows. In a 1933 speech in Dublin, he stated “I sympathize … with those who would minimize rather than those who would maximize economic entanglements among nations. Ideas, knowledge, art, hospitality, travel – these are things which should of their nature be international. But let goods be home-spun whenever it is reasonable and conveniently possible and, above all, let finance be national.” These suspicions of international capital movements contributed to the prevalence of administrative capital controls during the post-World War II Bretton Woods international monetary system.

The Bretton Woods system broke apart in the early 1970s, replaced by a “non-system” of generalized floating exchange rates. Administrative capital controls in richer countries began to

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12 The welfare implications of the imposition of an optimal tax on capital inflows is quite small. For example, Bianchi (2011) finds the welfare gains from correcting the externality associated with overborrowing of 0.135 percent of permanent consumption, which is consistent with the tiny welfare gains found in models that attempt to assess the welfare costs of business cycles.

13 Quoted in Skidelsky (1992), p. 477
be relaxed around that time as well. The prospect of international capital movements leading to wild swings in currency values led James Tobin to propose, in 1972, a market-based capital control – a small tax on transactions in foreign exchange to “throw some sand in the wheels of our excessively efficient international money markets.”\textsuperscript{14} While never enacted, the Tobin Tax on currency transactions remains a touchstone for those who advocate limiting capital flows, and discussion about it reemerges at times of concern about international capital movements.

These concerns were, for the most part, relatively dormant during the first half of the 1990s. At that time of widespread economic prosperity, there was an emphasis on the role of financial markets in fostering development and growth, and a view that capital inflows could promote financial development. The newly coined term “emerging markets” reflected the promise of that era. Emerging market nations tended to liberalize restrictions on their capital inflows. A notable exception was the Chilean \textit{encaje}, a policy enacted in May 1992 that required anyone borrowing from abroad to deposit between 20 percent and 30 percent of the loan at the central bank in a non-interest-bearing account (an unremunerated reserve requirement).\textsuperscript{15} But the \textit{encaje} was removed in May 1998 and, by the end of the century, there was a prevailing optimism about inflows to emerging market countries.\textsuperscript{16}

This sanguine view about capital flows began to shift in the early years of the 2000s, partly prompted by appreciations of emerging market currencies. These concerns intensified with the advent of the crisis, and the subsequent “currency war” as monetary policy in advanced economies eased to combat the Great Recession. For example, a wave of capital controls were tightened or introduced in 2010 when, besides the intensification of the Brazilian IOF discussed

\textsuperscript{14} This proposal was published in Tobin (1978).

\textsuperscript{15} This policy also included a 3 percent penalty for early withdrawal.

\textsuperscript{16} Another notable experience with capital controls in the 1990s was the imposition of controls on outflows by Malaysia in September 1998, at the time of the Asian financial crisis, that effectively outlawed the transfer of ringgit abroad.
previously, South Korea tightening limits on foreign banks’ holdings of currency derivatives in June, Peru increasing banks’ reserve requirements for foreign borrowing in August, and Thailand reintroducing a 15% withholding tax on interest payments and capital gains on bonds held by foreign investors in October.

This short narrative of the history of capital controls over the past forty years is reflected in the data presented in Figure 1. The data in this figure are based on the indicators of capital controls (both inflows and outflows) first developed by Quinn (1997) and recently updated to include data through 2007 by Quinn, Schindler and Toyoda (2011). The original Quinn (1997) series used the broad on/off control information in the summary tables in the pre-1996 volumes of the IMF’s *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER), supplemented by descriptions of controls for individual countries in an effort to capture the intensity of restrictions. This series does not distinguish between controls on inflows and outflows. The indicator is the sum of two categories of controls on capital transactions, those by residents and those by non-residents, each of which range from 0 to 2, to get an overall indicator that ranges from 0 to 4, with larger values indicating a lower level of restrictions. The updated Quinn, Schindler and Toyoda (2011) series conforms to this template. The series in Figure 1 flips the series such a value of 0 represents no restrictions and a value of 4 represents the most stringent restrictions.

Figure 1 presents the average of this inverse Quinn Index for 23 advanced-economy countries, and also for 21 emerging market nations, for the period 1970 to 2007. These series

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17 The original Quinn scoring method is as follows, for both of the two categories, transactions by residents and transactions by non-residents: 0 means payments are forbidden, 0.5 means that there are quantitative or other regulatory restrictions, 1 means that transactions are subject to heavy taxes, 1.5 means that there are less severe taxes, and 2 means that transactions are free of restrictions or taxes.

18 The advanced economy countries include Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States. The emerging market countries include
show that, on average, Advanced Economies had a steady reduction of capital controls from the mid-1970s through the turn of the century, and controls stayed at that relatively low level through 2007. In contrast, the 21 emerging market economies, on average, did not see a marked reduction of capital controls until the late 1980s, and the trend towards capital account liberalization stalled in the late 1990s. By this indicator, the capital accounts of these 21 countries were about as open in 2007 as they were a decade earlier.19

![Figure 1: Broad Capital Control Index](image)

**Figure 1: Broad Capital Control Index**

1970 to 2007

- **Inverse Quinn Index**
- **Year**
- **Average for 23 Adv. Economies**
- **Average for 21 EMEs**

**Controls on Capital Inflows by Categories of Assets, 1995 - 2010**

While the data used to construct the capital account restriction indicators presented in Figure 1 give a sense of the overall stance of policy, they do not distinguish between inflows versus...
outflows, nor do they offer information on restrictions on separate categories of assets.

Beginning in 1996 (which reports on conditions in 1995), the annual issues of the *Annual Report on Exchange Arrangements and Exchange Restrictions* provided much greater detail than in earlier issues, with indicators distinguishing between inflows and outflows, and across categories of assets. Schindler (2009) developed a method for using the new *AREAER* format, and presents data on controls on inflows and outflows of six categories of assets for the period 1995 to 2005. This is not an exhaustive list of assets, but covers the “lion’s share of global cross-asset holdings; …that broadly reflects the structure of global *de facto* financial integration.” (Schindler 2009, p. 226). In this paper we adopt Schindler’s method and update his data set to also include the period 2006 to 2010. For each of the inflow categories, for each year, the indicator takes a value of 0 if there are no controls in place and 1 if there is a restriction on transactions.\(^\text{20}\)

The six categories, along with their abbreviations and descriptions, are presented in Table 1. The first two categories, Money Market and Bonds, refer to controls on debt instruments, with the former representing assets with an original maturity of one year or less and the latter representing controls on longer maturity.\(^\text{21}\) The Financial Credits category includes controls on banks. The next two categories represent controls on shares, either for individual companies (Equities) or in the form of mutual funds or other investment trusts (Collective Investment). The sixth category, direct investment, refers to controls on investments made that would include the participation in the management of the acquired entities. Figure 2 is a histogram showing the proportion of observations with capital controls across these six categories of assets. There is a marked similarity in the incidence of these controls, with the range of observations with

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\(^{20}\) Schindler distinguishes between cases when there are controls on either non-residents or residents but not both, and when there are controls on transactions by both non-residents and residents. For more details, see Schindler (2009) page 228, and also footnote 10 in that article.

\(^{21}\) Information on the category Bonds (BO) is only available from 1997 – 2010.
restrictions in place between 30 percent (for Financial Credits and Collective Investments) and 35 percent (for Money Market instruments).

![Figure 2: Incidence of Controls by Asset Categories](image-url)
Table 1: Asset Categories for Capital Controls

Money Market (mm): 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 papers, interbank deposits, and repurchase agreements.

Bonds (bo): Refers to bonds and other securities with an original maturity of more than one year. The term "other securities" includes notes and debentures.

Financial Credits (fc): Includes credits other than commercial credits granted by all residents, including banks, to nonresidents, or vice versa.

Equities (eq): Includes transactions involving shares and other securities of a participating nature if they are not effected for the purpose of acquiring a lasting economic interest in the management of the enterprise concerned. Investments for the purpose of acquiring a lasting economic interest are addressed under foreign direct investments.

Collective Investments (ci): 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.

Direct Investment (di): 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 investments that allow investor participation in the management of the 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.

*Categories based on Schindler (2009) cataloguing of information in IMF’s AREAER.*
This histogram masks variation in the prevalence of controls across groups of countries and across the 1995 – 2010 period. Figures 3a and 3b present data on the averages of the control indicators for three categories of assets (“MM, BO” = money market and bonds; “EQ, FC, CI” = equities, financial credits, and collective investments; and “DI” = direct investments) for the 23 Advanced countries (Figure 3a) and the 21 Emerging Market Economies (Figure 3b). The first thing to note is a cross-sectional difference. The range of averages for the Advanced Economies (left axis) is from 1 percent to 26 percent, with a relatively small range for the two categories MM, BO and EQ, FC, CI of 1 percent to 7 percent, and a larger range for DI of 13 percent to 26 percent. In contrast, the range of averages for the Emerging Market Economies is from 38 percent to 62 percent, and the averages for DI are not outliers for this group of countries as they are for the Advanced Economies.

There is notable times series variation in the averages across both sets of countries. The advanced countries, as a group, saw a reduction in the controls on money markets and bonds from an annual average of 6.5 percent in 1997 to 1.1 percent in 1999, but then an increase beginning in 2003 that reached 5.4 percent in 2008. The annual average for the Direct Investment category also began to rise in 2003, from 13 percent, the value it had since 1999, to 26 percent in 2006 – 2010. Emerging market economies, like advanced countries, saw a decrease in the annual average for the categories of money market securities and bonds in the first part of the sample period, from 55 percent in 1996 to 38 percent in 2002, and a subsequent increase to 48 percent in 2009 and 2010. Averages for both the direct investment and financial credits category and the equities and collective investments category decreased from annual averages near 60 percent in the mid-1990s to their lowest values in 2003 and 2004, and, subsequently, annual averages for these two categories stayed within a relatively narrow range.
Figure 3a: Inflow Controls, 23 Advanced Countries
Averages of Countries' Indicators, By Asset Categories

Figure 3b: Inflow Controls, 21 EMEs
Average of Countries' Indicators, by Asset Categories
Data on the experiences of each country with controls on inflows for five of the categories (all but Direct Investment) enable us to divide the 44 countries into three groups; 16 countries that were almost always persistently open to inflows of all five categories of assets, 10 countries that were almost always persistently closed to inflows of four or five of the five categories of assets, and 18 other countries.\footnote{We do not consider controls on direct investment inflows in the subsequent analysis because the goals of these controls, such as concerns about national security, are distinct from those from controls on the other categories of assets. Table A in the appendix presents a comprehensive listing of the experience with the controls on capital inflows, across the six categories of assets, for all countries.} Among these other 18 countries, 12 imposed controls at some point between 1995 and 2010 while the other 6 began with some controls in place at the beginning of the period but removed some or all of them during the sample period. There are 23 country-year observations in which controls were imposed, among these 12 countries. Table 2 lists the countries in each of these categories, and also notes the number of years in which countries imposed new controls.

The first row of statistics at the bottom of Table 2 shows that the annual geometric average of income per capita (in PPP constant 2005 US dollars) for the countries in the persistently closed group is 18 percent of that of the persistently open countries, and 28 percent of that of the episodic group – note that the all the countries in the persistently closed group are emerging market nations, and the preponderance of countries in the persistently open group are advanced economies.\footnote{This fact will be important when we consider, in the next section, whether the relatively higher growth rates of these 10 economies is due to their capital controls or, rather, if the controls proxy for convergence whereby poorer countries grow more rapidly than richer ones.} Further distinctions across these three groups, with respect to the incidence of their use of capital controls, are presented in the final rows of Table 2. The statistics in these rows show that there are no instances of controls on any of the five categories of assets for any of the countries in the persistently open category, while 55 percent (157 of 288) of the
### Table 2: Inflow Control Categories for 1995-2010

<table>
<thead>
<tr>
<th>Persistently Open (16)</th>
<th>Persistently closed (10)</th>
<th>Episodic controls (18)</th>
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<td>Austria (ADV)</td>
<td>China (EME)</td>
<td>Argentina*(3) (EME)</td>
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<td>Brazil*(3) (ADV)</td>
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*(n) = Imposed controls in n different years between 1995 and 2010. Other countries in Episodic group only removed existing controls but did not impose new controls during sample period.


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<th></th>
<th>$27,054</th>
<th>$4,902</th>
<th>$17,387</th>
</tr>
</thead>
</table>

**Number of Country-Year Observations with Controls on Any Categories of Assets (DI Excluded)**

<table>
<thead>
<tr>
<th></th>
<th>0 out of 256</th>
<th>160 out of 160</th>
<th>157 out of 288 (55%)</th>
</tr>
</thead>
</table>

**Number of Country-Year Observations with Controls on All Categories of Assets (DI Excluded)**

<table>
<thead>
<tr>
<th></th>
<th>0 out of 256</th>
<th>111 out of 160 (69%)</th>
<th>26 out of 288 (9%)</th>
</tr>
</thead>
</table>

**Number of Country-Year Observations with Controls on 4 or 5 Categories of Assets (DI Excluded)**

<table>
<thead>
<tr>
<th></th>
<th>0 out of 256</th>
<th>149 out of 160 (93%)</th>
<th>44 out of 288 (15%)</th>
</tr>
</thead>
</table>
observations in the episodic category had restrictions on at least one category of assets and, as would be expected, every observation for all countries in the closed category had restrictions on at least one category of assets in each year. The statistics in the next row further demonstrate the distinction between the incidence of controls between countries in the episodic and closed categories. There were controls on all five categories of assets for 69 percent of the observations for the 10 countries in the closed category but only for 9 percent of the observations for the 18 countries in the episodic category. This difference is even more marked when considering the number of observations in which there were controls on at least 4 categories of assets; this condition was met by 15 percent of the observations for countries in the episodic category but by 93 percent of the observations for countries in the closed category. Thus, walls to capital inflows for this latter group were both persistent and wide.

The Pecking Order of the Imposition of Controls on Capital Inflows

We close this section with a consideration of the pattern of imposition of controls across categories of assets. The theory of the prudential role of capital controls described above prescribes a “pecking order,” with controls first imposed on those assets most likely to contribute to financial instability. A practical application of this principle is found in Ostry et al. (2010) in which the proposed pecking order is that controls are imposed first on foreign currency debt, then on CPI-Indexed local currency debt, then local currency debt, then portfolio investment, and, finally, on direct investment. The categories in the AREAER do not allow for as finely grained an analysis as this, but it is still possible to analyze whether the pattern of the imposition of controls is consistent with financial stability considerations.
The categories of assets in Table 1 are ordered to reflect decreasing risk of financial
instability; short-maturity bonds are more risky than longer-maturity bonds, bonds are more risky
than bank lending, bank lending is more risky than equity flows and collective investments, and
direct investment is considered the least risky type of international capital flow. This ordering
suggests a pattern of the imposition of controls consistent with the pecking order; that controls
on either short-maturity bonds or longer-maturity bonds preceded the imposition of the other
three categories of assets (and there were no controls already in place on any of these three
categories), or that a simultaneous imposition of controls on bank lending and either short-
maturity or longer-maturity bonds preceded the imposition of controls on equity flows or
collective investments (and there were no already standing controls on these latter two categories
of assets). These are relatively weak pecking order conditions, and tilt towards the finding of a
pecking order for five reasons: there is no requirement that controls on shorter-maturity bonds
precede those on longer-maturity bonds; controls on both types of bonds are treated
interchangeably; controls are required on only one of the two categories of bonds; there can be a
simultaneous impositions of controls (or, more precisely, impositions occurring within a single
calendar year) on at least one bond category and the Financial Credits category; and Direct
investment is not considered since the imposition of controls on this category of assets before the
imposition on any other category would lead to a finding that the pecking order was not met.

Even under these relatively weak conditions, however, there is little evidence that capital
controls were imposed in a manner consistent with this pecking order. As shown in Table 2,
there are 23 episodes of newly imposed controls for the subset of 12 countries that imposed
controls episodically. Seven of these 23 episodes represented the imposition of controls on
either short-maturity or longer maturity bonds (or both), but in only four of these cases were
these controls imposed when there were no controls on other categories of assets (but for direct investment). Three of these cases, Turkey in 2007, and Ireland and Peru in 2008, represented the imposition of controls on shorter-maturity money market instruments, but not on bonds with maturity of at least one year. The fourth case would not meet a stronger form of the pecking order since Iceland imposed controls on bonds with maturity of at least one year in 2005, but not on shorter-maturity money market instruments. The fifth case consistent with the pecking order is the imposition of controls on money market instruments, bonds with maturity of at least one year, and financial credits in Argentina in 2003. Thus, there is little evidence that governments have systematically acted in a manner consistent with the prescriptions of prudential capital control theory.

There are, of course, reasons for imposing capital controls other than to promote financial stability. In particular, governments may be concerned about the competitiveness effects of an appreciation. In this case, the pattern of imposition could reflect an effort to use episodic controls that are the most efficacious and least likely to be subject to evasion. But whether or not capital controls achieve their desired results is an open question. In the next section we consider the correlation of exchange rates, as well as other aggregate variables, with both episodic and long-standing capital controls.

III. Capital Controls and Economic Outcomes

In this section we investigate the partial correlation between controls on capital inflows and variables associated with financial vulnerabilities, GDP growth and the real exchange rate. The analysis distinguishes between long-standing and episodic capital controls. Results presented here suggest a more significant partial correlation between long-standing controls and
the variables of interest than that found for episodic controls. But, as will be shown, this reflects the fact that countries with long-standing controls have much lower income per capita than the other 34 countries in the data set. The statistical distinction between long-standing and episodic controls disappears in most cases when the partial correlations take into account income per capita. In most of the regressions that include income per capita, neither long-standing nor episodic capital controls are found to be significantly associated with economic outcomes at the aggregate level.

These results are important from a practical perspective. Policy discussion on the desirability of capital controls is about episodic controls because these can be imposed and removed as conditions change. The motivation for imposing episodic controls, however, is often drawn from the experience of countries with long-standing controls. Analyses that do not distinguish between episodic and long-standing controls may not provide accurate guidance for decisions about policy on controls on capital inflows. Furthermore, as demonstrated below, the significant estimated link between long-standing controls and financial variables does not survive the inclusion of income per capita in regressions. Likewise, the statistical significance of the estimated positive association between long-standing controls on capital inflows and economic growth disappears when controlling for income per capita. Finally, while the estimates presented below show a significant depreciation of China’s bilateral real dollar exchange rate than countries with open capital accounts, conditional on other factors, this is not the case for the other countries with long-standing capital controls.

The panel estimates in this section include three separate annual dummy variables; CL, which equals 1 for all years for the 10 countries with persistent controls on inflows, BOMMt-1, which equals 1 if there are controls on either money market instruments or bonds in the previous
year, and \( \text{FEC}_{t-1} \), which equals 1 if there are controls on financial credits, equities, or collective investments in the previous year.\(^{24}\) The two dummy variables for the episodic controls allow for different effects of controls on bonds and controls on the other three categories of inflows. These two dummy variables are lagged one year in order to avoid capturing reverse causality, for example, if a real exchange rate appreciation prompts the imposition of controls.\(^{25}\)

**Capital Controls and Financial Vulnerabilities**

Events of the past few years have highlighted the role financial vulnerabilities can play in contributing to economic distress. As discussed above, theory suggests that appropriately imposed episodic capital controls can temper a boom-bust cycle. In this section we present a panel analysis of the effects of both long-standing and episodic controls on the change in the levels of these variables, as well as on surges of capital inflows.\(^{26}\)

The results presented in this section are related to those presented by Ostry, Ghosh, Chamon and Qureshi (2012). That paper includes both panel and cross-section analysis of the effects of capital controls on the share of debt liabilities to total liabilities, the change in the private credit relative to GDP, the share of foreign exchange-denominated credit to total credit, and the differences in GDP growth rates before and after the crisis, and their sample includes 51 emerging market nations over the period 1995 to 2008. Estimates in that paper also control for

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\(^{24}\) The fact that \( \text{CL} \) equals 1 in all years for the 10 countries with persistent controls on inflows means that it is not possible to controls for country fixed effects in the panel estimates. Year fixed effects are included.

\(^{25}\) Alternatively, another approach was to estimate a logit equation for the imposition of controls among the episodic countries using only lagged variables (including the presence of controls in the previous year), and to use the contemporaneous probability of the presence of controls from these first stage estimates, \( \text{BOMM}_t \) and \( \text{FEC}_t \) in the regressions for financial vulnerability variables, GDP growth, and bilateral real exchange rates. The first stage logit regressions have pseudo-R's of 0.58 for BOMM and 0.66 for FEC. The results with this two-stage procedure were very similar to the OLS results reported in the paper, with an almost identical pattern of significance.

\(^{26}\) Also, it is worth noting that one person’s prudential policy may be another’s financial repression, that is, government interference in financial markets in order to direct savings towards politically preferred projects. One argument for capital account liberalization is that it promotes financial development (Klein and Olivei 2008). In turbulent times, however, financial development may go hand-in-hand with a boom-bust cycle.
the presence of domestic prudential regulation because, as discussed in Habermeier, Kokenyne
and Baba (2011), controls on inflows are almost always imposed at the same time as other
prudential policies. Estimates of the effects of episodic capital controls that do not include
controls for domestic prudential regulation are therefore potentially biased towards finding an
effect of capital controls. The analysis here is also related to that of Forbes and Warnock (2012)
who find that controls on inflows do not significantly affect surges of gross capital inflows. But
neither of these two papers distinguishes between episodic and long-standing capital controls.

The three financial variables that are the dependent variables studied in this section are
the changes in private credit relative to GDP, the percentage of domestic credit provided by the
banking sector and the share of debt liabilities in total liabilities (DS). Positive growth in these
variables indicate greater potential for asset market booms. There is also a panel estimate of the
partial correlation between capital controls and a qualitative indicator of whether a country had a
surge of capital inflows (this series is from Ghosh, Kim, Qureshi and Zalduendo, 2012).

Table 3 presents the annual panel estimates of the partial correlation of both long-
standing and episodic controls and the change in the three financial variables, as well as the
likelihood of a surge in capital inflows. The regressions in the odd number columns include,
besides the capital control variables, the lagged level of the respective financial variables (for the
surge regression, whether there was a surge in the previous period), lagged real GDP growth, a
variable indicating whether the country had a pegged exchange rate in the previous period, and
year dummy variables. The results in this table show that, conditional on these other factors,
countries with persistently closed capital accounts had significantly lower annual rates of growth
of each of the three financial variables as compared to countries with open capital accounts. The
estimated reductions in growth rates are 37 percent of the standard deviation of credit growth, 20

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27 These data are from the World Bank. See http://data.worldbank.org/indicator/.
Table 3: Capital Controls and Financial Vulnerabilities
Annual Panel Estimates, 1995 - 2010

<table>
<thead>
<tr>
<th>Dep. Var.</th>
<th>Δ(Credit/GDP)</th>
<th>ΔBank Credit</th>
<th>ΔDebt Share</th>
<th>Surge*†</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL</td>
<td>-3.813**</td>
<td>1.247</td>
<td>-0.026**</td>
<td>-0.471</td>
</tr>
<tr>
<td>(s.e.)</td>
<td>(1.277)</td>
<td>(0.009)</td>
<td>(0.014)</td>
<td>(0.427)</td>
</tr>
<tr>
<td>BOMMt-1</td>
<td>-3.032</td>
<td>-2.665</td>
<td>-0.028</td>
<td>-0.026</td>
</tr>
<tr>
<td>(s.e.)</td>
<td>(2.631)</td>
<td>(0.021)</td>
<td>(0.019)</td>
<td>(0.714)</td>
</tr>
<tr>
<td>FECt-1</td>
<td>0.208</td>
<td>0.438</td>
<td>0.008</td>
<td>0.010</td>
</tr>
<tr>
<td>(s.e.)</td>
<td>(1.213)</td>
<td>(0.015)</td>
<td>(0.013)</td>
<td>(0.724)</td>
</tr>
<tr>
<td>Levelt-1</td>
<td>-0.010</td>
<td>-0.033*</td>
<td>-0.00015**</td>
<td>-0.049**</td>
</tr>
<tr>
<td>(s.e.)</td>
<td>(0.013)</td>
<td>(0.018)</td>
<td>(0.0006)</td>
<td>(0.017)</td>
</tr>
<tr>
<td>Pegt-1</td>
<td>3.336**</td>
<td>3.231**</td>
<td>0.026**</td>
<td>0.025**</td>
</tr>
<tr>
<td>(s.e.)</td>
<td>(1.203)</td>
<td>(0.010)</td>
<td>(0.010)</td>
<td>(0.384)</td>
</tr>
<tr>
<td>Δln(GDPt-1)</td>
<td>54.729**</td>
<td>62.56**</td>
<td>0.316**</td>
<td>0.361**</td>
</tr>
<tr>
<td>(s.e.)</td>
<td>(15.009)</td>
<td>(13.84)</td>
<td>(1.577)</td>
<td>(10.039)</td>
</tr>
<tr>
<td>ln(GDPPCt-1)</td>
<td>3.721**</td>
<td>0.021**</td>
<td>0.846**</td>
<td>-0.199</td>
</tr>
<tr>
<td>(s.e.)</td>
<td>(1.076)</td>
<td>(0.009)</td>
<td>(0.396)</td>
<td>(0.417)</td>
</tr>
<tr>
<td>R²</td>
<td>0.08</td>
<td>0.10</td>
<td>0.07</td>
<td>0.10</td>
</tr>
<tr>
<td>No. Obs.</td>
<td>636</td>
<td>636</td>
<td>635</td>
<td>571</td>
</tr>
<tr>
<td>CL – BOMM</td>
<td>-0.781</td>
<td>3.911</td>
<td>0.002</td>
<td>0.030</td>
</tr>
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<td>(s.e.)</td>
<td>(2.158)</td>
<td>(0.020)</td>
<td>(0.024)</td>
<td>(0.779)</td>
</tr>
<tr>
<td>CL – FEC</td>
<td>-4.021**</td>
<td>0.809</td>
<td>-0.034*</td>
<td>-0.006</td>
</tr>
<tr>
<td>(s.e.)</td>
<td>(1.686)</td>
<td>(0.017)</td>
<td>(0.017)</td>
<td>(0.834)</td>
</tr>
<tr>
<td>Mean</td>
<td>1.859</td>
<td>0.022</td>
<td>-1.106</td>
<td></td>
</tr>
<tr>
<td>St. Dev.</td>
<td>10.329</td>
<td>0.128</td>
<td>4.751</td>
<td></td>
</tr>
</tbody>
</table>

ΔCredit / GDP = change in private credit relative to GDP (in percent)
ΔBank Credit = change in domestic credit provided by the banking sector (in percent)
ΔDebt Share = change in share of debt liabilities in total liabilities (in percent)
Surge = 1 if surge inflows in year, else 0 (Logit regression).
† Sample is 2000 – 2010 for Surge, and only EME countries
CL = Persistently Closed to Capital Inflows
BOMMt-1 = 1 if episodic controls on either money market instruments or bonds in t-1, else 0
FECt-1 = 1 if episodic controls on financial credits, equities, or collective investments in in t-1, else 0
Levelt-1 = lag level of respective dependent variables (e.g. (C/A)t-1). For Surge, if Surge in t-1.
Δln(GDPt-1) = lag change in real GDP
Pegt-1 = 1 if pegged exchange rate in t-1, else 0
Year dummy variables in all regressions.
Standard errors clustered at country level
** = significant at the 95 percent level of confidence or higher
* = significant at the 90 to 95 percent level of confidence
percent of the standard deviation of the growth of bank credit, and 35 percent of the standard deviation of the change in debt share. There is also a statistically significant difference between the coefficients on CL and \( \text{FEC}_{t-1} \) in Columns 1 and 3, and between the coefficients on CL and \( \text{BOMM}_{t-1} \) in Columns 5, 7 and 8.

Estimates in the even numbered columns in Table 3 include the lagged level of GDP per capita. The inclusion of this regressor changes the results such that there are no significant partial correlations of either long-standing controls or episodic controls with the three financial measures, while the coefficient on GDP per capita is positive and significant in Columns 2, 4, and 6. Thus, the significant coefficient on CL seems to reflect the fact that countries with long-standing capital controls are poorer than the other countries in the sample, and that poorer countries have lower growth rates of overall credit, bank credit, and debt share.

The estimates in Columns 7 and 8, however, show that there is a significantly higher likelihood of a surge for a country with controls on bonds than for a country with a closed capital account, and a significantly lower likelihood of a surge for a country with controls on financial credits, equities, or collective investments than for a country with an open capital account. The coefficient on episodic controls on bond inflows are positive and significant in Columns 7 and 8, showing that these controls are associated with a higher likelihood of a surge in the subsequent period. Perhaps these controls were put in place in anticipation of a surge which ultimately did materialize, but it is worth noting that these results also hold for the two-stage estimates in which the instrumented values of BOMM, and FEC are used (see footnote 25).
The results in Tables 3 call into question the prudential effects of capital controls. Ultimately, we are interested in the effect of capital controls on these variables because of the potential effect on GDP.\textsuperscript{28} We next consider the direct effects of capital controls on GDP.

**Capital Controls and GDP Growth**

There is a view that countries that were insulated from international capital flows suffered less during the Great Recession than countries with open capital markets.\textsuperscript{29} But an alternative, longer-term, perspective is that capital account liberalization fosters growth through providing capital, fostering technology transfer, and offering domestic residents opportunities for portfolio diversification that makes them willing to undertake more risky investment projects.

There is a large literature that examines the effects of capital account liberalization on growth. In a wide-ranging survey of this empirical literature, Kose, Prasad, Rogoff and Wei (2009) write “…our reading of this large literature based on aggregate data is that it remains difficult to find robust evidence that financial integration systematically increases growth once other determinants of growth are controlled for. Nevertheless, the weight of the evidence seems to be gradually shifting towards finding positive marginal effects…” (p. 27).

The typical approach to investigating whether capital account liberalization is associated with faster economic growth across countries is to augment a standard empirical growth model with an indicator of capital controls. Given the available data, these studies did not distinguish between controls on inflows and controls on outflows, or across controls on different types of capital controls.

\textsuperscript{28} Nevertheless, it is important to consider the effect of capital controls on variables that could potentially affect GDP through a boom-bust cycle, and not just the effects on GDP, because a sample may be too short to include the bust part of the cycle.

\textsuperscript{29} Kose, Prasad, Rogoff and Wei (2009) write “Capital account liberalization is believed to have played an important role in fomenting financial crises and has been indicted by some observers as the proximate cause for the crises experienced by emerging markets in recent decades. But there is little empirical evidence to support the view that capital account liberalization by itself increases vulnerabilities to crises.” (p. 27)
In this section we panel estimates of annual GDP growth for three time periods; 1995 to 2010 (Columns 1 and 2), 2002 to 2010 (Columns 3 and 4), and 2008 to 2010 (Columns 5 and 6). Along with the capital control indicators, the odd-numbered columns include lagged GDP growth and the even-number columns include both lagged GDP growth and lagged income per capita.

The estimates in the odd-numbered columns show, for each of the time periods, a significant positive partial correlation between long-standing controls on capital inflows and economic growth. The size of the effect is notable, as well, of 1.4 percent per year to 1.6 percent per year. There is also a statistically significant difference in the partial correlation of growth between long-standing and episodic capital controls, as shown in the rows at the bottom of the table. But, as was the case in Table 3, these significant effects disappear when lagged income per capita is included in the regression and, in each of the three estimates in Columns 2, 4 and 6, lagged income per capita is highly statistically significant. These estimates show that neither long-standing nor episodic capital controls had a conditional impact on year-to-year GDP growth, even during the Great Recession, a time when capital controls have been touted as insulating economies.

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30 Edison, Klein, Ricci and Sløk (2004) provide a synthesis of the research of the effects of capital account liberalization on economic growth, and discuss the different types of capital account liberalization indicators used in this literature.
Table 3:  
Capital Controls and Financial Vulnerabilities  
Annual Panel Estimates, 1995 - 2010

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<td></td>
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<td>(2.334)</td>
<td>(0.021)</td>
<td>(0.019)</td>
</tr>
<tr>
<td>FECt-1</td>
<td>0.208</td>
<td>0.438</td>
<td>0.008</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>(1.213)</td>
<td>(0.949)</td>
<td>(0.015)</td>
<td>(0.013)</td>
</tr>
<tr>
<td>Levelt-1</td>
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<td>-0.033*</td>
<td>-0.0015**</td>
<td>-0.0025**</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.018)</td>
<td>(0.0006)</td>
<td>(0.001)</td>
</tr>
<tr>
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<td>0.025**</td>
</tr>
<tr>
<td></td>
<td>(1.203)</td>
<td>(1.245)</td>
<td>(0.010)</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Δln(GDPt-1)</td>
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<td>62.56**</td>
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</tr>
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<td></td>
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<td>(0.024)</td>
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<tr>
<td>CL – FEC</td>
<td>-4.021**</td>
<td>0.809</td>
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<td>-0.006</td>
</tr>
<tr>
<td></td>
<td>(1.686)</td>
<td>(1.564)</td>
<td>(0.017)</td>
<td>(0.017)</td>
</tr>
</tbody>
</table>

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ΔBank Credit = change in domestic credit provided by the banking sector (in percent)  
ΔDebt Share = change in share of debt liabilities in total liabilities (in percent)  
Surge = 1 if surge inflows in year, else 0 (Logit regression).  
† Sample is 2000 – 2010 for Surge, and only EME countries  
CL = Persistently Closed to Capital Inflows  
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FECt-1 = 1 if episodic controls on financial credits, equities, or collective investments in in t-1, else 0  
Levelt-1 = lag level of respective dependent variables (e.g. (C/A)t-1). For Surge, if Surge in t-1.  
Δln(GDPt-1) = lag change in real GDP  
Pegt-1 = 1 if pegged exchange rate in t-1, else 0  
Year dummy variables in all regressions.  
Standard errors clustered at country level  
** = significant at the 95 percent level of confidence or higher  
* = significant at the 90 to 95 percent level of confidence
Capital Controls and the Exchange Rate

The appreciation of emerging market countries’ currencies in the wake of expansionary monetary policy in advanced economies during the Great Recession prompted declarations of “currency wars” and the imposition of controls on capital inflows. Were these controls effective in mitigating appreciations? Part of the difficulty in answering this question is that we do not have a good model of exchange rate determination over short horizons. It is therefore difficult to determine whether a particular event, like sterilized intervention or the imposition of controls on inflows, significantly affects currency values. 31

Table 5 presents estimates of the determinants of the annual percentage change in the bilateral United States dollar real exchange rates of each country in the panel for the same three time periods used in Table 4, 1995 to 2010, 2002 to 2010, and 2008 to 2010 (a positive value of the change in the real exchange rate indicates an appreciation). The odd-numbered columns include the same capital control dummy variables as in the previous two tables. The even-numbered columns separate out China from the other countries with long-standing controls on capital inflows – the dummy variable CLxChina equals 1 for the nine countries, other than China, that had long-standing capital controls. A comparison of the estimates in the odd and even numbered columns enables one to see whether there is a distinct effect of the behavior of the Chinese currency vis-à-vis the dollar. The other regressors include the lagged change in the exchange rate, lagged GDP growth, a dummy variable indicating whether the country had a pegged exchange rate, and the lagged level of income per capita.

The coefficients on the dummy variable for long-standing capital controls and for the dummy variable on controls on financial investments, equities and collective investments are not

31 Some research on the experience of Chile has shown that its unremunerated reserve requirement (encaje) did not significantly affect the real exchange rate, but had some influence on the composition of inflows, tilting them towards longer maturities. See DeGregorio, Edwards and Valdes (2000).
## Table 3: Capital Controls and Financial Vulnerabilities
### Annual Panel Estimates, 1995 - 2010

<table>
<thead>
<tr>
<th>Dep. Var.</th>
<th>Δ(Credit/GDP)</th>
<th>ΔBank Credit</th>
<th>ΔDebt Share</th>
<th>Surge†</th>
<th>R²</th>
<th>No. Obs.</th>
<th>Mean</th>
<th>St. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL</td>
<td>-3.813**</td>
<td>-0.026**</td>
<td>-1.662**</td>
<td>-0.471</td>
<td>0.08</td>
<td>636</td>
<td>1.859</td>
<td>10.329</td>
</tr>
<tr>
<td></td>
<td>(1.277)</td>
<td>(0.009)</td>
<td>(0.427)</td>
<td>(0.641)</td>
<td></td>
<td>(1.076)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BOMMt-1</td>
<td>-3.032</td>
<td>-0.028</td>
<td>-0.284</td>
<td>-0.196</td>
<td>54.729**</td>
<td>(2.158)</td>
<td>0.002</td>
<td>1.564</td>
</tr>
<tr>
<td></td>
<td>(2.631)</td>
<td>(0.021)</td>
<td>(0.714)</td>
<td>(0.659)</td>
<td></td>
<td>(2.760)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FECt-1</td>
<td>0.208</td>
<td>0.008</td>
<td>0.010</td>
<td>-0.331</td>
<td>3.721**</td>
<td>(0.13)</td>
<td>0.002</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>(1.213)</td>
<td>(0.013)</td>
<td>(0.724)</td>
<td>(0.595)</td>
<td></td>
<td>(0.009)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levelt-1</td>
<td>-0.010</td>
<td>-0.003*</td>
<td>-0.0015**</td>
<td>-0.049**</td>
<td>0.846**</td>
<td>(1.500)</td>
<td>0.000</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td>(0.018)</td>
<td>(0.0006)</td>
<td>(0.001)</td>
<td></td>
<td>(1.057)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pegt-1</td>
<td>3.336**</td>
<td>0.026**</td>
<td>1.075**</td>
<td>0.959**</td>
<td>-1.378*</td>
<td>(1.000)</td>
<td>0.002</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>(1.203)</td>
<td>(0.010)</td>
<td>(0.384)</td>
<td>(0.391)</td>
<td></td>
<td>(0.384)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δln(GDPt-1)</td>
<td>54.729**</td>
<td>0.316**</td>
<td>-15.528</td>
<td>-11.443</td>
<td>0.846**</td>
<td>(15.009)</td>
<td>0.002</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>(13.84)</td>
<td>(0.157)</td>
<td>(10.039)</td>
<td>(10.940)</td>
<td></td>
<td>(10.157)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ln(GDPPCt-1)</td>
<td>3.721**</td>
<td>0.021**</td>
<td>0.846**</td>
<td>-0.199</td>
<td>0.002</td>
<td>636</td>
<td>0.022</td>
<td>4.751</td>
</tr>
<tr>
<td></td>
<td>(1.076)</td>
<td>(0.009)</td>
<td>(0.396)</td>
<td>(0.417)</td>
<td></td>
<td>(1.564)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL – BOMM</td>
<td>-0.781</td>
<td>0.002</td>
<td>-1.378*</td>
<td>-0.276</td>
<td>0.08</td>
<td>636</td>
<td>0.022</td>
<td>4.751</td>
</tr>
<tr>
<td></td>
<td>(2.158)</td>
<td>(0.020)</td>
<td>(0.779)</td>
<td>(0.764)</td>
<td></td>
<td>(2.760)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CL – FEC</td>
<td>-4.021**</td>
<td>-0.034*</td>
<td>-1.331</td>
<td>-0.308</td>
<td>1.859</td>
<td>636</td>
<td>1.062</td>
<td>4.751</td>
</tr>
<tr>
<td></td>
<td>(1.686)</td>
<td>(0.017)</td>
<td>(0.834)</td>
<td>(0.822)</td>
<td></td>
<td>(1.564)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ΔCredit / GDP = change in private credit relative to GDP (in percent)
ΔBank Credit = change in domestic credit provided by the banking sector (in percent)
ΔDebt Share = change in share of debt liabilities in total liabilities (in percent)
Surge = 1 if surge inflows in year, else 0 (Logit regression).
† Sample is 2000 – 2010 for Surge, and only EME countries
CL = Persistently Closed to Capital Inflows
BOMMt-1 = 1 if episodic controls on either money market instruments or bonds in t-1, else 0
FECt-1 = 1 if episodic controls on financial credits, equities, or collective investments in t-1, else 0
Levelt-1 = lag level of respective dependent variables (e.g. (C/A)ₜ₋₁). For Surge, if Surge in t-1.
Δln(GDPₜ₋₁) = lag change in real GDP
Pegt-1 = 1 if pegged exchange rate in t-1, else 0
Year dummy variables in all regressions.
Standard errors clustered at country level
** = significant at the 95 percent level of confidence or higher
* = significant at the 90 to 95 percent level of confidence
significant for any of the time periods presented in Table 5. But there is a significant negative coefficient on the Chinese dummy variable, indicating a depreciation of the real dollar/renminbi exchange rate of 3.1 percent over the full sample period, and 5.4 percent over the 2002 to 2010 period, over and above the factors accounted for in the model.

Table 5 also shows a significant, 3.4 percent depreciation of the real bilateral exchange rate for countries that imposed controls on bond inflows during the Great Recession, conditional on other factors. This is the only instance in the three tables in which these types of controls are shown to be significantly associated with aggregate economic variables.

Another means to consider the effect of episodic controls on the exchange rate is to focus on the period around QE2, when the Federal Reserve began an aggressive monetary expansion. There were a number of efforts by emerging market countries to stem appreciation at this time. Figure 4 presents a monthly index of the nominal dollar exchange rate for 5 countries, Argentina, Brazil, Chile, Korea, and Peru, between July 2009 and October 2011. Federal Reserve Chairman Ben Bernanke announced QE2 at the Jackson Hole meeting in August 2010, a date represented by the thick vertical dashed line in this figure. Both before and after that time, these countries had imposed capital controls, with the dates shown by the various thinner dashed vertical lines. The currencies of Brazil, Chile and Korea, which had begun appreciating earlier in the summer of 2010, continued to appreciate after the Bernanke announcement, and continued to do so through the autumn as QE2 was implemented. The appreciation of each of these three currencies did not show evidence of abating as controls were imposed, until July 2011 when Korea raised controls on inflows for the fourth time. The currencies of Korea, as well as Peru and Chile, began to depreciate in the wake of this event. But earlier impositions of controls were not
effective, and it is difficult, from the evidence presented in this figure to assert that episodic capital controls systematically affect currency values.

**Fig. 6: Inflow controls and Exchange Rates Around QE2**

- Argentina - 13; Brazil - 1,2,7,10,11; Korea - 2,8,9,10,12; Peru - 3,4,5; QE2 (US) - 6
- erindex = $/national currency indexed to 1 at Aug 2010
IV. Conclusion

The exchange rate appreciations, asset price booms and busts, and general economic volatility of the past few years has prompted a search for a better way to manage economies. Controls on capital inflows have been receiving increasing support in policy circles, among researchers, and in the general economic debate. Theoretical research provides rationales for the imposition of episodic controls at the time of surging capital inflows, or at a time when the economy is booming. There is little or no theoretical support for long-standing capital controls. But much of the policy debate does not distinguish between the effects of long-standing controls and episodic controls, although implicitly the debate is about the imposition of episodic controls, not about permanently removing a country from engaging with the world capital market.

Part of the reason for this lack of distinction between long-standing and episodic controls on inflows in the policy debate is the lack of study of the possible differences in these two categories of capital controls. This paper is an effort to fill that gap. The analysis in this paper demonstrates some distinction in the effects of long-standing and episodic capital controls, but for the most part these differences disappear, and neither type of capital control is found to be significantly associated with aggregate economic variables, once one accounts for the fact that countries with long-standing controls on capital inflows are poorer than the other countries in the study. Thus, this preliminary evidence does not show that controls on capital inflows provide an effective policy option.
Appendix

Each cell of Table A reports the years in which there a country had controls in place for the category of assets, with “Open” signifying no controls during the entire 1995 – 2010 period and “Closed” signifying controls in place in each of the 1995 – 2010 period (1997 – 2010 for Bonds since data on this category was not available in 1995 or 1996).

<table>
<thead>
<tr>
<th>Countries with Persistent Controls on Capital Inflows</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
</tr>
<tr>
<td>Colombia</td>
</tr>
<tr>
<td>India</td>
</tr>
<tr>
<td>Indonesia</td>
</tr>
<tr>
<td>Malaysia</td>
</tr>
<tr>
<td>Morocco</td>
</tr>
<tr>
<td>Philippines</td>
</tr>
<tr>
<td>Russia</td>
</tr>
<tr>
<td>South Africa</td>
</tr>
<tr>
<td>Thailand</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Countries with Episodic Controls on Capital Inflows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
</tr>
<tr>
<td>Australia</td>
</tr>
<tr>
<td>Brazil</td>
</tr>
<tr>
<td>Chile</td>
</tr>
<tr>
<td>Czech Rep.</td>
</tr>
<tr>
<td>France</td>
</tr>
<tr>
<td>Germany</td>
</tr>
<tr>
<td>Hungary</td>
</tr>
<tr>
<td>Iceland</td>
</tr>
<tr>
<td>Ireland</td>
</tr>
<tr>
<td>Israel</td>
</tr>
<tr>
<td>Korea</td>
</tr>
<tr>
<td>Mexico</td>
</tr>
<tr>
<td>Peru</td>
</tr>
<tr>
<td>Portugal</td>
</tr>
<tr>
<td>Poland</td>
</tr>
<tr>
<td>Sweden</td>
</tr>
<tr>
<td>Turkey</td>
</tr>
</tbody>
</table>

Open All: Austria, Belgium, Denmark, Greece, Italy, Netherlands, Norway, Switzerland, UK, US Only DI closed (years) : Canada ('95-'10), Egypt ('95), Finland ('05-'10), Japan ('98), New Zealand ('95-'10), Spain ('95-'98).
Bibliography


