

NBER WORKING PAPER SERIES

CAPITAL CONTROLS:
GATES VERSUS WALLS

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Working Paper 18526
<http://www.nber.org/papers/w18526>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
November 2012

Support from the Brookings Institution is gratefully acknowledged. I thank Charles Collyns, Kristin Forbes, Jeff Frieden, Maury Obstfeld, Jonathan Ostry, David Romer, Iván Werning and Justin Wolfers for comments on an earlier draft, and to Dennis Quinn for making his most recent data set available.

A special thanks to Patrick O'Halloran who provided excellent research assistance. The views expressed herein are those of the author and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 18526
November 2012
JEL No. F3,F33,F36

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 for a set of 44 advanced and emerging market economies over the 1995 to 2010 period. 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. Estimates show significant differences in the partial correlations of long-standing and episodic controls with the growth of financial variables and with GDP growth, but these differences seem to arise because countries with long-standing controls are poorer than the other countries in the sample. With a few exceptions, there is little evidence of the efficacy of capital controls on the growth of financial variables, the real exchange rate, or GDP growth at an annual frequency. These preliminary results raise doubts about assumptions behind recent calls for a greater use of episodic controls on capital inflows.

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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.¹ 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."

¹ For example, see Sachs and Warner (1995), Dornbusch (1998), Summers (2000) and Fischer (2003). Around that time, others voiced concerns about international capital flows and doubts about the positive effects of capital account liberalization, including Bhagwati (1998), Rodrik (1998) and Stiglitz (2002).

More recently, the IMF staff published position papers that accept a role for capital controls.² 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.³

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 rate appreciations or asset price booms. 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

² See Ostry, Ghosh, Habermeier, Chamon, Qureshi and Reinhardt (2010), Ostry, Ghosh, Habermeier, Laeven, Chamon, Qureshi, and Kokenyne (2011), and IMF Strategy, Policy and Review Department (2011).

³ For example, see Korinek (2010), Jeanne and Korinek (2010), Bianchi and Mendoza (2011) and Jeanne (2012).

their use. For example, the Brazilian government imposed a 2 percent tax on investment in 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. Governments in 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, people in countries with

pervasive capital controls also tend to have fewer options for evasion because they have less developed financial markets and also impose controls on a wider set of 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 confiscated.⁴

Statistics presented in this paper show that countries closed to capital inflows do have lower annual rates of growth of financial variables associated with booms and higher rates of growth of GDP. Regression results also show that, in partial correlations, there is a statistically significant lower rate of the growth of these aggregate economic variables between countries with long-standing controls and countries that have episodically imposed controls. But countries with long-standing controls on capital inflows differ in important ways from the other countries in the sample, most notably they have much lower levels of GDP per capita. When controlling for this, the partial correlations suggest that neither long-standing nor episodic controls are associated with lower annual rates of growth of financial variables or GDP growth, nor with lower rates of exchange rate appreciation.

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 theory of the effects of capital controls. This section also includes a brief discussion of the long history of capital controls, and introduces the capital controls data set used in the subsequent analysis. The 44 countries in the data set are

⁴ The punch bowl analogy for monetary policy is from William McChesney Martin, Chairman of the Federal Reserve from 1951 to 1970.

divided into the three categories, 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.

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.⁵

⁵ 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, Fratzscher, Kostka and Straub (2012) present evidence that Brazilian capital controls altered investors' portfolio allocations.

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.

Capital Controls in Theory

Long-term international borrowing and lending offers several distinct economic benefits.⁶ 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 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

⁶ Obstfeld and Rogoff (1996).

management, and international capital mobility.⁷ Unfettered capital mobility presents monetary authorities with the choice of targeting either 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 “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 a country 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 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 undertake these policies (but, presumably, could enforce capital controls). Also, capital controls are more broad-based than bank regulation, which is important in economies in which capital

⁷ 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.

flows in through channels other than regulated financial institutions (Ostry, Ghosh, Chamon and Qureshi, 2011).⁸

Recent theoretical research has considered the manner in which episodic capital controls could contribute to financial stability and prevent boom-bust cycles.⁹ The starting point for this work is the recognition that the response to inherent characteristics of financial markets, such as 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.¹⁰ 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.

⁸ 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.

⁹ Korinek (2011) surveys this theoretical work.

¹⁰ The market failure in this case arises because of imperfections in financial markets due to features such as asymmetric information.

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 not be broad based, but would target inflows that present particular concerns about financial vulnerability, for example foreign-currency denominated debt as opposed to direct investment.¹¹ 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), 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.¹² The size of these taxes might be considered inconsequential by investors at a time of a rapid appreciation or a vibrant boom that substantially raises returns in affected markets.

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

¹¹ The consideration of relative riskiness of assets gives rise to a “pecking order” of capital controls (Ostry, Ghosh, Habermeier, Chamon, Qureshi, and Reinhart 2010). Below we consider whether controls were imposed in a manner consistent with this pecking order.

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

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.”¹³ 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 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.”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

¹³ Quoted in Skidelsky (1992), p. 477

¹⁴ This proposal was published in Tobin (1978).

inflows. A notable exception was the Chilean *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).¹⁵ But the *encaje* was removed in May 1998 and, by the end of the century, there was a prevailing optimism about inflows to emerging market countries.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 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

¹⁵ This policy also included a 3 percent penalty for early withdrawal.

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.

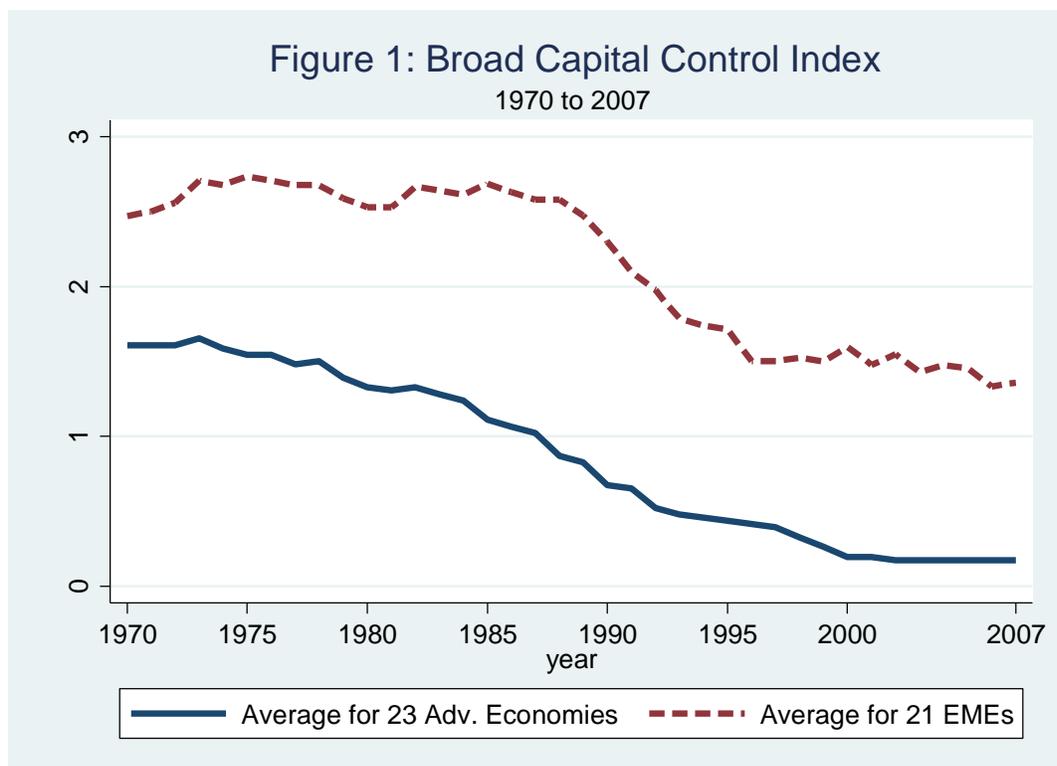
intensity of restrictions. This series does not distinguish between controls on inflows and outflows. The indicator is the sum of two categories of controls on capital transactions, those by residents and those by non-residents, each of which range from 0 to 2, to get an overall indicator that ranges from 0 to 4, with larger values indicating a lower level of restrictions.¹⁷ 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 2007.¹⁸ These series 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

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 Argentina, Brazil, Chile, China, Colombia, the Czech Republic, Egypt, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Morocco, Peru, Philippines, Poland, Russia, South Africa, Thailand, and Turkey.

¹⁹ The figure shows the trend towards liberalization until the mid-1990s that tended to focus empirical research using the pre-1996 AREAER classification on the effects of capital account liberalization.



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.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.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 that involve 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 restrictions in place between 30 percent (for Financial Credits and Collective Investments) and 37 percent (for Money Market instruments).

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.

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.

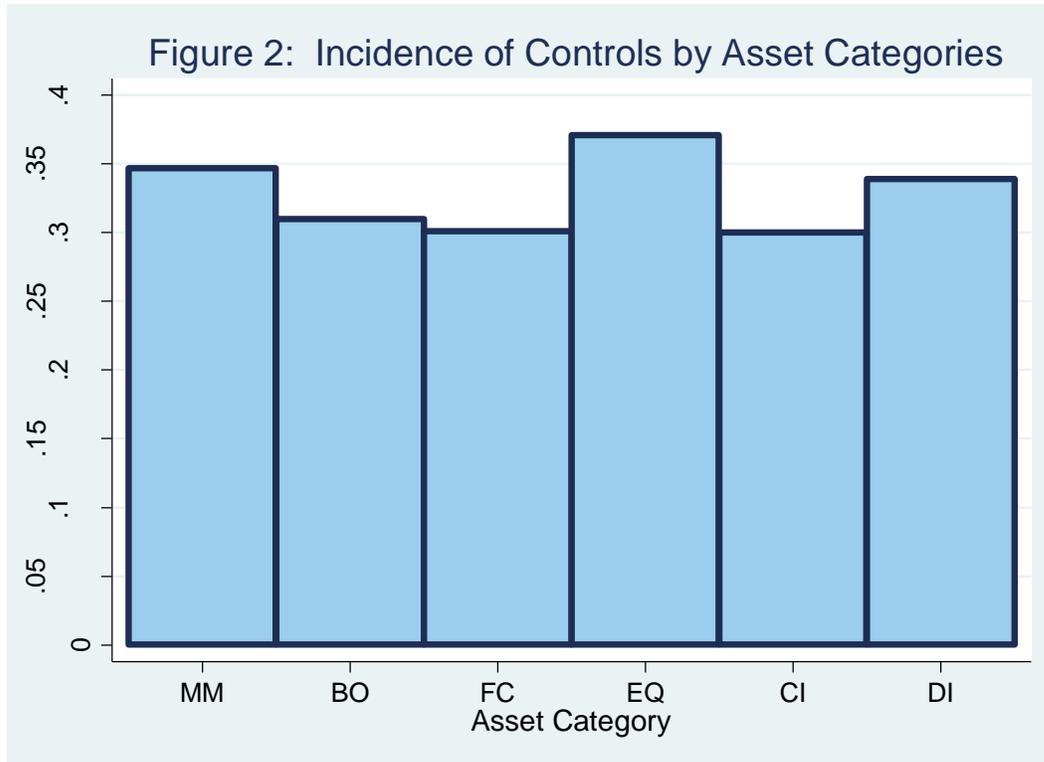
Financial Credits (fc): Includes credits other than commercial credits granted by all residents, including banks, to nonresidents, or vice versa.

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 is from 1 percent to 26 percent, with a relatively small range for the categories MM,BO (money market and bonds), and EQ, FC, CI (equities, financial credits and collective investments) of 1 percent to 7 percent, and a larger range for direct investment 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 direct investment 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, its value since 1999, to 26 percent in 2006 – 2010. Emerging market economies, like advanced countries, saw a decrease in the annual average for controls on 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 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.

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 that had some experience with capital controls but were not persistently closed to inflows across a wide range of categories of assets.²² Among these 18 countries, the 12 that imposed controls at some point between 1995 and 2010 are denoted with an asterisk in Table 2 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

²² We do not consider controls on direct investment inflows in the subsequent analysis because these controls are typically imposed for reasons such as national security rather than, as with the other categories of controls, achieving short-run macroeconomic targets or promoting financial stability. Table A in the appendix presents a comprehensive listing of the experience with the controls on capital inflows, across the six categories of assets.

Figure 3a: Inflow Controls, 23 Advanced Countries
Average of Countries' Indicators, by Categories

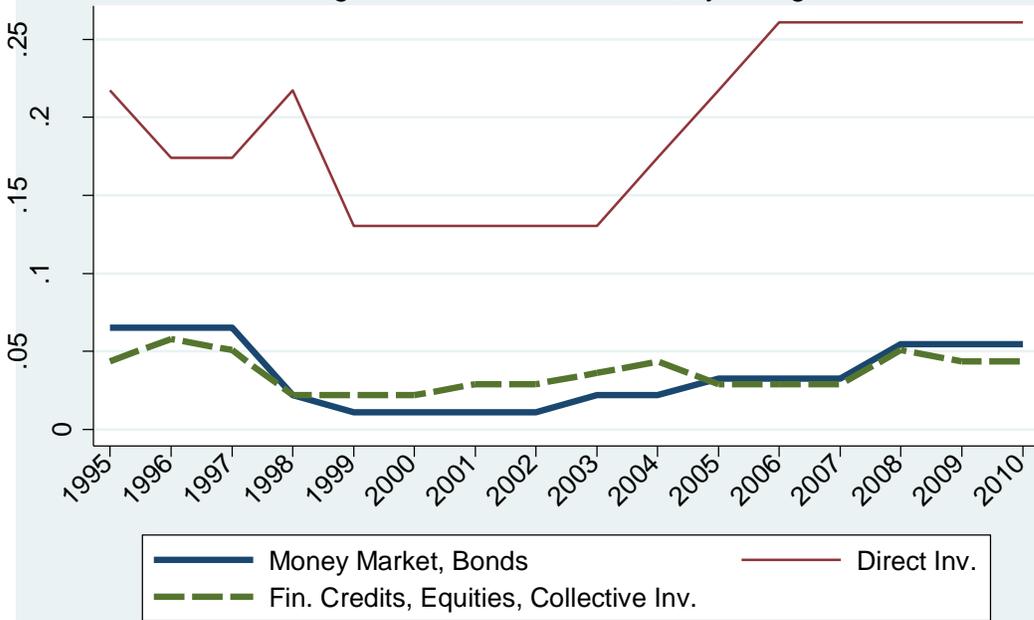
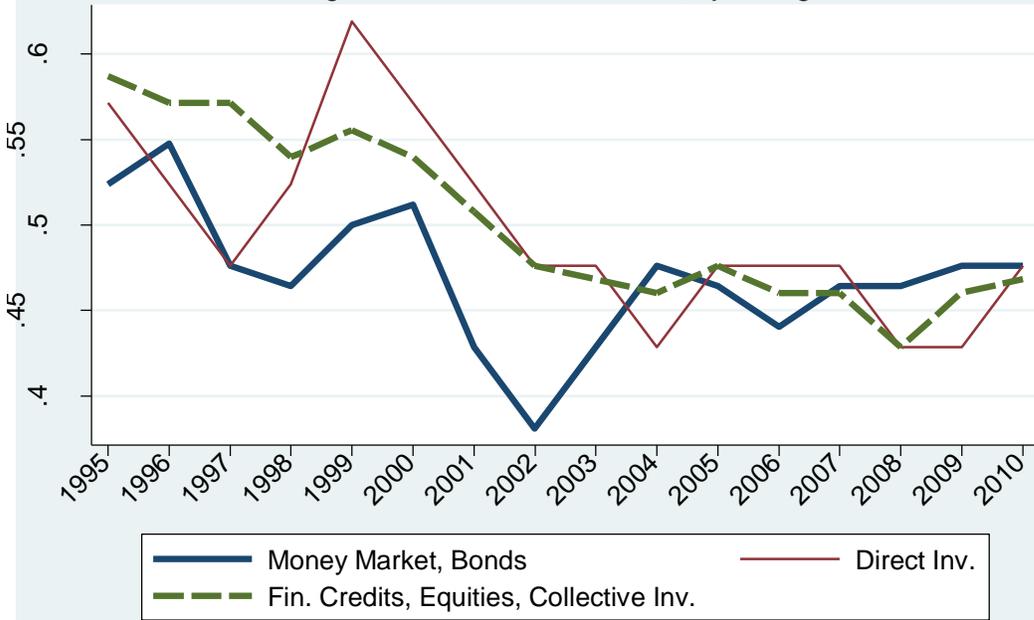


Figure 3b: Inflow Controls, 21 Emerging Market Countries
Averages of Countries' Indicators, by Categories



country-year observations in which controls were imposed, among these 12 countries and the number of years in which countries imposed new controls is presented in the table.

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.²³ 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 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 for 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.

²³ This fact will be important when we consider, in the next section, the partial correlations of capital controls with aggregate economic variables.

Table 2: Inflow Control Categories for 1995-2010		
<u>Persistently Open (16)</u>	<u>Persistently closed (10)</u>	<u>Episodic controls (18)</u>
Austria (ADV)	China (EME)	Argentina*(3) (EME)
Belgium (ADV)	Colombia (EME)	Australia*(1) (ADV)
Canada (ADV)	India (EME)	Brazil*(3) (EME)
Denmark (ADV)	Indonesia (EME)	Chile (EME)
Egypt (EME)	Malaysia (EME)	Czech Republic*(2) (EME)
Finland (ADV)	Morocco (EME)	France (ADV)
Greece (ADV)	Philippines (EME)	Germany (ADV)
Italy (ADV)	Russia (EME)	Hungary (EME)
Japan (ADV)	South Africa (EME)	Iceland*(4) (ADV)
Netherlands (ADV)	Thailand (EME)	Ireland*(1) (ADV)
New Zealand (ADV)		Israel (ADV)
Norway (ADV)		Korea (EME)
Spain (ADV)		Mexico*(2) (EME)
Switzerland (ADV)		Peru*(1) (EME)
United Kingdom (ADV)		Poland*(1) (EME)
United States (ADV)		Portugal*(2) (ADV)
		Sweden*(1) (ADV)
		Turkey*(2) (EME)
*(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.		
Geometric Average of GDP Per Capita, 1995 – 2010 (in PPP-adjusted 2005 US Dollars)		
\$27,054	\$4,902	\$17,387
Number of Country-Year Observations with Controls on Any Categories of Assets (DI Excluded)		
0 out of 256	160 out of 160	157 out of 288 (55%)
Number of Country-Year Observations with Controls on All Categories of Assets (DI Excluded)		
0 out of 256	111 out of 160 (69%)	26 out of 288 (9%)
Number of Country-Year Observations with Controls on 4 or 5 Categories of Assets (DI Excluded)		
0 out of 256	149 out of 160 (93%)	44 out of 288 (15%)

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 on local currency debt, then on 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 a decreasing contribution to the 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.²⁴

²⁴ There are five ways in which these conditions make it more likely to find a pattern of the imposition of controls consistent with the pecking order: (i) There is no requirement that controls on shorter-maturity bonds precede those

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 financial credits, equities, or collective investments. Three of these four 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, with only 5 of the 23 cases of the imposition of controls on capital inflows consistent with these weak pecking order conditions, 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

on longer-maturity bonds; (ii) Controls on both types of bonds are treated interchangeably; (iii) Controls are required on only one of the two categories of bonds; (iv) 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; (v) 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.

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

Interest in the use of capital controls has grown in the wake of the Great Recession due to the perception that countries that blocked capital inflows performed better than those that did not.²⁵ The theory discussed in Section II provides a rationale for this view, and it is also supported by statistics showing countries with capital controls had higher rates of GDP growth and lower rates of growth of financial variables associated with asset price booms. In a similar fashion, the value of capital controls is supported by the view that countries with long-standing controls, like China, can successfully stem appreciation pressures.

The empirical results presented in this section provide a preliminary investigation of the correlations between controls on capital inflows and variables associated with financial vulnerabilities, GDP growth and the real exchange rate. We present unconditional statistics, as well as partial correlations drawn from the annual panel data set of 44 countries over the 1995 to 2010 period. These estimates are based on estimates using annual data although, at the end of this section, we also consider the association of capital controls and exchange rates at a monthly frequency.²⁶

²⁵ 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, as mentioned in Ostry, *et al.* (2010). In contrast, 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)

²⁶ While an analysis at an annual frequency may be less likely to discern significant associations between capital inflows and aggregate economic variables than a study using monthly data, it might have more relevance for macroeconomic and financial policy than higher frequency results.

A key point in this analysis is distinguishing the effects of long-standing capital controls from those of episodic controls on different categories of assets. The panel analysis distinguishes between long-standing and episodic capital controls with the use of three separate dummy variables; CL, which equals 1 for all years for the 10 countries with persistent controls on inflows, BOMM_{t-1}, which equals 1 if there are controls on either money market instruments or bonds in the previous year, and FEC_{t-1}, which equals 1 if there are controls on financial credits, equities, or collective investments in the previous year.²⁷

The identification of the effects of controls on capital inflows is challenging. Capital controls are typically not imposed in isolation from other policies and, to the extent that these policies are aimed towards the same objective, partial correlations from regression analysis would overstate the association between capital controls and economic outcomes because of omitted variables.²⁸ On the other hand, episodic capital controls may be systematically imposed in response to movements in exchange rates, GDP, or financial variables, and, if this were the case, partial correlations would understate the effect of capital controls on these variables because of endogeneity. For this reason, the two dummy variables BOMM_{t-1}, and FEC_{t-1}, are lagged one year in an effort to avoid capturing reverse causality, for example, if a real exchange rate appreciation prompts the imposition of controls. Regressions were also run in which the episodic control variables represent the contemporaneous probability of the imposition of controls derived from a probit regressions that use only lagged variables. The results from

²⁷ The fact that CL equals 1 in all years for the 10 countries with persistent controls on inflows means that it is not possible to control for country fixed effects in the panel estimates. Year fixed effects are included.

²⁸ Habermeier, Kokenyne and Baba (2011) argue that controls on inflows are almost always imposed at the same time as other prudential policies.

estimates using this two-stage procedure were almost identical to those using lagged dummy variables in terms of the pattern of the significance of results.²⁹

Statistics presented below show that countries with persistent controls on capital inflows had higher rates of GDP growth and lower rates of growth of financial variables than the other countries in the sample. Regressions controlling for other variables show that these statistics should not be used as a guide for the efficacy of episodic controls, however, because, with a few exceptions, there is not a comparable significant partial correlation between episodic controls and economic aggregates, and, in many cases, there is a significant difference between the partial correlations for long-standing and episodic controls. Countries with long-standing controls differ from other countries in a number of ways including, as shown in Table 2, having lower income per capita. The significant association between long-standing controls and annual growth in aggregate economic variables disappears once partial correlations control for income per capita, while the inclusion of this variable does not shift the estimates towards finding a statistically significant effect of episodic controls.

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, the significant estimated link

²⁹ The estimated contemporaneous probability of the presence of controls from these first stage estimates, $B\widehat{O}M M_t$ and $F\widehat{E}C_t$, are from probit regressions run for the subset of 18 countries that had experience with episodic inflow controls. The regressors include a dummy variable indicating whether controls were in place the previous year as well as lagged values of GDP growth, bilateral real appreciation against the United States dollar, lagged growth in credit to GDP and in debt share, and lagged GDP per capita. The first stage probit regressions have pseudo-R²s of 0.59 for BOMM and 0.65 for FEC. The estimates $B\widehat{O}M M_t$ and $F\widehat{E}C_t$, along with CL, were used in regressions that were otherwise identical to the OLS estimates presented in Tables 3, 4, and 5 below.

between long-standing controls and aggregate variables does not survive the inclusion of income per capita in regressions. Finally, while the estimates presented below show a significant depreciation of China's bilateral real dollar exchange rate as compared to countries with open capital accounts, conditional on other factors, this is not the case for the other countries with long-standing capital controls.

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 association between both long-standing and episodic controls on the change in the levels of these variables, as well as on surges of capital inflows.³⁰

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 the presence of domestic prudential regulation. 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

³⁰ 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.

capital inflows. But neither of these two papers distinguishes between episodic and long-standing capital controls.

The three financial 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.³¹ 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 statistics on these variables, as well as the annual panel estimates of the partial correlation between each of them and both long-standing and episodic controls on capital inflows. The statistics in the bottom rows of the table show that countries closed to capital inflows had lower growth rates of credit to GDP, bank credit, and debt liabilities relative to total liabilities than the other countries in the sample. These ten countries also had less than half the percentage of observations with a capital inflow surge than the other 34 countries.

The regressions estimates in the columns 1, 3 and 5 show that countries with long-standing controls on capital inflows had a statistically significant lower growth rate of the three financial variables, and a statistically lower association with capital inflow surges, than countries with open capital accounts. The same is not true when episodic controls were imposed in the previous period, but for the lower likelihood of a surge of inflows when controls were imposed on bonds. The partial correlations of episodic controls with the three financial variables is estimated imprecisely (standard errors almost always exceed estimated coefficients), and there are only two instances of a significantly lower association of long-standing than of episodic controls. But the significant partial correlation of these three financial variables with long-

³¹ These data are from the World Bank. See <http://data.worldbank.org/indicator/>.

standing controls disappears when lagged GDP per capita is included as a regressor, as shown in columns 2, 4 and 6. The estimates in these columns also show that the coefficient on GDP per capita consistently enters with a positive and significant coefficient. It is reasonable to interpret the results in columns 1 through 6 as showing that the significant effect of long-standing controls arises because it serves as a proxy for income per capita.

This is not the case with the estimates of the partial correlation of surges with long-standing and episodic controls (columns 7 and 8).³² Countries with long-standing capital controls had a lower likelihood of a surge, even when controlling for whether there was a surge in the previous period, lagged real GDP growth, whether the country had a pegged exchange rate in the previous period, and year dummy variables. Similarly, the estimates in these columns show a significant negative coefficient on the dummy variable for the presence of financial credits, equities or collective investments in the previous period. There is a statistically significant difference in the estimated coefficient on long-standing controls and the coefficient on bonds, and a positive and significant partial correlation between controls on bonds and a surge.³³

Notwithstanding the significant effects for surges, the results in Tables 3 call into question the prudential effects of capital controls. Ultimately, however, we are interested in the relationship between capital controls and these variables because of the potential effect on GDP, a topic that we turn to next.³⁴

³² Note that, because of data limitations, the surge regressions in columns 7 and 8 include only Emerging Market countries and cover the period 2001 to 2010.

³³ These results also hold for the two-stage estimates described above (see footnote 29) which employ the instrumented values of $BOMM_t$ and FEC_t .

³⁴ 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.

Table 3: Capital Controls and Financial Vulnerabilities
Annual Panel Estimates, 1995 - 2010

	1	2	3	4	5	6	7	8
Dep. Var.	$\Delta(\text{Credit}/\text{GDP})$		$\Delta\text{Bank Credit}$		$\Delta\text{Debt Share}$		Surge [†]	
CL	-0.043**	0.030	-0.026**	0.003	-0.032**	-0.011	-0.579*	-0.574**
(s.e.)	(0.018)	(0.019)	(0.009)	(0.014)	(0.008)	(0.013)	(0.248)	(0.287)
BOMM _{t-1}	-0.022	-0.016	-0.028	-0.026	-0.004	-0.003	0.892**	0.891**
(s.e.)	(0.024)	(0.022)	(0.021)	(0.019)	(0.015)	(0.014)	(0.367)	(0.376)
FEC _{t-1}	0.003	0.007	0.008	0.010	-0.010	-0.007	-0.874**	-0.874**
(s.e.)	(0.017)	(0.014)	(0.015)	(0.013)	(0.015)	(0.012)	(0.308)	(0.308)
Level _{t-1}	-0.0002	-.0006**	-0.00015**	-.00025**	-0.0005*	-0.0005**	1.057**	1.057**
(s.e.)	(0.0013)	(.00016)	(0.00006)	(.0001)	(0.00026)	(0.00025)	(0.189)	(0.190)
Peg _{t-1}	0.029**	0.027**	0.026**	0.025**	0.015**	0.013**	-0.393*	-0.391*
(s.e.)	(0.013)	(0.013)	(0.010)	(0.010)	(0.006)	(0.006)	(0.225)	(0.229)
$\Delta\ln(\text{GDP}_{t-1})$	1.125**	1.238**	0.316**	0.361**	-0.247	-0.174	3.995**	4.008**
(s.e.)	(0.353)	(0.329)	(0.157)	(0.157)	(0.170)	(0.183)	(1.865)	(1.927)
$\ln(\text{GDPPC}_{t-1})$		0.053**		0.021**		0.015**		0.006
(s.e.)		(0.013)		(0.009)		(0.0075)		(0.204)
R ²	0.12	0.16	0.07	0.08	0.21	0.22	0.25	0.25
No. Obs.	636	636	635	635	571	571	305	305
CL – BOMM	-0.021	0.046	0.002	0.030	-0.028*	-0.008	-1.471**	-1.465**
(s.e.)	(0.027)	(0.031)	(0.020)	(0.024)	(0.016)	(0.016)	(0.421)	(0.485)
CL – FEC	-0.046*	0.023	-0.033	-0.006	-0.022	-0.004	0.295	0.300
(s.e.)	(0.024)	(0.023)	(0.017)	(0.017)	(0.017)	(0.018)	(0.367)	(0.388)
Full Sample								
Mean (s.d.)	0.031 (0.129)		0.026 (0.109)		-0.025 (0.090)		Surge = 19% obs.	
Countries Persistently Closed to Inflows								
Mean (s.d.)	0.018 (0.133)		0.013 (0.102)		-0.053 (0.108)		Surge = 12% obs.	
Countries Not Persistently Closed to Inflows								
Mean (s.d.)	0.035 (0.128)		0.030 (0.110)		-0.018 (0.084)		Surge = 26% obs.	
$\Delta\text{Credit} / \text{GDP}$ = Percentage change in private credit relative to GDP $\Delta\text{Bank Credit}$ = Percentage change in domestic credit provided by the banking sector $\Delta\text{Debt Share}$ = Percentage change in share of debt liabilities in total liabilities Surge = 1 if surge inflows in year, else 0 (Probit regression). [†] Sample is 2000 – 2010 for Surge, and only EME countries CL = Persistently Closed to Capital Inflows BOMM _{t-1} = 1 if episodic controls on either money market instruments or bonds in <i>t-1</i> , else 0 FEC _{t-1} = 1 if episodic controls on financial credits, equities, or collective investments in in <i>t-1</i> , else 0 Level _{t-1} = lag level of respective dependent variables (e.g. (C/A) _{t-1}). For Surge, Surge in <i>t-1</i> . $\Delta\ln(\text{GDP}_{t-1})$ = lag change in real GDP Peg _{t-1} = 1 if pegged exchange rate in <i>t-1</i> , 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 GDP Growth

The average growth rate of real GDP in the ten countries in our data set with long-standing controls on capital inflows was notably higher than that of the other 34 countries over the period 1995 to 2010; 4.6 percent per annum as opposed to 2.7 percent per annum. This difference was even larger during the 2008 to 2010 Great Recession period, when the average growth rate of the countries with long-standing controls was 4.1 percent per annum as opposed to 0.5 percent for the other 34 countries. But, of course, these ten countries differed from the other 34 in many ways other than their stances on capital controls. In this section, we present evidence on the partial correlations between both long-standing and episodic capital controls and annual GDP growth to examine whether controls on capital inflows were associated with faster GDP growth when controlling for other factors.

The extensive literature on capital account policies and economic growth has focused on the effects of capital account liberalization. The typical approach 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 assets.³⁵ In a survey of this 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).

Table 4 includes growth statistics and 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

³⁵ Edison, Klein, Ricci and Sløk (2004) discuss the different types of capital account liberalization indicators employed in their synthesis of the effects of capital account liberalization on economic growth.

2010 (Columns 5 and 6). The statistics in the bottom rows of the table show that large differences between the growth rates of the ten countries with long-standing controls on capital inflows and the other countries in the sample mentioned in the first paragraph of this section. But these rows also show that there were large standard deviations of the countries' average growth rates.

Columns 1, 3 and 5 in Table 4 present estimates, for each of the time periods, of the partial correlations of GDP growth and the three indicators of controls on capital inflows, controlling for lagged GDP growth and year fixed effects. These columns demonstrate a significant positive partial correlation between long-standing controls on capital inflows and economic growth. The size of the relationship is notable as well, ranging from 1.4 percent per year to 1.9 percent per year. There is also a statistically significant difference in the partial correlation of growth between long-standing and episodic capital controls in most cases. But these results are overturned when lagged income per capita is also included in the regression. There are no instances of significant partial correlations of any of the control on capital inflow dummy variables in the even-numbered columns. This is even true for the estimates exclusively focusing on the Great Recession period 2008 to 2010, a time when the difference in unconditional growth rates between countries with long-standing controls and the other countries is largest, and a time when capital controls were touted as insulating economies from the economic distress spreading around the world.

**Table 4:
Capital Controls and Growth in Real GDP
Annual Panel Estimates**

Column No.	1	2	3	4	5	6
	1995 - 2010		2002 - 2010		2008 - 2010	
CL	0.014**	0.00005	0.016**	-0.0001	0.019**	-0.008
(s.e.)	(0.004)	(0.0032)	(0.003)	(0.0040)	(0.007)	(0.007)
BOMM _{t-1}	0.001	0.0002	-0.0003	-0.0003	-0.001	-0.004
(s.e.)	(0.004)	(0.005)	(0.0043)	(0.0046)	(0.005)	(0.007)
FEC _{t-1}	0.0055**	0.0029	0.0058**	0.0021	0.009	0.005
(s.e.)	(0.0026)	(0.0037)	(0.0026)	(0.0033)	(0.007)	(0.009)
$\Delta \ln(\text{GDP}_{t-1})$	0.377**	0.340**	0.533**	0.448**	0.529**	0.322**
(s.e.)	(0.092)	(0.088)	(0.076)	(0.073)	(0.097)	(0.103)
$\ln(\text{GDP}/\text{cap})_{t-1}$		-0.009**		-0.012**		-0.024**
(s.e.)		(0.001)		(0.002)		(0.004)
R ²	0.43	0.45	0.63	0.67	0.62	0.69
No. Obs.	664	664	396	396	132	132
CL - BOMM	0.013**	-0.0001	0.016**	0.0002	0.020**	-0.004
(s.e.)	(0.006)	(0.0054)	(0.005)	(0.0054)	(0.008)	(0.008)
CL - FEC	0.009**	-0.0028	0.010**	-0.0022	0.010	-0.013
(s.e.)	(0.004)	(0.0049)	(0.003)	(0.0049)	(0.007)	(0.010)
	Full Sample					
Mean (s.d.)	0.032 (0.033)		0.031 (0.33)		0.014 (0.042)	
	Countries Persistently Closed to Inflows					
Mean (s.d.)	0.046 (0.040)		0.054 (0.030)		0.041 (0.039)	
	Countries Not Persistently Closed to Inflows					
Mean (s.d.)	0.027 (0.029)		0.024 (0.032)		0.005 (0.039)	
Dependent variable is annual change in real GDP						
CL = Persistently Closed to Capital Inflows						
BOMM _{t-1} = 1 if controls on either money market instruments or bonds in <i>t-1</i> , else 0						
FEC _{t-1} = 1 if controls on financial credits, equities, or collective investments in <i>t-1</i> , else 0						
$\ln(\text{GDP}/\text{cap})_{t-1}$ = lag real GDP per capita						
$\Delta \ln(\text{GDP}_{t-1})$ = lag change in real GDP						
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 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?³⁶ Did long-standing controls on capital inflows contribute to depreciations, or lower rates of appreciation, than would have otherwise occurred?

We make an effort to address these questions by considering the partial correlations of controls on capital inflows and the bilateral real dollar exchange rate of each country. Table 5 presents these estimates in an annual panel for each of the same three time periods used in Table 4; 1995 to 2010, 2002 to 2010, and 2008 to 2010. The dependent variable is the real bilateral exchange rate with the United States, with a positive value indicating a real appreciation against the dollar. The regressors include, besides the variables representing controls on capital inflows, the lagged appreciation of the real bilateral dollar exchange rate, lagged real GDP growth, whether the country had a pegged exchange rate, the logarithm of GDP per capita, and year fixed effects. The estimates in the odd-numbered columns include the same three capital inflow control dummy variables used in Tables 3 and 4. The estimates in the even-numbered columns separate the long-standing capital control variable into a China dummy variable and CLnotChina, a dummy variable that equals 1 for observations in which the country is one of the other nine with long-standing controls on capital inflows. This allows an examination of whether the experience with respect to the bilateral real dollar exchange rate was different from that of the other countries with “walls.”

³⁶ 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 5: Capital Controls and Real Bilateral US Dollar Exchange Rate						
Annual Panel Estimates						
Column No.	1	2	3	4	5	6
	1995 – 2010		2002 – 2010		2008 - 2010	
CL	-0.018		0.007		-0.030	
(s.e.)	(0.018)		(0.016)		(0.022)	
CLnotChina		-0.018		0.010		-0.029
(s.e.)		(0.018)		(0.017)		(0.023)
China		-0.026		-0.047**		-0.041
(s.e.)		(0.017)		(0.013)		(0.026)
BOMM _{t-1}	-0.016	-0.016	-0.026	-0.027	-0.034**	-0.034**
(s.e.)	(0.014)	(0.014)	(0.017)	(0.017)	(0.014)	(0.014)
FEC _{t-1}	0.002	0.002	0.012	0.012	-0.011	-0.011
(s.e.)	(0.010)	(0.010)	(0.014)	(0.014)	(0.017)	(0.017)
$\Delta \ln(\text{RER}_{t-1})$	0.056	0.054	0.120	0.102	0.039	0.037
(s.e.)	(0.067)	(0.068)	(0.122)	(0.126)	(0.094)	(0.094)
$\Delta \ln(\text{GDP}_{t-1})$	0.256	0.269	0.619**	0.766**	0.413*	0.446
(s.e.)	(0.229)	(0.248)	(0.299)	(0.317)	(0.244)	(0.298)
Peg _{t-1}	-0.003	-0.002	-0.012	-0.006	-0.007	-0.006
(s.e.)	(0.009)	(0.010)	(0.011)	(0.010)	(0.009)	(0.010)
$\ln(\text{GDP}/\text{cap})_{t-1}$	-0.004	-0.004	0.013	0.013	-0.027*	-0.027*
(s.e.)	(0.009)	(0.009)	(0.013)	(0.013)	(0.016)	(0.016)
R ²	0.28	0.28	0.32	0.32	0.50	0.50
No. Obs.	633	633	391	391	129	129
CL – BOMM	0.002	-0.001	0.033	0.037	0.004	0.005
(s.e.)	(0.022)	(0.022)	(0.021)	(0.023)	(0.020)	(0.021)
CL – FEC	-0.020	-0.020	-0.005	-0.003	-0.019	-0.018
(s.e.)	(0.015)	(0.015)	(0.022)	(0.021)	(0.020)	(0.020)
	Full Sample					
Mean (s.d.)	0.032 (0.113)		0.061 (0.098)		0.027 (0.095)	
	Countries Persistently Closed to Inflows					
Mean (s.d.)	0.028 (0.117)		0.069 (0.079)		0.058 (0.079)	
	Countries Not Persistently Closed to Inflows					
Mean (s.d.)	0.034 (0.111)		0.058 (0.102)		0.019 (0.097)	
Dependent variable: annual % Δ real bilateral US dollar exchange rate (increase = appreciation)						
CL = Persistently Closed to Capital Inflows						
CLnotChina = Persistently Closed to Capital Inflows, not including China						
China = 1 if China, else 0						
BOMM _{t-1} = 1 if controls on either money market instruments or bonds in $t-1$, else 0						
FEC _{t-1} = 1 if controls on financial credits, equities, or collective investments in in $t-1$, else 0						
$\ln(\text{GDP}/\text{cap})_{t-1}$ = lag real GDP per capita, $\Delta \ln(\text{GDP}_{t-1})$ = lag change in real GDP						
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						

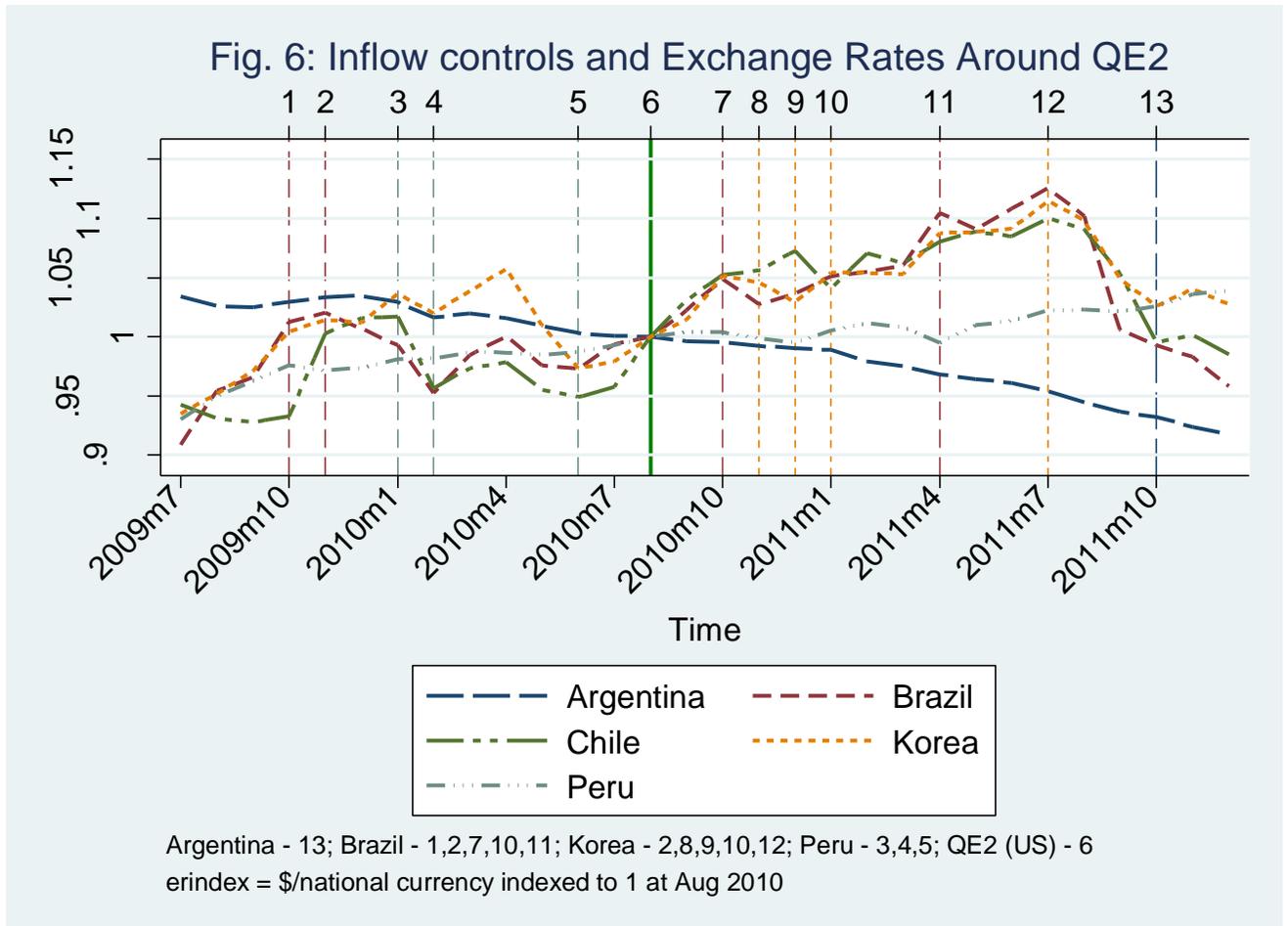
The estimates in columns 1 and 3 show no significant effects of either long-standing or episodic capital controls. During the crisis period, however, there is evidence that controls on bond inflows were associated with a depreciation of 3.4 percent per annum, conditional on the other variables included in the regression. This represents about one-third of the standard deviation of the change in the exchange rate during this period. The two-stage procedure described above also has a significant coefficient on controls on bonds for this period, with a value of 0.039, about 15 percent larger (in absolute value) than the OLS estimator. There are no other significant coefficients on episodic controls using the two stage procedure, consistent with the OLS estimates in Table 5. In addition, the estimates in column 4 show a significant real depreciation for the dollar / renminbi exchange rate in the 2002 to 2010 period, conditional on the other variables included in the model. The coefficient on the China dummy variable is not significant in the other two periods, however.

One concern about these results is that the annual frequency may mask shorter-run exchange rate responses to the imposition of controls on capital inflows. Another means to consider the effect of episodic controls on the exchange rate is to focus on the period around the QE2. Federal Reserve Chairman Ben Bernanke announced QE2 at the Jackson Hole meeting in August 2010, and more aggressive monetary easing began that fall. In the wake of the August announcement, some emerging market currencies began to appreciate against the dollar. In response, Brazil and South Korea undertook actions to stem the appreciation of their currencies in the fall of 2010 and through the summer of 2011.

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. The August

2010 QE2 announcement date is represented by the thick vertical dashed line in this figure.

Thinner dashed vertical lines show the dates of the imposition of controls on capital inflows.



The figure shows that the currencies of Brazil, Chile and Korea, which had begun appreciating earlier in the summer of 2010, continued to appreciate, after the Bernanke announcement, through the autumn as QE2 was implemented. The appreciation of the won and the real did not show evidence of abating as controls were imposed by the Brazilian and Korean governments through the autumn of 2010 and through the first half of 2011. The Chilean peso also followed the appreciation of the won and the real, while the Argentine peso depreciated and the Peruvian Nuevo Sol maintained a relatively constant level. In July 2011, after the Korean authorities raised controls on inflows for the fourth time since the QE2 announcement, the

currencies of Korea, Brazil and Chile began to depreciate. 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 affected currency values during this period.

IV. Conclusions

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.

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 A: Years With Controls on Capital Inflows, By Category of Asset						
	MM	BO	FC	EQ	CI	DI
Countries with Persistent Controls on Capital Inflows						
China	Closed	Closed	Closed	Closed	Closed	Closed
Colombia	Closed	Closed	Closed	Closed	'95-'99, '02-'10	'99-'10
India	Closed	'02-'10	Closed	Closed	Closed	Closed
Indonesia	Closed	Closed	'95-'02	Closed	Closed	Closed
Malaysia	Closed	Closed	Closed	Closed	Closed	Closed
Morocco	Closed	Closed	Closed	Closed	Closed	Open
Philippines	'95-'97, '03-'10	Closed	Closed	Closed	'95-'97, '03-'10	'03
Russia	Closed	Closed	'95-'00, '02-'03, '05-'07	Closed	Closed	Closed
South Africa	Closed	Closed	Closed	Closed	'06-'10	Closed
Thailand	Closed	Closed	'01-'03, '05-'10	Closed	'95-'09	'95-'07
Countries with Episodic Controls on Capital Inflows						
Argentina	'03-'10	'03-'10	'03-'10	'06-'10	'04-'10	'98-'05
Australia	Open	Open	Open	'96-'10	Open	'95-'10
Brazil	'98-'01, '09-'10	'97-'01, '09-'10	'95-'01, '09-'10	Closed	'95-'02, '10	'95-'01, '06-'10
Chile	'95 – '01	'97 – '01	'95 – '04	'95 – '02	'95 – '03	'95 – '01
Czech Rep.	'98 – '00	'97 – '00	Open	'96 – '97	'98-'99	Open
France	'95-'00	Open	Open	'95-'97	Open	Open
Germany	'95-'97	'97	Open	'95-'96	Open	Open
Hungary	'95-'00	'97-'00	'95-'00	Open	'95-'00	'10
Iceland	'08-'10	'05-'10	'08-'10	'95-'04, '06-'10	'08	'95, '04-'10
Ireland	'08-'10	Open	Open	Open	Open	'06-'10
Israel	'95-'97	'97	Open	'95-'97	'95-'97	Open
Korea	'95-'04	'97	'95-'04	'95-'97	'95-'03	'95-'96
Mexico	'95-'97	Open	'95-'97, '01-'10	'95	'95, '98-'10	'95-'99, '05-'10
Peru	'08-'09	Open	Open	Open	Open	Open
Portugal	Open	'01-'10	Open	'01-'10	'04-'05	Open
Poland	Closed	'99-'10	'95-'06	Closed	'95-'01	Closed
Sweden	'03-'10	Open	Open	'03-'04	Open	Open
Turkey	'07-'10	Open	'09-'10	Open	Open	'95-'02
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).						

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