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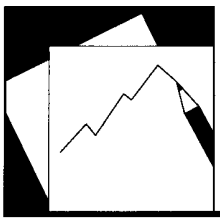

IMF Working Paper

Controlling Capital? Legal Restrictions and the Asset Composition of International Financial Flows

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Controlling Capital? Legal Restrictions and the Asset Composition of International Financial Flows

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Abstract

How effective are capital account restrictions? We provide new answers based on a novel panel data set of capital controls, disaggregated by asset class and by inflows/outflows, covering 74 countries during 1995-2005. We find the estimated effects of capital controls to vary markedly across the types of capital controls, both by asset categories, by the direction of flows, and across countries' income levels. In particular, both debt and equity controls can substantially reduce outflows, with little effect on capital inflows, but only high-income countries appear able to effectively impose debt (outflow) controls. The results imply that capital controls can affect both the volume and the composition of capital flows.

JEL Classification Numbers: F21; F32; F36

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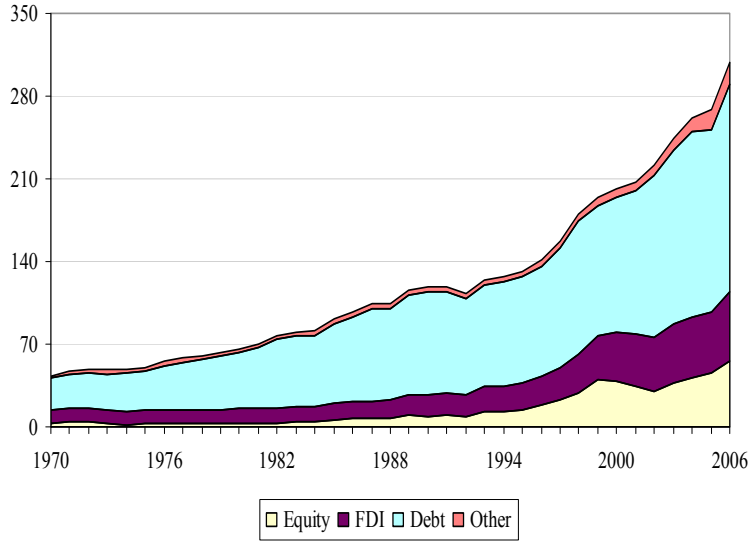
I. INTRODUCTION

Financial globalization has increased dramatically over the past three decades. At over 300 percent of world GDP in 2006, financial integration, measured as the sum of a country's external assets and liabilities relative to GDP, is now over six times larger than in 1970 (Figure 1). Increased financial integration in turn has sparked a broad and vigorous discussion among academics and policymakers on the risk and opportunities that these developments bring. Much of the debate has focused on the desirability and feasibility of limiting the volume and composition of capital inflows and outflows and, in particular, the effectiveness of imposing legal restrictions on cross-border financial transactions, one of the few tools at the disposal of policymakers to influence capital flows.

Figure 1: International Financial Integration, 1970–2006

(In percent of GDP)



Notes: Based on Lane and Milesi-Ferretti (2007), updated through 2006. The figure depicts the sum of countries' total equity, FDI, debt and other assets and liabilities relative to aggregate GDP.

Empirically, the sharp rise in financial integration has gone hand in hand with a dramatic decrease in countries' de jure restrictions on capital flows, although almost no economy has completely eliminated capital controls, and in many cases they remain substantial, with officials frequently increasing the intensity of controls during episodes of financial disruption. However, despite the frequent use of capital controls as a policy tool, there is no general consensus on critical questions regarding the efficacy of capital controls. Existing research on

the effects of capital controls on capital flows is relatively sparse and the results often ambiguous.[2] Data limitations are an important reason for the lack of more extensive research and the mixed results on this topic. Although existing aggregate binary indicators of de jure restrictions on capital flows are useful for providing information on broad aggregate trends on financial liberalization, they are too coarse to distinguish between more subtle variations in capital account regimes. We are able to partly overcome this limitation and revisit the efficacy of capital controls by using a new data set that allows us to look at the specific effects of restrictions on the volume and composition of capital flows on a disaggregated level. The new data set contains more differentiated information on various dimensions of capital controls than do previous data sets, including information on inflows versus outflows and on the relative levels of controls across different asset categories (Schindler, 2009).

We exploit these novel data features to investigate a more differentiated view of how capital flows are affected by legal restrictions and to revisit some fundamental questions: How effective are capital account restrictions in stemming capital flows? Which types of controls, both in terms of asset classes and in terms of inflows and outflows, are most effective? To this end, we estimate the effects of six types of legal restrictions on their respective categories of capital flows: restrictions on equity, foreign direct investment (FDI) and debt holdings, for both capital inflows and capital outflows, respectively. We test for these effects within a standard model of capital flows using data covering 74 countries during 1995–2005. The model is estimated using panel methods and fixed effects and includes a host of well-known determinants of capital flows in addition to our indicators of legal restrictions on asset categories.

Our main finding is that existing, more aggregated capital control indicators hide substantial variation in the effects of capital controls across the various subcomponents of capital flows. We find that capital controls are effective in limiting capital outflows on equity-like instruments (equity and FDI) and debt instruments. However, controls affect capital flows only through outflows, with little or no discernable impact on inflows—that is, countries appear to be able to prevent capital from leaving the economy, but much less capable of keeping capital out. Our findings also highlight important differences in the relative effects of capital controls across income groups: while the overall qualitative pattern across asset categories is similar for countries at different income levels, low and middle-income countries appear somewhat less successful at enforcing capital account restrictions, particularly regarding debt instruments. The finding of the different effectiveness of capital controls across inflows and outflows has important policy implications.

[2] As discussed in the following section in more detail, while a number of individual country studies exist, there is relatively little cross-country research on this topic.

The remainder of the paper proceeds as follows. Section 2 provides an overview of the existing related literature. Section 3 describes the data set and methodology. Section 4 presents the main results. Section 5 discusses extensions. Section 6 concludes.

II. Literature Review

Capital controls are imposed for a number of reasons but all are based on the desire to insulate the domestic economy from some form of international capital flow (Dooley, 1996). Three main reasons are usually put forward. The first is concern over the impact of large exchange rate movements, either bouts of substantial appreciation or depreciation of the currency, on the real and financial economy, and the hope that various forms of capital controls can help offset these exchange rate pressures. The second is a concern over potentially disruptive effects of large and volatile short-term volatile capital flows ("hot money"). The third concern is over the potential loss of monetary control that may be associated with large capital flows.

Our research focuses on the link between administrative and legal controls on financial transactions—in various asset categories, and on both outflows and inflows—and the volumes of flows in these asset categories. A number of individual country studies have studied the effects of capital controls on the volume of capital flows, but relatively few multi-country studies have focused on this issue.[3] And the few multi-country studies that have considered the effects of controls have focused on capital inflows rather than outflows (or both). As Magud and Reinhart (2007) put it in a recent survey of this literature, studies to date "are not very informative regarding the effectiveness of controls in reducing the volume of capital flows and reducing real exchange rate pressures" (p. 650).

A. Individual Country Studies

Many individual country case studies have considered the effect of controls on capital flow volumes. Overall, most studies find that controls do not successfully alter the volume of capital inflows and outflows but do affect, to a limited degree, the composition of capital inflows. To the extent that controls affect net capital flows, these effects are short-lived.
For example, a number of studies examine the effects of a specific type of capital control—unremunerated reserve requirements (URR)—on various measures of capital flows. Cardenas and Barrera (1997) address this question for the case of Colombia, and De Gregorio and others (2000) study the Chilean case during 1991–1998, where URR were aimed at reducing the volume of capital inflows to increase monetary autonomy and to limit the appreciation of the real exchange rate. Both the Colombia and the Chile study find that their measure of capital

[3] Magud and Reinhart (2007) review more than 30 studies, only five of which are multi-country studies.

controls does not affect the level of capital inflows, but that the URR appear to have been effective in tilting foreign liabilities toward long-term maturities. Cardenas and Barrera (1997) argue that the compositional effect of capital controls has made Colombia less vulnerable to a sudden reversal in capital flows.

Cardoso and Goldfajn (1998) analyze the determinants of net capital flows in Brazil over 1988–1995. They construct separate indices of restrictions on capital inflows, outflows and a composite index (based on de jure measures from AREAER). Their capital flow measures are the net flows of debt, portfolio equity and FDI as a percentage of GDP. In contrast to the Colombia and Chile studies, they find that capital controls (both inflow and outflow controls) affect not only affect the composition, but also the volume, of capital flows. However, they consider net, rather than gross inflows, and find that the effects of capital controls only last for about six months. In particular, using impulse response functions, they find that an unexpected increase in controls on capital inflows (outflows) temporarily reduces (increases) the volume of net capital flows.

B. Multi-Country Studies

Only a small number of multi-country studies have investigated the link between capital controls and the volume of capital inflows and outflows. Most studies in this area have focused on the effect of capital controls on exchange rate stability and currency crises (e.g., Glick and Hutchison, 2005; and Glick, Guo and Hutchison, 2006), financial stability and policy autonomy (e.g., Edison and Reinhart, 2001) and domestic investment (e.g., Mody and Murshid, 2005).[4] The exceptions are Ariyoshi and others (2000), Montiel and Reinhart (1999), Lane and Milesi-Ferretti (2003) and, to some extent, IMF (2008).

Ariyoshi and others. (2000) review the experience of 14 emerging-market countries that used capital controls in the 1990s to address whether capital controls played any role in determining the movement of capital flows. They provide a case-by-case descriptive analysis focusing on the effectiveness of capital controls and the costs associated with them. They do not undertake any formal econometric analysis, but their qualitative case studies suggest that controls on capital inflows were partially effective (in Malaysia and Thailand) in reducing the volume and

[4] Edison and Reinhart (2001) consider the linkages between controls and financial stability (i.e., interest rate and exchange rate stability) and policy autonomy in a panel dataset with daily observations for Brazil, Malaysia and Thailand (and with South Korea and the Philippines as a control group). Using a variety of time series methodologies, they find that capital controls are ineffective for Brazil and Thailand and partly effective in Malaysia. Mody and Murshid (2005) consider the link between capital controls and domestic investment. In a panel data set consisting of 60 developing economies, they find that the surge in capital flows during the 1990s associated with financial liberalization (based on de jure measures from AREAER) was driven largely by diversification motives and did not lead to an increase in domestic investment. However, stronger policy environments appear to strengthen the link between capital inflows and domestic investment.

altering the maturity of flows. Controls on outflows, by contrast, at best only appeared to have a very short-lived effect.

Montiel and Reinhart (1999) focus on the effects of capital controls on both the volume and the distribution of capital inflows, based on an aggregate measure of the intensity of controls. (Their aggregate measure ranges from 0 to 2, with 0 indicating no restrictions and 2 indicating substantial restrictions). Using a panel data set of fifteen emerging market economies during 1990–96 and employing both least-squares dummy variable (LSDV) regression and LSDV with instrumental variables, they break down capital inflows into three categories of capital inflows: portfolio inflows, short-term inflows and FDI inflows. While they do not find any evidence that capital controls impact the volume of capital inflows, capital controls appear to influence the composition of inflows by reducing the share of portfolio and short-term flows in total capital inflows. They do not consider capital outflows, nor do they have nuanced measures of capital controls for specific asset classifications.

Lane and Milesi-Ferretti (2003) focus on the determinants of the increase in financial integration, defined as the sum of gross foreign assets and gross foreign liabilities as a percentage of GDP, during the preceding two decades. In a panel data set for 18 OECD countries over 1978–2001 (data averaged over six four-year periods) and employing LSDV, they regress changes in financial integration on a set of regressors that include a measure of capital controls (capital account liberalization index). Their capital control variable is an aggregate capital controls index ranging from 0 to 4 (with 0 representing stringent controls), based on de jure restrictions reported in the IMF AREAER and averaged over each four-year period. Their measure of capital controls does not distinguish between inflows and outflows or between different types of capital flows, and it does not have independent explanatory power when included in multivariate regressions.

Finally, IMF (2008) take an intermediate position by considering the effects of policy responses during episodes of large capital (net) inflows on GDP growth and on exchange rate pressures. They find that capital controls do not seem to be effective in reducing vulnerability to inflow reversals. However, because their sample begins in the late 1980s, they cannot meaningfully distinguish between inflow and outflow controls.[5]

III. Data and Methodology

A. The Basic Framework

To address our question of interest—the effect of de jure restrictions on particular asset categories on capital inflows and outflows in these categories (composition of capital flows)—we estimate the following baseline regression equation for several asset categories:

[5] The IMF's AREAER started to systematically differentiate between inflow and outflow controls only in 1995.

$$CapitalFlows_{it} = Constant + \beta_{1..m} CountryDummy + \delta\, CapitalControl_{it} + X'_{it}\theta + \varepsilon_{it} \qquad \textbf{(1)}$$

where i and t denote country and year, respectively, and X_{it} is a vector of control variables, including the log of real per-capita GDP, institutional quality, trade openness, measures of financial development (both private credit to GDP and stock market capitalization to GDP) and a control for natural resources. Some specifications also include year dummies.

Our choice of control variables is based on existing studies which have identified seemingly robust determinants of capital flows, for example, Alfaro, Kalemli-Ozcan and Volosovych (2008), IMF (2007), Lane and Milesi-Ferretti (2003), Montiel and Reinhart (1999), Portes, Rey and Oh (2001), and Portes and Rey (2005). We estimate this equation (in various forms) using a panel data set covering 74 developed and developing countries during 1995 to 2005. See Appendix Table 1 for a list of the countries in the sample. The country and time coverage is dictated by the joint coverage of our key variables, namely, a capital flow measure and a de jure restrictions (capital controls) indicator.

To measure the asset composition of capital flows, we rely on the data set by Lane and Milesi-Ferretti (2007) [hereafter: LMF]. Following the methodology described in the IMF's Balance of Payments Manual, LMF use as a benchmark countries' estimates of their International Investment Position (IIP) and then work backward with data on capital flows, together with calculations for capital gains and losses, to generate estimates for stock positions for earlier years. We transform the stock data into flows by taking first differences. LMF stock data is based on the balance of payments data which measure net capital inflows and outflows during a recording period.

Net capital inflows measure net purchases or sales by nonresidents of domestic assets, while net outflows measure net purchases or sales of foreign assets by residents. Therefore, both capital inflows and capital outflows can take negative values. In this case, the negative values for net inflow (net outflow) can be considered as outflow (inflow). Therefore, to construct the best counterpart of inflow and outflow data from stock data we use the formulation: INFLOWS = - min(d.assets,0) + max(d.liabilities,0) and OUTFLOWS = max(d.assets,0) - min(d.liabilities,0). We estimate the equation with (log) financial flows per capita as the dependent variable, both as an aggregate as well as separately for inflows and outflows, and for equity (the sum of portfolio equity and FDI) and debt flows (including both short-term and long-term debt).[6]

[6] Although there are clear conceptual differences between portfolio equity and FDI flows, in practice, the difference is less clear-cut. Typically, equity ownership in excess of a 10 percent share in a company is considered FDI, but it is not obvious that this cutoff also corresponds to a conceptually different kind of investment. However, we also provide estimates separately for portfolio equity and FDI flows (see footnote 8).

An important implication of the data construction is that changes in the financial stocks can arise from sales/purchases as well as from valuation changes. Conceptually, we believe this is the appropriate measure since valuation changes are likely to affect behavior and may substitute for actual transactions. At the same time, since capital account restrictions only affect actual transactions, we may underestimate the effects of capital controls by using the LMF measure and our estimates can thus be interpreted as lower bounds (in absolute terms).

For de jure capital account restrictions, we employ the data set constructed in Schindler (2009) which allows us to pair the various inflow and outflow asset subcategories with the corresponding capital control variables. A systematic panel data set containing separate inflow and outflow information as well as by asset category was not previously available.[7] The data are derived from the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) and distinguish capital controls by asset category and by the direction of flows. The time dimension of our sample is constrained by the fact that the AREAER started to systematically differentiate between those categories only in 1995. The indices are more finely gradated than, for example, the IMF's binary capital controls dummy that has been used in numerous studies. This added degree of differentiation can be interpreted as an "intensity" dimension and is helpful in detecting more subtle differences across countries and over time.

The capital controls indices in Schindler (2009) are constructed by first coding the restrictiveness of controls at the level of individual transactions, and then aggregating these subindices to obtain more finely gradated asset or inflow/outflow specific indices. For example, equity outflow (inflow) transactions can arise based on four types of transactions: residents buying (selling) assets abroad, and nonresidents selling (buying) domestic assets. Each of these basic transactions is coded as 1 if restrictions exist and 0 otherwise. Thus, an aggregate equity controls index would be the average of four binary variables and could thus take on five different values: 0, .25, .5, .75, or 1. The equity inflow and outflow indices, respectively, are the average of two underlying transaction variables, thus potentially assuming three values: 0, .5, or 1. Schindler (2009) provides a detailed description.

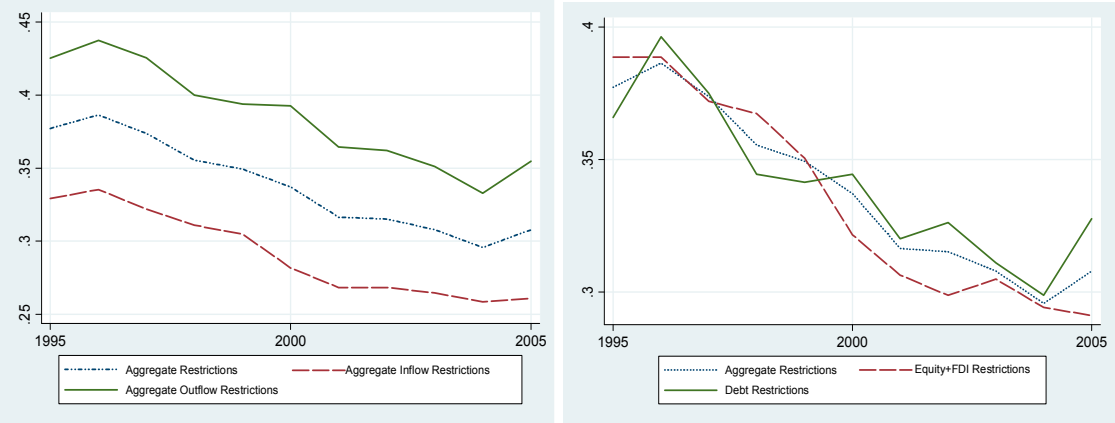
Figure 2 plots, for the full sample, the evolution in capital controls, both by the direction of flows (panel a) and by asset category (panel b). Average inflow and outflow controls are highly correlated over time, suggesting that countries on average have liberalized their capital accounts symmetrically across inflows and outflows. However, the co-movement in the sample average hides substantial heterogeneity at the country level. As shown in Figure 3 for a number

[7] These distinctions are clearly essential to our research question, but have also been used in other recent research. For example, Prati, Schindler, and Valenzuela (2009) exploit the inflow/outflow distinction in combination with firm-level credit ratings data to identify one of the channels through which capital account restrictions affect an economy.

of country examples, in many cases changes in inflow and outflow controls have not closely mirrored each other. The same holds for changes in capital account restrictions across asset categories, although the differences are even stronger here and visible even in the sample average. Overall, the data suggest that countries have followed different strategies of liberalizing (or, in some cases, tightening) capital account restrictions. This cross-country and dynamic variation in the composition of capital controls provides important variation to estimate the effects of different capital account regimes on international financial flows. Table 1 presents summary statistics for all the variables used in this paper.

Figure 2. The Composition of Capital Controls (sample average)

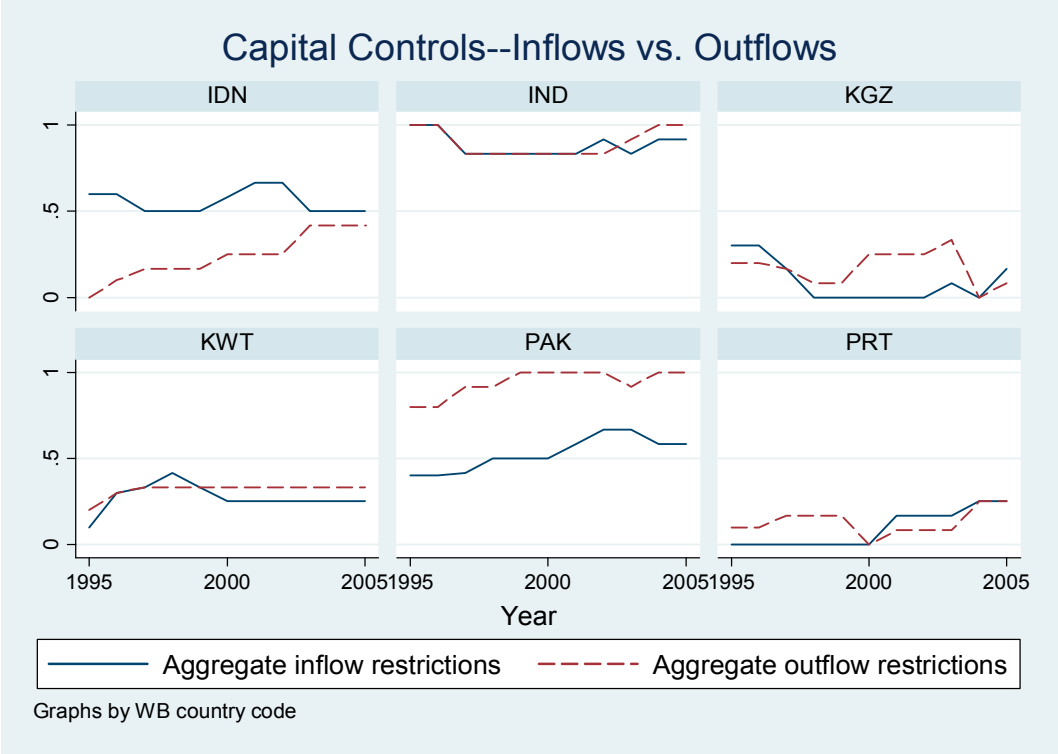
Panel (a)–Inflows versus Outflows Panel (b)–Equity versus Debt



B. Control Variables: Determinants of Capital Flows

Our choice of control variables is guided by the existing literature on the determinants of capital flows. We include most control variables that in the literature are typically found to be a significant determinant of aggregate capital flows. The first control variable is GDP per capita as an indicator of economic development; it is an important capital flows determinant to include since income levels are likely to affect the level of cross-border asset holdings. For example, better developed financial institutions make advanced countries more suitable destinations for capital, including for diversification purposes (e.g., Dell'Ariccia et al., 2008), and several empirical studies have found a positive association with capital inflows and outflows (e.g., Martin and Rey, 2000, 2001; Lane and Milesi-Ferretti, 2003).

Figure 3. The Composition of Capital Controls (country level)
Panel (a)–Inflows versus Outflows



Panel (b)–Equity versus Debt

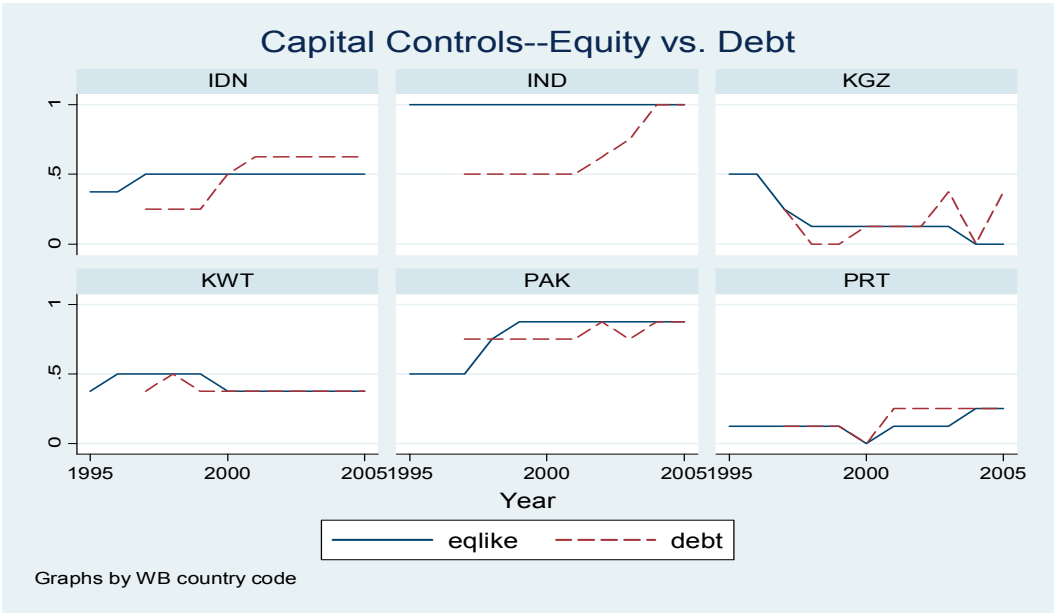


Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
a) Entire Sample					
Capital Flows Per Capita					
Debt+FDI+Equity Flows	814	6334.1	16501.4	3.149	198556.7
Debt Flows	814	3509.8	10506.9	0.416	133586.7
FDI+Equity Flows	814	2824.4	6890.2	0.041	65578.1
Debt Inflows	814	1755.2	5211.4	0	65563.4
Debt Outflows	814	1754.6	5506.1	0	76709.7
FDI+Equity Inflows	814	1420.1	3894.0	0	44528.8
FDI+Equity Outflows	814	1404.3	3478.2	0	32204.7
Capital Controls					
Debt+FDI+Equity	814	0.32	0.36	0	1
Debt	814	0.32	0.37	0	1
FDI+Equity	814	0.32	0.36	0	1
Debt Inflows	814	0.26	0.36	0	1
Debt Outflows	814	0.38	0.42	0	1
FDI+Equity Inflows	814	0.28	0.37	0	1
FDI+Equity Outflows	814	0.35	0.43	0	1
Other Control Variables					
GDP Per Capita	814	9917.8	10943.5	203.3	40597.0
Institutional Quality	814	61.9	25.2	6.6	99.5
Trade Openness	802	0.83	0.54	0.15	4.59
Private Credit	800	0.56	0.44	0.03	2.18
Stock Market Cap.	770	0.51	0.61	0.00	5.28
Natural Resources	788	0.14	0.18	0.00	0.90
b) Capital Controls with Country Groups					
High Income Countries					
Debt Inflows	319	0.09	0.24	0	1
Debt Outflows	319	0.18	0.29	0	1
FDI+Equity Inflows	319	0.17	0.30	0	1
FDI+Equity Outflows	319	0.13	0.28	0	1
Low-Middle Income Countries					
Debt Inflows	495	0.37	0.39	0	1
Debt Outflows	495	0.50	0.43	0	1
FDI+Equity Inflows	495	0.36	0.39	0	1
FDI+Equity Outflows	495	0.49	0.46	0	1

The second control variable is a measure of institutional quality. Countries with better institutions provide better protection of property rights, less corruption, more political stability and rule of law, and a lower default risk, and can therefore better attract capital inflows and discourage capital outflows (e.g., Lucas, 1990; Tornell and Velasco, 1992). Several empirical studies have found a link between institutional quality and capital flows (e.g., Alfaro and Kalemli-Ozcan and Volosovych, 2007, 2008; Faria and Mauro, 2004).

The third control variable is a measure of trade openness. Trade openness can be linked with capital flows through several channels. A direct channel is that trade in goods and services

involve financial transactions. Also, as argued by Lane and Milesi-Ferretti (2003), openness in goods markets may increase market participants' willingness to conduct cross-border financial transactions (a "familiarity" effect), thus reducing financial home bias. Portes, Rey and Oh (2001) and Portes and Rey (2005) present results that are consistent with this view using a gravity approach to explain international financial transactions (similar to previous gravity models of trade in goods). Thus, we would expect a positive link between trade openness and financial integration.

The fourth control variable is a proxy for domestic financial development. We use private credit and stock market capitalization (in shares of GDP) as indicators of domestic financial development. Empirical evidence suggests that domestic financial sector development facilitates international capital flows because deeper domestic financial markets and a more sophisticated financial infrastructure offer a broader array of channels and instruments through which capital can be allocated (e.g., Lane and Milesi-Ferretti, 2003).

Finally, our fifth control variable is a measure of a country's endowment with natural resources. Capital flows, especially FDI and equity inflows, are likely to be partly driven by foreign investors' desire to exploit basic natural resources as inputs in the international production chain. Faria and Mauro (2004) find a statistically significant positive link between domestic natural resources and inward FDI as well as with total equity and portfolio equity.

IV. RESULTS

A. Reference Results

Table 2 presents tests of the effectiveness of capital controls using aggregate data for all asset categories (column 1) and separately for debt (column 2) and equity-like flows (column 3: equity plus FDI). The specification in column (1) follows the extant literature in using aggregated measures of capital flows and capital controls and thus provides a natural reference point against which to compare our main results using disaggregated measures that we present below. Specifically, column (1) of Table 2 considers aggregate gross flows (the sum of inflows and outflows) of Debt, FDI and Equity and the associated aggregate measures of capital controls, calculated as the average of restrictions across the Debt, FDI and Equity categories and across inflows and outflows.

The equation is estimated using LSDV and has high explanatory power (R–square equal to 0.93). The estimated coefficient on capital controls in column (1), our focus point, indicates that aggregate restrictions are significantly (95 percent level) linked to capital flows and can help insulate the domestic economy from aggregate capital flows, or, put differently, relaxing controls helps a country integrate more into the global financial system by increasing aggregate capital inflows and outflows. This result, of course, is consistent with the broad picture that emerges from the existing literature reviewed in the previous section and the observation from

the figures that the trend increase in financial integration is in parallel with a trend relaxation of capital flow restrictions over the past two decades.

Table 2: Aggregate Capital Flows and Controls

	Debt+FDI+Equity	Debt	FDI+Equity
	(1)	(2)	(3)
Capital Control	-0.538***	-0.295	-0.766***
	(0.16)	(0.20)	(0.17)
GDP Per Capita	2.849***	2.538***	3.162***
	(0.29)	(0.42)	(0.34)
Institutional Quality	-0.00105	0.00207	0.00187
	(0.0055)	(0.0082)	(0.0062)
Trade Openness	-0.478**	-0.454	-0.290
	(0.21)	(0.36)	(0.29)
Private Credit	0.591***	0.695**	0.415**
	(0.19)	(0.29)	(0.18)
Stock Market Cap.	0.256**	-0.105	0.531***
	(0.099)	(0.14)	(0.12)
Natural Resources	0.491	1.572**	-1.155
	(0.54)	(0.76)	(0.84)
Constant	-22.80***	-20.43***	-27.08***
	(2.91)	(4.19)	(3.47)
Observations	727	727	727
R-squared	0.95	0.88	0.93

Notes: All regressions include country fixed effects. Dependent variable is the log of capital flow per capita. GDP Per Capita is in log term. Robust standard errors in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent level, respectively.

Notably, while Lane and Milesi-Ferretti (2003) find a significant and negative effect of (aggregate) capital controls in their baseline regression, the coefficient becomes insignificant once other controls are included, whereas the coefficient remains highly significant in our analysis even when other controls are included. As we argue below, this is at least in part likely a measurement issue: Lane and Milesi-Ferretti (2003), as many other authors, use the binary capital controls dummy discussed in the previous section, a crude indicator which is hides important cross-country and time variation in the degree of capital account restrictiveness, biasing coefficients towards zero.

In terms of control variables for our reference regression, GDP per capita, stock market capitalization and natural resources are all statistically significant. The first two explanatory variables are highly significant (99 percent level) and have the expected signs (higher income and greater stock market capitalization are associated with greater financial integration); the estimated negative coefficient on natural resources is more surprising, but only marginally statistically significant.

B. Asset Categories

As noted above, past capital controls measures tend to suffer from measurement problems, in that two countries may be classified as restricted (the binary dummy taking a value of 1), and thus be treated equally in empirical analyses, even though the level and intensity of their restrictions may differ substantially. But aggregate indices hide differences also along a different dimension: for example, a country that tightly restricts debt flows but leaves equity flows unfettered likely provides a different framework to investors than a country with the reverse structure. Yet, aggregate indices may assign the same value to both countries. We use the new index to investigate this issue and estimate the basic equation from column 1 in Table 2 separately for debt flows (column 2) and for equity-like instruments, i.e., the sum of portfolio equity and FDI flows (column 3).[8]

High explanatory power is again observed in the two equations, and we again find negative signs on the coefficients for legal restrictions. However, the two columns highlight that the composition of capital controls matters: the aggregate effect we picked up in column 1 is almost entirely driven by a strong effect of capital controls on equity-like instruments while debt flows appear not to be strongly affected.

This difference is also reflected in the magnitudes of the coefficients of capital controls: FDI+Equity controls appear to have a much larger impact on flows than Debt and total capital flows. For instance, a country that moves from the midpoint of the scale (.5) to being completely open (0) would, by our estimates, experience an average increase of nearly 34 percent in the aggregate flow of Debt+FDI+Equity (in per capita terms). A similar change in the FDI+Equity category would raise the corresponding per-capita flows by 39 percent. The same change in the debt category is not statistically significant but the point estimate indicates that it would raise debt flows by only 15 percent.

We delay discussion of the control variables until the next section where we present their effects in the context of our fully specified "baseline" model (Table 3).

[8] Throughout the paper, we combine FDI and equity flows, rather than considering them separately. The reason is that while conceptually distinct, in practice, the difference is less clear: countries typically classify as FDI equity investments that exceed a certain threshold (e.g., a greater than 10 percent share). Separate regressions may therefore not be particularly meaningful. Indeed, as reported in Appendix Table 3, running separate regressions yields qualitatively unchanged results, and the fact that the estimated coefficients between portfolio equity and FDI are virtually identical supports the notion that the two measures may not capture truly distinct capital flows.

Table 3: Disaggregated Capital Flows and Controls

	Debt Securities		FDI+Equity	
	Inflow	Outflow	Inflow	Outflow
	(1)	(2)	(3)	(4)
Capital In/Out-flow Control	0.215	-1.142***	-0.0330	-1.263***
	(0.38)	(0.43)	(0.36)	(0.28)
GDP Per Capita	4.423***	2.277***	4.318***	3.199***
	(0.98)	(0.83)	(0.71)	(0.64)
Institutional Quality	0.0416**	-0.0337**	0.0330***	-0.0274**
	(0.017)	(0.015)	(0.012)	(0.012)
Trade Openness	-2.181***	0.738	-0.00194	-0.172
	(0.83)	(0.90)	(0.70)	(0.47)
Private Credit	0.660	1.301**	-0.343	0.830***
	(0.50)	(0.52)	(0.40)	(0.24)
Stock Market Cap.	-0.0153	-0.510	0.0749	0.581***
	(0.37)	(0.38)	(0.32)	(0.15)
Natural Resources	-0.982	4.579***	-0.672	1.377
	(1.91)	(1.65)	(1.56)	(1.67)
Constant	-44.73***	-16.14*	-41.75***	-26.71***
	(9.81)	(8.32)	(7.12)	(6.44)
Observations	727	727	727	727
R-squared	0.67	0.64	0.72	0.90

Notes: All regressions include country fixed effects. Dependent variable is the log of capital inflow (outflow) per capita. GDP Per Capita is in log term. Capital inflow (outflow) control is used as regressor for capital inflow (outflow). Robust standard errors in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent level, respectively.

C. Inflows versus Outflows

The previous section showed that examining some of new index' subcomponents separately can yield important information. We show in this section that the same holds for a different disaggregation, namely by inflows and outflows. Table 3 measures the effectiveness of specific administrative and legal controls on both (a) asset categories and (b) inflows and outflows of capital. Table 3 extends the previous analysis in these two dimensions and presents our "baseline" regression results.[9]

The results from this analysis, in terms of the effectiveness of restrictions on capital flows, provide insight into the factors that are driving the previous results (Table 2). In particular, the effect of capital controls on gross capital flows arises largely through their effect on outflows:

[9] Country fixed effects are designed to capture systematic capital flows associated with idiosyncratic country-specific factors. In addition, over our data sample period (1995–2005) there was a noticeable trend decrease in de jure capital market restrictions. This trend was broken, temporarily, by the 1997–98 Asian financial crises that led many emerging economies to re-impose capital account restrictions. Including time fixed effects in the panel regressions would help to account for such broad movements over time, but as shown in Appendix Table A4, results are virtually identical when country and time fixed effects are included.

only restrictions on outflows of Debt and FDI+Equity (columns 2 and 4) are effective in reducing the volume of flows. The effects of debt controls are now highly significant and somewhat larger in magnitude than those for equity flows. Restrictions on capital inflows, by contrast, do not appear to significantly insulate the domestic economy from capital inflows. For example, the coefficient estimates suggest that specific liberalization of FDI+Equity outflows (Debt outflows), lowering the capital controls index from 1.0 to 0.5, would increase capital outflows in this asset class by 63 (57) percent.

These results are in contrast to those in Ariyoshi and others (2000) who find evidence for effects on inflows, but only weak evidence for outflow effects (see our discussion in section 2). However, their study was qualitative and covered only a small sample of emerging market economies. Our results, based on a broader sample and using more formal econometric methods, suggest that these previous results may not hold systematically when considering a broader set of country experiences, at least during the time period we study. Our results also differ from those in Montiel and Reinhart (1999) who focus on a similar set of countries and time period as Ariyoshi and others. (2000). Although Montiel and Reinhart find little effect on the aggregate level of inflows, they do find effects on the composition of inflows. By contrast, we only find compositional effects on the outflow side (see the next section). Again, a broader sample, somewhat later time coverage and our more refined measurement of capital controls may be behind this divergence.

In terms of the control variables in Table 3, the two most important variable coefficient estimates are those for GDP per capita and institutional quality. Consistent with previous work, we find that high GDP per capita is associated with both higher inflows and higher outflows of both equity and debt instruments, consistent with the fact that higher-income countries engage in more two-way trades (see Dell'Ariccia and others, 2008, and the discussion in section 3.2). All of the coefficients are positive, large in magnitude and highly statistically significant. A one percent increase in per capita income raises Debt and FDI+Equity inflows (outflows), on average, by about 2.3 (3.1) percent.

Institutional quality is also highly statistically significant in all four equations and the estimated signs are consistent with the notion that higher institutional quality encourages inflows and discourages outflows for both debt and equity. For instance, over the period of 1995–2005, the average institutional quality index for Mexico is 49.5 and for Spain is 84.19. (The index ranges from 0 to 100, with higher values indicating better institutional quality). The coefficient estimates suggest that if Mexico were to improve institutional quality to the level of Spain, FDI+Equity inflows (outflows) would rise (fall) by 114 percent (94 percent). Alfaro and others (2008) find that low institutional quality discourages net capital flows to developing economies, partly explaining the "Lucas Paradox." Our results are fully consistent with this finding.

Financial development, on the other hand, exhibits a complex, though intuitive pattern: measured by stock market capitalization, its main positive effect is via the equity outflow subcategory, while when measured by private credit, it is significantly positively associated with both debt and equity outflows. In each of the statistically significant cases, greater financial development (larger stock market capitalization or larger private credit markets) facilitates more international financial integration. It is noteworthy that the strong relationship between stock market capitalization with aggregated gross flows, shown in column 1 of Table 2, is consistent with what other studies have found (Lane and Milesi-Ferretti, 2003). However, our results are more nuanced in that they show differences in effects across asset categories and inflows and outflows.

Notably, with one exception, trade openness is not significantly correlated with capital flows, in contrast to the consistently significant relationship found by Lane and Milesi-Ferretti (2003).[10] Higher trade openness does appear to be significantly negatively associated with debt inflows, while a larger natural resource base is significantly positively associated with debt outflows, but otherwise not linked to other forms of capital flows.

D. Composition of Capital Flows

We are interested in the effect of controls on the composition of capital flows as well as their volume. Clearly, if controls on a particular asset class affect inflows or outflows of that class but no other category, then both the volume and composition are directly affected. But it is also possible that there may be indirect substitution effects such that controls on one instrument may induce changes in capital flows in another asset category. One must consider both the direct and the indirect effects of capital controls to determine the compositional effects in these circumstances.

Table 4 follows the same format as Table 3 but now adds controls in the complementary asset category to each equation. For example, the dependent variable of column 2 is capital outflow in the form of debt securities. The direct effect in this case is the impact of restrictions on the outflow of debt securities (with the estimated effect of -0.955 given in the row labeled "Debt In/Out-flow Control"). But these restrictions on the outflow of debt securities may also have an indirect effect on the outflow of equity and FDI, perhaps increasing these latter flows as individuals and firms switch from debt to equity as a way of moving capital out of the country. This is given in column 4 (row also labeled "Debt In/Out-

[10] A possible explanation is the different sample, both in terms of time and country coverage.

Table 4: Disaggregated Capital Flows and Controls: Composition Effects

	Debt Securities		FDI+Equity	
	Inflow	Outflow	Inflow	Outflow
	(1)	(2)	(3)	(4)
FDI+Equity In/Out-flow Control	0.403	-0.344	-0.116	-1.271***
	(0.52)	(0.53)	(0.39)	(0.31)
Debt In/Out-flow Control	0.0633	-0.955*	0.158	0.0143
	(0.42)	(0.54)	(0.36)	(0.26)
GDP Per Capita	4.471***	2.146***	4.349***	3.199***
	(0.99)	(0.83)	(0.71)	(0.64)
Institutional Quality	0.0421**	-0.0348**	0.0339***	-0.0274**
	(0.017)	(0.015)	(0.012)	(0.012)
Trade Openness	-2.179***	0.734	0.0134	-0.172
	(0.83)	(0.90)	(0.70)	(0.47)
Private Credit	0.638	1.285**	-0.334	0.829***
	(0.50)	(0.52)	(0.40)	(0.24)
Stock Market Cap.	-0.00677	-0.512	0.0693	0.580***
	(0.37)	(0.38)	(0.32)	(0.15)
Natural Resources	-0.927	4.602***	-0.714	1.375
	(1.91)	(1.65)	(1.56)	(1.68)
Constant	-45.28***	-14.66*	-42.15***	-26.71***
	(9.96)	(8.35)	(7.19)	(6.45)
Observations	727	727	727	727
R-squared	0.67	0.64	0.72	0.90

Notes: All regressions include country fixed effects. Dependent variable is the log of capital inflow (outflow) per capita. GDP Per Capita is in log term. Capital inflow (outflow) control is used as regressor for capital inflow (outflow). Robust standard errors in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent level, respectively.

flow Control"). Our results are unchanged—none of the substitution effects estimated in Table 4 are statistically significant. The only statistically significant results are again controls on debt outflows and equity outflows.

Another issue is how capital controls affect net flows for either equity or debt instruments. For example, direct controls that reduce outflows of debt instruments (column 2) effectively reduce the option value of an investment as such restrictions limit investors' ability to repatriate capital in the future. Thus, debt outflow restrictions, for example, may induce investors to also reduce inflows of debt instruments (column 1), with an a priori ambiguous impact on net capital flows in this asset category. That is, the reaction to more intense controls on outflows may be offset by a reduction of inflows into the country.

To investigate this issue, Table 5 follows the same format as Table 3 but we now investigate controls on the same instrument on the outflow side when comparing inflows, and the same instrument on the inflow side when investigating outflows. Again our results are unchanged: restrictions on capital outflows are still significant and negative for both Debt and FDI/Equity asset classes even when we take into account the degree of legal and

Table 5: Disaggregated Capital Flows and Simultaneous Inflow and Outflow Controls

	Debt Securities		FDI+Equity	
	Inflow	Outflow	Inflow	Outflow
	(1)	(2)	(3)	(4)
Inflow Capital Controls	0.572	0.311	-0.0253	-0.143
	(0.51)	(0.49)	(0.43)	(0.30)
Outflow Capital Control	-0.658	-1.347**	-0.0201	-1.210***
	(0.63)	(0.54)	(0.45)	(0.29)
GDP Per Capita	4.270***	2.293***	4.308***	3.196***
	(0.98)	(0.83)	(0.74)	(0.64)
Institutional Quality	0.0405**	-0.0326**	0.0330***	-0.0277**
	(0.017)	(0.015)	(0.012)	(0.012)
Trade Openness	-2.185***	0.761	-0.00257	-0.177
	(0.83)	(0.90)	(0.70)	(0.47)
Private Credit	0.706	1.322**	-0.344	0.838***
	(0.50)	(0.52)	(0.40)	(0.24)
Stock Market Cap.	0.0254	-0.503	0.0757	0.577***
	(0.37)	(0.38)	(0.32)	(0.15)
Natural Resources	-0.908	4.553***	-0.667	1.360
	(1.92)	(1.64)	(1.58)	(1.68)
Constant	-43.14***	-16.46**	-41.64***	-26.66***
	(9.90)	(8.32)	(7.55)	(6.45)
Observations	727	727	727	727
R-squared	0.67	0.64	0.72	0.90

Notes: All regressions include country fixed effects. Dependent variable is the log of capital inflow (outflow) per capita. GDP Per Capita is in log term. Capital inflow (outflow) controls are used as regressor for both capital inflows and outflows. Robust standard errors in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent level, respectively.

administrative impediments on capital inflows (columns 2 and 4). These impacts are not offset by counterbalancing effects on the outflow or inflow side of capital flows in this asset category.

These two sets of results indicate that looking at the direct effect on the volume of capital outflows is sufficient to determine both the composition effects of controls and the net effect of controls on capital flows. The results in this section suggest that capital controls can be relatively well targeted, for example, on a certain asset group or on outflows, with little effect on other asset groups or inflows. That substitution effects appear to be limited is a fairly striking result as it suggests that the ability to move capital out of a country does not play a key role in investors' decision of whether to invest in a country in the first place, calling into question the efficiency and sophistication of some capital markets. At the same time, while not statistically significant, the estimated coefficients are large, making it somewhat difficult to fully ignore the possibility of substitution effects. We conclude that this is an area that deserves further investigation.

V. EXTENSIONS

We extend our basic analysis in this section by re-estimating our key regressions for different samples (high-income countries and others) and by including lagged effects. We examine first the extent to which results differ by the level of economic development. The results reported in Table 3 are based on a comprehensive data set encompassing both countries of all income levels. Even though the country fixed effects in our analysis captures some level differences across countries, the response of capital flows to administrative and legal controls may differ depending on the level of economic development. To investigate this issue, we extend our analysis by estimating the baseline model for two samples of countries—high and low/middle income countries, based on the World Bank classification.

Table 6 presents separately the estimation results for the high-income countries and for low/middle income countries. The effectiveness of capital controls in the high income group (panel a) is qualitatively and quantitatively similar to the results for the full sample of countries—capital controls are effective in slowing capital outflows in both the debt security and FDI/Equity asset classes. However, the effectiveness of restrictions on debt outflows appears much stronger than for equity outflows. Again, restrictions on inflows do not appear to be effective.

Outflow controls in the low/middle income group, however, only appear effective in reducing FDI/Equity outflows and not debt flows. Analogous to our baseline results, controls on capital inflows are not effective in reducing capital inflows in either income group, for either asset class. Although the level of restrictions on capital flows in high income countries is, on average, significantly lower than in low/middle income countries, the effectiveness of these controls is stronger in high income countries. This may be because more advanced countries are more successful in enforcing de jure restrictions, at least on capital outflows.

In a second extension, we recognize that the dynamics of the effects of capital controls may be more complicated than simply through a contemporaneous effect. To investigate this possibility, we include both contemporaneous and lagged capital controls in our baseline model specifications, see Table 7. Lagged effects are generally not significant with the exception of the lagged effect of controls on debt outflows. The dynamic pattern in this case indicates that the strong restrictive effect of capital controls on debt outflows is reduced by about half in the second year of their imposition. The magnitudes of the coefficients on the control variables are similar to those in the baseline specification in Table 3.

In a third extension, we investigated the "forward effect" of capital controls, that is, the possibility that future changes in controls may affect current capital flows if they are partially anticipated. To this end, we estimated the effect of one period-ahead Debt (FDI-Equity)

Table 6: Disaggregated Capital Flows, Controls and Country Groups

	Debt Securities		FDI+Equity	
	Inflow	Outflow	Inflow	Outflow
	(1)	(2)	(3)	(4)
a) High Income Countries				
Capital In/Out-flow Control	0.990	-2.545***	0.0333	-1.115**
	(0.62)	(0.71)	(0.57)	(0.45)
GDP Per Capita	7.627***	5.084***	5.501***	5.307***
	(1.92)	(1.76)	(1.55)	(0.75)
Institutional Quality	0.111**	0.0177	0.0829**	-0.0512**
	(0.044)	(0.047)	(0.039)	(0.022)
Trade Openness	-2.643**	1.255	0.666	-1.123***
	(1.13)	(1.22)	(1.11)	(0.42)
Private Credit	0.202	0.977	-0.0589	0.182
	(0.64)	(0.64)	(0.46)	(0.23)
Stock Market Cap.	-0.568	-1.184**	-0.406	0.543***
	(0.53)	(0.48)	(0.44)	(0.17)
Natural Resources	-2.215	5.490	-2.208	1.719
	(3.87)	(5.60)	(4.66)	(2.27)
Constant	-67.55***	-49.05***	-55.91***	-36.51***
	(18.7)	(16.0)	(14.4)	(7.15)
Observations	294	294	294	294
R-squared	0.39	0.38	0.43	0.78
b) Low-Middle Income Countries				
Capital In/Out-flow Control	-0.132	-0.548	0.000231	-1.227***
	(0.48)	(0.52)	(0.47)	(0.34)
GDP Per Capita	3.330***	1.474	4.381***	2.067**
	(1.19)	(0.95)	(0.83)	(0.82)
Institutional Quality	0.0356*	-0.0301*	0.0325***	-0.0224*
	(0.019)	(0.017)	(0.012)	(0.013)
Trade Openness	-1.560	0.422	-0.748	1.071
	(1.26)	(1.29)	(0.88)	(0.77)
Private Credit	0.785	0.594	-2.434**	2.744***
	(1.28)	(0.96)	(1.09)	(0.84)
Stock Market Cap.	0.753	-0.263	0.404	1.048***
	(0.81)	(0.72)	(0.39)	(0.32)
Natural Resources	-1.268	4.377**	-0.921	1.365
	(2.14)	(1.77)	(1.69)	(1.94)
Constant	-17.57***	-6.669	-22.22***	-14.09***
	(6.52)	(5.05)	(4.49)	(4.32)
Observations	433	433	433	433
R-squared	0.39	0.39	0.57	0.74

Notes: All regressions include country fixed effects. Dependent variable is the log of capital inflow (outflow) per capita. GDP Per Capita is in log term. Capital inflow (outflow) control is used as regressor for capital inflow (outflow). Robust standard errors in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent level, respectively. Country groups are based on the World Bank classification

Table 7: Disaggregated Capital Flows and Contemporaneous and Lagged Capital Controls

	Debt Securities		FDI+Equity	
	Inflow	Outflow	Inflow	Outflow
	(1)	(2)	(3)	(4)
Capital In/Out-flow Control_(t)	0.569	-1.991***	0.686	-1.014**
	(0.46)	(0.49)	(0.57)	(0.39)
Capital In/Out-flow Control_(t-1)	-0.623	0.983**	-0.916	-0.551
	(0.47)	(0.41)	(0.64)	(0.38)
GDP Per Capita	5.330***	2.598***	4.905***	3.071***
	(1.03)	(0.84)	(0.79)	(0.72)
Institutional Quality	0.0275	-0.0410**	0.0251*	-0.0286*
	(0.020)	(0.018)	(0.014)	(0.015)
Trade Openness	-2.137**	1.795**	0.0620	-0.278
	(0.90)	(0.88)	(0.79)	(0.54)
Private Credit	0.859	1.448**	-0.429	0.802***
	(0.53)	(0.58)	(0.45)	(0.25)
Stock Market Cap.	-0.139	-0.700	0.0595	0.625***
	(0.42)	(0.45)	(0.40)	(0.18)
Natural Resources	-1.404	3.621**	-1.262	1.082
	(2.03)	(1.67)	(1.64)	(1.77)
Constant	-28.31***	-13.16***	-25.41***	-18.69***
	(5.74)	(4.54)	(4.25)	(3.93)
Observations	675	675	675	675
R-squared	0.68	0.65	0.72	0.90

Notes: All regressions include country fixed effects. Dependent variable is the log of capital inflow (outflow) per capita. GDP Per Capita is in log term. Capital inflow (outflow) control is used as regressor for capital inflow (outflow). Robust standard errors in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent level, respectively.

controls on contemporaneous Debt (FDI-Equity) flows, while keeping contemporaneous controls in the regression equation.[11]

The results for forward controls are insignificant for the models of debt flows. However, the one-period ahead controls are significant in the FDI-Equity regressions—the one-period ahead controls on FDI-Equity outflows appear to *reduce* contemporaneous FDI-Equity outflows (the contemporaneous value on controls is insignificant in this regression). This result is counterintuitive since, all else equal, one would expect higher anticipated future outflow controls to increase contemporaneous outflows. The result is also inconsistent with the standard reverse causation explanation where an increase in capital flows might induce policymakers to increase controls on those flows in the next period.

[11] Regression estimates for this and subsequent extensions in this section are not reported for brevity. They are available from the authors upon request.

In a fourth extension of the basic model we investigated whether the period of time that controls were in place ("duration") influenced the impact of controls on capital flows. We developed two duration measures: D2 indicates whether controls at a given level have been in place for 2 or more years, while D3 indicates whether controls at a given level have been in place for 3 or more years. We added (to our baseline regressions reported in Table 3) this indicator as an interaction term with capital controls (D2*CC or D3*CC) to test whether the effectiveness of controls increase or decreased with the length of time they were in place. All of the D2 and D3 interaction terms were insignificant in the four regressions.

In a final extension of the basic model we investigated whether capital controls influence flows in a non-linear fashion. We tested for nonlinearity in the impact of controls by adding an additional capital control squared term (the standard approach to testing for non-linearities) to the baseline model (Table 3). With this formulation of the model, the effectiveness of capital controls now depends on the particular level of capital controls, i.e., the effect may vary with the level of controls.

In the two outflow equations (Debt and FDI-Equity), the non-linear term is not statistically significant. In addition, the statistical significance of the term on capital controls is reduced. Moreover, non-linearity does appear to play a role in the FDI-Equity inflow equation. Previously, in the linear version, capital controls were not statistically significant. In the non-linear version of the model, capital controls now play a significant role, but not in intuitive manner, i.e., higher degree of controls appear to reduce the effectiveness of controls.

A fuller examination of the dynamic effects of capital controls is clearly warranted. Such research could take the form of an event study approach, which could be implemented once the time coverage of the capital controls data set is expanded. Incidentally, what may matter also is how countries implement restrictions: gradually over extended periods of time, or in discrete "big bang" fashion? If the former, then the estimated coefficients may suffer from attenuation bias since their effects on flows may be diluted over time. Again, an event study approach that focuses on large changes in capital control regimes (along the lines of the proposed approach in Schindler, 2009) could help disentangle the different effects of countries' different capital controls strategies.

VI. CONCLUSION

In this paper, we have taken a fresh look at the effects of capital controls on the level and composition of capital flows. Our analysis adds to the existing literature by exploiting a novel panel data set that allows us to disaggregate capital controls and capital flows into three basic asset categories (equity, FDI and debt) and to distinguish between capital flowing into and capital flowing out of a country. We revisit the question of whether capital controls on specific asset types are effective in either increasing or decreasing capital inflows or outflows in their respective categories. To this end, we estimate the effects of six types of legal restrictions on

their respective categories of capital flow within a standard model of capital flows using data covering 74 countries during 1995–2005. The model is estimated using panel methods and fixed effects with a host of well-known determinants of capital flows in addition to our indicators of legal restrictions on asset categories.

The decomposition analysis highlights a number of new findings. First, investigating the links between aggregate capital controls on aggregate flows, as is common in the literature, is misleading and may underestimate the effectiveness of capital controls in some dimensions. Second, we find that capital controls have asymmetric effects on the volume of capital inflows and outflows. Countries do not seem able to effectively stem inflows by legal restrictions, which might be due to strong domestic incentives to evade. By contrast, once capital is in the country, governments seem better able to discourage outflows in all categories (debt, equity and FDI), potentially making the country less vulnerable to sudden reversals in capital flows. Third, the direct effects of restrictions on debt and equity outflows do not seem to induce attempts to circumvent the controls by substituting into other types of capital flows. The upshot is that the effects of controls on the volume of capital outflows translate directly into the composition of capital flows—for example, tighter restrictions on outflows of equity mean a larger share of debt outflows and an unchanged pattern of inflows—and a net effect—for example, tighter restrictions on outflows of equity mean net outflows of equity are also reduced.

Alternative specifications indicate that our results are robust, although they highlight certain asymmetries, namely, that capital controls appear more effective in advanced countries than in less developed and emerging market economies. This may be associated with better institutional ability to enforce controls. However, the seeming inability to effectively insulate the economy from inflows remains in the high-income country sample.

Overall, our study demonstrates the value of employing disaggregated data on asset restrictions across international capital outflows and inflows. Aggregate measures may provide misleading and biased estimates of the effectiveness of capital controls on international financial movements and therefore provide a poor guide for policymakers attempting to insulate their economies from foreign shocks and pursue some independence in monetary policy. We find that policy makers are able to employ legal restrictions that are effective in partially limiting equity, FDI and debt sales by foreigners. This could be useful in stemming or warding off capital flight along some dimensions. These findings are in contrast to some of the existing literature, for example IMF (2008), that has suggested that policy makers cannot prevent large outflows—our results based on disaggregated data appear to qualify those policy implications (although important differences may remain in capital outflow responses during “normal” times and those during crises). Addressing the question of why capital controls appear to be effective in stemming outflows but not capital inflows is on our research agenda.

APPENDIX

Table A1: List of Countries in the Data set

High-Income	Middle-Income	Low-Income
Australia	Bolivia	Bangladesh
Austria	Brazil	Côte d'Ivoire
Belgium	Bulgaria	Ghana
Canada	Ecuador	India
Denmark	Egypt	Kenya
Finland	El Salvador	Kyrgyz Republic
France	Georgia	Pakistan
Germany	Guatemala	Tanzania
Greece	Indonesia	Uganda
Iceland	Jamaica	Zambia
Ireland	Kazakhstan	Yemen, Republic of.*
Italy	Moldova	
Japan	Morocco	
Netherlands	Paraguay	
New Zealand	Peru	
Norway	Philippines	
Portugal	Sri Lanka	
Spain	Swaziland	
Sweden	Thailand	
Switzerland	Tunisia	
United Kingdom	Argentina	
United States	Chile	
Korea	Costa Rica	
Cyprus	Czech Republic	
Hong Kong	Hungary	
Israel	Latvia	
Malta	Malaysia	
Singapore	Mauritius	
Slovenia	Mexico	
Brunei Darussalam*	Panama	
Bahrain*	Romania	
Kuwait*	Russia	
Qatar*	South Africa	
Saudi Arabia*	Turkey	
United Arab Emirates*	Uruguay	
	Venezuela*	
	Oman*	

Note: Income group is based on World Bank classification.

* = Oil exporting countries not included in analysis.

Table A2: Data Description and Sources

Variable	Description	Source
Capital Flows	Debt, FDI and Equity Flow (per capita, in US Dollar).	Lane and Milesi-Ferretti (2007)
Capital In/Out-flow Control	Index of Financial Openness (Range:0-1, from least to most regulated)	Schindler (2009)
GDP Per Capita	GDP per capita with constant 2000 US Dollar.	World Bank, World Development Indicators
Trade Openness	Total Export and Import / GDP	World Bank, World Development Indicators
Natural Resources	Sum of Fuel, Ores and Metal Export/Total Export	World Bank, World Development Indicators
Private Credit	Private Credit by Deposit Money Banks / GDP	World Bank, Financial Structure Data set
Stock Market Cap.	Stock Market Capitalization / GDP	World Bank, Financial Structure Data set
Institutional Quality	Average of the Percentile Rank of Six Indicators: Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption (Range: 0-100, where a higher score means better institution).	Kaufman, Kraay, and Mastruzzi (2006)

Table A3: Disaggregated Capital Flows and Controls

	FDI			Equity		
	Total FDI Flow	Inflow	Outflow	Total Equity Flow	Inflow	Outflow
	(1)	(2)	(3)	(4)	(5)	(6)
Capital In/Out-flow Control	-0.366**	-0.0637	-0.831***	-0.883***	-0.810	-0.848**
	(0.17)	(0.30)	(0.30)	(0.28)	(0.50)	(0.35)
GDP Per Capita	3.028***	3.376***	2.392***	3.658***	3.054***	2.709***
	(0.42)	(0.96)	(0.81)	(0.48)	(0.87)	(0.81)
Institutional Quality	0.0073	0.0463***	-0.0192	0.0001	0.0255*	-0.0158
	(0.0078)	(0.013)	(0.015)	(0.010)	(0.014)	(0.013)
Trade Openness	-0.301	0.147	0.175	-0.431	0.256	-0.468
	(0.37)	(0.76)	(0.57)	(0.43)	(0.90)	(0.67)
Private Credit	0.419	-0.156	0.564	0.450**	0.384	1.084***
	(0.28)	(0.61)	(0.44)	(0.21)	(0.53)	(0.35)
Stock Market Cap.	0.356**	0.0495	0.121	0.700***	-0.289	0.886***
	(0.17)	(0.33)	(0.27)	(0.19)	(0.53)	(0.29)
Natural Resources	-0.510	-1.261	1.810	0.504	3.888**	-0.745
	(0.91)	(1.76)	(1.71)	(1.24)	(1.92)	(1.46)
Constant	-27.98***	-35.88***	-20.77**	-32.61***	-29.04***	-23.30***
	(4.33)	(9.47)	(8.32)	(4.86)	(8.77)	(8.05)
Observations	727	727	727	727	727	727
R-squared	0.89	0.52	0.82	0.92	0.64	0.81

Notes: All regressions include country fixed effects. Dependent variable is the log of capital flow, inflow (outflow) per capita. GDP Per Capita is in log term. Average of capital Inflow and outflow controls are used as capital controls when running the regression for total flows. Capital inflow (outflow) control is used as regressor for capital inflow (outflow). Robust standard errors in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent level, respectively.

Table A4: Disaggregated Capital Flows and Controls: Country and Time FE

	Debt Securities		FDI+Equity	
	Inflow	Outflow	Inflow	Outflow
	(1)	(2)	(3)	(4)
Capital In/Out-flow Control	0.292	-1.033**	0.0721	-1.228***
	(0.36)	(0.43)	(0.35)	(0.27)
GDP Per Capita	3.329***	-1.494	1.667	2.444**
	(1.28)	(1.23)	(1.05)	(1.00)
Institutional Quality	0.0448**	-0.00547	0.0530***	-0.0203
	(0.019)	(0.019)	(0.013)	(0.013)
Trade Openness	-1.938***	0.254	0.163	-0.214
	(0.74)	(0.86)	(0.65)	(0.47)
Private Credit	0.768*	1.276**	-0.308	0.732***
	(0.46)	(0.50)	(0.37)	(0.24)
Stock Market Cap.	0.626	-0.508	0.245	0.444***
	(0.40)	(0.37)	(0.30)	(0.17)
Natural Resources	0.626	2.427	-0.384	2.634
	(1.79)	(1.70)	(1.61)	(1.82)
Constant	-33.48***	21.11*	-15.73	-19.34**
	(12.9)	(12.0)	(10.3)	(9.83)
Observations	727	727	727	727
R-squared	0.72	0.66	0.75	0.91

Notes: All regressions include country and time fixed effects. Dependent variable is the log of capital inflow (outflow) per capita. Dependent variable is the log of capital inflow (outflow) per capita. GDP Per Capita is in log term. Capital inflow (outflow) control is used as regressor for capital inflow (outflow). Robust standard errors in parentheses. The symbols *, **, and *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent level, respectively.

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