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ABSTRACT

Gross Capital Flows: Dynamics and Crises*

This paper analyzes the joint behavior of international capital flows by foreign and domestic agents--gross capital flows--over the business cycle and during financial crises. We show that gross capital flows are very large and volatile, especially relative to net capital flows. When foreigners invest in a country, domestic agents tend to invest abroad, and vice versa. Gross capital flows are also pro-cyclical, with foreigners investing more in the country and domestic agents investing more abroad during expansions. During crises, especially during severe ones, there is retrenchment, that is, a reduction in both capital inflows by foreigners and capital outflows by domestic agents. This evidence sheds light on the nature of shocks driving capital flows and helps discriminate among existing theories. Our findings seem consistent with shocks that affect foreign and domestic agents asymmetrically, such as sovereign risk and asymmetric information.

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1. Introduction

International capital flows have played an increasingly important role in the business cycles of developed and developing countries, especially since the 1970s and during episodes of financial crises. As a consequence, a large literature has grown, analyzing the cyclical behavior of capital flows. The literature has concentrated on studying *net* capital flows, defined as the difference in *gross* capital flows, that is, the net purchases of domestic assets by foreign agents minus the net purchases of foreign assets by domestic agents.[1] The literature shows that net capital flows are volatile and pro-cyclical and decline during crisis times. These patterns are more extreme in emerging markets and have even motivated the use of the term sudden stops to refer to the large collapses in net capital inflows that often accompany crises.[2]

While net capital flows have concentrated significant attention, much less is known about the behavior of gross capital flows. And yet understanding the behavior of gross capital flows seems crucial given that capital flows by foreign and domestic agents are very likely driven by different incentives. For example, agents might invest directly in a firm located in a foreign country if they have access to a technology that is superior to that of domestic agents, an asset might be more attractive for some agents than others if it provides a better hedge to their non-pledgeable labor income, and sovereign risk might make the return of an asset depend on the residency of the agent who holds it. As a result, it seems reasonable to expect that gross capital flows by foreign and domestic agents behave differently both over the cycle and during crises.[3]

A number of papers have analyzed long-run trends in gross capital flows (Lane and Milesi-Ferretti, 2001 and 2007; Kraay et al., 2005, Devereux, 2007, and Gourinchas and Rey,

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[1] See, for example, Dornbusch, Goldfajn, and Valdés (1995), Kaminsky, Lizondo, and Reinhart (1998), Broner and Rigobon (2006), Levchenko and Mauro (2007), and Mendoza (forthcoming).
[2] See, for example, Calvo (1998), Calvo, Izquierdo, and Mejía (2008), and Cavallo and Frankel (2008).
[3] This is indeed what we find, as we explain below. We also find that the importance of gross capital flows has increased monotonically since the 1970s to the 2000s.

2007a and 2007b).[4] But, surprisingly, there are very few studies on the cyclical behavior of gross capital flows. The literature has so far mostly focused on classifying episodes of abrupt reversals in capital inflows into those driven by foreign agents, or true sudden stops, and those driven by domestic agents, or episodes of capital flight (Faucette, Rothenberg, and Warnock, 2005, Cowan et al., 2008, Forbes and Warnock, 2011, and Rothenberg and Warnock, forthcoming). There are also a few studies that typically compare the behavior of some types of gross capital flows around specific events or in particular countries or assets (Frankel and Schmukler, 1996, Kim and Wei, 2002, Dvorak, 2003, Choe, Kho, and Stulz, 2005, and Milesi-Ferretti and Tille, 2010). Nevertheless, none of these studies provide a systematic cross-country analysis of the cyclical behavior of the different types of gross capital flows over the business cycle as well as during turbulent times.

Because of the limited research on gross capital flows, many important questions remain unanswered. For example, are periods in which foreign agents purchase domestic assets also periods in which domestic agents sell foreign assets? Is there a positive or negative correlation between capital flows by foreign and domestic agents? What is the behavior of gross capital flows over the business cycle and during financial crises? We know that crises are associated with reductions in net capital inflows. But are these reductions on average due to sales of domestic assets by foreign agents, purchases of foreign assets by domestic agents, or both? How large and how volatile are gross capital flows relative to net capital flows?

In this paper, we address the type of questions raised above by documenting a number of stylized facts about the dynamics of gross capital flows, which shed light on the behavior of domestic and foreign agents and the types of shocks underlying international capital movement.

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[4] These studies show that gross capital flows have on average been sizeable, which has resulted in large gross international investment positions.

This analysis also helps clarify the importance of focusing on gross capital flows as opposed to net capital flows. We document these patterns by systematically analyzing the cyclical behavior of gross capital flows: the capital inflows by foreign agents (*CIF*) and the capital outflows by domestic agents (*COD*). Positive *CIF* and *COD* both associate with increases in gross international investment positions. To construct *CIF* and *COD*, we use balance of payments data from the International Financial Statistics of the International Monetary Fund, from 1970 to 2009 for 103 countries. *CIF* equals net purchases of domestic assets by non-residents and is thus equal to the sum of all liability inflows. *COD* equals net purchases of foreign assets by domestic agents and is thus equal to the negative of the sum of all asset inflows, including international reserves. Hence, net capital flows are equal to the difference *CIF-COD*.

Our main findings are the following. (i) Over the last four decades, the volatility of gross capital flows (*CIF* and *COD*) has been large and increasing, especially relative to the much lower volatility of net capital flows. This reflects the increasingly positive correlation between *CIF* and *COD*. (ii) Gross capital flows are pro-cyclical. In other words, during expansions foreign agents increase their purchases of domestic assets and domestic agents increase their purchases of foreign assets. During crises, especially during severe ones, there is a reduction in gross capital flows, with reductions in both *CIF* and *COD*. However, *CIF* tends to fall more during crises as these tend to be associated with lower net capital flows. The 2008 financial crisis is a clear example of such *retrenchment*, i.e. a simultaneous decline of both *CIF* and *COD*, but we show that retrenchment was a feature of previous episodes as well. (iii) A decomposition of gross capital flows reveals interesting heterogeneity in the behavior of their components around crises. In the case of *CIF*, its reduction is due to declines in all its components for all country groups. In the case of *COD* for developed countries, its reduction is due to declines in equity, portfolio debt,

bank flows, and direct investments, but not in reserves. For developing countries, declines in reserves play an important role in accounting for the reduction in *COD*, but there are also significant declines in equity, bank flows, and direct investments.

The findings in this paper have important implications regarding the sources of fluctuations in economies open to capital flows. There is a growing literature in international macro-finance that brings portfolio choice and asset pricing considerations into dynamic stochastic general equilibrium (DSGE) models of international macroeconomics, with many papers focusing on the composition of countries' portfolios. These models have so far emphasized productivity shocks as the main source of fluctuations in economies open to capital flows. Unlike us, most of these papers and other related papers with different methodologies have focused on the long-run composition of countries' portfolios.[5]

Two recent contributions that emphasize the high-frequency behavior of international portfolios are Hnatkovska (2010) and Tille and van Wincoop (2010). Both document that in the U.S. there is a positive correlation between domestic purchases of foreign equity and foreign purchases of domestic equity and present DSGE models that can account for this correlation.[6] Hnatkovska (2010) shows that this correlation can be explained by a preponderance of productivity shocks in the nontradable sector. Tille and van Wincoop (2010) show that, even in a model with a single good and endogenous time variation in expected returns and risk, productivity shocks can account for the positive correlation of gross capital flows. These models are highly successful at matching some features of the data, but not all. For instance, Tille and Van Wincoop (2010)'s model predicts that gross capital flows are counter-cyclical, which is at

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[5] See, for example, Kraay and Ventura (2000), Evans and Hnatkovska (2005), Coeurdacier, Kollmann, and Martin (2010), Devereux and Sutherland (2010 and 2011), and Pavlova and Rigobon (2010a). Pavlova and Rigobon (2010b) provide a short survey of this literature.
[6] Dvorak (2003) presents similar evidence.

odds with the evidence presented in this paper. Hnatkovska (2010)'s model does predict that gross capital flows are pro-cyclical. However, it also predicts a strongly negative correlation between portfolio equity and bond inflows, which is not observed in the data.[7]

At an intuitive level, while it is possible to construct models in which productivity shocks lead to a positive correlation between gross capital flows (between *CIF* and *COD*), this does not seem the most natural effect of productivity shocks. In particular, if a negative productivity shock lowers the incentives for domestic agents to invest at home it would seem most natural that foreigners also have fewer incentives to invest in the country. That is why, we believe, models that account for the positive correlation between gross capital flows solely as a result of productivity shocks will likely have a hard time matching the different important features of the data.

The evidence presented in this paper suggests that other factors besides productivity shocks must be important determinants of gross capital flows. In addition, and unlike productivity shocks, these factors must affect foreign and domestic agents asymmetrically. One set of models introduces asymmetric information between domestic and foreign agents. For example, Brenan and Cao (1997) and Tille and Van Wincoop (2008) argue that retrenchment during crises can take place if foreign agents are less informed than domestic agents about the return of domestic assets and crises increase this informational asymmetry.[8]

Other models introduce asymmetry in asset returns depending on whether the asset is held by foreign or domestic agents. For example, in models based on sovereign risk, such as Broner, Martin, and Ventura (2010), domestic agents are less likely to be defaulted on than

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[7] Business cycle models solely driven by shocks to the nontradable sector also tend to predict counter-cyclical real exchange, as the relative abundance of nontradable goods during booms reduces their price. This prediction also seems counterfactual.

[8] See also Dvorak (2003), who emphasizes informational asymmetry both between and within countries.

foreign agents. This is because the welfare of domestic residents has a higher weight in the objective function of the government than the welfare of foreigners. Such models predict retrenchment during crises, when the probability of default increases disproportionately on foreign holders of domestic assets. More generally, all models in which crises are associated with a relative deterioration of foreigners' property rights are likely to predict retrenchment during crises.[9]

Another potential asymmetry comes from the access to liquidity during crises, with domestic agents probably becoming financially constrained relative to foreigners. The literature has shown that this asymmetry is likely to lead to fire sales of domestic firms to foreigners, and that this has happened in a number of cases.[10] Our results in this respect are mixed. We do find some evidence that FDI inflows by foreigners increase in high-income countries during severe crises, but this does not seem to be the case for developing countries.[11] Of course, this does not mean that fire sales have not taken place for some types of assets during particular episodes. But overall fire sales do not appear to be an important determinant of capital flows in the average developing-country crisis.

The rest of the paper is organized as follows. Section 2 describes the data. Section 3 characterizes the comovement of capital flows by foreign and domestic agents. Section 4 analyzes the behavior of gross capital flows over the business cycle and during crises. Section 5 concludes.

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[9] Shocks to risk aversion can also lead to retrenchment during crises if agents consider foreign assets as riskier than domestic ones. One reason for this is that the return of assets denominated in domestic currency and the domestic price level tend to be positively correlated when the nominal exchange rate is volatile. Milesi-Ferreti and Tille (2010) argue that this effect might have been the driver of the retrenchment in flows observed during the 2008 global financial crisis.

[10] See Krugman (1998), Aguiar and Gopinath (2005), Baker, Foley, and Wurgler (2009), and Acharya, Shin, and Yorulmazer (2010).

[11] We do find that FDI inflows by foreigners are more stable than other inflows. This relative stability of FDI flows has long been known for net capital flows. For a recent analysis, see Levchenko and Mauro (2007).

2.   Data

To document worldwide patterns of capital flows by domestic and foreign agents, we assemble a comprehensive dataset on aggregate gross capital flows, including not only capital inflows and outflows but also their subcomponents, reflecting the different flow types. The data come from the analytic presentation of the IMF's Balance of Payments Statistics Yearbooks (BOP).[12] The IMF's BOP dataset provides country-level data, on an annual basis from 1970 until 2009, on different types of capital inflows measured in U.S. dollars. Fundamental to our goal, this dataset allows us to disentangle, respectively, capital outflows by domestic agents (*COD*) and capital inflows by foreigners (*CIF*), which are reported as flows related to the reporting country's assets and liabilities vis-à-vis non-residents. In other words, *CIF* is recorded as capital inflows to the reporting economy by foreign agents, indicating an increase in foreigners' holdings of domestic assets. Analogously, *COD* is reported as flows from the reporting economy, where positive values correspond to an increasing of the holdings of foreign assets by domestic agents.[13] Hence a positive *COD* should be interpreted as capital outflows by domestic agents whereas a negative *COD* means capital inflows.

Our dataset also allows us to analyze the behavior of the different types of capital flows. Flows are classified as: direct investments (also known as FDI), portfolio flows, other investments (mostly bank flows and trade credit), and international reserves.[14] Portfolio flows are further divided into equity and debt flows. Both private and public flows are included in our

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[12] Debt refinancing and rescheduling entries that involve changes in existing debt contracts or replacement by new ones, generally with extended debt service payments are excluded from our dataset. In the analytic presentation of the IMF's BOP, these flows (credit and debt entries that account for the new contracts) are computed within a country's financial account as exceptional financing items. Therefore, our analysis excludes items derived from the rescheduling or refinancing of existing debt contracts as they generally do not involve new capital inflows to the reporting country.

[13] These measures however do not capture increases in foreigners' (domestic agents') holdings of domestic (foreign) assets that are due to valuation effects.

[14] Due to their relatively small size and the scarcity of data, we exclude flows in financial derivatives from our analysis.

dataset. Therefore, *CIF*, the measure of aggregate capital inflows by foreigners, is equivalent to the sum of the following inflows: direct investments in the reporting economy, portfolio investment liabilities, and other investment liabilities. Similarly, *COD* is the aggregation of outflows of direct investments abroad, portfolio investment assets, other investment assets, and international reserve assets. As our aim is to shed light on both how large and how volatile capital flows are, we scale *CIF* and *COD* and their components by trend GDP throughout the paper.[15]

Our sample of countries is based mostly on data availability. However, we exclude countries that are either very small or very poor. Small countries are a concern because they might display an artificially high volume of financial transactions due to their role as offshore financial centers or tax havens. A country is considered small if its gross national income (GNI) in 2005 was less than four billion U.S. dollars, PPP adjusted. Thirty countries are excluded from the analysis for this reason, among them Belize, Guyana, and Maldives. Poor countries generally depend heavily on official aid flows that behave differently than private capital flows, and are thus beyond the scope of our analysis. We exclude 46 countries with GNI per capita smaller than 2,000 U.S. dollars (PPP adjusted) in 2005, among them Bangladesh, Ethiopia, and Niger.[16]

We classify our final sample of 103 countries into groups according to their income levels as measured by their GNI per capita in 2005. In particular, we classify *low-income countries* as those with GNI per capita below 7,500 U.S. dollars. *Middle-income countries* include those with GNI per capita between 7,500 and 15,000 U.S. dollars. These two groups,

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[15] Trend GDP is calculated by applying the Hodrick-Prescott filter to the series of nominal GDP in U.S. dollars. Nominal GDP is obtained from the *World Development Indicators*. If data for the last years of the sample was not available, we complemented our dataset with data from the *World Economic Outlook 2009*.
[16] We used 2005 data on both GNI and GNI per capita as using more updated data would reduce significantly our sample coverage. Moreover, the ranking of countries relative to the thresholds used in this paper does not change considerably over time.

low- and middle-income countries, are more generally called *developing countries* in this paper. Lastly, *high-income countries* are those with GNI per capita above 15,000 U.S. dollars.[17]

In order to analyze capital flows around crises, we create a composite crisis indicator that takes into account banking, currency, and domestic and external debt crises on an annual basis. We consider the initial year of any of these measures of crises as the beginning of a crisis event. More precisely, a crisis period starts the year when a country experiences the beginning of a crisis (according to any of the indicators) and no other crisis has been observed in the preceding two years.

In order to obtain the starting dates of these different crises, we use several indicators available in the literature, all updated until 2009. Banking crises come from the dating of crisis periods available in Honohan and Laeven (2005), Laeven and Valencia (2008 and website update), and Reinhart and Rogoff (2009). Currency crises are identified through the methodology in Laeven and Valencia (2008), which in turn follows Frankel and Rose (1996).[18] Under this definition, a country experiences a currency crisis if there is a nominal depreciation of the exchange rate of at least 30 percent that also represents at least a 10 percent increase in the rate of depreciation over the previous year. For countries meeting this criteria for several consecutive years, only the first year within five-year windows is considered a crisis year in our analysis. Domestic debt crises are identified by the year in which Standard & Poor's downgrades the local currency debt of an economy into default. We also consider episodes identified in Reinhart and Rogoff (2009). Analogously, for external debt crises, we consider the crisis dating in Laeven and Valencia (2008) and Reinhart and Reinhart (2008) as well as Standard & Poor's downgrades of foreign currency debt and foreign currency bank loans of an economy to default levels (up to

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[17] See Appendix Table 1 for the sample coverage. First and last years of available data are reported for each country.
[18] We use just one indicator of currency crises as most indicators described in the literature are constructed using data on reserves, one of our variables of interest, hence making them less appropriate for our analysis.

2009). Appendix Table 2 lists all the crisis episodes considered in our sample.

We further classify these crises events into two different types of episodes depending on the intensity of the turmoil affecting a country. First, we define *one crisis* episodes in which a country experiences the beginning of one, and only one, type of crisis in a given year, and no other type of crisis is observed in the preceding two years. The second episode type considers periods in which a country faces the beginning of more than one type of crisis within a given year, and no such event has occurred in the previous two years. These severe episodes are called *more than one crisis*. In sum, we distinguish between mild and severe crisis episodes according to the number of different types of crises a country faces in any given year.

The final database, after the sample adjustments mentioned above, covers 103 countries over the 1970-2009 sample period. There are 39 countries classified as high-income, and 28 of these countries have experienced at least one crisis during our sample period and five countries have faced severe crisis episodes. Our sample includes 26 middle-income countries, which have experienced significantly more turmoil than high-income countries. All middle-income countries faced at least one crisis within our sample period and a total of 78 crises episodes (24 severe ones) have been observed in these countries. Lastly, 38 low-income countries are included in our empirical analysis and all but one country have gone through at least one crisis episode. In total, these low-income countries have experienced 96 crises episodes, with 27 being severe ones.

3. The Behavior of Capital Flows by Foreign and Domestic Agents

In this section, we study the behavior of gross capital flows over the past decades. As a first pass at the data, Figures 1 and 2 show the evolution over time of *CIF* and *COD* (normalized by trend GDP) for a number of developed and developing countries, respectively. The figures show a

strong positive comovement between *CIF* and *COD*, which indicates that capital inflows by foreigners and outflows by domestic agents move in tandem. Namely, when foreign investors pour capital into domestic markets, domestic agents increase their investments abroad. This correlation seems to hold during both tranquil and turbulent periods, when a retrenchment in flows is observed. The figures also suggest that gross capital flows behave very differently from net capital flows (the difference in gross capital flows). For instance, the 2008 financial crisis was characterized by a sharp drop in gross capital flows around the world, even though net flows have remained relatively stable. As a consequence, gross capital flows seem more volatile than net capital flows. In the rest of this section, we document more formally the joint behavior of *CIF* and *COD*.

Table 1 presents summary statistics of gross capital flows (total and the components, i.e. *CIF+COD, CIF*, and *COD*) and net capital flows (*CIF-COD*). It shows that gross capital flows, measured as a percentage of output, have increased over time around the world. Confirming the trends in Figures 1 and 2, these increases suggests a broad process of financial globalization with capital flows by both domestic and foreign agents rising, especially so for high- and middle-income countries. For example, *CIF* increases from about 4.8 percent (0.8 percent) of trend GDP for the median high-income (middle-income) country in the 1980s to more than 15 percent (5 percent) of trend GDP in high-income (middle-income) economies in the 2000s. Similar patterns are observed for *COD*. Nevertheless, there is no clear evidence of such a positive trend in net capital flows, despite the high attention by the literature. If anything, they have decreased over time for both high- and low-income countries. Therefore, to gauge the extent of globalization with capital flows measures it seems important to focus on gross capital flows as opposed to net capital flows.

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Table 1 also shows that over time the volatility of gross capital inflows has increased significantly, more than that of net capital flows. For high-income countries, the median standard deviation of *CIF (COD)* is 9.2 (8.1) percent of trend GDP during the 2000s, compared to 2.7 (2.3) during the 1970s. In middle- and low-income countries the increase in the volatility of gross flows is less pronounced. For example, the median standard deviation of *CIF* is 5 percent of trend GDP for middle-income countries in the 2000s, compared to 3.1 during the 1970s. In low-income countries, an even less pronounced trend is observed. The standard deviation of *COD (CIF)* goes from 2.1 (3.4) in the 1980s to 3.4 (3.9) in the 2000s.

These statistics indicate that the volatility of gross capital flows is larger for high-income countries than for middle-income countries in recent decades. These patterns stand in contrast with the well-known fact that net capital flows are more volatile in developing countries, which is also observed in our analysis. The median standard deviation of net capital flows is 3.9 and 5.6 for high- and middle-income countries, respectively, over the entire sample period. In contrast to the observed patterns in gross capital flows, the volatility of net capital flows has remained relatively stable over the past three decades for countries across all income levels. Thus, the standard deviation of net capital inflows in middle-income countries reaches 3.9 during the 1970s, increases to 4.2 in the 1990s, and declines back to 3.9 in the 2000s. In high- and low-income countries, the volatility of flows has increased slightly over time. In low-income countries, the standard deviation of net flows is 4.1 percent of trend GDP in the 1980s and reaches 4.4 in the 2000s.

The statistics in Table 1 suggest that gross capital flows are not only increasingly larger, but also increasingly are more volatile, with the difference with respect to net capital flows growing over time. This pattern is observed for high-income countries over the whole sample

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and for middle-income countries during the 2000s. For example, as shown in Table 1, the median standard deviation of *COD* and *CIF* for high-income countries is 8.1 and 7.8 percent of trend GDP, respectively, a much larger statistics than the standard deviation of net flows, 3.9 percent of trend GDP. If one considers only the 2000s, the differences are even larger. In middle-income countries, the standard deviation of net flows is also smaller than that of gross capital flows by both foreign and domestic agents during the 2000s. In contrast, the volatility of net capital flows is actually higher than that of its disaggregated components during the 1970s, 1980s, and 1990s. Likely reflecting the more closed capital accounts and greater restrictions on foreign investments by domestic agents in those countries, especially in the first half of our sample, the volatility of net flows is larger than that of gross capital flows throughout our entire sample for low-income countries.

The patterns documented above suggest an increasing importance of gross capital flows, particularly starting in the 2000s. Figure 3 further illustrates how gross flows have increased over time while net capital flows have remained relatively stable. The figure shows ellipses corresponding to the bivariate Gaussian distribution of *COD* and *CIF*. Each ellipsis summarizes the distribution of the observations (one per country-year) separately for the 1980s, 1990s, and 2000s. The ellipses are centered at the mean of these variables and their shape is given by their covariance matrix. The main axes of the ellipses are given by the first and second principal components of the covariance matrix, while the boundaries of the ellipses capture two standard deviations, hence encompassing 86% of the total probability mass. An increase in size in these ellipses along the inverted 45-degree line shows an increase in gross capital flows, whereas the distance between the boundaries of the ellipses and this inverted 45-degree line indicates the magnitude of net capital flows. Notice that the inverted 45-degree line in Figure 3 captures

country-year observations in which net capital flows are zero, i.e. *COD* is equal to *CIF*. Thus, Figure 3 shows that capital flows by both foreign and domestic agents have increased steadily over time, and especially so in the 2000s, while net flows have not changed considerably over time.

Our results so far support a generalized process of financial globalization with capital flows by both foreign and domestic agents increasing significantly over time, particularly since the 1990s. We next assess whether this suggested positive correlation between *CIF* and *COD* indeed holds when performing a cross-country and time-series comparison over the four decades under study. More formally, we estimate the following regressions:

$$CIF_{c,t} = \alpha + \beta \cdot COD_{c,t} + Controls + \varepsilon_{c,t}, \qquad (1)$$

$$COD_{c,t} = \alpha + \beta \cdot CIF_{c,t} + Controls + \varepsilon_{c,t}, \qquad (2)$$

where *Controls* stand for additional control-variables such as country trends. To prevent the estimates from being driven by individual countries, *CIF* and *COD* are not only scaled by trend GDP, but also further standardized by de-meaning and scaling by their corresponding standard deviations on a country-by-country basis. The results are reported in Table 2, where countries are once more split in our three income groups. We present estimations for the whole sample as well as for each of the decades under analysis.

The estimations provide robust evidence that *CIF* is positively correlated with *COD*. In other words, when foreigners invest in a country, its domestic agents invest abroad. Such a positive correlation generates an expansion in financial globalization, in which a country's international assets and liabilities expand. Conversely, when foreign capital leaves, domestic capital placed abroad is repatriated. In other words, a *retrenchment* in gross capital flows is observed. In line with the graphical evidence, the positive comovement between gross capital

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flows has increased over time, as the magnitude of the coefficients increases. Moreover, the estimated coefficient increases with countries' income level. The estimated coefficient for low-income countries is 0.27, while the same parameter is 0.44 for middle-income countries and 0.78 for high-income countries.[19]

In sum, the evidence in this section suggests that capital flows by domestic and foreign agents have become increasingly large and volatile, surpassing the size and, in most cases, the volatility of net capital flows. Furthermore, *CIF* and *COD* are positively correlated. In other words, there are periods of *globalization* and periods of *retrenchment*. We investigate next the cyclical properties of gross capital flows and their behavior around financial crises.

4.   The Cyclical Behavior of Gross Capital Flows

In the previous section, we showed that capital inflows by foreigners and outflows by domestic agents are positively correlated. In this section, we explore the cyclical properties of gross capital flows by analyzing the behavior of *CIF* and *COD* over the business cycle and around crises. We provide empirical evidence that periods of financial globalization tend to occur during economic expansions and retrenchment periods tend to occur during contractions or crises.

4.1   Gross Capital Flows over the Business Cycle

To analyze the cyclical properties of gross capital flows, we estimate the following equations:

$$Y_{c,t} = \alpha + \beta \cdot X_{c,t} + Controls + \varepsilon_{c,t}, \tag{3}$$

where $Y_{c,t}$ stands for *CIF*, *COD*, or a measure of aggregate gross flows (*CIF+COD*); $X_{c,t}$ represents either net capital flows, the trade balance in goods and services, or a measure of GDP

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[19] Similar estimates are obtained if a different set of controls is used. If year dummies are included the results are qualitatively similar, although point estimates decrease, suggesting the presence of systemic or aggregate effects.

fluctuations; and *Controls* stand for additional control variables such as country trends, as above. In these regressions, net capital flows are calculated using the standardized versions of *CIF* and *COD*. The trade balance in goods and services is also scaled by trend GDP, demeaned and standardized by its standard deviations at the country level.[20] Our measure of business cycles is based on real GDP in constant units of local currency.[21] More specifically, we use the growth rates in real GDP, which should capture accurately the current state of the economy over the business cycle.[22]

The results are reported in Table 3. They show that net capital inflows are strongly associated with capital inflows by foreigners for all income groups. For high-income countries, they are also strongly correlated with capital outflows by domestic agents. However, such association is not as strong in middle- and low-income countries, where larger coefficients are estimated for *CIF*. Note that net capital flows are calculated as the difference between *CIF* and *COD*, and are thus, by construction, correlated with our dependent variables. To partly avoid this correlation, we use the trade balance in goods and services as an alternative measure of capital flows to the extent that it captures the other side of the balance of payments. The estimated coefficients confirm the previous results. The trade balance is strongly correlated with capital flows by foreigners, and more so than flows by domestic agents in middle- and low-income countries.

Regarding the dynamics of gross capital flows during the business cycles, we find that gross capital flows expand during good times, while during bad times, they decline. In other

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[20] The data on the trade balance are from the IMF's *Balance of Payment Statistics Yearbooks*.
[21] Real GDP in constant units of local currency comes from the World Bank's *World Development Indicators*. This information was complemented with data from the IMF's *World Economic Outlook 2009* if the data from the original source were missing.
[22] As an alternative measure of business cycles, we also considered a measure of output gap based on the Hodrick-Prescott filter. The results were qualitatively similar to the ones reported here.

words, we find that not only capital flows by foreigners are pro-cyclical. Capital outflows by domestic agents are also pro-cyclical, with domestic agents investing more abroad in good times when the domestic economy is above potential or is growing in real terms. As a consequence, as shown by the estimated coefficients on *CIF+COD*, expansions in financial globalization, in which a country's international assets and liabilities expand, are observed during good times. Analogously, during downturns in economic activity, there is retrenchment in gross capital flows.

The evidence in Table 3 expands the widely-documented pro-cyclicality of net capital inflows. During booms, foreigners increase their purchases of domestic assets and domestic agents augment their investments abroad. These patterns suggest that changes in net capital inflows are driven mostly by foreigners in developing economies; with domestic agents' behavior being most relevant for the behavior of net flows in high-income countries.

4.2   Gross Capital Flows during Crises

To analyze how gross capital flows behave during crises, we start by providing some descriptive statistics comparing the behavior of *CIF* and *COD* during turbulent and tranquil periods. Turbulent periods are defined as those falling within a five-year window around each crisis episode.

Table 4 shows that both capital inflows by foreigners and capital outflows by domestic agents decline during turbulent periods for countries from all income groups. For example, *CIF* falls by almost 50 percent for high-income countries while *COD* decreases by about 65 percent. Similarly, declines between 40 and 50 percent of trend GDP in gross capital flows are observed in low-income countries. In middle-income countries, the retrenchment in gross capital flows is

even stronger – *CIF* declines from inflows of 7.2 percent of trend GDP to actual outflows of 2.6 percent of trend GDP and *COD* goes from outflows of 6.5 percent of trend GDP to inflows of 2.6 percent of trend GDP.[23]

Despite the similarities in the dynamics of gross capital flows among countries from all income levels, the behavior of net capital flows is rather contrasting. While net capital inflows increase during crises for high-income countries, middle- and low-income countries face a decline in net capital inflows. This evidence is consistent with retrenchment by domestic agents being stronger than that of foreigners in high-income countries but weaker in developing economies.

An event study analysis of gross capital flows around crises reinforces the evidence above. For this exercise, we focus on the dynamics of *CIF* and *COD* not only during the crisis years, but also in the run-up to crises and the immediate aftermath by analyzing the two years preceding and following crises. We estimate the following equation:

$$Y_{c,t} = \alpha + \sum_{i=-2}^{i=2} \beta_i \cdot Crisis_{c,t+i} + Controls + \varepsilon_{c,t},$$ (4)

where $Y_{c,t}$ stands for our standardized measures of *CIF* or *COD*; *Crisis* is the composite crisis indicator; and *Controls* capture the additional control variables such as country trends.[24] Once more, we perform the analysis by pooling countries according to their income level.

The estimates are presented in Table 5 and Figure 4. They provide robust evidence of retrenchment, that is, capital flows by both foreign and domestic agents decline for countries from all income groups. In particular, both *CIF* and *COD* are negative and statistically different

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[23] To the extent that official flows are unlikely to decline during crises, the milder reaction of capital flows in low-income countries when compared to middle-income ones might be explained by the relative size of these flows.
[24] We report results with country trends as controls only, but our results are qualitatively similar if we add year dummies as controls as well.

than zero during the crisis years for countries in all income groups, except for *CIF* in high-income countries. Table 5 also presents Wald statistics that test if the behavior of flows during the crisis years or in the immediate aftermath was significantly different from the one observed in the run-up. The Wald tests show that the decline in capital inflows by foreigners and capital outflows by domestic agents during the crisis years (in comparison to the average flow in the previous two years) is statistically significant for all income levels, including *CIF* in high-income countries. Furthermore, the Wald tests show that gross capital flows remain at depressed levels, or decline even further, during the two-year period after the onset of the crisis.

Figure 4 shows that the median retrenchment in gross capital flows around crises is rather large. For instance, *CIF* in high-income countries on average declines from inflows of 5.5 percent of trend GDP during the pre-crisis year to outflows of 4.3 percent during the first post-crisis year. In middle-income countries, these flows reverse from 0.4 to -2.5 percent of trend GDP over the same period. In low-income countries, *CIF* declines from around 0.2 percent of trend GDP during the two years preceding the turmoil period to around -1.7 percent of trend GDP during the year following the onset of the crisis. Similar numbers are estimated for *COD*.

The analysis so far has included the global financial crisis that hit countries in 2008. However, the empirical evidence in Milesi-Ferretti and Tille (2010) suggests that this latest crisis has been marked by a significant decline in capital flows around the world. A re-estimation of equation (4) around this episode, reported in the top panel of Table 6, reproduces their findings. The Wald tests suggest a significant retrenchment in capital flows during in 2008 and the following year in comparison to the pre-crisis period for all income groups.

To test if the 2008 global financial crisis is driving our results and as a robustness exercise, we re-estimate our event study analysis excluding this episode. The results are reported

in the bottom panel of Table 6 and show that our previous results stand and remain statistically and economically significant. Both *CIF* and *COD* decline significantly during the crisis year and, according to the Wald tests, are statistically smaller than their average during the preceding two years. Also consistent with our previous results, gross capital flows during the post-crisis period remain at depressed levels in comparison to the run up to crises. In sum, the results in Table 6 show that the behavior of foreign and domestic agents during the recent financial crisis is in line with their behavior during previous crisis episodes, with estimates confirming a generalized retrenchment of gross capital flows around these events. Hence, for the remainder of the paper, we proceed with the analysis of the data based on our entire sample period, from 1970 to 2009.

Thus far we have considered a single crisis indicator that pools together several types of financial crises for a particular country in a given year. We extend this analysis by considering the intensity of the turmoil episodes and distinguishing mild and severe crisis episodes.[25] In particular, as described in Section 2, we classify crisis events into: *one crisis* episodes, in which a country experiences the beginning of one, and only one, type of crisis in a given year; and *more than one crisis* episodes, in which a country faces the beginning of more than one type of crisis within a given year. We estimate the following equation, which adapts equation (4) to these two indicators:

$$Y_{c,t} = \alpha + \sum_{i=-2}^{i=2} \beta_{1,i} \cdot One\,Crisis_{c,t+i} + \sum_{i=-2}^{i=2} \beta_{2,i} \cdot More\,One\,Crisis_{c,t+i} + Controls + \varepsilon_{c,t}, \quad (5)$$

where $Y_{c,t}$ stands for our standardized measures of *CIF* or *COD*; *One Crisis* corresponds to the *one crisis* indicator; *More One Crisis* stands for the *more than one crisis* indicator; and *Controls* capture additional control variables such as country trends.

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[25] De Paoli, Hoggarth, and Saporta (2009) show that twin crises feature larger output losses than milder episodes.

The estimates for equation (5) are reported in Table 7 and Figure 5. The results suggest a significant retrenchment in gross capital flows; both domestic and foreign agents decline their cross-country outflows around both mild and severe crisis episodes for all income groups. During *one crisis* episodes, *CIF* and *COD* decline at the onset of the crisis as well as in its aftermath, and even more so for high-income countries, if compared to the two years before the crisis. Similar statistically significant results are found around *more than once crisis* episodes. Wald tests reported in Table 7 show that *CIF* and *COD* are significantly smaller during the crisis year relative to the pre-crisis average for countries from all income groups in our sample. The results however suggest that the fall in capital flows by domestic agents in the aftermath of severe crises is more short-lived and reversed during the following two years. Wald tests reject that *COD* is statistically different in the aftermath of the turmoil episode if compared to its pre-crisis values.

The retrenchment in gross capital flows is not only statistically but also economically significant as shown in Figure 5. In high-income countries, *CIF* reversers from 5.2 percent of trend GDP in the year preceding *one crisis* episodes in the average country to less than -4.4 percent of trend GDP in the first year after the onset of the crisis, suggesting a collapse in flows of over 9 percentage points. Domestic agents behave similarly during these episodes. This retrenchment in gross capital flows around mild crisis episodes is also large in middle-income countries, where a decline of almost 4 percentage points takes place on average during the five-year window around mild crisis episodes, and slightly milder in low-income countries, with declines of about 1 percentage point of trend GDP over the same period. During *more than one crisis* episodes, similar patterns are observed. Capital inflows by domestic agents decline from 15.7 percent of trend GDP in high-income countries to about 4 percent in the aftermath of the

crisis year, implying a collapse of flows of about 11.5 percentage points. In middle-income countries, *COD* declines around 5 percentage points of trend GDP during the crisis year if compared with the previous two years. Once more, a milder decline of 2 percentage points over the same period is observed in low-income countries.

Figure 5 also suggests that the reaction of domestic and foreign agents might be stronger during severe crisis episodes. *More than one crisis* episodes lead to significant retrenchment in capital flows by foreign and domestic agents during the crisis year and a significant fall by foreign agents during the following two years. Wald tests reported in Table 7 shows that this graphical evidence is statistically significant for middle- and low-income countries.[26]

Overall, the results reported in Table 7 and Figure 5 show that the retrenchment in gross capital flows takes place not only around severe crises but also around mild ones. Furthermore, these estimations suggest that such a retrenchment by domestic and foreign agents is indeed a stylized fact regarding the dynamics of gross capital flows during crises.

4.3   The Dynamics of the Subcomponents of Gross Capital Flows

In this section, we analyze whether the patterns of gross capital flows documented above are widespread across flow types or driven by a single type of flow. This is important because some types of flows might behave in particular ways. For example, reserves are likely to play an important role, especially in developing countries trying to stabilize their exchange rates. We show that the observed patterns of gross capital flows are indeed present in most subcomponents of gross capital flows.

We start by discussing the relative size and evolution of the different subcomponents of

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[26] The test results for high-income countries are less robust probably because of the low number of severe episodes, only five in our sample.

gross capital flows over the past decades. A decomposition of gross flows into portfolio investment flows, other investments, and direct investment flows suggest that their relative importance varies across income levels. Table 8 presents summary statistics. In high-income countries, other investment flows are the largest subcomponent of both *CIF* and *COD*, representing almost 50 percent and 40 percent, respectively. In contrast, in developing countries around half of *CIF* takes the form of direct investments. For example, the median middle-income (low-income) country received FDI of 2.2 (2.5) percent of trend GDP in comparison to portfolio investments of 0.6 (0.1) percent and other investments of 1.6 (1.9) percent. On the other hand, international reserves represent 46 (58) percent of COD in middle-income (low-income) countries.

Although the striking increase in gross capital flows over time is evident in Table 8, it has not taken place across all types of flows. Other investment flows capture the bulk of the increase in *CIF* in high-income countries, whereas *FDI* flows have increased the most for developing countries since the 1990s. If anything, in low-income countries, other investment flows by foreign agents have actually decreased since the 1980s. Regarding *COD*, other investment flows have increased considerably during the 2000s for all income groups. Still, for developing countries, the expansion of international reserves explains a large part of the increase in *COD*.

In sum, these summary statistics suggest that the dynamics of gross capital flows around crises might be driven by different types of flows in different income groups. [27]

In order to assess the relevance of the various flow types on the dynamics of aggregate

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[27] Also the evidence on the volatility of the different types of flows sheds light on their dynamics. Other investment flows by foreigners are the most volatile flow type for all income levels. This stands in contrast to existing perceptions that portfolio flows are the most volatile type of flow. In fact, the volatility of these flows is similar across high- and middle income countries. Similar patterns are observed for other investment flows by domestic agents. Their standard deviation is larger than that of portfolio outflows or direct investments abroad for all income groups. International reserves nevertheless are slightly more volatile in developing countries.

gross capital flows during periods of financial distress, we re-estimate equation (5) separately for each component of *COD* and *CIF*. The results for high-, middle-, and low-income countries are reported in Tables 9A through 9C, respectively. The estimations strongly suggest asymmetric effects across both components of capital flows and income levels.

The results on the different components of *CIF* reflect partly the relative size of the different flows. The statistically significant decline in other investment flows by foreigners during both mild and severe episodes is a regular pattern for countries from all income groups. Nevertheless, contrasting patterns arise for other flow types. For instance, while portfolio debt inflows decline during the post-crisis periods of both mild and severe crises in high- and low-income countries; in middle-income countries, these inflows remain relatively stable within our five-year windows around *one crisis* episodes, but significantly decrease around severe episodes. Furthermore, portfolio equity inflows do not fall considerably in middle-income countries around severe crisis episodes, whereas they actually decline in high- and low-income countries. During mild episodes, these flows contract in high- and middle-income countries but not in low-income ones. Lastly, foreign direct investments decline only in response to mild crisis episodes, remaining relatively stable, or even increasing, during severe crisis episodes in high-income countries. In contrast, FDI inflows are relatively stable during mild crises in low-income countries and tend to decline during severe crises. Middle-income countries are somewhere in between, with significant declines during both mild and severe crisis episodes. Overall, portfolio debt inflows and other investment inflows drive most of the decrease in *CIF* during *more than one crisis* episodes, especially in high- and middle-income countries. The patterns for *one crisis* events are more diffuse, varying among income levels, though other investment flows still play a significant role.

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Regarding the subcomponents of *COD*, the differences across countries are even more striking. In high-income countries, all flow types but those related to international reserves fall around *one crisis* episodes, international reserve flows contract significantly in middle-income countries. During *more than one crisis* episodes, international reserves decline in both low- and middle-income countries. The selloff of foreign assets by domestic agents in middle- and low-income countries is, however, not concentrated in international reserves. For middle-income countries, there is also a significant decline in direct investments abroad and portfolio outflows during severe crises episodes and a decline in portfolio equity and other investment outflows during mild crisis episodes. In contrast, low-income countries face only a contraction in other investment outflows in severe crises years. During mild crises, there is a weak decrease in portfolio equity and other investment outflows. In sum, while high-income countries do not sell their international reserve assets during turbulent periods, less developed countries, and especially middle-income ones, make a buffer use of international reserves. Other investment outflows and direct investment abroad are the other flow types mostly driving the aggregate dynamics of *COD*.

5.   Conclusions

This paper provides a number of important stylized facts on the dynamic behavior of gross capital flows by domestic and foreign agents. We have shown that: (i) while the volatility of gross capital flows has increased over time, this increase has not translated in the same magnitude into more volatile net capital flows, since *CIF* and *COD* are highly positively correlated; (ii) gross capital flows are pro-cyclical, with *CIF* and *COD* increasing during expansions; (iii) total gross capital flows retrench significantly during crises, especially severe

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ones, and during economic downturns; and (iv) the behavior of gross capital flows during crises is not driven by a single component, although international reserves play an important role in middle- and low-income countries and debt flows play an important role in advanced and middle-income countries.

The identified behavior of gross capital flows allows us to shed light on the sources of fluctuations in economies open to capital flows. The evidence runs contrary to the view that capital flows are mostly driven by productivity shocks, since such shocks would generally imply a similar behavior towards domestic assets by foreigners and domestic agents. More generally, our empirical evidence points to crises affecting foreign and domestic agents asymmetrically. Examples of models where such asymmetry plays an important role include models with asymmetric information and models of sovereign risk. Interestingly, we also find little evidence that, on average, gross capital flows are driven by fire sales of domestic assets to foreigners and/or domestic capital flight.

Regardless of our own specific interpretation of the evidence, it is clear that it is not possible to reject or prove right general classes of models. Still, given the importance of gross capital flows, the stylized facts we provide in this paper will help judge the relevance of existing and future theories of international to capital flows.

References

Acharya, V., H. Shin, and T., Yorulmazer, 2010. "Crisis Resolution and Bank Liquidity." NYU Working Paper FIN-08-035.

Aguiar, M., and G. Gopinath, 2005. "Fire-Sale Foreign Direct Investment and Liquidity Crises." *The Review of Economics and Statistics* 87(3), 439-452.

Backus, D., P. Kehoe, and F. Kydland. 1995. "International Business Cycles: Theory and Evidence." in *Frontiers of Business Cycle Research*, ed. T. Cooley. Princeton University Press.

Baker, M., F. Foley, and J. Wurgler, 2009. "Multinational as Arbitrageurs: The Effect of Stock Market Valuations on Foreign Direct Investment." *Review of Financial Studies* 22(1), 337-369.

Brennan, M., and H. Cao, 1997. "International Portfolio Equity Flows." *Journal of Finance* 52, 1851-1880.

Broner, F., A. Martin, and J. Ventura, 2010. "Sovereign Risk and Secondary Markets." *American Economic Review* 100, 1523-55.

Broner, F., and R. Rigobon, 2006. "Why are Capital Flows so Much More Volatile in Emerging than in Developed Countries?" in *External Vulnerability and Preventive Policies*, ed. R. Caballero, C. Calderón, and L. Céspedes, 15-40. Central Bank of Chile.

Calvo, G., 1998. "Capital Flows and Capital-Markets Crises: The Simple Economics of Sudden Stops." *Journal of Applied Economics* 1(1), 35-54.

Calvo, G., A. Izquierdo, and L. Mejía, 2008. "Systemic Sudden Stop: The Relevance of Balance-Sheet Effects and Financial Integration." NBER Working Paper 14026.

Cavallo, E., and J. Frankel, 2008. "Does Openness to Trade Make Countries More Vulnerable to Sudden Stops, or Less? Using Gravity to Establish Causality." *Journal of International Money and Finance* 27, 1430-1452.

Choe, H., B. Kho, and R. Stulz, 2005. "Do Domestic Investors Have an Edge? The Trading Experience of Foreign Investors in Korea." *Review of Financial Studies* 18(3), 795-829.

Coeurdacier, N., R. Kollmann, and P. Martin, 2010. "International Portfolios, Capital Accumulation and Foreign Assets Dynamics." *Journal of International Economics* 80, 100-112.

Cowan, K., J. De Gregorio, A. Micco, and C. Neilson, 2008. "Financial Diversification, Sudden Stops, and Sudden Starts," in *Current Account and External Finance,* ed. K. Cowan, S. Edwards, R. Valdés, and N. Loayza, 159-194. Central Bank of Chile.

De Paoli, B., G. Hoggarth, and V. Saporta, 2009. "Output Costs of Sovereign Crises: Some Empirical Estimates." Bank of England Working Papers 362.

Devereux, M., 2007. "Financial Globalization and Emerging Market Portfolios." *Monetary and Economic Studies* 25, 101-30.

Devereux, M., and A. Sutherland, 2010. "Valuation Effects and the Dynamics of Net External Assets." *Journal of International Economics* 80, 129-143.

Devereux, M., and A. Sutherland, 2011. "Country Portfolios in Open Economy Macro Models." *Journal of the European Economic Association 9(2), 337-369.*

Dornbusch, R., I. Goldfajn, and R. Valdés, 1995. "Currency Crises and Collapses." *Brooking Papers on Economic Activity* 1995(2), 219-270.

Dvorak, T., 2003. "Gross Capital Flows and Asymmetric Information." *Journal of International Money and Finance* 22, 835-864.

Evans, M., and V. Hnatkovska, 2005. "International Capital Flows Returns and World Financial Integration." NBER Working Paper No. 11701.

Faucette, J., A. Rothenberg, and F. Warnock, 2005. "Outflows-Induced Sudden Stops," *Journal of Policy Reform* 8, 119-29.

Forbes, K., and F. Warnock, 2011. "Capital Flow Waves: Surges, Stops, Flight and Retrenchment." Mimeo.

Frankel, J., and A. Rose, 1996. "Currency Crashes in Emerging Markets: An Empirical Treatment." *Journal of International Economics* 41, 351-66.

Frankel, J., and S. Schmukler, 1996. "Country Fund Discounts and the Mexican Crisis of December 1994: Did Local Residents Turn Pessimistic Before International Investors?" *Open Economies Review* 7, 511-34.

Gourinchas, P., and H. Rey, 2007a. "From World Banker to World Venture Capitalist: U.S. External Adjustment and the Exorbitant Privilege." in *G7 Current Account Imbalances: Sustainability and Adjustment,* ed. R. Clarida, 11-66. NBER.

Gourinchas, P., and H. Rey, 2007b. "International Financial Adjustment." *Journal of Political Economy* 115, 665-703.

Hnatkovska, V., 2010. "Home Bias and High Turnover: Dynamic Portfolio Choice with Incomplete Markets." *Journal of International Economics* 80, 113-28.

Honohan, P., and L. Laeven, 2005. *Systemic Financial Crises: Containment and resolution.* Cambridge University Press.

Kaminsky, G., S. Lizondo, and C. Reinhart, 1998. "Leading Indicators of Currency Crises." *IMF Staff Papers* 45, 1-48.

Kim, W., and S. Wei, 2002. "Foreign Portfolio Investors Before and During a Crisis." *Journal of International Economics* 56, 77-96.

Kraay, A., N. Loayza, L. Servén, and J. Ventura, 2005. "Country Portfolios." *Journal of the European Economic Association* 3, 914-45.

Kraay, A., and J. Ventura, 2000. "Current Account in Debtors and Creditors Countries," *Quarterly Journal of Economics* 115, 665-703.

Krugman, P., 1998. "Fire-Sale FDI." Princeton University Notes.

Laeven, L., and F. Valencia, 2008. "Systemic Banking Crises: A New Database." IMF Working Paper 224.

Lane, P., and G. Milesi-Ferretti, 2001 "Long-Term Capital Movements." *NBER Macroeconomics Annual 2000*, 73-116. NBER.

Lane, P., and G. Milesi-Ferretti, 2007. "The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970-2004." *Journal of International Economics* 73, 223-50.

Levechenko, A., and P. Mauro, 2007. "Do Some Forms of Financial Flows Protect from Sudden Stops?" *World Bank Economic Review* 21, 389-411.

Mendoza, E., forthcoming. "Sudden Stops, Financial Crises, and Leverage." *American Economic Review.*

Milesi-Ferretti, G., and C. Tille, 2010. "The Great Retrenchment: International Capital Flows During the Global Financial Crisis." IHEID Working Papers 18-2010.

Pavlova, A. and R. Rigobon, 2010a. "An Asset-Pricing View of External Adjustment." *Journal of International Economics* 80, 144-156.

Pavlova, A., and R. Rigobon, 2010b. "International Macro-Finance." NBER Working Paper No. 16630.

Reinhart, C., and V. Reinhart, 2008. "Capital Flow Bonanzas: An Encompassing View of the Past and Present." CEPR Discussion Papers 6996.

Reinhart, C., and K. Rogoff, 2009. *This Time is Different: Eight Centuries of Financial Folly*. Princeton University Press.

Rothenberg, A., and F. Warnock, forthcoming. Sudden Flight and True Sudden Stops." *Review of International Economics.*

Tille, C., and E. van Wincoop, 2008. "International Capital Flows." *Journal of International Economics* 80, 157-75.

Tille, C., and E. van Wincoop, 2010. "International Capital Flows under Dispersed Information: Theory and Evidence." NBER Working Paper No. 14390.

Figure 1
Capital Flows in High-Income Countries
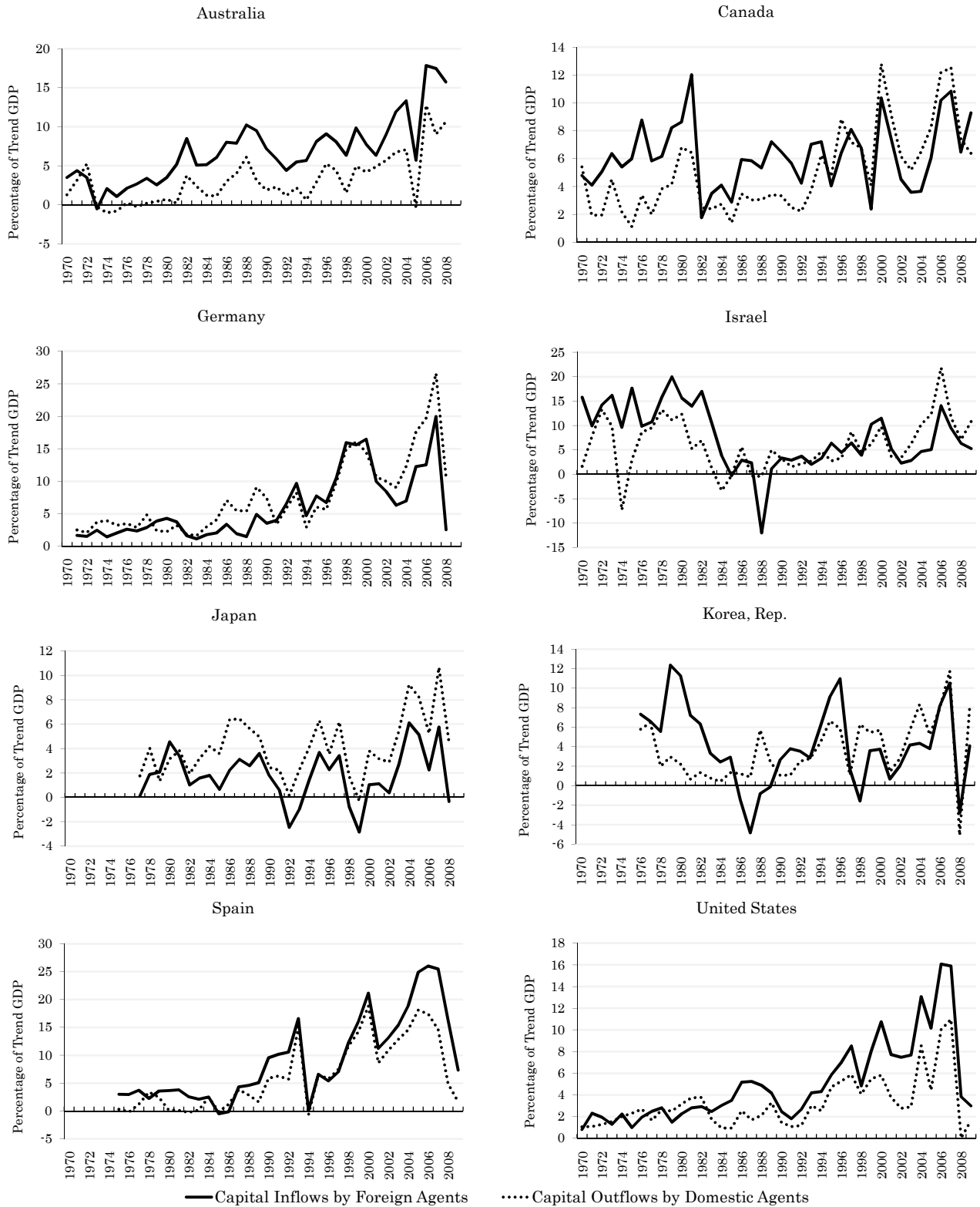
The figure shows the evolution of capital inflows by foreign agents (*CIF*) and capital outflows by domestic agents (*COD*) as a percentage of trend GDP for a select sample of high-income countries from 1970 until 2009.

Figure 2
Capital Flows in Low- and Middle-Income Countries
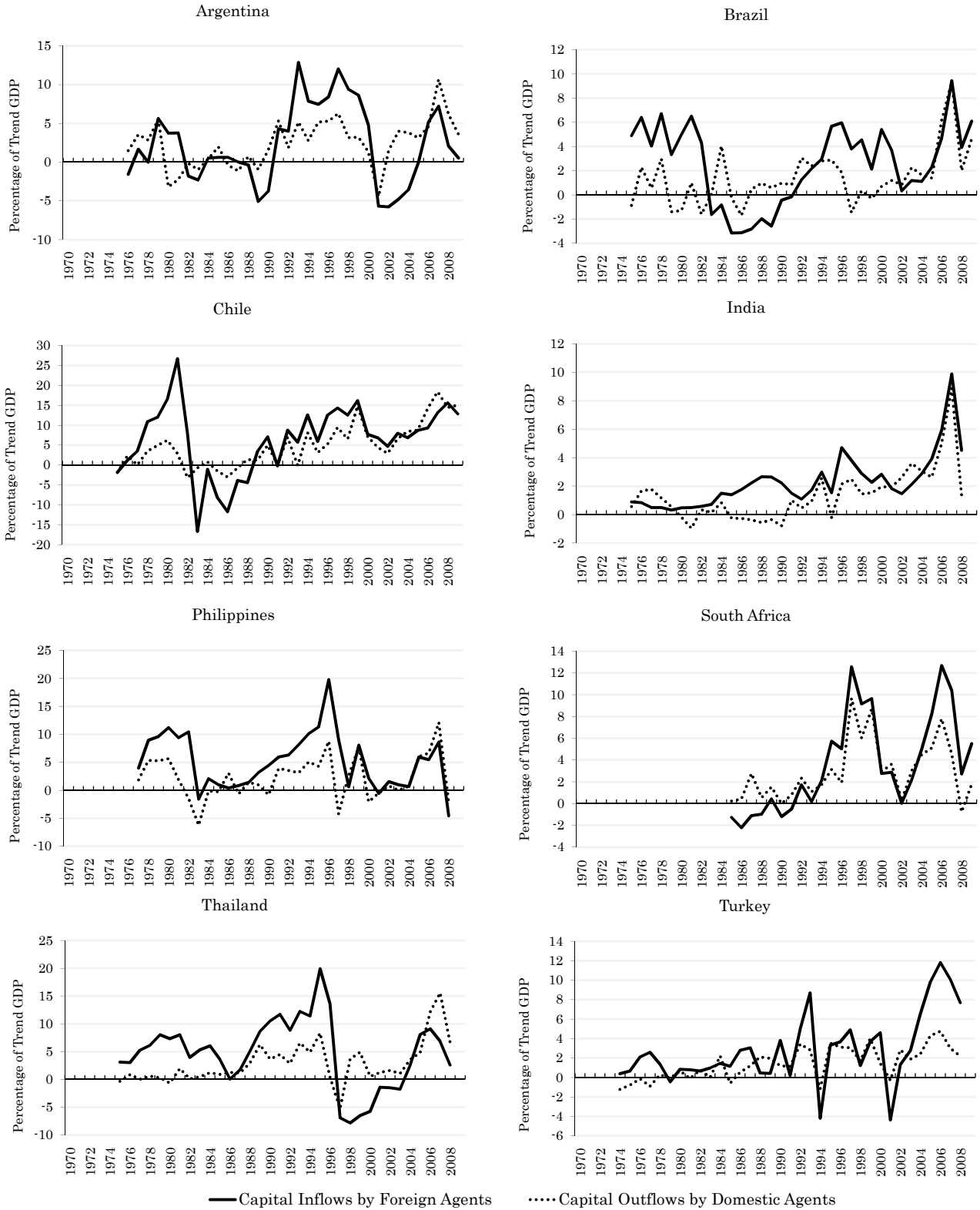
——Capital Inflows by Foreign Agents   ·····Capital Outflows by Domestic Agents

The figure shows the evolution of capital inflows by foreign agents (*CIF*) and capital outflows by domestic agents (*COD*) as a percentage of trend GDP for a select sample of low- and middle-income countries from 1970 until 2009.

Figure 3
Joint Distribution of Capital Flows
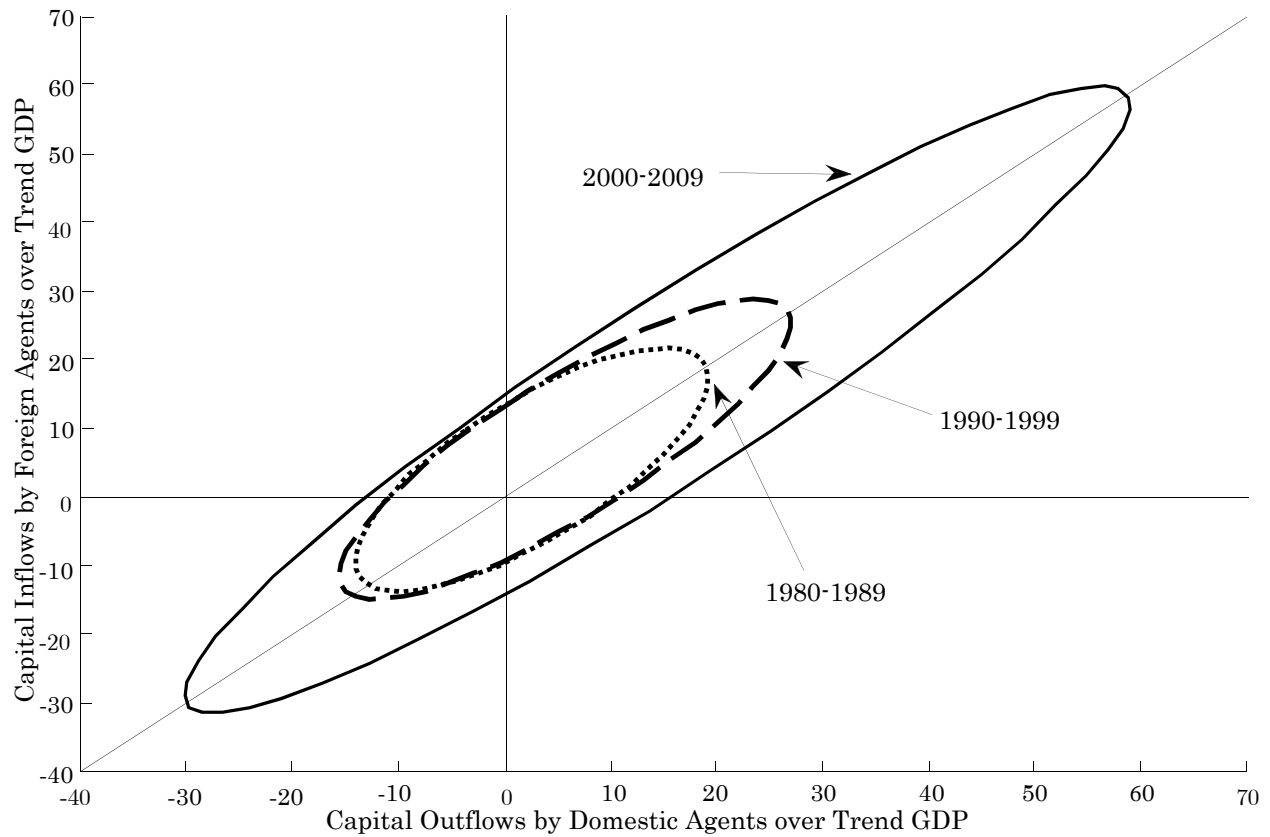
The figure shows ellipses that account for the joint distribution of capital flows by foreign and domestic agents. One ellipsis for each decade is reported. Each ellipsis captures 103 points and each one point represents the average for that decade for a country in our sample. Capital flows are scaled by trend GDP.

Figure 4

Capital Flows around Crises
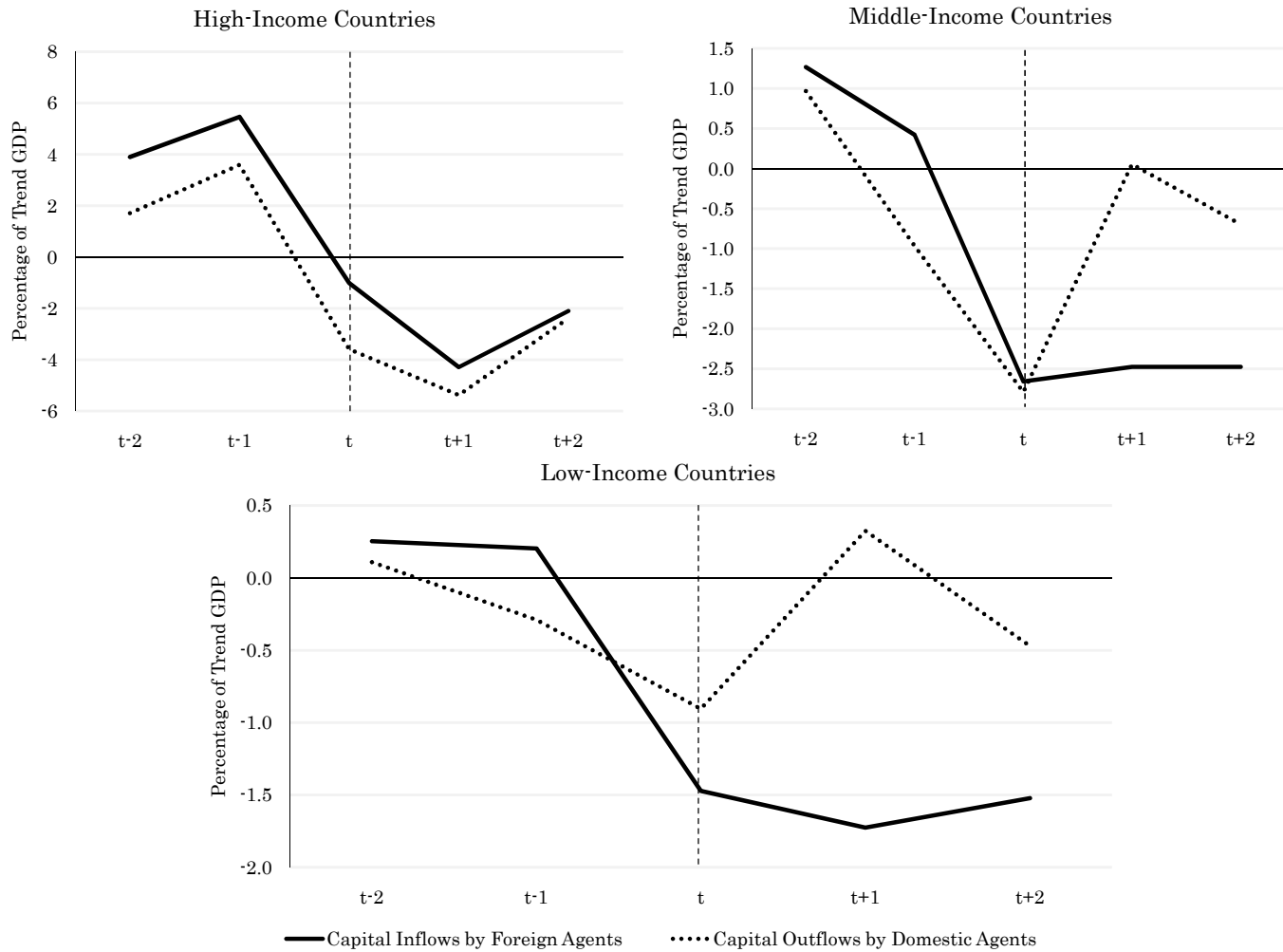
The figure shows the economic significance of the regression coefficients in the event study analyses of capital inflows by foreign agents (*CIF* and capital outflows by domestic agents (*COD*) around five-year windows of crisis periods. These regressions are reported in Table 5. The economic significance is defined as the product of the estimated coefficient and the median one standard deviation of the non-standardized version of the dependent variable across countries with at least one crisis during the period of analysis. Capital flows are first normalized by trend GDP and then standardized by de-meaning and dividing by the standard deviation at the country level. The sample period is from 1970 to 2009.

Figure 5
Capital Flows around Crises of Different Intensities

One Crisis
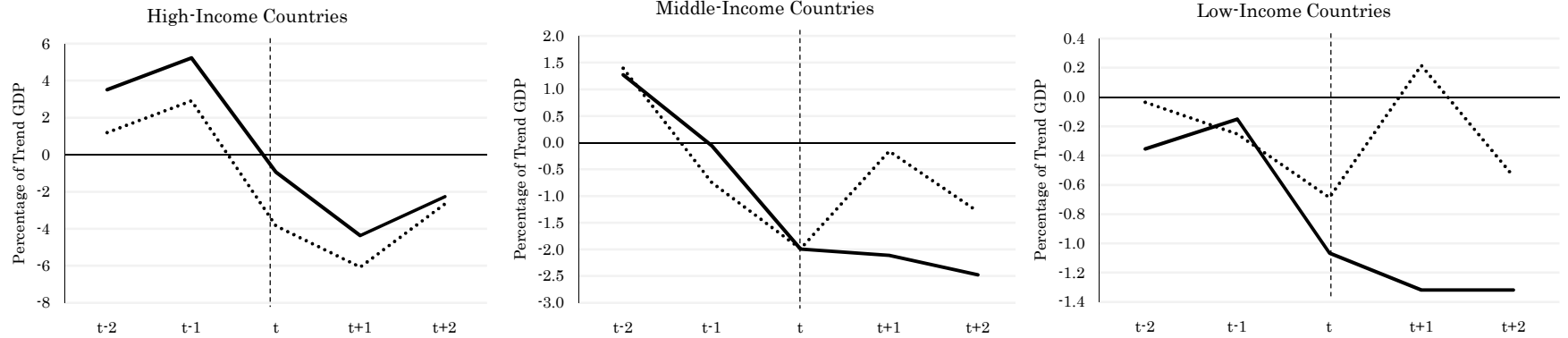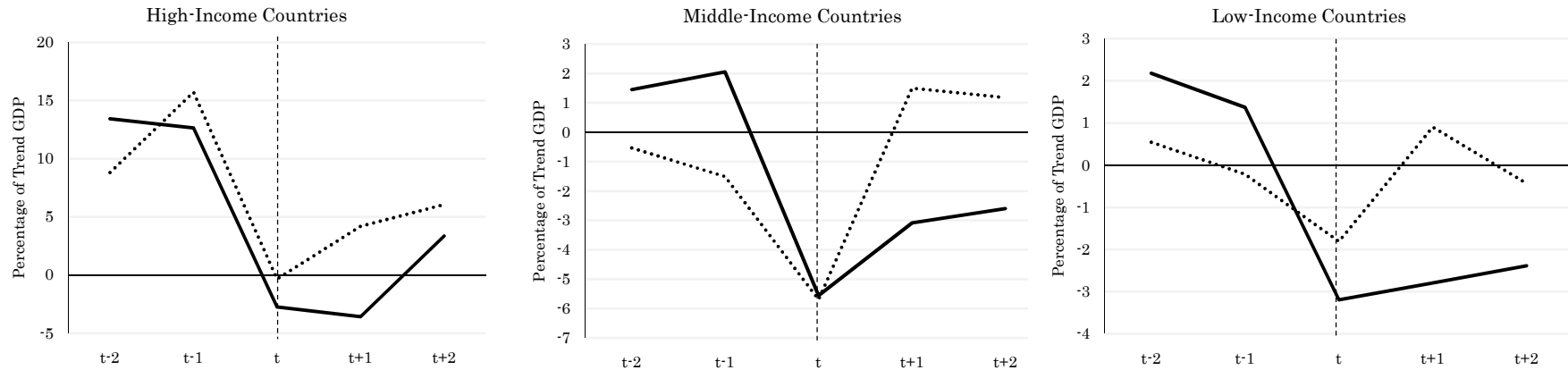
High-Income Countries   Middle-Income Countries   Low-Income Countries

More than One Crisis

High-Income Countries   Middle-Income Countries   Low-Income Countries

—— Capital Inflows by Foreign Agents   ••••• Capital Outflows by Domestic Agents

The figure shows the economic significance of the regression coefficients in the event study analyses of capital inflows by foreign agents (*CIF*) and capital outflows by domestic agents (*COD*) around five-year windows of crisis periods. These regressions are reported in Table 6. Crisis events are divided into *one crisis* periods and *more than one crisis* periods, according to their intensity. The economic significance is defined as the product of the estimated coefficient and the median one standard deviation of the non-standardized version of the dependent variable across countries with at least one crisis during the period of analysis. Capital flows are first normalized by trend GDP and then standardized by de-meaning and dividing by the standard deviation at the country level. The sample period is from 1970 to 2009.

Table 1
Capital Flows: Summary Statistics

	High-Income Countries		Middle-Income Countries		Low-Income Countries	
	Median Average	Median Std. Dev.	Median Average	Median Std. Dev.	Median Average	Median Std. Dev.
Net Capital Flows (*CIF - COD*)	0.64	3.92	1.29	5.62	2.08	5.51
1970s	1.64	2.41	3.37	3.94	3.54	3.09
1980s	1.42	2.71	0.39	5.56	2.71	4.11
1990s	0.87	2.79	0.82	4.23	1.28	4.18
2000s	-0.18	3.60	1.90	3.94	0.56	4.37
Total Gross Capital Flows (*CIF + COD*)	17.67	15.49	9.31	10.01	6.97	7.17
1970s	9.50	3.62	7.01	5.27	7.92	2.75
1980s	9.10	6.16	1.96	5.95	4.86	3.90
1990s	13.56	9.39	7.80	5.60	7.21	5.56
2000s	32.65	16.70	15.06	8.48	8.41	6.21
Capital Inflows by Foreign Agents (*CIF*)	8.89	7.81	4.83	6.06	4.07	5.21
1970s	4.73	2.66	5.08	3.07	5.62	2.29
1980s	4.79	3.47	0.83	4.03	3.99	3.37
1990s	7.00	5.54	3.96	4.12	4.43	4.16
2000s	15.16	9.16	5.58	4.96	4.22	3.93
Capital Outflows by Domestic Agents (*COD*)	8.33	8.05	3.78	5.10	2.87	3.87
1970s	3.43	2.29	3.34	2.96	2.07	1.77
1980s	3.78	3.09	1.40	2.71	0.54	2.06
1990s	6.56	5.32	2.80	3.32	2.54	3.03
2000s	17.71	8.13	6.44	4.86	3.73	3.35
No. of Countries	39		26		38	

The table shows summary statistics of capital flows by both foreign and domestic agents as well as net capital flows and total gross capital flows. The median value of country averages and of country standard deviations of capital flows over trend GDP are shown. The sample period is from 1970 to 2009.

Table 2
Correlation between Capital Flows

	High-Income Countries				Middle-Income Countries				Low-Income Countries			
	1980s	1990s	2000s	Whole Sample	1980s	1990s	2000s	Whole Sample	1980s	1990s	2000s	Whole Sample
COD = ß* *CIF* (a)	0.48 **	0.83 ***	0.93 ***	0.78 ***	0.28	0.23 ***	0.65 ***	0.44 ***	0.09	0.38 ***	0.31 ***	0.27 ***
	[0.20]	[0.08]	[0.04]	[0.05]	[0.17]	[0.08]	[0.07]	[0.07]	[0.06]	[0.09]	[0.07]	[0.06]
CIF = ß* *COD* (b)	0.37 ***	0.68 ***	0.92 ***	0.75 ***	0.25	0.36 ***	0.88 ***	0.45 ***	0.16	0.40 ***	0.45 ***	0.27 ***
	[0.12]	[0.06]	[0.04]	[0.05]	[0.16]	[0.11]	[0.06]	[0.07]	[0.12]	[0.10]	[0.10]	[0.06]
Country-Trend Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Countries	34	39	39	39	20	26	25	26	29	38	37	38
No. of Observations	338	371	365	1,300	176	237	226	702	277	329	332	1,050
R-squared (a)	0.46	0.68	0.89	0.71	0.45	0.40	0.70	0.36	0.48	0.47	0.46	0.23
R-squared (b)	0.46	0.73	0.89	0.71	0.33	0.23	0.67	0.35	0.17	0.37	0.44	0.23

The table reports fixed-effects panel regressions of capital inflows by foreign agents (*CIF*) on capital outflows by domestic agents (*COD*) and *COD* on *CIF* by decade, controlling for country-trend effects. Capital flows are first normalized by trend GDP and then standardized by de-meaning and dividing by the standard deviation at the country level. The sample period is from 1970 to 2009. Standard errors, clustered at the country-level, are reported in brackets. *, **, and *** mean significant at 10%, 5%, and 1%, respectively.

Table 3
Cyclicality in Capital Flows

	High-Income Countries								
	CIF	*COD*	*CIF+COD*	*CIF*	*COD*	*CIF+COD*	*CIF*	*COD*	*CIF+COD*
Net Capital Flows (*CIF* - *COD*)	0.25 *** [0.05]	-0.24 *** [0.07]	-0.02 [0.07]						
Trade Balance				-0.25 *** [0.06]	0.19 ** [0.07]	0.00 [0.07]			
GDP Growth							3.58 ** [1.45]	5.20 *** [1.46]	5.17 *** [1.41]
Country-Trend Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Countries	39	39	39	39	39	39	39	39	39
No. of Observations	1300	1300	1300	1300	1300	1300	1287	1287	1287
R-squared	0.34	0.35	0.30	0.33	0.33	0.30	0.31	0.35	0.35
	Middle-Income Countries								
	CIF	*COD*	*CIF+COD*	*CIF*	*COD*	*CIF+COD*	*CIF*	*COD*	*CIF+COD*
Net Capital Flows (*CIF* - *COD*)	0.63 *** [0.06]	-0.26 ** [0.09]	0.26 ** [0.10]						
Trade Balance				-0.59 *** [0.04]	0.21 ** [0.09]	-0.25 *** [0.08]			
GDP Growth							3.90 *** [0.91]	3.18 *** [0.92]	4.47 *** [0.87]
Country-Trend Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Countries	26	26	26	26	26	26	26	26	26
No. of Observations	702	702	702	702	702	702	681	681	681
R-squared	0.53	0.25	0.28	0.46	0.23	0.27	0.24	0.22	0.27
	Low-Income Countries								
	CIF	*COD*	*CIF+COD*	*CIF*	*COD*	*CIF+COD*	*CIF*	*COD*	*CIF+COD*
Net Capital Flows (*CIF* - *COD*)	0.72 *** [0.04]	-0.39 *** [0.05]	0.32 *** [0.06]						
Trade Balance				-0.58 *** [0.04]	0.30 *** [0.05]	-0.27 *** [0.05]			
GDP Growth							3.02 *** [0.86]	2.95 *** [0.78]	3.71 *** [0.87]
Country-Trend Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Countries	38	38	38	38	38	38	38	38	38
No. of Observations	1050	1050	1050	1050	1050	1050	1042	1042	1042
R-squared	0.60	0.29	0.23	0.40	0.23	0.20	0.19	0.18	0.18

The table reports fixed-effects panel regressions of capital inflows by foreign agents (*CIF*), capital outflows by domestic agents (*COD*), and a measure of aggregate capital flows, *CIF+COD*, on net capital flows, the trade balance in goods and services, and real GDP growth. All regressions control for country-trend effects. Capital flows are first normalized by trend GDP and then standardized by de-meaning and dividing by the standard deviation at the country level. The sample period is from 1970 to 2009. Standard errors, clustered at the country-level, are reported in brackets. *, **, and *** mean significant at 10%, 5%, and 1%, respectively.

Table 4
Capital Flows: Tranquil vs. Crisis Periods

	High-Income Countries	Middle-Income Countries	Low-Income Countries
Net Capital Flows (*CIF - COD*)			
Non-Crisis Years	-0.18	0.76	1.73
Crisis Years	2.58	-0.02	1.29
Total Gross Capital Flows (*CIF + COD*)			
Non-Crisis Years	27.53	13.66	8.45
Crisis Years	12.43	-5.21	4.62
Capital Inflows by Foreign Agents (*CIF*)			
Non-Crisis Years	13.67	7.21	5.09
Crisis Years	7.50	-2.62	2.96
Capital Outflows by Domestic Agents (*COD*)			
Non-Crisis Years	13.86	6.45	3.36
Crisis Years	4.92	-2.60	1.66
No. of Countries	39	26	38

The table shows average capital flows around crisis and non-crisis periods. Crisis years capture five-year windows around the crisis events, as described in Section 2 of the main text. Non-crisis years capture all the remaing years in the sample. Capital flows are measured as a percentage of trend GDP. The sample period is from 1970 to 2009.

Table 5
Capital Flows around Crises

	High-Income		Middle-Income		Low-Income Countries	
	CIF	*COD*	*CIF*	*COD*	*CIF*	*COD*
Year t - 2	0.50 ***	0.20	0.21 *	0.18 *	0.05	0.03
	[0.11]	[0.13]	[0.11]	[0.10]	[0.11]	[0.11]
Year t - 1	0.70 ***	0.42 ***	0.07	-0.18	0.04	-0.08
	[0.13]	[0.14]	[0.12]	[0.11]	[0.10]	[0.08]
Crisis Year	-0.13	-0.42 ***	-0.44 ***	-0.52 ***	-0.29 ***	-0.25 **
	[0.12]	[0.13]	[0.12]	[0.11]	[0.08]	[0.09]
Year t - 2	-0.55 ***	-0.63 ***	-0.41 ***	0.01	-0.34 ***	0.09
	[0.11]	[0.15]	[0.10]	[0.10]	[0.10]	[0.09]
Year t - 1	-0.27 *	-0.28 **	-0.41 ***	-0.13	-0.30 ***	-0.13
	[0.14]	[0.12]	[0.09]	[0.08]	[0.09]	[0.09]
One-Sided Wald Tests:						
Crisis Year vs. Avg. Pre-Crisis	-0.73 ***	-0.73 ***	-0.58 ***	-0.52 ***	-0.34 ***	-0.23 *
Avg. Post-Crisis (incl. Crisis Year) vs. Avg. Pre-Crisis	-0.92 ***	-0.75 ***	-0.56 ***	-0.21 ***	-0.36 ***	-0.07 *
Country-Trend Dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of Crises	85	85	134	134	158	158
No. of Countries	39	39	26	26	38	38
No. of Observations	1300	1300	702	702	1050	1050
R-squared	0.35	0.36	0.28	0.24	0.21	0.18

The table reports fixed-effects panel regressions of capital inflows by foreign agents (*CIF*) and capital outflows by domestic agents (*COD*) on a five-year window around crisis events, controlling for country-trend effects. Capital flows are first normalized by trend GDP and then standardized by de-meaning and dividing by the standard deviation at the country level. One-sided Wald tests comparing pre- and post-crisis periods are also reported. The sample period is from 1970 to 2009. Standard errors, clustered at the country-level, are reported in brackets. *, **, and *** mean significant at 10%, 5%, and 1% respectively.

Table 6
Robustness Tables

Panel A. Capital Flows around 2008

	High-Income Countries		Middle-Income Countries		Low-Income Countries	
	CIF	COD	CIF	COD	CIF	COD
Year 2006	1.36 ***	1.55 ***	0.80 ***	1.16 ***	0.15	1.01 ***
	[0.19]	[0.16]	[0.21]	[0.21]	[0.17]	[0.17]
Year 2007	2.22 ***	2.25 ***	1.75 ***	1.91 ***	0.65 ***	1.18 ***
	[0.19]	[0.16]	[0.25]	[0.23]	[0.22]	[0.23]
Year 2008	0.36	0.19	0.48 **	0.11	0.59 ***	0.18
	[0.25]	[0.27]	[0.22]	[0.24]	[0.16]	[0.24]
Year 2009	-0.21	-0.14	0.21	0.34	0.02	0.58
	[0.30]	[0.28]	[0.24]	[0.23]	[0.39]	[0.71]
One-Sided Wald Tests:						
Year 2008 vs. Avg. Previous 2 Years	-1.43 ***	-1.71 ***	-0.80 ***	-1.43 ***	0.19	-0.92 ***
Avg. 2008 /2009 vs. Avg. Previous 2 Years	-1.72 ***	-1.88 ***	-0.93 ***	-1.31 ***	-0.10	-0.72 **
No. of Countries	39	39	23	23	37	37
No. of Observations	132	132	81	81	110	110
R-squared	0.56	0.61	0.52	0.59	0.17	0.34

Panel B. Excluding the 2008 Crisis

	High-Income Countries		Middle-Income Countries		Low-Income Countries	
	CIF	COD	CIF	COD	CIF	COD
Year t - 2	0.35 ***	-0.02	0.12	0.08	0.06	0.02
	[0.10]	[0.14]	[0.11]	[0.09]	[0.12]	[0.11]
Year t - 1	0.28 **	-0.07	-0.03	-0.24 **	0.05	-0.07
	[0.13]	[0.11]	[0.13]	[0.10]	[0.10]	[0.07]
Crisis Year	-0.01	-0.27 **	-0.45 ***	-0.49 ***	-0.28 ***	-0.25 **
	[0.11]	[0.12]	[0.12]	[0.12]	[0.07]	[0.10]
Year t + 1	-0.32 ***	-0.38 **	-0.37 ***	0.07	-0.30 ***	0.12
	[0.11]	[0.15]	[0.10]	[0.10]	[0.10]	[0.09]
Year t + 2	-0.19	-0.18	-0.35 ***	-0.08	-0.24 **	-0.08
	[0.14]	[0.11]	[0.10]	[0.09]	[0.10]	[0.09]
One-Sided Wald Tests:						
Crisis Year vs. Avg. Pre-Crisis	-0.33 ***	-0.23 ***	-0.50 ***	-0.41 ***	-0.34 ***	-0.23 *
Avg. Post-Crisis (incl. Crisis Year) vs. Avg. Pre-Crisis	-0.49 ***	-0.23 ***	-0.44 ***	-0.09	-0.33 ***	-0.05
Country-Trend Dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of Crises	66	66	127	127	154	154
No. of Countries	39	39	26	26	38	38
No. of Observations	1168	1168	621	621	940	940
R-squared	0.30	0.33	0.21	0.18	0.21	0.11

The table reports two sets of regressions of capital inflows by foreign agents (*CIF*) and capital outflows by domestic agents (*COD*) on different explanatory variables. Panel A reports pooled OLS regressions on four year dummies for the 2006-2009 period. Panel B reports fixed-effects panel regressions on a five-year window around crisis events for the 1970-2005 period, controlling for country-trend effects. Capital flows are first normalized by trend GDP and then standardized by de-meaning and dividing by the standard deviation at the country level. One-sided Wald tests comparing pre- and post-crisis periods are also reported in both Panels. Standard errors, clustered at the country-level, are reported in brackets. *, **, and *** mean significant at 10%, 5%, and 1% respectively.

<div align="center">

Table 7

Capital Flows around Crises of Different Intensities

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	High-Income Countries		Middle-Income Countries		Low-Income Countries	
	CIF	*COD*	*CIF*	*COD*	*CIF*	*COD*
One Crisis Episodes						
Year t - 2	0.45 ***	0.14	0.21 *	0.26 ***	-0.07	-0.01
Year t - 1	0.67 ***	0.34 **	-0.01	-0.14	-0.03	-0.07
Crisis Year	-0.12	-0.45 ***	-0.33 **	-0.37 ***	-0.21 **	-0.19 **
Year t + 1	-0.56 ***	-0.71 ***	-0.35 ***	-0.03	-0.26 **	0.06
Year t + 2	-0.29 **	-0.31 **	-0.41 ***	-0.24 ***	-0.26 **	-0.15
One-Sided Wald Tests:						
Crisis Year vs. Avg. Pre-Crisis	-0.68 ***	-0.69 ***	-0.43 ***	-0.43 ***	-0.16 **	-0.15
Avg. Post-Crisis (incl. Crisis Year) vs. Avg. Pre-Crisis	-0.88 ***	-0.73 ***	-0.46 ***	-0.27 ***	-0.19 **	-0.05
More than One Crisis Episodes						
Year t - 2	1.72 ***	1.03 **	0.24	-0.10	0.43 *	0.15
Year t - 1	1.62 ***	1.84 **	0.34	-0.28	0.27	-0.06
Crisis Year	-0.35	-0.04	-0.92 ***	-1.06 ***	-0.63 **	-0.50 **
Year t + 1	-0.46	0.49	-0.51 ***	0.28	-0.55 **	0.25
Year t + 2	0.43	0.71 **	-0.43 **	0.22	-0.47 **	-0.12
One-Sided Wald Tests:						
Crisis Year vs. Avg. Pre-Crisis	-2.02 ***	-1.48 *	-1.21 ***	-0.87 ***	-0.98 ***	-0.55 **
Avg. Post-Crisis (incl. Crisis Year) vs. Avg. Pre-Crisis	-1.80 ***	-1.05	-0.91 ***	0.00	-0.90 ***	-0.17
One-Sided Wald Tests: *One Crisis* vs. *More than Once Crisis*						
Crisis Year	-0.23	0.41	-0.59 ***	-0.69 ***	-0.42 *	-0.31
Avg. Post-Crisis (incl. Crisis Year)	0.20	0.88	-0.26 **	0.03	-0.31 **	-0.03
Country-Trend Dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of Only *One Crisis* Episodes	80	80	107	107	126	126
No. of *More than One Crisis* Episodes	5	5	27	27	32	32
No. of Countries	39	39	26	26	38	38
No. of Observations	1300	1300	702	702	1050	1050
R-squared	0.36	0.37	0.29	0.27	0.22	0.18

The table reports fixed-effects panel regressions of capital inflows by foreign agents (*CIF*) and capital outflows by domestic agents (*COD*) on a five-year window around crisis events, controlling for country-trend effects. Crisis events are split into *one crisis* episodes and *more than one crisis* episodes. See Section 2 of the main text for details on how these indicators are constructed. Capital flows are first normalized by trend GDP and then standardized by de-meaning and dividing by the standard deviation at the country level. One-sided Wald tests comparing pre- and post-crisis periods are also reported. The sample period is from 1970 to 2009. Standard errors, clustered at the country-level, are reported in brackets. *, **, and *** mean significant at 10%, 5%, and 1% respectively.

Table 8
Components of Capital Flows: Summary Statistics

	High-Income Countries		Middle-Income Countries		Low-Income Countries	
	Median Average	Median Std. Dev.	Median Average	Median Std. Dev.	Median Average	Median Std. Dev.
Capital Inflows by Foreign Agents						
Portfolio Investments	2.13	2.84	0.58	1.34	0.06	0.62
1980s	0.60	0.73	0.00	0.12	0.00	0.00
1990s	2.25	1.79	0.48	1.02	0.02	0.15
2000s	3.35	3.20	0.48	1.46	0.08	0.51
Other Investments	3.86	5.09	1.61	4.87	1.86	4.06
1980s	2.94	3.01	0.25	3.36	3.19	3.19
1990s	2.69	3.48	1.77	2.52	1.59	2.74
2000s	5.98	7.27	1.98	3.36	0.90	2.22
Direct Investments	2.03	2.33	2.23	2.09	2.45	2.22
1980s	0.64	0.56	0.42	0.38	0.67	0.38
1990s	1.91	1.25	2.04	1.84	2.25	1.44
2000s	3.65	2.79	3.12	2.01	3.81	1.98
Capital Outflows by Domestic Agents						
Portfolio Investments	2.26	3.22	0.25	0.79	0.05	0.22
1980s	0.30	0.35	0.00	0.00	0.00	0.00
1990s	1.77	2.25	0.08	0.29	0.00	0.02
2000s	4.15	3.47	0.52	0.84	0.09	0.30
Other Investments	2.62	3.56	1.07	2.74	0.87	1.73
1980s	1.58	1.95	0.95	1.53	0.35	0.53
1990s	1.76	2.68	0.78	1.98	0.68	1.47
2000s	4.53	4.71	2.25	2.96	1.01	2.17
Direct Investments	1.48	1.93	0.25	0.43	0.04	0.15
1980s	0.40	0.24	0.01	0.02	0.00	0.00
1990s	0.82	0.83	0.07	0.12	0.01	0.03
2000s	3.07	2.72	0.45	0.58	0.09	0.15
International Reserves	0.77	2.26	1.33	2.78	1.31	2.97
1980s	0.40	1.46	0.30	2.42	0.01	1.85
1990s	0.57	2.42	1.32	2.36	1.43	2.31
2000s	0.94	1.72	1.54	2.53	2.23	2.89
No. of Countries	39		26		38	

The table shows summary statistics of the components of capital flows by both foreign and domestic agents. The median values of country averages and standard deviations of capital flows over trend GDP are reported. The sample period is from 1970 to 2009.

Table 9.A

Components of Capital Flows around Crises of Different Intensities

| | High-Income Countries | | | | | | | | |
| | CIF | | | | COD | | | | |
	Portfolio Equity Flows	Portfolio Debt Flows	Bank Flows	Direct Investments	Reserves	Portfolio Equity Flows	Portfolio Debt Flows	Bank Flows	Direct Investments
One Crisis Episodes									
Year t - 2	-0.09	0.21 **	0.54 ***	-0.05	-0.32 **	0.21 **	0.08	0.43 ***	0.09
Year t - 1	-0.16	0.33 **	0.71 ***	0.06	-0.09	-0.06	0.05	0.53 ***	0.27 **
Crisis Year	-0.40 ***	-0.05	0.07	-0.13	-0.17	-0.59 ***	-0.33 ***	-0.22	0.03
Year t + 1	0.02	-0.28 **	-0.61 ***	-0.30 ***	0.12	-0.38 ***	-0.41 ***	-0.61 ***	-0.39 ***
Year t + 2	0.14	-0.22 *	-0.28 *	-0.14	0.08	-0.11	-0.09	-0.38 ***	-0.12
One-Sided Wald Tests:									
Crisis Year vs. Avg. Pre-Crisis	-0.28 *	-0.32 **	-0.56 ***	-0.14 *	0.04	-0.67 ***	-0.40 ***	-0.70 ***	-0.15 **
	0.05	-0.45 ***	-0.90 ***	-0.20 **	0.22	-0.44 ***	-0.34 ***	-0.88 ***	-0.34 ***
More than One Crisis Episodes									
Year t - 2	1.40 *	1.01 *	1.01 ***	1.24	1.13	0.10	0.92 **	1.67 **	0.81 *
Year t - 1	0.49 *	0.25	2.00	-0.56	-0.12	0.54	2.25 **	2.37 ***	1.59 *
Crisis Year	-1.05	-0.52	-0.15	0.31 **	0.39	-0.45	-0.62	0.74 **	-0.12
Year t + 1	0.02	-1.31 **	0.05	0.22	1.03 *	-0.26	-0.04	-0.26	0.13
Year t + 2	0.28	-0.98 ***	0.54 *	0.92	0.16	0.22	-0.05	0.73 *	0.16
One-Sided Wald Tests:									
Crisis Year vs. Avg. Pre-Crisis	-2.00 *	-1.15 ***	-1.66 ***	-0.03	-0.12	-0.77	-2.21 **	-1.28 *	-1.32
Avg. Post-Crisis (incl. Crisis Year) vs. Avg. Pre-Crisis	-1.20 *	-1.57 ***	-1.36 ***	0.14	0.02	-0.48	-1.82 **	-1.62 **	-1.14 *
Country-Trend Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Only *One Crisis* Episodes	77	80	80	80	80	80	80	80	80
No. of *More than One Crisis* Episodes	5	5	5	5	5	5	5	5	5
No. of Countries	36	38	39	39	39	38	38	39	39
No. of Observations	1184	1251	1300	1300	1300	1250	1249	1300	1300
R-squared	0.16	0.29	0.22	0.29	0.06	0.3	0.34	0.21	0.37

The table reports fixed-effects panel regressions of the components of capital inflows by foreign agents (*CIF*) and of capital outflows by domestic agents (*COD*) for high-income countries on a five-year window around crisis events, controlling for country-trend effects. Portfolio Equity Flows and Portfolio Debt Flows are subcomponents of "Portfolio Investments", Bank Flows is equivalent to "Other Investments", and Reserves is equivalent to "International Reserve Assets." Crisis events are split into *one crisis* episodes and *more than one crisis* episodes. See Section 2 of the main text for details on how these indicators are constructed. The components of capital flows are first normalized by trend GDP and then standardized by de-meaning and dividing by their standard deviation at the country level. One-sided Wald tests comparing pre- and post-crisis periods are also reported. The sample period is from 1970 to 2009. Standard errors, clustered at the country-level, are reported in brackets. *, **, and *** mean significant at 10%, 5%, and 1% respectively.

Table 9.B
Components of Capital Flows around Crises of Different Intensities

	Middle-Income Countries								
	CIF				COD				
	Portfolio Equity Flows	Portfolio Debt Flows	Bank Flows	Direct Investments	Reserves	Portfolio Equity Flows	Portfolio Debt Flows	Bank Flows	Direct Investments
One Crisis Episodes									
Year t - 2	0.08	0.14	0.19	-0.02	0.22 *	0.06	-0.07	0.20 **	0.04
Year t - 1	-0.12	-0.03	0.12	-0.07	-0.22 **	0.25 **	-0.13	0.02	-0.04
Crisis Year	-0.41 ***	-0.05	-0.22	-0.20 **	-0.46 ***	-0.08	0.00	-0.08	0.06
Year t + 1	-0.02	0.08	-0.35 ***	-0.33 ***	-0.01	-0.01	0.05	-0.00	-0.13
Year t + 2	-0.20 *	-0.13	-0.35 **	-0.19 **	-0.24 **	-0.13	0.14	-0.09	-0.20 **
One-Sided Wald Tests:									
Crisis Year vs. Avg. Pre-Crisis	-0.39 ***	-0.11	-0.38 ***	-0.16 *	-0.46 ***	-0.24 **	0.10	-0.19 *	0.06
Avg. Post-Crisis (incl. Crisis Year) vs. Avg. Pre-Crisis	-0.19 **	-0.09	-0.46 ***	-0.20 ***	-0.24 **	-0.23 ***	0.16	-0.17 **	-0.09
More than One Crisis Episodes									
Year t - 2	0.03	0.15	0.20	0.02	-0.07	0.00	0.26	0.08	0.09
Year t - 1	0.36	0.30	0.31	-0.07	-0.41 **	0.09	-0.23 ***	0.04	0.09
Crisis Year	0.06	-0.44 ***	-0.84 ***	-0.30	-1.00 ***	-0.32 ***	-0.33	-0.30	-0.23
Year t + 1	0.12	-0.24 **	-0.42 **	-0.30 **	0.32	-0.00	-0.09	0.21	-0.27 **
Year t + 2	0.28	-0.22	-0.42 ***	-0.19	0.38 **	-0.29 ***	0.54 ***	-0.17	-0.20
One-Sided Wald Tests:									
Crisis Year vs. Avg. Pre-Crisis	-0.14	-0.67 ***	-1.10 ***	-0.28 *	-0.76 ***	-0.37 **	-0.35 *	-0.36	-0.32 **
Avg. Post-Crisis (incl. Crisis Year) vs. Avg. Pre-Crisis	-0.04	-0.53 ***	-0.82 ***	-0.24	0.14	-0.25	0.03	-0.15	-0.32 ***
Country-Trend Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Only *One Crisis* Episodes	94	98	107	107	109	98	100	107	98
No. of *More than One Crisis* Episodes	26	27	27	27	27	24	27	27	26
No. of Countries	22	23	26	26	26	23	24	26	23
No. of Observations	604	632	702	702	717	634	664	702	634
R-squared	0.11	0.09	0.24	0.39	0.19	0.17	0.15	0.16	0.31

The table reports fixed-effects panel regressions of the components of capital inflows by foreign agents (*CIF*) and of capital outflows by domestic agents (*COD*) for high-income countries on a five-year window around crisis events, controlling for country-trend effects. Portfolio Equity Flows and Portfolio Debt Flows are subcomponents of "Portfolio Investments", Bank Flows is equivalent to "Other Investments", and Reserves is equivalent to "International Reserve Assets." Crisis events are split into *one crisis* episodes and *more than one crisis* episodes. See Section 2 of the main text for details on how these indicators are constructed. The components of capital flows are first normalized by trend GDP and then standardized by de-meaning and dividing by their standard deviation at the country level. One-sided Wald tests comparing pre- and post-crisis periods are also reported. The sample period is from 1970 to 2009. Standard errors, clustered at the country-level, are reported in brackets. *, **, and *** mean significant at 10%, 5%, and 1% respectively.

Table 9.C
Components of Capital Flows around Crises of Different Intensities

| | Low-Income Countries | | | | | | | | |
| | CIF | | | | COD | | | | |
	Portfolio Equity Flows	Portfolio Debt Flows	Bank Flows	Direct Investments	Reserves	Portfolio Equity Flows	Portfolio Debt Flows	Bank Flows	Direct Investments
One Crisis Episodes									
Year t - 2	-0.21 *	0.05	0.01	-0.15 **	0.02	-0.10	0.05	0.04	-0.02
Year t - 1	0.08	-0.14 *	0.05	-0.09	-0.08	-0.07	-0.09	0.05	0.01
Crisis Year	-0.14 *	-0.20	-0.21 **	-0.09	-0.14	-0.03	-0.00	-0.04	0.02
Year t + 1	0.06	-0.22 **	-0.20 **	-0.12	-0.07	-0.14 ***	-0.12	0.31 ***	-0.10
Year t + 2	-0.05	-0.14	-0.21 **	-0.20 **	-0.10	-0.11 **	-0.07	-0.05	-0.16 **
One-Sided Wald Tests:									
Crisis Year vs. Avg. Pre-Crisis	-0.08	-0.16	-0.24 **	0.03	-0.11	0.06	0.02	-0.09	0.03
Avg. Post-Crisis (incl. Crisis Year) vs. Avg. Pre-Crisis	0.02	-0.14 *	-0.24 **	-0.02	-0.07	-0.01	-0.04	0.03	-0.08
More than One Crisis Episodes									
Year t - 2	0.41 *	0.59 *	0.33 *	0.23	0.08	-0.01	0.04	0.16	0.00
Year t - 1	0.22	0.51 **	0.26	0.12	-0.42 **	-0.02	-0.23 **	0.31	0.08
Crisis Year	-0.18	-0.08	-0.65 **	-0.04	-0.56 **	-0.01	-0.13 *	-0.07	-0.03
Year t + 1	-0.07	-0.25	-0.41 **	-0.24	0.16	0.15	-0.15	0.20	-0.08
Year t + 2	0.05	-0.18	-0.35 **	-0.24	0.26	-0.08	-0.10	-0.57 ***	-0.16
One-Sided Wald Tests:									
Crisis Year vs. Avg. Pre-Crisis	-0.50 *	-0.63 **	-0.95 ***	-0.22 *	-0.39 *	0.01	-0.04	-0.31 *	-0.07
Avg. Post-Crisis (incl. Crisis Year) vs. Avg. Pre-Crisis	-0.38 **	-0.72 ***	-0.77 ***	-0.35 **	0.12	0.04	-0.03	-0.38 ***	-0.13
Country-Trend Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Only *One Crisis* Episodes	92	108	126	126	126	109	111	126	107
No. of *More than One Crisis* Episodes	24	29	32	32	32	29	27	32	26
No. of Countries	30	30	38	38	38	32	31	38	33
No. of Observations	821	853	1050	1050	1050	890	853	1050	889
R-squared	0.12	0.12	0.26	0.38	0.12	0.13	0.12	0.15	0.25

The table reports fixed-effects panel regressions of the components of capital inflows by foreign agents (*CIF*) and of capital outflows by domestic agents (*COD*) for high-income countries on a five-year window around crisis events, controlling for country-trend effects. Portfolio Equity Flows and Portfolio Debt Flows are subcomponents of "Portfolio Investments", Bank Flows is equivalent to "Other Investments", and Reserves is equivalent to "International Reserve Assets." Crisis events are split into *one crisis* episodes and *more than one crisis* episodes. See Section 2 of the main text for details on how these indicators are constructed. The components of capital flows are first normalized by trend GDP and then standardized by de-meaning and dividing by their standard deviation at the country level. One-sided Wald tests comparing pre- and post-crisis periods are also reported. The sample period is from 1970 to 2009. Standard errors, clustered at the country-level, are reported in brackets. *, **, and *** mean significant at 10%, 5%, and 1% respectively.

Appendix Table 1
Sample Coverage

High-Income Countries	Coverage	Middle-Income Countries (contd.)	Coverage
Australia	1970 - 2008	Libya	1977 - 2008
Austria	1970 - 2009	Lithuania	1993 - 2008
Bahamas, The	1976 - 2008	Malaysia	1974 - 2008
Barbados	1970 - 2007	Mauritius	1976 - 2008
Belgium-Luxembourg	1975 - 2008	Mexico	1979 - 2008
Canada	1970 - 2009	Panama	1977 - 2009
Cyprus	1976 - 2009	Poland	1985 - 2009
Czech Republic	1993 - 2008	Romania	1987 - 2009
Denmark	1975 - 2009	Russian Federation	1994 - 2009
Estonia	1992 - 2009	South Africa	1985 - 2009
Finland	1975 - 2009	Turkey	1974 - 2008
France	1975 - 2008	Uruguay	1978 - 2008
Germany	1971 - 2008	Venezuela, R.B.	1970 - 2009
Greece	1976 - 2008		
Hong Kong	1998 - 2008		
Hungary	1982 - 2008	Low-Income Countries	Coverage
Iceland	1976 - 2009	Albania	1984 - 2008
Ireland	1974 - 2009	Algeria	1977 - 1991
Israel	1970 - 2009	Angola	1985 - 2008
Italy	1970 - 2009	Armenia	1993 - 2008
Japan	1977 - 2008	Azerbaijan, Rep. of	1995 - 2008
Korea, Rep.	1976 - 2009	Bolivia	1976 - 2008
Kuwait	1975 - 2008	Bosnia and Herzegovina	1998 - 2008
Malta	1971 - 2008	China, P.R.: Mainland	1982 - 2008
Netherlands	1970 - 2009	Colombia	1970 - 2008
New Zealand	1972 - 2008	Congo, Republic of	1978 - 2007
Norway	1975 - 2008	Dominican Republic	1970 - 2008
Oman	1974 - 2008	Ecuador	1976 - 2008
Portugal	1975 - 2009	Egypt	1977 - 2008
Saudi Arabia	1971 - 2008	El Salvador	1976 - 2008
Singapore	1972 - 2008	Georgia	1997 - 2008
Slovak Republic	1993 - 2008	Guatemala	1977 - 2008
Slovenia	1992 - 2008	Honduras	1974 - 2008
Spain	1975 - 2009	India	1975 - 2008
Sweden	1970 - 2008	Indonesia	1981 - 2009
Switzerland	1977 - 2009	Jamaica	1976 - 2008
Trinidad and Tobago	1975 - 2007	Jordan	1972 - 2008
United Kingdom	1970 - 2009	Macedonia	1996 - 2008
United States	1970 - 2009	Moldova	1994 - 2009
		Mongolia	1981 - 2006
Middle-Income Countries	Coverage	Morocco	1975 - 2008
Argentina	1976 - 2009	Namibia	1990 - 2008
Belarus	1993 - 2009	Nicaragua	1977 - 2008
Botswana	1975 - 2008	Pakistan	1976 - 2008
Brazil	1975 - 2009	Paraguay	1975 - 2009
Bulgaria	1980 - 2009	Peru	1977 - 2008
Chile	1975 - 2009	Philippines	1977 - 2008
Costa Rica	1977 - 2008	Sri Lanka	1975 - 2008
Croatia	1993 - 2008	Swaziland	1974 - 2007
Equatorial Guinea	1987 - 1996	Syrian Arab Republic	1977 - 2007
Gabon	1978 - 2005	Thailand	1975 - 2008
Iran, I.R. of	1976 - 2000	Tunisia	1976 - 2008
Kazakhstan	1995 - 2008	Ukraine	1994 - 2009
Latvia	1992 - 2009	Vietnam	1996 - 2008

High-Income Countries	Crisis Dates	Middle-Income Countries (contd.)	Crisis Dates
Australia	1989	Libya	2002
Austria	-	Lithuania	1995
Bahamas, The	-	Malaysia	1985, 1997
Barbados	-	Mauritius	1981, 1996
Belgium-Luxembourg	-	Mexico	1981, 1985, 1994
Canada	1983	Panama	1983, 1987
Cyprus	-	Poland	1986, 1989
Czech Republic	1996	Romania	1990, 1993, 1996, 1999
Denmark	1987	Russian Federation	1995, 1998
Estonia	1992, 1998	South Africa	1985, 1989, 1993, 2001, 2008
Finland	1991	Turkey	1978, 1982, 1988, 1994, 1999, 2008
France	1994	Uruguay	1978, 1981, 1987, 2002
Germany	1976	Venezuela, R.B.	1976, 1982, 1989, 1993, 2002
Greece	1983, 1991		
Hong Kong	1998		
Hungary	1991	**Low-Income Countries**	**Crisis Dates**
Iceland	1978, 1985, 1989, 1993, 2008	Albania	1990, 1997
Ireland	-	Algeria	1988
Israel	1975, 1985	Angola	1985, 1988, 1991, 1996
Italy	1981, 1990	Armenia	1994
Japan	1992, 1997	Azerbaijan, Rep. of	1995
Korea, Rep.	1980, 1983, 1997, 2008	Bolivia	1980, 1985, 1994, 1999
Kuwait	1980, 1990	Bosnia and Herzegovina	-
Malta	-	China, P.R.: Mainland	1984, 1990, 1998
Netherlands	-	Colombia	1982, 1985, 1998
New Zealand	1984, 1987, 2008	Congo, Republic of	1983, 1986, 1991
Norway	1987, 1990	Dominican Republic	1975, 1982, 1985, 1990, 2003
Oman	-	Ecuador	1980, 1996, 2008
Portugal	1982	Egypt	1979, 1984, 1989, 2003
Saudi Arabia	-	El Salvador	1981, 1986, 1989, 1998
Singapore	1982	Georgia	1998
Slovak Republic	1998	Guatemala	1986, 1989, 2001, 2006
Slovenia	1992	Honduras	1981, 1990, 1999
Spain	1977, 1983	India	1991
Sweden	1991	Indonesia	1983, 1986, 1992, 1997
Switzerland	-	Jamaica	1978, 1981, 1987, 1991
Trinidad and Tobago	1982, 1985, 1993	Jordan	1988
United Kingdom	1974, 1980, 1984, 1991, 1995, 2007	Macedonia	1997
United States	1984, 1988, 2007	Moldova	1998, 2002
		Mongolia	1990, 1993, 1996
Middle-Income Countries	**Crisis Dates**	Morocco	1980, 1986
Argentina	1980, 1985, 1995, 2001	Namibia	2001, 2008
Belarus	1994, 1999	Nicaragua	1979, 1985, 1990, 2000
Botswana	1984, 1994, 2001	Pakistan	1981, 1998
Brazil	1976, 1982, 1990, 1999, 2002, 2008	Paraguay	1982, 1989, 1995, 2001
Bulgaria	1990, 1993, 1996	Peru	1978, 1988, 1999
Chile	1975, 1980	Philippines	1981, 1997
Costa Rica	1981, 1987, 1991, 1994	Sri Lanka	1977, 1981, 1989, 1996
Croatia	1993, 1996	Swaziland	1984, 1995, 2001
Equatorial Guinea	1994	Syrian Arab Republic	1988
Gabon	1986, 1994, 1999, 2002	Thailand	1983, 1996
Iran, I.R. of	1978, 1985, 1992, 2000	Tunisia	1980, 1991
Kazakhstan	1999	Ukraine	1997, 2008
Latvia	1992, 1995	Vietnam	1997