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Abstract

We describe the second-moment properties of the components of international capital flows and their relationship to business cycle variables for 22 industrial and emerging countries. Inward flows are procyclical. Outward and net flows are countercyclical for most industrial and emerging countries, except for the G7. Results for individual flows are ambiguous except for inward FDI flows that are procyclical in industrial countries, but countercyclical in emerging countries. Using formal statistical tests, we find mixed evidence of changes in the covariance and correlation of capital flows with a set of macroeconomic variables in the G7 countries. We detect significant increases in the variance of all flows.

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1 Introduction

What are the cyclical properties of international capital flows? Do inward and outward flows of foreign direct investment (FDI) increase or decrease during recessions? Are certain flows more influential than others in determining the procyclical behavior of net inward flows? Has financial globalization changed the cyclical behavior of capital flows?

Most empirical research on capital flows has focused on aggregate net flows, flows between particular country pairs, and single components of flows, such as FDI or debt. However, a systematic analysis on the behavior of all types of capital flows at the business cycle frequency is still missing. Unlike the existing literature, which has examined the time-series properties of the components of international capital flows (Claessens, Dooley, and Warner, 1995), our focus is on their second-moment properties and on the relationship between capital flows and business cycle variables in source and destination countries. We adapt an idea originally suggested by Doyle and Faust (2005) – and revisited in De Pace (2010) – in the context of the international business cycle literature, and use formal statistical tests for changes in the volatility of capital flows and in comovement measures between flows and macroeconomic variables.

We delineate stylized facts on the cyclical properties of disaggregated capital flows for at least three reasons. First, we know that capital flows from developed economies to emerging markets are more volatile than flows entering developed economies (Broner and Rigobon, 2006). However, we know little about how the composition of capital flows contributes to the observed heterogeneity in the risk sharing experience of countries at different stages of financial development (Kose, Prasad, and Terrones, 2009). Second, international capital flows can be seen as adjustments to country portfolios in response to investment decisions and exogenous shocks. By empirically characterizing the second moments of these flows, we provide a set of stylized facts that can guide the calibration of models that incorporate country portfolios (Devereux and Sutherland, forthcoming; Tille and van Wincoop, 2010).[1] Third, from a different perspective, we provide facts that should be valuable for answering policy-related questions concerning the dynamics of international capital flows following specific economic events. For example, will a recession in the G7 countries reduce the size and type of capital flows to emerging countries, and therefore constrain

[1] Tille and van Wincoop (2010) theoretically show that the two most important causes of capital flow movements are portfolio growth due to time-varying expected returns and portfolio reallocation associated with time-varying second moments. However, they also note that fluctuations in second moments affect capital flows only to the extent that they affect the portfolio choice of domestic and foreign investors differently.

their ability to access international liquidity? Will this further reduce developed countries' demand for emerging market goods, as a propagation mechanism? Or will it give northern investors an incentive to invest in southern countries?

We analyze 22 advanced and emerging economies for which we have quarterly data over the period 1992-2005.[2] Within this group we devote particular attention to the G7 countries, for which we have quarterly data from 1975. We collect time series on total net flows and disaggregated gross flows and consider the ratio between each flow and gross domestic product (GDP).[3] We then pick three (transformations of) macroeconomic variables: the logarithm of real GDP, the ratio between gross fixed capital formation and GDP, and the real interest rate. For each transformed macroeconomic and capital flow series we estimate cyclical and trend components using standard filtering techniques.[4] We then study second-moment properties and structural shifts and recursively estimate the time evolution of the former using five-year rolling windows. In Section 3, we discuss the three methods we adopt to determine the breaks. In Section 4, we describe how capital flows relate to business cycle measures and test for significant shifts in their second moments over three sets of breaks. In Section 5 we discuss the results and relate them to questions about the effect of financial globalization and the effect of the recent financial crisis. Section 6 concludes.

At the aggregate level, we find that (1A) Inward flows are procyclical. (1B) Outward flows are generally countercyclical with respect to GDP and investment in industrial countries, but procyclical for the G7 countries. (1C) Net flows are countercyclical with respect to GDP and investment. At the disaggregate level, we show that (2A) Inward FDI tends to be procyclical in industrial countries and countercyclical in emerging countries. Outward FDI is procyclical in industrialized countries. (2B) Inward FPI tends to be procyclical only in the G7 economies. (2C) Inward debt is procyclical in most countries. Finally, our

[2]These countries are among the largest sources and destinations of capital flows. Advanced economies: Canada (CAN), Denmark (DEN), Finland (FIN), France (FRA), Germany (GER), Italy (ITA), Japan (JAP), Norway (NOR), Portugal, (POR), Spain, (SPA), Sweden (SWE), United Kingdom (UK), United States (US). Emerging economies: Argentina (ARG), Brazil (BRA), Indonesia (IND), Mexico (MEX), Peru (PER), Philippines (PHI), South Korea (SKO), Thailand (THA), Turkey (TUR). G7 countries: Canada, France, Germany, Italy, Japan, United Kingdom, United States.

[3]We analyze up to 12 flow series for each country: inward FDI (iFDI), inward Foreign Portfolio Investment (iFPI), inward debt (iDebt), and total inward flows (iTot); outward FDI (oFDI), outward Portfolio Investment (oFPI), outward debt (oDebt), and total outward flows (oTot); net total flows (noTot), defined as outward flows net of inward flows; net FDI (noFDI), net FPI (noFPI), net debt (noDebt), defined analogously. These variables are described in the data appendix and are conceptually similar to net exports-to-GDP ratios in the international business cycle literature. See Neumeyer and Perri (2005).

[4]For some countries and variable pairs, ideally, we would prefer to have longer samples to avoid the well-known complications associated with the available filtering procedures. When we study the second moment properties of the variables, we try to mitigate the small-sample problem by extensive use of bootstrap techniques.

analysis indicates that: (3A) Capital account liberalization and changes in the volatility of flow are not associated with systematic changes in correlations and covariances of the different types of capital flows with macroeconomic variables.[5]

2 Background on the Properties of Capital Flows

In this section we motivate our research on the second-moment properties of disaggregated flows.

2.1 Looking at Disaggregated Flows

Issues of data availability have limited the empirical literature. Past research concentrated predominantly on net inward flows, i.e., the difference between inflows and outflows. In fact, net flows have historically been the only form in which the components of the capital account were reported.[6] However, as argued in Lipsey (1999), Rothenberg and Warnock (2006), and Kose, Prasad, and Terrones (2009), there is a strong case for also looking at gross disaggregated flows. This is now possible, since the data series on disaggregated flows are long enough and usually available, although they may occasionally be plagued by problems of cross-country heterogeneity in data reporting.

Many international transactions involving financial instruments – for example, bank loans, government securities, bonds, and equity – are channelled through markets with numerous buyers and sellers, standardized contracts, and publicly available prices. The market structure often approximates perfect competition. FDI, however, is not observed in financial markets. Rather, it is the result of financial and industrial decisions, internal to the firm, that may have real implications potentially unrelated to purely financial variables. As pointed out by Lipsey (1999), "*a comparison of net direct investment flows with aggregate net international investment misses much of the significance of direct investment.*" Outward FDI flows are registered as generated by firms incorporated in the reporting country, whereas inward direct investment flows represent the activity of foreign firms based in the host economy. These flows are categorized by the International Monetary Fund (IMF) as *investment abroad* and *investment in a coun-*

[5] In this work a single capital flow is said to be procyclical (countercyclical) with respect to a reference macroeconomic variable if the correlation coefficient of the cyclical component of the ratio between that capital flow and GDP and the cyclical component of the reference macroeconomic variable is positive (negative).

[6] Even today some transactions are observable only as simultaneous flows of the opposite sign. For example, purchases of short-term debt.

try, respectively.[7] On the other hand, much FPI moves across organized exchanges, reflecting investors' preference for risk, diversification strategies, and portfolio biases which may vary across countries.

A few authors have argued that, by considering net flows, we may miss important nuances in the data that are likely to affect the way we interpret empirical results. For example, Rothenberg and Warnock (2006) look at gross flows and show that about half of the observed sudden stops (retreat of global investors) are actually episodes of sudden flights of local investors, associated with economic slowdowns and currency depreciations. Kose, Prasad, and Terrones (2009) and Devereux and Sutherland (2009) make a similar point. They discuss emerging markets' ability to share risk and conclude that this ability could be dependent, to some extent, on the composition of flows.

2.2 Related Literature

This work is related to two branches of literature. The first branch includes a growing body of studies in applied macroeconometrics and international business cycles – e.g., McConnell and Quiros (2000), Ambler, Cardia, and Zimmermann (2004), Heathcote and Perri (2004), Doyle and Faust (2005), Fogli and Perri (2006), and references therein – that examines changes in domestic volatility and cross-country correlation of macroeconomic aggregates. Doyle and Faust (2005) find falling volatility in macroeconomic variables for G7 countries through formal statistical tests based on parametric bootstrap techniques, but no systematic changes in measures of cross-country comovement over time. De Pace (2010) revisits their approach to describe comovement changes in international business cycles within currency unions and free trade areas. In this work we use similar methods to make inference on volatility changes of capital flows and on correlation and covariance shifts between capital flows and macroeconomic aggregates. The second branch studies the determinants of international capital flows and how their volatility features are related to the performance of emerging markets in terms of growth. One strand examines the changes in the price of capital, e.g., Uribe and Yue (2006), Neumeyer and Perri (2005), and their effect on the business cycles of recipient countries. A second strand considers the variations in net capital flows and returns associated with financial integration (e.g., Broner and Rigobon, 2006, Neumann, Penl, and Tanku, 2009). A third strand, within which financial assets and liabilities are interpreted as country portfolios, focuses

[7] Investment abroad (oFDI) data can be negative when repatriation of foreign investment is larger than new investment. This is a case that occurs in our dataset and that has been observed in countries affected by financial crisis, such as Indonesia after the Asian crisis. Such situations need to be treated carefully in empirical work.

on the macroeconomic implications of financial integration (e.g., Devereux and Sutherland, forthcoming, Devereux and Sutherland, 2009, and Tille and van Wincoop, 2010).

A small set of articles studies the cyclical properties of certain types of capital flows and provides a direct term of comparison to our work. Kaminsky, Reinhart, and Vegh (2005) collect yearly data on 105 economies and find that net capital inflows are procyclical in most OECD and developing countries. Since disaggregated capital flows data for such a large number of countries do not exist, the authors cannot derive further results for gross flows or for the disaggregated components. Pintus (2007) notes that the empirical evidence in Kaminsky, Reinhart, and Vegh (2005) contradicts the standard neoclassical prediction that countercyclical capital flows should function as conduits for international risk sharing.[8] Kose, Prasad, and Terrones (2009) show that industrialized countries are able to achieve some modest risk sharing. They also find that emerging markets actually experience increasing consumption volatility even as financial integration increases.[9] There may be a variety of reasons explaining the lack of international risk sharing observed in the data. Pintus (2007) suggests that endogenous borrowing constraints might boost aggregate volatility in developing countries. Another explanation is that the relationship between financial integration and risk sharing may be nonlinear, so that a threshold level of financial development is required before efficient risk sharing can be achieved.[10]

Three recent pieces of research look at the second moments of individual flows. Levy-Yeyati, Panizza, and Stein (2007) study the cyclical nature of *north-south* FDI.[11] They consider the United States, Europe, and Japan, and find that outward FDI is countercyclical with respect to output and interest rate cycles in the United States and Europe, and mildly procyclical in Japan. They also find that FDI and local investment in the source country are negatively correlated. Using a more systematic approach, Levchenko and Mauro (2007) look at 142 countries over the 1970-2003 period and show that (a) FDI is the least volatile type of capital flow and Friday, July 2, 2010 at 15:40 (b) different types of flows behave differently

[8]Theoretically, under the assumption of complete markets, cross-country consumption growth rates should be perfectly or highly correlated, fluctuations in consumption should be more highly correlated across countries than fluctuations in output, and the correlation of consumption growth rates with world output growth rates should be higher than with domestic output growth rates. These theoretical predictions find mixed support in the data, however. In fact, most studies find either limited risk sharing (among industrialized countries) or none at all (for emerging-market and developing countries).

[9]They suggest that this may be due to inappropriate use of capital flows to bolster current consumption growth, rather than to deepen domestic investment.

[10]The recovery of emerging-market economies after the Asian crisis may push these countries over that threshold and allow them to manage capital flows more efficiently for growth and risk sharing so that, in the next few years, evidence of risk sharing may become more apparent.

[11]They use bilateral yearly data for 22 source and 56 destination countries based on the OECD *International Direct Investment Statistics* database.

over episodes of sudden stops, with FDI being remarkably stable. They also show that bank lending flows drop dramatically and take a long time to recover after those episodes. Smith and Valderrama (2009) focus on emerging-market countries and consider disaggregated inward flows data to find that (a) gross capital inflows tend to be positively correlated with domestic investment, (b) the components of flows have diverse cyclical properties (debt and portfolio flows are more correlated with investment than with GDP, whereas FDI is more correlated with GDP), and (c) each type of financial flow is individually more volatile than the sum of the flows, suggesting some degree of substitutability across flows. In their paper they construct a small open-economy model with borrowing constraints and a countercyclical financing premium to explain these stylized facts.[12]

3 Breakpoint Analysis

Recent literature has developed empirical methods to determine whether the volatility of aggregate macroeconomic variables – such as GDP, consumption, and investment – has declined over time. In this work we make inference on changes in volatility and comovement measures using a nonparametric bootstrap procedure described in De Pace (2010). Breaks are chosen on the basis of three different methods. Using Methods I and II, we impose exogenous breaks based on specific economic events. Using method III, we estimate breaks at unknown dates via a recursive Chow test procedure.

3.1 Method I: Breaks in Capital Account Liberalization Measures

Using the first method we choose breaks from changes in the indices of capital flow liberalization in the G7 countries. We use the three variables constructed by Kaminsky and Schmukler (2008) to capture liberalization in capital accounts, domestic financial markets, and stock markets.[13] The resulting financial liberalization indicator is the mean of the measures of liberalization. Each measure may have one of three possible qualitative values: none, partial, or full. The levels are coded numerically and averaged to yield a single numerical level of financial liberalization. We use the dates of changes in the level of capital account controls as exogenous breaks to estimate shifts in variances, correlations, and covariances.

[12] Another way of differentiating these flows is suggested by Goldstein and Razin (2006), who, using an agency theory approach, model the difference between FDI and FPI as a trade-off between ownership or direct management and delegation of control.

[13] See Contessi, De Pace, and Francis (2010) for further details.

G7 countries fully liberalized their capital accounts between 1970 and 2005. From the liberalization data, Canada experienced a single break in the mid-1970s, Germany in the early 1980s. France, Italy, and the United States exhibit two breaks each, whereas the United Kingdom has three and Japan four. Each break corresponds to an increase in liberalization from none to partial, or to full, that occurred within the sample. Canada's full liberalization is recorded before the beginning of our sample. The remaining 6 countries achieved full capital account liberalization by 1992:Q1. We choose a single break for each country, corresponding to its most recent liberalization episode, as follows: Japan (1991:Q4), France (1990:Q1), Germany (1981:Q1), Italy (1992:Q2), U.K. (1981:Q1), USA (1982:Q1).

3.2 Method II: Breaks at Unknown Dates

We estimate the best simple univariate $AR(K)$ model for the generic capital flow series, s_t:

$$s_t = \mu + \Sigma_{k=0}^{K} \alpha_k s_{t-k} + \varepsilon_t, \qquad \text{(st)}$$

where ε_t is a serially uncorrelated random error term, μ is the intercept term, and $\alpha_0 = 0$. The innovation variance of the model is $Var(\varepsilon_t) = E(\varepsilon_t^2) - [E(\varepsilon_t)]^2 = E(\varepsilon_t^2)$. We look for a break in $Var(\varepsilon_t)$ and constrain it to occur in the middle 70 percent of the sample. We run a sequence of recursive Chow tests for breakpoint estimation and use a fixed-regressor grid-bootstrap procedure to derive the first-order asymptotic distribution for the statistics of interest, as described in the Technical Appendix, to be used to test the null of no breaks in the innovation variance versus the alternative of one break.

All significant breakpoints in the conditional variances of inward, outward, and net total flows occur later than the breakpoints in output, consumption, and investment detected by Doyle and Faust (2005), and later than the episodes of capital account liberalization we consider. We find breaks in the late 1990s and in early 2000-2001.

3.3 Changes in Second Moments

The next sections describe the statistical methods used to test the significance of second moments and their changes.

3.3.1 Testing for Changes in Variance, Covariance, and Correlation

We use a version of a nonparametric bootstrap technique to test for second-moment changes in time-series pairs (covariances and correlations), or in single time series (variances).[14] We bootstrap nonparametrically the difference between the second moments over two subsequent subsamples. The breakpoint, Br, is exogenously given (Method I) or detected through the previously described recursive procedure (Method II).

Let θ be the parameter under investigation, θ_1 its true value over the first sample, and θ_2 its true value over the second sample. In this paper, θ can be the variance, the covariance, or the correlation coefficient. We test whether the parameter shift, $\Delta\theta = (\theta_2 - \theta_1)$, is statistically significant. Formally, we consider the statistical test with size $(1-\alpha) \in (0,1)$, $H_0 : \Delta\theta = (\theta_2 - \theta_1) = 0$ against the alternative $H_1 : \Delta\theta = (\theta_2 - \theta_1) \neq 0$.

We base our statistical inference on the construction of two-sided α-level confidence intervals from the bootstrap distribution of $\widehat{\Delta\theta}$.[15] We can thus test for significant shifts and directly infer the sign of their direction. We apply the bootstrap to the data and use bootstrap iteration to estimate confidence intervals with improved accuracy.[16] That is, we derive iterated bootstrap percentile confidence intervals and iterated bias-corrected (BC) percentile confidence intervals, as described in DiCiccio, Martin, and Young (1992). We determine significant shifts at either the 5 percent or 10 percent level to as indicative of parameter instability.

3.3.2 Testing for the Statistical Significance of Correlations

The same technique is used to test the statistical significance of correlations between reference macroeconomic series and capital flows. This time, we test the null hypothesis $H_0 : \theta = 0$ against $H_1 : \theta \neq 0$, where θ is the unconditional correlation between two variables. The algorithm of the bootstrap works as outlined in the previous section, with the exception that it is applied over the full sample, T, to compose the bootstrap distribution of the correlation coefficient estimator, $\widehat{\theta}$. A second round of bootstrapping

[14] We follow De Pace (2010). See the Technical Appendix in this paper for a more detailed discussion of the technique.

[15] We always refer to two-sided equal tailed confidence intervals. They are equal-tailed because they attempt to place equal probability in each tail.

[16] We resample blocks of random length. Length is sampled from an independent geometric distribution whose expected value equals the expected block size. The original series should be *wrapped* around a circle to fill blocks going past the last observation. Optimal expected length is estimated through an inner (smaller) bootstrap procedure. This resampling scheme is known as a stationary bootstrap.

(bootstrap iteration) is used to estimate the coverage error of percentile confidence intervals, construct accurate bootstrap percentile confidence intervals, and make reliable inference on θ.

4 Empirical Evidence and Results

Gross capital flows among industrialized countries expanded by 722 percent between 1991 and 2005. This increase exceeded real GDP growth (approximately 29 percent) and international trade growth (about 151 percent) in advanced economies. During those years macroeconomic comovement among the G7 economies was lower than in previous decades.[17] In this section, we describe the evolution of the second moments (variance and covariance/correlation with business cycle variables) for a set of disaggregated capital flows. We include 12 flows: inward FDI, FPI, debt, and total flows; outward FDI, FPI, debt, and total flows, as well as net flows, for each of the 22 countries in the sample.

4.1 Capital Flows: Levels and Standard Deviations

We find that both inward and outward FDI and FPI in the G7 countries exhibit an increasing trend beginning in the mid-1990s, with peaks in the late 1990s and early 2000.[18] Debt flows have high volatility, but no clear pattern, except for an upward trend in the United States. Five-year rolling standard deviations (SDs) generally increase and then slightly rebound due to the boom and subsequent slowdown in capital flows in the late 1990s and early 2000s. The SD of inward debt flows is high and rising roughly throughout the sample in Canada, Italy, and the United States. The SD of outward debt flows trends upward in Italy and the United States only. In the other G7 countries, instead, the SD of debt flows displays an inverted U-shape.

The other six advanced countries show similar patterns. FDI and FPI generally increase in the late 1990s, decline in the early 2000s, and then increase again to late 2005. Corresponding rolling SDs also have an inverted U-shape. The volatility of debt flows is more broadly increasing, however. FDI shows more stability, with a few exceptions (e.g., the Scandinavian countries). Debt flows are the most volatile flows in the advanced economies.

Considering total gross and net flows for the G7 countries, inward and outward flows are dominated

[17] Heathcote and Perri (2004) and Stock and Watson (2005).
[18] See the online appendix for this paper.

by movements in debt. There is only a mildly increasing trend in inward and outward flows, whereas net flows do not exhibit much of a trend.[19] One exception is the United States, where net flows are downward sloping from the early 2000s. The volatility of inward and outward capital flows increases throughout the sample for most of the countries. On the other hand, there seems to be little trend in the volatility of net flows, with the exception of France and the United States (whose SDs are increasing) and the United Kingdom (which experiences a decreasing volatility).

Patterns are different and not easily detectable in emerging-market countries. There is no clear trend for inward flows. Some countries have an inverted U-shaped volatility that peaks in the early 2000s. Debt is still the most volatile flow, but inward FDI is not the most stable. Inward flow volatility is bigger than that of outward flows in most emerging economies. Net flows are predominantly negative and their volatility appears to be driven by that of inward flows.

This informal analysis confirms some established facts in the empirical literature about capital flow trends and volatilities. (a) Net capital flows exhibit a slightly increasing trend for most G7 countries, with the exception of the United States, where they show a marked downward trend. (b) Net flows in the rest of the advanced and emerging-market economies are predominantly negative. (c) Net flow volatility is lower than both inward and outward flow volatility for most G7 countries, but not, in general, for the advanced and emerging-market countries. (d) Debt is the most volatile of the three types of capital flows. (e) FDI is the most stable flow in most advanced countries. (f) Volatility shows an inverted U-shaped pattern for most disaggregated flows and for total inward flows.

4.2 Correlations with Business Cycle Variables

In this section we discuss the correlations between the cyclical components of capital flows and three reference business cycle variables – GDP, the ratio between gross fixed capital formation and GDP, and the real interest rate – for the 22 countries in the sample. Results are reported in Figures 1 through 3 and Tables 2 through 12.

[19] Contessi, De Pace, and Francis (2010).

4.2.1 Recursive Correlations

We measure correlations recursively over the samples 1975-2005, 1981-2005, 1986-2005, 1996-2005, and 2001-05. These recursive correlations (Figures 1 and 2) are computed backward.[20] The graphical representation allows us to assess the evolution of correlations over the years during which financial globalization intensified and international business cycles exhibited breaks (Doyle and Faust, 2005; Stock and Watson, 2005), and to compare in the same plot G7 countries and emerging economies, for which quarterly series are shorter.

In the G7 countries, (see Figure 1), inward FDI, FPI, and debt are generally positively correlated with real GDP. Inward FDI, in particular, is strongly procyclical. However, the only general conclusion we can make is that procyclicality has increased for most G7 countries and for most disaggregated capital flows since 1996. There seems to be some instability in the correlations, though, which can also be observed in the correlations between disaggregated capital flows and GDP or investment for all the economies we study (see also Figure 2). Aggregate flows show similar patterns (Figure 3), with the correlations between total flows and both GDP and investment frequently switching sign over the samples.

4.2.2 Correlations over the Full Sample

We look at the correlations between the cyclical components of disaggregated capital flows and real GDP, investment to GDP ratio, and real interest rate (Tables 2 through 10) over the period 1992-2005. For the G7 countries we also look at the periods 1975-2005 and 1975-92. Bold figures are significantly different from zero at least at the 10 percent level. To determine that a particular flow is procyclical (a plus sign in the tables), countercyclical (a minus sign), or uncertain (a question mark) over the sample and with respect to a reference macroeconomic variable, we use a simple rule of thumb and summarize entries by flow in each table as follows: (i) + (or -) if there are significant correlations and the majority of them are positive (or negative); in these case we consider the flow procyclical (or countercyclical); (ii) ?/+ if the number of significantly positive correlations is the same as the number of significantly negative correlations and the majority of the nonsignificant correlations are positive; (iii) ?/- if the number of significantly positive correlations is the same as the number of significantly negative correlations and the

[20] For example, the observation corresponding to the period 2001-2005 in the case of iFDI and GDP (Figure 1) is the correlation between the cyclical components of iFDI/GDP and GDP over the period 2001:Q1-05:Q4. The observation corresponding to the period 1996–2005 is the correlation computed over the period 1996:Q1-2005:Q4. Hence, rolling backward.

majority of the nonsignificant correlations are negative; (iv) ? all the other cases.

Aggregate Flows. We consider aggregate inward, outward, and net flows first and find that: (1A) Inward flows are procyclical in both industrial and emerging-market countries, as well as in the G7 countries, with respect to GDP and investment. They are countercyclical with respect to the real interest rate only in the emerging-market economies. (1B) Outward flows are countercyclical in industrial countries with respect to GDP and investment but are procyclical in the G7. In emerging-market countries outflows are countercyclical with respect to GDP, but procyclical with respect to investment. Outward flows are also countercyclical with respect to the real interest rate in emerging-market countries. (1C) Net flows are countercyclical with respect to GDP and investment for both emerging and industrial countries, including those in the G7. Net flows are procyclical in emerging-market and the G7 countries with respect to the real interest rate and countercyclical in the rest of the advanced economies.

Disaggregated Flows. We find the following patterns by looking at the components of capital flow: (2A) Inward FDI tends to be procyclical in industrial countries with respect to all three reference macroeconomic variables and countercyclical in emerging-market countries with respect to GDP and the real interest rate. Outward FDI is procyclical in industrial countries, particularly in the G7 economies. (2B) Inward FPI tends to be procyclical in the G7. (2C) Inward debt is procyclical in most countries. Net debt is procyclical in the G7 and emerging-market economies with respect to investment.

Net Financial Asset Positions. As also reported in Lane and Milesi-Ferretti (2007), all of the emerging-market and industrial countries in our sample have negative net financial asset positions with the exception of France, Germany, Japan, and Norway, predominantly due to the fact that almost all countries have negative net debt positions. Net FDI positions are positive for all of our industrial countries except Canada and negative for all of our emerging-market countries. Most industrial countries in our sample have positive net FPI positions, whereas all emerging-market countries except for Argentina have negative positions.

The majority of disaggregated net capital flow positions are positively correlated with GDP (Table 12), so that financial asset positions across all types of cross-border flows tend to improve during booms and deteriorate during recessions. Interestingly, for the G7, correlations between inward or outward disaggregated flows and GDP tend to have the same sign, whereas for the other countries in our sample, the signs differ between inward and outward flows. Outward flows are predominantly countercyclical and

inward flows are generally procyclical. One exception is for inward and outward debt positions where debt flows are procyclical in both directions. Looking at FDI positions in particular, inward FDI tends to be countercyclical in emerging-market countries, which may be driven by fire-sale opportunities or changes from local to cross-border financing by multi-national companies during recessionary periods. Outward FDI is evenly split between procyclical and countercyclical depending on the particular emerging-market country.

The significant heterogeneity in the cyclicality of the components of capital flows warrants more careful study and casts doubt on whether stylized facts by broad growth status can be determined.

4.3 Shifts in Second Moments

In Tables 13 and 14 we describe inferences on the changes of correlation and covariance between net, gross, and disaggregated capital flows and the reference macroeconomic variables in the G7 countries. Breakpoints are imposed using the three methods described above. These tables also report results on the variance changes pertaining to both flows and macroeconomic series.

Most point estimates of variance shifts in GDP are negative. Many of these changes are significant at the 10 percent level at least. The negative variations are most likely linked to the Great Moderation, the fall in the variability of real output, and the reduction in the severity of economic shocks that occurred in the G7 and other industrialized countries roughly during the 1980s.[21]

Variance Changes. Variance point estimates generally increase over the breaks for net, total, and disaggregated flows. The large majority of these variance switches are also statistically significant. This finding is consistent with previous evidence in the empirical literature and might suggest the existence of an underlying common factor affecting the volatility properties of total inward and outward flows across the countries. The existence of such a factor would not emerge, however, if we considered only net flows (as in Kaminsky, Reinhart, and Vegh (2005)), for which case, in fact, we observe less significant switches and several negative point estimates.

Correlation and Covariance Changes. Results are more heterogeneous across types of flows and macro aggregates. In general, we cannot identify specific patterns. Pointwise, covariance changes

[21] With positive covariances, a decrease in the idiosyncratic variability of macroeconomic variables may be a source of increased correlations between those variables and capital flows. However, the net effect on correlation coefficients also depends on the sign and size of the variance changes of capital flows and on the variations of their common variability with the macro variable, as measured by covariances.

usually have the same sign as correlation changes, with relatively few exceptions, due to the variations in the idiosyncratic components of the correlation coefficients. Furthermore, the proportion of significant switches is modest.

5 Discussion of the Results

First, inward capital flows are procyclical for all countries in our sample, although further dividing the flows into their components shows that this procyclicality is largely driven by the fact that inward debt flows are procyclical for most countries. Previous research has documented that composition of capital flows is different across countries, with FDI dominating emerging-economies' inflows and debt and portfolio flows dominating advanced economies' inflows. We show that disaggregated inflows (FDI, FPI, and debt) are procylical for G7 countries. However, the properties of inward FDI and foreign portfolio investment differ across advanced and emerging countries in that they are more frequently counter-cyclical in the emerging markets in our sample. From a policy perspective, the resilience of inward FDI relative to other types of international financing is appealing as FDI may help avoid disruptive capital flights during downturns and periods of relative low liquidity when debt and portfolio flows may be more likely to dry up.[22]

Second, FDI is, somewhat surprisingly, countercyclical in emerging-market countries.

This can be explained by fire-sale opportunities arising from currency devaluation and lack of access to credit that host country firms face during large recessions (and especially during financial crises) when they have trouble accessing credit. Previous empirical work based on micro data (Aguiar and Gopinath, 2005) is consistent with our results and suggests a positive relationship between lack of liquidity in the host economy and frequency of foreign acquisitions.

A group of recent theories explain these facts as a product of the interaction between information asymmetry and need for liquidity.[23] If projects have different productivity levels and returns, investors may liquidate a project due to either low productivity or temporary liquidity problems that a potential (foreign) buyer with limited information cannot distinguish. Therefore, in countries with liquidity shocks FDI may increase relative to FPI because it provides superior private information about productivity through direct managerial control. A liquidity shock associated with a deep recession raises the probability

[22]Here, we discuss below-trend growth and low liquidity essentially in a similar way to be consistent with the literature we quote, although clearly one could easily identify periods of below-trend growth and high liquidity.

[23]See Goldstein and Razin (2006), Kirabaeva (2009), and Kirabaeva and Razin (2009)

that foreign investors will enter through FDI rather than portfolio investment.

Another explanation for countercyclicality of FDI relies on changes in the valuation of domestic firms over the business cycle. Smith and Valderrama (2009) show that when multinationals face search costs to identify target firms, inward FDI becomes a function of the wedge between foreign and domestic valuation of a host country firm. When domestic firms are more financially constrained than multinationals, their value to foreign firms with access to cheaper credit increases, inducing multinationals to intensify the search. Currency depreciation, when it occurs in a context in which a country's macroeconomic fundamentals remain relatively strong, reduces the price of domestic firms for foreign buyers.

When we confront these explanations with our data, we can observe that our sample (1992-2005), contains a number of large devaluations or depreciations, along with periods of low liquidity in the emerging countries we study.[24] During these sharp currency corrections, with the exception of the Argentine and Turkish crises in 2001, industrial countries, particularly the United States and the United Kingdom, were experiencing an expansion, and the precipitous drop in the domestic valuation of local firms in these emerging-market countries made acquisition more appealing for foreign investors.

Our results on changes in second moments over various breakpoints suggest two questions. First, have financial globalization and changes in international comovement altered the cyclical behavior of capital flows? Our data and methodology suggest that little change has occurred so far. We do not find evidence of significant systematic changes in the cyclicality of flows across the various break-dates we estimate, thus we cautiously suggest that the recent increase in financial globalization has not changed the cyclical behavior of flows, at least in the countries we examine and over the time periods for which we have data.

Second, what is the relationship between the recent recession in the G7 countries and the size and type of capital flows to emerging countries? Our results suggest that the answer to this question depends on the synchronicity of the business cycle fluctuations in advanced and emerging countries. Since net outward flows are procyclical in the G7 – the largest source of capital flows – the deep global financial crisis and attendant recessions in the G7, ceteris paribus, should lead to a substantial decrease of flows into emerging-market countries. Recent data show that this may be the case during the recent global recession (Worldbank, 2009). Because inward debt flows are strongly procylical, emerging-market countries experiencing larger recessions may also experience a substantial decline in their access to debt, but stable

[24]The Mexican peso crisis of 1994-95, Argentina's currency crisis of 1994 and 2001, Brazil devaluation of the real in 1999, the East Asian crisis of 1997-98, and Turkey's 2001 currency collapse.

FDI flows. Initial evidence using manufacturing firm-level stock prices supports the idea that liquidity shocks in emerging economies are stronger in countries that have higher pre-crisis (countrywide) exposure to FPI and debt but less severe for countries that rely mostly on FDI as a sourceof external financing (Tong and Wei, 2010).

6 Conclusion

We describe stylized facts regarding the second-moment properties of the components of international capital flows and their relationship (covariance and correlation) to macroeconomic variables in 22 source and destination emerging and advanced countries. We find that capital flows exhibit heterogeneous volatility properties, with debt being the most volatile and FDI the least volatile, at least in a majority of countries. We show that (a) inward flows are procyclical but outward and net outward flows are countercyclical for most industrial and emerging-market countries, whereas both inward and outward flows are procyclical and net outflows are countercyclical in the G7 economies; (b) inward FDI is procyclical in industrial countries and countercyclical in emerging countries; and (c) there is no clear pattern of cyclicality for the other equity flows and debt.

Moreover, we run formal statistical tests to make inferences on the variations of volatility, covariance, and correlation between capital flows and a set of macroeconomic variables in the G7 countries. Second-moment shifts are mixed in sign over episodes of capital account liberalization and breakpoints in standard deviations of the individual capital flows. We detect a clear increase in the variance of all types of flows. We estimate breaks at unknown dates in the conditional variance of each capital flow to find that they differ significantly from the breaks associated with capital account liberalization and the breaks in business cycles estimated in Doyle and Faust (2005).

Recent theoretical papers model the link between business cycles and the dynamics of capital flows. However, there seems to be substantial uncertainty about the stylized facts. Our comprehensive assessment of the second-moment properties of capital flows provides a benchmark set of results useful for further theoretical and empirical work in this area.

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Appendix

A Data

Capital Flows. We collect quarterly data from 1975:Q1—2005:Q4. If available, they are taken from *International Financial Statistics* (IFS), published by the IMF. We use quarterly nominal GDP from the IFS to norm capital flow series. Quarterly GDP is reported in national currencies. For each country we convert national currencies into U.S. dollars using end-of-period market exchange rates (also reported in the IFS). For euro area countries, we use original national currencies (franc, deutsche mark, and lira) until the introduction of the euro (January 1, 1999). Then we use fixed national currency factors to determine the euro rate. We collect FPI, FDI, and other investment flows for each of the G7 countries from the IFS. Assets (outflows) and liabilities (inflows) are reported separately.

Foreign Direct Investment: Inflows are direct investment in the reporting economy, n.i.e (line 78bed) IFS; outflows are direct investment abroad (line 78bdd). FDI includes equity capital, reinvested earnings, other capital, and financial derivatives associated with various intercompany transactions between affiliated companies (IFS June 2007).

Portfolio Investment: Inflows are portfolio investment liabilities, n.i.e., (line 78bgd); outflows are portfolio investment assets (line 78bfd). Portfolio investment includes financial securities of any maturity, including corporate securities, bonds, notes, and money market instruments, other than those included in direct investment or reserve assets. Portfolio investment is reported in IFS data as combined debt and

equity portfolio investment. It can be separated into equity securities and debt securities. Equity securities assets (line 78bkd) and equity securities liabilities (line 78bmd) include shares, stock participation, and similar equity investments (e.g., American depository receipts and global depository receipts). Debt securities assets (line 78bld) and debt securities liabilities (line 78bnd) include bonds, debentures, notes, and money market or negotiable debt instruments.

Other Investment: Inflows are other investment liabilities (line 78bid IFS); outflows are other investment assets (line 78bhd IFS) and include all financial transactions not covered in direct investment (FDI), portfolio investment, financial derivatives, or other assets. This category comprises trade credits, loans, transactions in currency and deposits, and other assets/liabilities.

Total equity flows are calculated as equity securities + foreign direct investment, for both inflows (liabilities) and outflows (assets), to create total equity liabilities and total equity assets.

Total debt flows are calculated as debt securities + other investment, for both inflows (liabilities) and outflows (assets) to create total debt liabilities and total debt assets.

Total flows include total equity flows plus total debt flows. They are broken down into total inflows (liabilities) and total outflows (assets). Hence, net total flows are decomposed as follows:

Type	Component	
Foreign Direct Investment	FDI	} Total Equity
Foreign Portfolio Investment	Equity	
	Debt	} Total Debt
Other Investment	Other Debt	

We remove the few outliers for which we have anecdotal evidence indicating an extraordinary individual quarterly flow. We substitute those outliers with five-year moving averages of the flow, centered around the quarters where the abnormal flows are registered.

Liberalization Variables. Financial liberalization (FL) in Kaminsky and Schmukler (2008) is the mean of the measures of liberalization for capital controls, the domestic financial sector, and the stock market. Each measure of liberalization is given one of three possible qualitative values: none, partial, or

full. The levels are coded numerically and averaged across the three areas to produce a single numerical level of FL. We use the dates of change in the level of capital account control as exogenous breaks to estimate shifts in variances, correlations, and covariances. The levels of liberalization are defined as follows.

National Accounts Data, Interest Rates and Inflation Measures. We use quarterly data from the Quarterly National Accounts (QNA) of the OECD on Gross Domestic Product and Gross Fixed Capital Formation, compiled according to the 1993 System of National Accounts, when available. If the time series are not long enough, we splice the OECD series with the Doyle and Faust (2005) dataset, constructed with OECD QNA series. Data for the period 1975Q1—1977Q4 are from the same paper. To splice the data and construct a full series, we use quarterly growth rates over the earlier samples. For Germany, we use quarterly growth rates of West German GDP and investment up to 1991Q1, when reunification occurred. After reunification, we use data on the unified country, using the splicing method described in Doyle and Faust (2005) to retain consistency.

Other Data Sources are obtained from the following sources (base years in brackets). Real GDP, Nominal and Real Gross Fixed Capital Formation : (i) OECD-QNA Chained Price index: Canada* (1997), Germany* (2000), Italy (2000), Japan (2000), United Kingdom (2003), Denmark (2000), Finland (2000), Norway (2003), Portugal (2000), Spain (2000), Sweden (2000). (ii) OECD-QNA: Korea (2000 won), Mexico (1993 pesos). (iii) ECD-MEI: Brazil (2000), Indonesia (2000). (iv) IFS: Argentina (1993), Peru (1994), Philippines (1985), Thailand (1988), Turkey (1995). (v) INSEE Chained Price index: France (1980). (vi) BEA Chained Price index: USA (2000). Nominal interest rates and inflation measures are from the IFS: Overnight Money market rate (Canada, United Kingdom), Call Money rate (France, Germany), Money market rate (Italy, Japan), Federal Funds Rate (USA), CPI-All items (Germany, Italy, Japan, United Kingdom), CPI-All cities over 30,000 (Canada), CPI-108 cities (France), CPI-All items city average (USA).

B Method II: Breaks at Unknown Dates

We estimate the best simple univariate $AR(K)$ model for the generic series, s_t:

$$s_t = \mu + \Sigma_{k=0}^{K} \alpha_k s_{t-k} + \varepsilon_t, \qquad \text{(st)}$$

where ε_t is a serially uncorrelated random error term, μ is the intercept term, and $\alpha_0 = 0$. The innovation variance of the model is $Var(\varepsilon_t) = E(\varepsilon_t^2) - [E(\varepsilon_t)]^2 = E(\varepsilon_t^2)$. To detect a one-time structural break at an unknown date in the variability of ε_t, we allow for a specific form of heteroskedasticity. In general, $E(\varepsilon_t^2) = E(\varepsilon_t^2|z_t) = \sigma^2 + z_t'\alpha$, where z_t is an exogenous variable. Therefore $\varepsilon_t^2 = \sigma^2 + z_t'\alpha + [\varepsilon_t^2 - E(\varepsilon_t^2|z_t)] = \sigma^2 + z_t'\alpha + v_t$, with $E(v_t|z_t) = 0$. We assume that heteroskedasticity, if any, takes the form:

$$E(\varepsilon_t^2|z_t) = \gamma_0 + D_t\gamma_1, \tag{E}$$

where D_t is a dummy variable that controls for the shift in the innovation variance, γ_0 and γ_1 are two constants to be estimated. D_t is a vector of T observations – where T is the sample size – that contains 0's until a structural break is detected and then contains 1's for the remainder of the sample. We regress $\widehat{\varepsilon}_t^2$ from (st) on a constant and then test for the presence of structural shifts in the intercept term using a sequence of breakpoint Chow tests at different dates. We constrain the potential break to occur in the middle 70 percent of the sample. The null of the Chow test is no structural breaks. Relevant statistics above their corresponding critical values show that the null can be rejected and that at least a one-time structural break occurs in the data. Sequential breakpoint Chow tests select possible time intervals within which the actual break may be found. By focusing on the maximal statistics, we can isolate individual dates in correspondence to which the probability of a one-time break is maximized. However, the critical values produced by this recursive approach might not always be reliable. Let F_t be the F (Wald) statistic of the breakpoint Chow test at time t. Then consider three statistics, for which exact asymptotic theory exists: a) $\sup F = \sup_{t\in[t_1,t_2]} F_t$ (Quandt/Andrews), b) $\exp F = \ln\left[\int_{t_1}^{t_2} e^{\left(\frac{F_t}{2}\right)} dw_t\right]$ (Exponentially-Weighted F), and c) ave $F = \int_{t_1}^{t_2} F_t dw_t$ (Average F), where w_t is a measure that puts weight $\frac{1}{t_2 - t_1}$ on each integer t in the interval $[t_1; t_2]$, t_1 and t_2 representing the boundaries of the time interval along which the sequence of Chow tests is executed. We usually set $t_1 = 0.15T$ and $t_2 = 0.85T$.[25] Hansen (1999) develops a *fixed-regressor grid-bootstrap* procedure to derive the first-order

[25]The $\exp F$ statistic is optimal against distant alternatives, whereas the *ave* F statistic is optimal against very local alternatives. Hansen (1999) and Hansen (2000) refine the method of Andrews and Ploberger (1994) by showing that their statistics may vary with structural changes in the regressors of the test equations.

asymptotic distribution for these statistics.[26] His grid-bootstrap allows for arbitrary structural changes in the regressors, including simple structural shifts, as in the case described in this work, as well as for lagged dependent variables and heteroskedastic error processes. Probability levels for each statistic are computed following Hansen's indications and by using large Monte Carlo simulations. By returning the same estimated breakpoint date as in the sequence of breakpoint Chow tests, this approach either confirms or rejects the findings of a naïve procedure based on the incorrect critical values.

C Constructing the Bootstrap Distribution for $\widehat{\Delta\theta}$

In the simple case of two countries, A and B, let $X_{A,t} = \{X_{A,s}\}_{s=1}^{T}$ and $X_{B,t} = \{X_{B,s}\}_{s=1}^{T}$ denote two observed time series, with Br being an exogenous breakpoint between the first and the Tth observation. Each series is thus split into two subsamples, $X_{A,t}^{1} = \{X_{A,s}\}_{s=1}^{Br}$, $X_{B,t}^{1} = \{X_{B,s}\}_{s=1}^{Br}$, $X_{A,t}^{2} = \{X_{A,s}\}_{s=Br+1}^{T}$, and $X_{B,t}^{2} = \{X_{B,s}\}_{s=Br+1}^{T}$. Let θ be either the correlation coefficient or the covariance. In the first subsample, let $w_{A,i,l}$ and $w_{B,i,l}$, respectively, denote the blocks $\left\{X_{A,s}^{1}\right\}_{s=i}^{i+l-1}$ and $\left\{X_{B,s}^{1}\right\}_{s=i}^{i+l-1}$ of length l starting at $X_{A,i}^{1}$ and $X_{B,i}^{1}$, with $X_{A,i}^{1} = X_{A,1+\{(i-1) \bmod Br\}}^{1}$, $X_{B,i}^{1} = X_{B,1+\{(i-1) \bmod \ Br\}}^{1}$, $X_{A,0}^{1} = X_{A,Br}^{1}$, and $X_{B,0}^{1} = X_{B,Br}^{1}$. Finally, let $I_1, I_2, ...$ be a stream of random numbers uniform on the integers $1, ..., Br$, and let $L_1, L_2, ...$ be a stream of random numbers independently drawn from a geometric distribution, $Prob\,(L = l) = \lambda\,(1-\lambda)^{l-1}$ with $l = 1, 2, ...$ The inverse of λ is the expected block length, $E\,(L) = \frac{1}{\lambda}$, to be estimated through an inner procedure based on an automatic rule that minimizes an appropriate objective function. Given $\widehat{\left(\frac{1}{\lambda}\right)}$, the algorithm that generates a couple of stationary bootstrap time series replicates over the first subsample, $X_{A,t}^{1*}$ and $X_{B,t}^{1*}$, runs as follows: (i) set $X_{A,t}^{1*} = w_{A,I_1,L_1}$, $X_{B,t}^{1*} = w_{B,I_1,L_1}$, and $j = 1$; (ii) while $length\left(X_{A,t}^{1*}\right) < Br$, increment j by 1 and redefine $X_{A,t}^{1*}$ and $X_{B,t}^{1*}$ as $X_{A,t}^{1*} := X_{A,t}^{1*} \cup w_{A,I_j,L_j}$ and $X_{B,t}^{1*} := X_{B,t}^{1*} \cup w_{B,I_j,L_j}$; (iii) if $length\left(X_{A,t}^{1*}\right) > Br$, discard the two series of pseudo-data just generated and restart resampling from (i) after drawing new streams of I_j's and L_j's. We apply this scheme to both the first and the second subsamples N_O^B times. At each complete resample

[26] Hansen (1999) proposes a *grid-bootstrap* method to construct confidence intervals with improved performance over conventional bootstrap methods when the sampling distribution depends on the parameter. The basic idea is to calculate the bootstrap distribution over a grid of values for the parameter of interest and form the confidence interval by the no-rejection principle. This framework applies perfectly to autoregressive models, where it is known that conventional bootstrap methods fail to provide correct first-order asymptotic coverage when an autoregressive root is close to unity. In contrast, the grid bootstrap is first-order correct globally in the parameter space. The bootstrap treats all the regressors as exogenous even when they contain lagged values of the dependent variable. Note that Hansen (1997) derives asymptotic distributions for all three statistics. The two methods return identical results for tests such as those designed in this section.

of the original data, we estimate and collect $\widehat{\Delta\theta}^{*} = \left\{\widehat{\theta}\left(X_{A,t}^{2*}, X_{B,t}^{2*}\right) - \widehat{\theta}\left(X_{A,t}^{1*}, X_{B,t}^{1*}\right)\right\}$ to compose the bootstrap distribution of $\widehat{\Delta\theta}$. The same logic, with just one country and one time series, applies if the statistic of interest is the variance.

D Estimating Accurate Confidence Intervals for $\Delta\theta$

The following notation applies to the case of either correlations or covariances; by extension, it is also applicable to the case of variances, if only one time series is taken into account. Let $X_{A,t}$ and $X_{B,t}$ be two variables and $I_0\left(\alpha; X_{A,t}, X_{B,t}; X_{A,t}^{*}, X_{B,t}^{*}\right)$ the uncorrected bootstrap percentile confidence interval of nominal coverage probability α for $\Delta\theta$. $X_{A,t}^{*}$ and $X_{B,t}^{*}$ are two generic resamples with replacement from $X_{A,t}$ and $X_{B,t}$. I_0 is constructed from sample and resample information. Usually, in empirical applications, the coverage probability of I_0– namely, $P(\alpha) = Prob\left\{\Delta\theta \in I_0\left(\alpha; X_{A,t}, X_{B,t}; X_{A,t}^{*}, X_{B,t}^{*}\right)\right\}$– differs from α. There exists a real number, ϱ_α, such that $P(\varrho_\alpha) = \alpha$.

Let $I_0\left(\alpha; X_{A,t}^{*}, X_{B,t}^{*}; X_{A,t}^{**}, X_{B,t}^{**}\right)$ be a version of $I_0\left(\alpha; X_{A,t}, X_{B,t}; X_{A,t}^{*}, X_{B,t}^{*}\right)$ computed using information from $X_{A,t}^{*}$, $X_{B,t}^{*}$, $X_{A,t}^{**}$, and $X_{B,t}^{**}$; $X_{A,t}^{**}$ and $X_{B,t}^{**}$ are resamples with replacement of $X_{A,t}^{*}$ and $X_{B,t}^{*}$. An estimate of $P(\alpha)$ is

$$\widehat{P}(\alpha) = Prob\left\{\widehat{\Delta\theta} \in I_0\left(\alpha; X_{A,t}^{*}, X_{B,t}^{*}; X_{A,t}^{**}, X_{B,t}^{**} | X_{A,t}, X_{B,t}\right)\right\}.$$

Let N_O^B be the number of bootstrap replications at the outer level of resampling; then $\widehat{P}(\alpha)$ is calculated as

$$\widehat{P}(\alpha) = \left(\sum_{n_O^B=1}^{N_O^B} 1\left\{\widehat{\Delta\theta} \in I_{0,n_O^B}\left(\alpha; X_{A,t}^{*}, X_{B,t}^{*}; X_{A,t}^{**}, X_{B,t}^{**}\right)\right\}\right) / N_O^B.$$

Since distribution information on $X_{A,t}^{**}$ and $X_{B,t}^{**}$ given $X_{A,t}^{*}$ and $X_{B,t}^{*}$ is unavailable, an inner level of resamples (say, N_I^B resamples for each outer resample,[27] n_O^B) from $X_{A,t}^{*}$ and $X_{B,t}^{*}$ is used to outline the features of that distribution.[28] The bootstrap estimate for ϱ_α is the solution, $\widehat{\varrho}_\alpha$, to the

[27] We use $1,000$ replications for the outer bootstrap; 500 for the inner bootstrap. There exists a serious trade-off between number of resamples and computation time that must be taken into account.

[28] Bootstrap samples are drawn using the same nonparametric method in the main and nested bootstraps.

equation $\widehat{P}(\varrho_\alpha) = \alpha \therefore \widehat{\varrho}_\alpha = \widehat{P}^{-1}(\alpha)$.[29] The iterated bootstrap confidence interval for $\Delta\theta$ is then $I_1\left(\widehat{\varrho}_\alpha; X_{A,t}, X_{B,t}; X^*_{A,t}, X^*_{B,t}\right)$.

Table 1: Breaks in the conditional variance of capital flows (Method II)

Country	$iFDI$	$oFDI$	$iFPI$	$oFPI$	$iDebt$	$oDebt$	$iTot$	$oTot$	$noTot$
Canada	2001:Q1	1998:Q3	2000:Q1	2000:Q1	1996:Q4	1996:Q2	1996:Q4	1999:Q1	(2000:Q3)
France	1999:Q3	1999:Q2	1999:Q2	1997:Q3	1998:Q4	1997:Q4	1998:Q4	1998:Q4	2000:Q3
Germany	1998:Q1	1998:Q1	2000:Q1	1999:Q4	2001:Q1	2001:Q1	2000:Q1	1998:Q3	(1999:Q1)
Italy	2000:Q1	1999:Q2	1997:Q3	1998:Q1	1999:Q4	1992:Q3	2001:Q1	1992:Q4	(1991:Q2)
Japan	1999:Q2	1998:Q3	1997:Q4	1997:Q2	1997:Q4	1997:Q1	1997:Q2	1997:Q2	2001:Q2
U.K.	1999:Q2	1998:Q4	1998:Q4	1998:Q2	1998:Q4	1998:Q4	1998:Q4	1998:Q4	(1993:Q4)
USA	1998:Q4	1999:Q1	1997:Q2	1997:Q4	1996:Q3	2000:Q1	1996:Q4	2001:Q1	1995:Q3

Note. Breaks in parenthesis are not significant at the 5 percent level.

[29] With discrete variables and discrete bootstrap distributions, an exact solution for this equation cannot always be found, unless we use smoothing techniques. We choose the smallest value $\widehat{\varrho}_\alpha$ such that $\widehat{P}(\widehat{\varrho}_\alpha)$ is as close as possible to α, i.e., such that $\left|\widehat{P}(\varrho_\alpha) - \alpha\right|$ is minimized over a grid of values and additional conditions defining tolerance are satisfied. Refer to De Pace (2010) and the related Companion Technical Appendix for further information on the solving algorithm and on the other estimation procedures adopted in this paper.

Table 2: Correlations with GDP (1)

		iTot	oTot	noTot			iTot	oTot	noTot
1975-2005	Canada	**0.27**	**0.16**	-0.17	**1992-2005**	Canada	0.14	0.15	0.03
	France	**0.18**	**0.14**	-0.08		France	0.17	0.17	0.05
	Germany	0.07	0.04	-0.05		Germany	0.06	-0.02	**-0.18**
	Italy	0.09	0.02	**-0.19**		Italy	-0.06	-0.11	-0.14
	Japan	-0.05	-0.09	-0.07		Japan	-0.08	-0.08	-0.01
	U.K.	**0.06**	0.04	-0.11		U.K.	0.03	0.03	0.02
	USA	0.11	-0.01	**-0.20**		USA	0.24	0.13	-0.20
						Denmark	0.08	-0.08	-0.02
Positive	**G7**	6	5	0		Finland	0.07	-0.08	0.04
Negative	**G7**	1	2	7		Norway	-0.07	-0.02	0.15
Average	**G7**	0.10	0.04	-0.13		Portugal	**0.22**	**-0.15**	-0.17
		+	+	-		Spain	0.17	-0.15	-0.04
						Sweden	0.08	0.00	-0.19
		iTot	oTot	noTot		Argentina	**0.57**	**-0.40**	**-0.64**
1975-1992	Canada	**0.43**	0.21	-0.32		Brazil	-0.20	**-0.15**	0.14
	France	0.28	0.13	-0.40		Indonesia	**0.32**	0.14	0.11
	Germany	0.12	0.14	0.05		Mexico	-0.01	-0.10	0.03
	Italy	**0.18**	**0.09**	**-0.21**		Peru	0.19	**0.28**	-0.08
	Japan	-0.01	-0.15	-0.18		Philippines	-0.11	0.11	0.18
	U.K.	0.16	0.11	-0.16		South Korea	**0.31**	**-0.44**	-0.12
	USA	0.05	-0.12	-0.26		Thailand	0.15	-0.18	-0.19
						Turkey	**-0.28**	0.02	0.19
Positive	**G7**	6	5	1					
Negative	**G7**	1	2	6	**Positive**	**Advanced**	10	4	5
Average	**G7**	0.17	0.06	-0.21	**Negative**	**Economies**	3	9	8
		+	+	-	**Average**		0.08	-0.02	-0.05
							+	-	-
					Positive	**Emerging**	5	4	5
					Negative	**Economies**	4	5	4
					Average		0.10	-0.08	-0.04
							+	-	-

Note. To designate a particular flow procyclical (a plus sign in the tables), countercyclical (a minus sign), or uncertain (a question mark) over the sample and with respect to a reference macroeconomic variable, we used a simple rule of thumb described in subsection 4.2.2. Bold-face text indicates that the estimates are significant at the 10 percent confidence level or better.

Table 3: Correlations with GDP (2)

		iFDI	iFPI	iDebt	oFDI	oFPI	oDebt	noFDI	noFPI	noDebt
1975-2005	Canada	**0.13**	0.02	0.17	**0.11**	0.08	0.11	-0.001	0.03	-0.11
	France	**0.11**	0.17	**0.17**	**0.27**	0.03	0.07	0.27	-0.12	**-0.23**
	Germany	**0.09**	0.004	0.01	-0.01	0.12	-0.01	-0.03	0.05	-0.03
	Italy	0.07	0.04	0.07	0.12	0.06	-0.01	0.10	0.02	**-0.17**
	Japan	-0.02	0.02	-0.05	**0.22**	**-0.25**	-0.08	**0.22**	-0.09	-0.03
	U.K.	**0.12**	-0.01	0.05	**0.07**	-0.01	0.02	0.01	-0.01	-0.07
	USA	**0.24**	0.12	0.003	0.14	0.04	-0.06	-0.11	-0.05	-0.10
Positive	**G7**	6	6	6	6	5	3	4	3	0
Negative	**G7**	1	1	1	1	2	4	3	4	7
Average	**G7**	0.11	0.05	0.06	0.13	0.01	0.00	0.06	-0.02	-0.11
		+	?/+	+	+	-	?/-	+	?/-	-
1975-1992	Canada	0.09	-0.01	0.35	0.24	-0.25	**0.18**	0.04	-0.11	**-0.26**
	France	0.08	0.07	**0.29**	**0.37**	-0.13	0.16	0.32	-0.15	**-0.36**
	Germany	0.06	-0.07	0.13	0.01	-0.15	**0.12**	0.26	-0.03	0.01
	Italy	-0.05	0.11	**0.18**	-0.03	**0.13**	0.08	0.02	0.07	**-0.24**
	Japan	-0.001	0.30	-0.12	**0.37**	-0.26	-0.15	**0.36**	-0.33	-0.01
	U.K.	**0.27**	0.07	0.13	**0.31**	-0.12	0.08	0.04	-0.14	-0.12
	USA	0.17	-0.13	0.03	**0.35**	-0.11	-0.17	0.12	0.09	-0.32
Positive	**G7**	5	4	6	6	1	5	7	2	1
Negative	**G7**	2	3	1	1	6	2	0	5	6
Average	**G7**	0.09	0.05	0.14	0.23	-0.13	0.04	0.17	-0.08	-0.18
		+	?/+	+	+	+	+	+	?/-	-

Note. To designate a particular flow procyclical (a plus sign in the tables), countercyclical (a minus sign), or uncertain (a question mark) over the sample and with respect to a reference macroeconomic variable, we used a simple rule of thumb described in subsection 4.2.2. Bold-face text indicates that the estimates are significant at the 10 percent confidence level or better.

Table 4: Correlations with GDP (3)

		iFDI	iFPI	iDebt	oFDI	oFPI	oDebt	noFDI	noFPI	noDebt
1992-2005	Canada	**0.21**	0.04	-0.06	0.11	0.27	0.03	-0.04	0.13	0.11
	France	**0.15**	0.24	0.11	0.37	0.06	0.02	0.36	-0.15	-0.20
	Germany	0.16	0.02	-0.06	0.03	**0.27**	-0.12	-0.14	0.10	-0.08
	Italy	0.21	0.04	-0.08	0.23	0.04	**-0.18**	0.18	0.003	-0.12
	Japan	-0.02	-0.12	-0.04	0.07	**-0.26**	-0.06	0.08	0.03	-0.04
	U.K.	0.11	-0.03	0.02	0.07	0.02	0.004	0.01	0.04	-0.05
	USA	**0.48**	**0.45**	-0.05	-0.01	0.14	0.10	**-0.39**	-0.17	**0.24**
	Denmark	**0.32**	-0.05	0.001	**-0.31**	-0.47	0.04	**-0.31**	-0.37	0.02
	Finland	0.05	0.07	0.03	-0.19	-0.10	0.06	-0.14	-0.08	0.04
	Norway	-0.05	-0.02	-0.06	0.02	-0.15	0.01	0.03	-0.12	0.06
	Portugal	0.14	**-0.36**	**0.28**	-0.10	-0.12	-0.12	-0.10	**0.25**	**-0.20**
	Spain	0.25	**0.21**	0.01	-0.25	-0.23	0.04	-0.26	-0.30	0.01
	Sweden	0.07	0.07	0.02	-0.17	-0.07	0.16	-0.13	-0.12	0.07
	Argentina	0.04	-0.09	**0.55**	-0.26	0.07	**0.42**	-0.08	0.09	**-0.24**
	Brazil	-0.19	-0.28	-0.06	-0.04	**-0.15**	**0.21**	0.09	0.11	0.13
	Indonesia	0.20	0.25	**0.27**	-0.01	0.39	-0.01	0.07	-0.35	0.01
	Mexico	**-0.14**	0.11	0.005	0.36	n.a.	0.16	0.21	n.a.	0.07
	Peru	0.10	**0.23**	0.10	n.a.	0.10	**-0.34**	n.a.	-0.06	-0.21
	Philippines	-0.07	-0.06	-0.10	0.06	0.16	-0.12	-0.03	0.07	0.02
	South Korea	**-0.30**	-0.06	**0.40**	0.18	-0.07	**-0.46**	0.31	0.05	**-0.54**
	Thailand	**-0.45**	**0.20**	**0.19**	-0.17	0.19	**0.20**	0.40	-0.29	-0.10
	Turkey	-0.09	**-0.27**	-0.20	0.07	**-0.22**	**0.23**	0.11	-0.08	**0.28**
Positive	**Advanced**	11	8	7	7	6	9	5	6	7
Negative	**Economies**	2	5	6	6	7	4	8	7	6
Average		0.16	0.04	0.01	-0.01	-0.05	0.00	-0.07	-0.06	-0.01
		+	+	+	-	?/-	-	-	+	?/+
Positive	**Emerging**	3	4	6	4	5	5	6	4	5
Negative	**Economies**	6	5	3	4	3	4	2	4	4
Average		-0.10	0.00	0.13	0.02	0.06	0.03	0.13	-0.06	-0.06
		-	+	+	?	-	+	?/+	?	-

Note. To designate a particular flow procyclical (a plus sign in the tables), countercyclical (a minus sign), or uncertain (a question mark) over the sample and with respect to a reference macroeconomic variable, we used a simple rule of thumb described in subsection 4.2.2. Bold-face text indicates that the estimates are significant at the 10 percent confidence level or better.

Table 5: Correlations with Investment-to-GDP Ratios (1)

		iTot	oTot	noTot			iTot	oTot	noTot
1975-2005	Canada	0.21	0.06	**-0.22**	**1992-2005**	Canada	0.04	-0.02	-0.10
	France	**0.17**	0.16	0.01		France	0.20	0.20	0.09
	Germany	0.13	0.10	-0.07		Germany	0.16	0.13	-0.11
	Italy	0.11	0.08	-0.11		Italy	0.05	-0.01	-0.18
	Japan	**0.09**	0.03	-0.12		Japan	0.12	**0.17**	0.11
	U.K.	-0.02	-0.03	-0.02		U.K.	-0.10	-0.11	-0.10
	USA	0.12	-0.02	**-0.23**		USA	0.17	0.09	-0.15
						Denmark	0.03	-0.05	0.03
Positive	**G7**	6	5	1		Finland	-0.01	-0.0018	0.03
Negative	**G7**	1	2	6		Norway	-0.22	**0.30**	**-0.12**
Average	**G7**	0.12	0.05	-0.11		Portugal	0.10	-0.03	-0.17
		+	?/+	-		Spain	-0.02	-0.12	0.38
						Sweden	-0.17	**0.29**	**-0.24**
		iTot	oTot	noTot		Argentina	0.49	**-0.41**	**-0.59**
1975-1992	Canada	**0.40**	0.18	**-0.32**		Brazil	**0.24**	0.06	**-0.21**
	France	0.17	0.11	-0.15		Indonesia	**0.34**	-0.10	0.19
	Germany	0.10	0.07	-0.03		Mexico	0.15	-0.06	0.06
	Italy	**0.18**	**0.16**	-0.05		Peru	0.07	0.19	0.02
	Japan	0.10	-0.16	**-0.34**		Philippines	-0.03	-0.20	-0.08
	U.K.	0.10	0.12	0.02		South Korea	**0.34**	**-0.38**	-0.17
	USA	0.09	-0.13	**-0.35**		Thailand	0.18	-0.06	-0.18
						Turkey	0.02	-0.12	-0.08
Positive	**G7**	7	5	1					
Negative	**G7**	0	2	6	**Positive**	**Advanced**	8	6	5
Average	**G7**	0.16	0.05	-0.17	**Negative**	**Economies**	5	7	8
		+	+	-	**Average**		0.03	0.06	-0.04
							?/+	+	-
					Positive	**Emerging**	8	2	3
					Negative	**Economies**	1	7	6
					Average		0.20	-0.12	-0.12
							+	-	-
							+	-	-

Note. To designate a particular flow procyclical (a plus sign in the tables), countercyclical (a minus sign), or uncertain (a question mark) over the sample and with respect to a reference macroeconomic variable, we used a simple rule of thumb described in subsection 4.2.2. Bold-face text indicates that the estimates are significant at the 10 percent confidence level or better.

Table 6: Correlations with Investment-to-GDP Ratios (2)

		iFDI	iFPI	iDebt	oFDI	oFPI	oDebt	noFDI	noFPI	noDebt
1975-2005	Canada	-0.07	0.07	0.22	**0.09**	-0.09	0.06	0.12	-0.11	-0.21
	France	0.07	**0.22**	**0.15**	**0.32**	0.02	0.06	**0.34**	**-0.17**	**-0.21**
	Germany	0.07	-0.01	0.04	0.08	**0.29**	-0.01	0.02	**0.13**	-0.09
	Italy	0.05	-0.02	0.11	0.01	-0.03	0.09	-0.02	-0.003	-0.07
	Japan	-0.03	0.07	0.07	**0.36**	-0.08	0.02	**0.36**	-0.08	-0.10
	U.K.	**0.14**	0.01	-0.05	0.05	-0.07	-0.02	-0.02	-0.05	0.07
	USA	**0.24**	0.08	0.03	**0.13**	0.02	-0.06	-0.11	-0.04	-0.14
Positive	**G7**	5	5	6	7	3	4	4	1	1
Negative	**G7**	2	2	1	0	4	3	3	6	6
Average	**G7**	0.07	0.06	0.08	0.15	0.01	0.02	0.10	-0.05	-0.11
		+	+	+	+	+	?/+	+	?/-	-
1975-1992	Canada	-0.16	0.03	**0.39**	**0.17**	-0.15	0.16	0.26	-0.09	-0.34
	France	0.01	0.07	**0.21**	**0.43**	-0.07	0.13	**0.42**	-0.10	**-0.22**
	Germany	0.10	-0.03	0.10	0.02	-0.07	0.05	**0.13**	-0.02	-0.05
	Italy	0.13	-0.001	**0.17**	0.07	0.08	**0.15**	-0.07	0.08	-0.06
	Japan	-0.03	0.14	0.04	**0.44**	-0.15	-0.15	**0.43**	-0.16	-0.24
	U.K.	0.23	-0.15	0.08	**0.29**	-0.01	0.08	0.06	0.05	-0.03
	USA	0.10	**-0.24**	0.11	**0.27**	-0.15	-0.17	0.11	**0.19**	**-0.42**
Positive	**G7**	5	3	7	7	1	5	6	3	0
	G7	2	4	0	0	6	2	1	4	7
Negative	**G7**	0.05	-0.03	0.16	0.24	-0.07	0.04	0.19	-0.01	-0.19
		?/+	-	+	+	?/-	+	+	+	-

Note. To designate a particular flow procyclical (a plus sign in the tables), countercyclical (a minus sign), or uncertain (a question mark) over the sample and with respect to a reference macroeconomic variable, we used a simple rule of thumb described in subsection 4.2.2. Bold-face text indicates that the estimates are significant at the 10 percent confidence level or better.

Table 7: Correlations with Investment-to-GDP Ratios (3)

		iFDI	iFPI	iDebt	oFDI	oFPI	oDebt	noFDI	noFPI	noDebt
1992-2005	Canada	0.01	0.11	0.03	0.09	-0.10	-0.03	0.06	-0.16	-0.07
	France	0.11	**0.31**	0.13	**0.47**	0.04	0.03	**0.49**	**-0.23**	-0.24
	Germany	**0.09**	-0.01	0.03	0.17	**0.46**	-0.06	-0.005	**0.21**	-0.13
	Italy	0.01	-0.03	0.05	0.003	-0.07	0.02	0.001	-0.02	-0.08
	Japan	-0.06	0.02	0.12	**0.24**	-0.07	**0.17**	**0.26**	-0.04	0.10
	U.K.	**0.15**	0.04	-0.15	0.02	-0.14	-0.09	-0.05	-0.12	**0.17**
	USA	**0.41**	**0.34**	-0.07	0.06	0.08	0.05	**-0.30**	-0.16	**0.21**
	Denmark	0.20	**-0.25**	0.01	-0.10	-0.30	-0.07	-0.14	-0.15	-0.04
	Finland	0.01	-0.11	0.02	-0.01	0.03	0.001	-0.01	0.09	-0.01
	Norway	0.13	0.08	-0.25	0.004	-0.17	**0.34**	-0.04	-0.17	**0.30**
	Portugal	-0.01	**-0.15**	0.15	-0.07	0.01	-0.01	-0.01	0.11	-0.08
	Spain	0.04	-0.06	-0.02	-0.25	-0.23	0.07	-0.17	-0.10	0.05
	Sweden	0.10	-0.06	**-0.27**	0.11	-0.03	**0.39**	-0.04	-0.01	**0.35**
	Argentina	0.12	-0.0004	0.40	-0.24	-0.03	**0.44**	-0.16	-0.005	-0.12
	Brazil	-0.03	0.17	**0.23**	-0.10	-0.06	-0.03	-0.004	-0.03	**-0.19**
	Indonesia	**0.32**	0.22	0.27	**0.29**	0.24	0.03	-0.60	0.66	0.09
	Mexico	-0.10	0.08	0.17	-0.37	n.a.	0.23	-0.15	n.a.	-0.02
	Peru	-0.01	-0.21	0.13	n.a.	-0.06	-0.18	n.a.	0.08	-0.18
	Philippines	-0.14	-0.15	0.01	-0.12	0.08	0.21	**0.26**	0.16	0.09
	South Korea	**-0.31**	-0.03	**0.42**	0.17	-0.03	**-0.41**	0.32	0.02	**-0.54**
	Thailand	-0.29	0.06	**0.21**	0.06	0.01	0.06	**0.29**	0.07	**-0.18**
	Turkey	0.03	0.04	0.002	0.25	-0.03	0.18	0.07	-0.04	0.09
Positive	**Advanced**	11	6	8	9	5	8	4	3	6
Negative	**Economies**	2	7	5	4	8	5	9	10	7
Average		0.09	0.02	-0.02	0.06	-0.04	0.06	0.00	-0.06	0.04
		+	?/-	-	+	+	+	+	?/-	+
Positive	**Emerging**	3	5	9	4	3	6	4	5	3
Negative	**Economies**	6	4	0	4	5	3	4	3	6
Average		-0.05	0.02	0.20	-0.01	0.01	0.06	0.00	0.12	-0.11
		?/-	?/+	+	+	?/-	?/+	+	?/+	-

Note. To designate a particular flow procyclical (a plus sign in the tables), countercyclical (a minus sign), or uncertain (a question mark) over the sample and with respect to a reference macroeconomic variable, we used a simple rule of thumb described in subsection 4.2.2. Bold-face text indicates that the estimates are significant at the 10 percent confidence level or better.

Table 8: Correlations with Real Interest Rate (r)

		iTot	oTot	noTot
1975-2005	Canada	0.10	0.03	-0.11
	France	**0.12**	**0.12**	0.03
	Germany	0.07	0.05	-0.06
	Italy	**-0.12**	**-0.19**	**-0.19**
	Japan	-0.02	-0.09	-0.13
	U.K.	**0.08**	**0.11**	**0.18**
	USA	0.04	0.10	0.08
Positive	**G7**	5	5	3
Negative	**G7**	2	2	4
Average	**G7**	0.04	0.02	-0.03
		+	+	?/-
		iTot	oTot	noTot
1975-1992	Canada	**0.30**	**0.16**	-0.21
	France	0.25	**0.15**	-0.29
	Germany	**0.18**	**0.08**	-0.10
	Italy	-0.09	**-0.20**	**-0.26**
	Japan	0.18	-0.01	-0.31
	U.K.	0.07	**0.15**	0.17
	USA	0.002	**0.20**	**0.31**
Positive	**G7**	6	5	2
Negative	**G7**	1	2	5
Average	**G7**	0.13	0.08	-0.10
		+	+	?/-

		iTot	oTot	noTot
1992-2005	Canada	-0.15	-0.13	0.04
	France	**0.10**	**0.12**	**0.12**
	Germany	0.04	0.04	-0.01
	Italy	**-0.16**	**-0.19**	-0.05
	Japan	-0.36	**-0.29**	0.08
	U.K.	0.16	0.19	**0.26**
	USA	0.10	-0.01	-0.19
	Denmark	0.04	-0.01	-0.11
	Finland	-0.03	0.02	0.02
	Norway	-0.01	0.09	-0.12
	Portugal	0.08	0.06	**-0.27**
	Spain	-0.13	**0.23**	**-0.32**
	Sweden	0.07	-0.17	0.19
	Argentina	-0.33	0.09	0.30
	Brazil	n.a.	n.a.	n.a.
	Indonesia	-0.38	-0.01	0.31
	Mexico	-0.56	0.003	-0.03
	Peru	n.a.	n.a.	n.a.
	Philippines	-0.16	-0.18	0.07
	South Korea	-0.31	**-0.16**	0.38
	Thailand	-0.42	-0.20	0.29
	Turkey	0.05	0.25	0.12
Positive	**Advanced**	7	7	6
Negative	**Economies**	6	6	7
Average		-0.02	0	-0.03
		?/+	?/+	?/-
Positive	**Emerging**	1	3	6
Negative	**Economies**	6	4	1
Average		-0.30	-0.03	0.21
		?/-	-	?/+

Table 9: Correlations with Real Interest Rate (2)

	iFDI	iFPI	iDebt	oFDI	oFPI	oDebt	noFDI	noFPI	noDebt
Canada	-0.04	-0.09	0.11	0.08	-0.004	-0.01	0.09	**0.07**	-0.14
France	0.002	-0.06	0.07	0.04	-0.06	0.06	0.04	0.01	-0.03
Germany	0.02	**0.09**	0.05	-0.05	0.01	0.06	-0.04	-0.06	-0.01
Italy	0.08	0.09	**-0.14**	0.09	**-0.10**	**-0.19**	0.06	**-0.13**	-0.07
Japan	**0.10**	0.07	-0.05	0.04	**-0.23**	-0.07	-0.01	-0.13	-0.02
U.K.	**0.12**	-0.03	**0.08**	-0.02	0.02	**0.12**	-0.07	0.03	**0.15**
USA	**0.15**	0.15	-0.04	-0.10	-0.02	**0.13**	**-0.18**	**-0.12**	**0.28**
G7	6	4	4	4	2	4	3	3	2
G7	1	3	3	3	5	3	4	4	5
G7	0.06	0.03	0.01	0.01	-0.05	0.02	-0.02	-0.05	0.02
	+	+	?/+	?/+	-	+	-	-	+
Canada	-0.13	-0.14	**0.33**	0.16	-0.28	**0.16**	0.23	-0.02	**-0.25**
France	0.02	0.03	0.05	**0.26**	**-0.21**	-0.01	**0.25**	-0.19	-0.15
Germany	-0.01	0.08	**0.17**	-0.05	**-0.25**	**0.09**	**0.13**	**-0.20**	-0.07
Italy	0.05	0.04	-0.10	0.02	0.04	**-0.21**	-0.04	0.02	**-0.26**
Japan	0.13	**0.33**	0.05	-0.005	**-0.26**	0.04	-0.02	**-0.35**	-0.03
U.K.	0.19	-0.15	0.06	-0.07	**0.27**	0.12	-0.20	**0.32**	0.11
USA	**0.20**	0.01	-0.04	0.06	0.01	**0.18**	-0.09	-0.01	**0.34**
G7	5	5	5	4	3	5	3	2	2
G7	2	2	2	3	4	2	4	5	5
G7	0.06	0.03	0.07	0.05	-0.10	0.05	0.04	-0.06	-0.05
	+	+	+	+	-	+	+	-	-

Note. To designate a particular flow procyclical (a plus sign in the tables), countercyclical (a minus sign), or uncertain (a question mark) over the sample and with respect to a reference macroeconomic variable, we used a simple rule of thumb described in subsection 4.2.2. Bold-face text indicates that the estimates are significant at the 10 percent confidence level or better.

Table 10: Correlations with Real Interest Rate (3)

	iFDI	iFPI	iDebt	oFDI	oFPI	oDebt	noFDI	noFPI	noDebt
Canada	0.09	-0.11	**-0.25**	0.10	0.15	**-0.27**	0.03	**0.19**	0.01
France	-0.005	-0.08	**0.12**	0.02	-0.05	**0.14**	0.02	0.03	0.05
Germany	0.04	0.16	0.01	-0.10	0.09	0.05	**-0.12**	-0.08	0.05
Italy	0.13	**0.15**	**-0.20**	0.16	-0.20	**-0.16**	0.13	**-0.26**	**0.13**
Japan	**0.23**	**-0.25**	**-0.26**	0.13	**-0.38**	**-0.27**	-0.03	0.12	-0.01
U.K.	**0.17**	-0.04	0.16	-0.03	**-0.12**	**0.24**	-0.10	-0.05	**0.30**
USA	0.20	0.32	-0.05	**-0.29**	-0.05	0.09	**-0.32**	**-0.24**	**0.23**
Denmark	-0.02	0.19	-0.01	0.04	-0.31	0.003	0.03	-0.31	0.01
Finland	-0.06	-0.14	0.04	0.10	0.06	-0.06	0.09	0.13	-0.05
Norway	0.0003	**-0.26**	0.03	0.04	0.21	0.01	0.01	0.28	0.03
Portugal	-0.05	-0.03	**0.10**	-0.07	0.22	0.07	-0.02	0.11	-0.03
Spain	-0.15	-0.03	-0.07	**0.27**	**0.22**	0.06	**0.27**	**0.17**	0.06
Sweden	-0.004	-0.04	0.10	-0.19	0.04	-0.18	-0.08	0.06	-0.15
Argentina	-0.12	0.06	-0.27	**0.29**	-0.12	-0.12	**0.17**	-0.07	0.19
Brazil	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Indonesia	-0.10	-0.46	-0.16	0.29	-0.25	0.01	-0.31	0.19	0.15
Mexico	0.08	-0.25	-0.55	-0.01	n.a.	0.04	0.12	n.a.	0.43
Peru	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	0.01	-0.40	-0.13	**-0.19**	0.14	0.19	-0.12	0.43	0.18
South Korea	**-0.19**	-0.06	-0.29	**0.38**	0.04	**-0.23**	**0.31**	0.07	0.16
Thailand	0.18	0.24	-0.47	0.18	0.31	0.18	-0.13	-0.44	0.52
Turkey	-0.10	-0.10	**0.14**	**0.35**	-0.02	**-0.49**	0.21	0.03	**-0.37**
Advanced	7	4	7	8	7	8	7	8	9
Economies	6	9	6	5	6	5	6	5	4
	0.05	-0.01	-0.02	0.01	-0.01	-0.02	-0.01	0.01	0.05
	+	-	-	?/+	-	-	-	?/+	+
Emerging	3	2	1	5	3	4	4	4	6
Economies	4	5	6	2	3	3	3	2	1
	-0.03	-0.14	-0.25	0.18	0.02	-0.06	0.04	0.04	0.18
	-	?/-	+	+	?	-	+	?/+	-

Note. To designate a particular flow procyclical (a plus sign in the tables), countercyclical (a minus sign), or uncertain (a question mark) over the sample and with respect to a reference macroeconomic variable, we used a simple rule of thumb described in subsection 4.2.2. Bold-face text indicates that the estimates are significant at the 10 percent confidence level or better.

Table 11: Summary of the Cyclical Properties of Disaggregated Capital Flows (by time period and macroeconomic variable)

			iTot	oTot	nTot	iFDI	iFPI	iDebt	oFDI	oFPI	oDebt	noFDI	noFPI	noDebt
1992-2005	lg	G7	?/+	?/+	-	+	+	?/-	?/+	?/+	-	-	?/+	+
		Advanced	+	-	-	+	+	+	-	?/-	-	-	+	?/+
		Emerging	+	-	-	-	+	+	?	-	+	+	?	-
	iota	G7	?/+	+	?/-	+	+	?/+	+	+	+	+	?/-	+
		Advancedl	?/+	+	-	+	?/-	-	+	+	+	+	?/-	+
		Emerging	+	-	-	?/-	?/+	+	+	?/-	?/+	+	?/+	-
	r	G7	?/+	-	+	+	?/-	-	-	-	-	-	-	+
		Advanced	?/+	?/+	?/-	+	-	-	?/+	-	-	-	?/+	+
		Emerging	?/-	-	?/+	-	?/-	+	+	?	-	+	?/+	-
1975-2005	lg	G7	+	+	-	+	?/+	+	+	-	?/-	+	?/-	-
	iota	G7	+	?/+	-	+	+	+	+	+	?/+	+	?/-	-
	r	G7	+	+	?/-	+	+	?/+	?/+	-	+	-	-	+

Note. To designate a particular flow procyclical (a plus sign in the tables), countercyclical (a minus sign), or uncertain (a question mark) over the sample and with respect to a reference macroeconomic variable, we used a simple rule of thumb described in subsection 4.2.2. g: Real GDP, ι: Investment to GDP Ratio, r: Real Interest Rate

Table 12: Average Net Financial Asset Positions (and signs of the correlations of GDP with individual flows over the period 1992-2005)

	NFA pos.	Net FDI pos.	with iFDI	with oFDI	Net FPI pos.	with iFPI	with oFPI	Net debt pos.	with iDebt	with oDebt
Canada	-	-	+	+	+	+	+	-	-	+
France	+	+	+	+	-	+	+	-	+	+
Germany	+	+	+	+	+	+	+	-	-	-
Italy	-	+	+	+	+	+	+	-	-	-
Japan	+	+	-	+	-	-	-	+	-	-
U.K.	-	+	+	+	-	-	+	-	+	+
USA	-	+	+	-	+	+	+	-	-	+
Denmark	-	+	+	-	+	-	-	-	+	+
Finland	-	+	+	-	-	+	-	-	+	+
Norway	+	+	-	+	+	-	-	-	-	+
Portugal	-	+	+	-	-	-	-	-	+	-
Spain	-	+	+	-	-	+	-	-	+	+
Sweden	-	+	+	-	-	+	-	-	+	+
Argentina	-	-	+	-	+	-	+	-	+	+
Brazil	-	-	-	-	-	-	-	-	-	+
Indonesia	-	-	+	-	-	+	+	-	+	-
Mexico	-	-	-	+	-	+	n.a.	-	+	+
Peru	-	-	+	n.a.	-	+	+	-	+	-
Philippines	-	-	-	+	-	-	+	-	-	-
South Korea	-	-	-	+	-	-	-	-	+	-
Thailand	-	-	-	-	-	+	+	-	+	+
Turkey	-	-	-	+	-	-	-	-	-	+

Note: The data on net positions are from the web appendix of Lane and Milesi-Ferretti (2007). NFA pos: Net financial asset position

Table 13: Changes in Second Moments. Breaks Based on Episodes of Capital Account Liberalization (Method I)

	iToT, g	oToT, g	nTot, g	iFDI, g	iFPI, g	iDebt, g	oFDI, g	oFPI, g	oDebt, g
Japan	d-d-u-u	u-d-U-u	u-u-u-u	D-d-U-u	d-d-U-u	u-u-U-u	d-d-u-u	d-d-U-u	u-u-U-u
France	d-d-u-u	u-u-u-u	u-u-u-u	d-u-U-u	d-u-u-u	d-d-U-u	u-u-U-u	u-u-u-u	d-d-u-u
Germany	u-d-D-d	U-U-u-d	U-U-d-d	d-d-U-d	u-u-U-d	u-d-D-d	d-u-U-d	u-u-U-d	u-u-u-d
Italy	D-D-u-d	D-D-u-d	u-U-d-d	u-u-u-d	d-u-U-d	D-D-u-d	u-u-U-d	d-u-u-d	D-D-d-d
U.K.	d-d-u-D	d-d-u-D	u-u-u-D	d-d-u-D	u-u-u-D	d-d-u-D	D-d-u-D	u-u-U-D	d-d-u-D
USA	u-u-u-u	d-u-u-u	d-d-u-u	u-u-u-u	d-d-U-u	u-u-U-u	u-u-u-u	u-d-U-u	d-u-u-u
Canada	-	-	-	-	-	-	-	-	-

	iToT, ι	oToT, ι	nTot, ι	iToT, r	oToT, r	nTot, r
Japan	u-d-u-D	U-U-U-D	U-U-u-D	U-U-u-D	D-d-U-D	u-u-u-D
France	d-d-u-d	d-d-u-d	d-d-u-d	u-u-u-d	u-u-u-d	u-u-u-d
Germany	u-d-D-d	u-u-u-d	u-u-d-d	d-d-D-u	u-u-u-u	U-U-d-u
Italy	d-d-u-u	D-D-u-u	d-d-d-u	d-d-u-d	d-u-u-d	u-U-d-d
U.K.	d-D-u-u	d-d-u-u	u-u-u-u	u-u-u-d	u-u-u-d	D-d-u-d
USA	d-d-u-u	d-d-u-u	u-d-u-u	u-u-u-d	d-d-u-d	u-d-u-d
Canada	-	-	-	-	-	-

Table 14: Changes in Second Moments. Breaks in the Conditional Variance (Method II)

	iToT, g	oToT, g	nTot, g	iFDI, g	iFPI, g	iDebt, g	oFDI, g	oFPI, g	oDebt, g
Japan	u-u-u-u	u-u-U-u	d-d-u-d	d-d-U-d	D-D-U-d	u-u-U-d	d-d-u-d	u-u-U-u	u-u-U-u
France	d-u-U-d	u-u-U-d	U-U-U-d	u-u-U-d	u-u-U-d	d-d-U-d	u-u-U-d	u-u-U-d	d-d-U-d
Germany	u-u-U-D	u-u-U-D	d-d-U-D	u-u-U-D	u-u-U-D	u-u-U-D	u-u-U-D	u-u-U-D	u-u-U-D
Italy	d-d-U-D	d-D-d-d	u-u-D-d	U-u-U-D	u-u-U-D	D-d-U-D	U-u-U-D	u-u-U-D	d-D-d-d
U.K.	u-u-U-D	u-u-U-D	u-u-D-D	u-u-U-D	u-u-U-D	u-u-U-D	d-u-U-D	u-u-U-D	u-u-U-D
USA	U-u-U-d	U-U-U-D	d-d-U-d	U-U-U-d	U-U-U-d	d-d-U-d	d-d-U-d	U-U-U-d	U-U-U-d
Canada	d-d-U-D	u-u-U-D	u-u-D-D	u-u-U-D	u-u-u-D	D-D-U-D	u-u-U-D	U-U-U-D	D-D-U-D

	iToT, ι	oToT, ι	nTot, ι	iToT, r	oToT, r	nTot, r
Japan	u-d-u-D	U-U-U-D	U-U-u-D	u-U-u-D	D-D-U-D	u-u-u-D
France	u-u-U-d	u-U-U-d	U-U-U-d	D-d-U-D	d-d-U-D	u-u-U-D
Germany	u-u-U-u	u-U-U-d	d-d-U-u	d-D-U-D	d-d-U-D	U-U-U-D
Italy	d-d-U-d	D-d-d-u	d-d-D-u	u-u-U-D	d-d-d-D	u-U-D-d
U.K.	d-d-U-D	d-d-U-D	d-d-D-d	u-u-U-D	u-u-U-D	d-d-D-D
USA	u-u-U-d	U-U-U-d	u-u-U-d	u-u-U-d	d-D-U-d	D-D-U-d
Canada	D-d-U-d	D-d-U-D	u-U-D-D	d-d-U-D	d-d-U-D	u-u-D-D

Note. Changes in second moments are computed over the period 1975Q1—2005Q4 and reported in the following order: correlation change, covariance change, variance change in the cyclical component of the capital flow, variance change in the macroeconomic variable. g: Real GDP, ι: Investment-to-GDP Ratio, r: Real interest rate. u: non-significantly positive change in the second moment, U: significantly positive change in the second moment, d: non-significantly negative change in the second moment, D: significantly negative change in the second moment.

Figure 1: Disaggregated Flows: Correlations with GDP

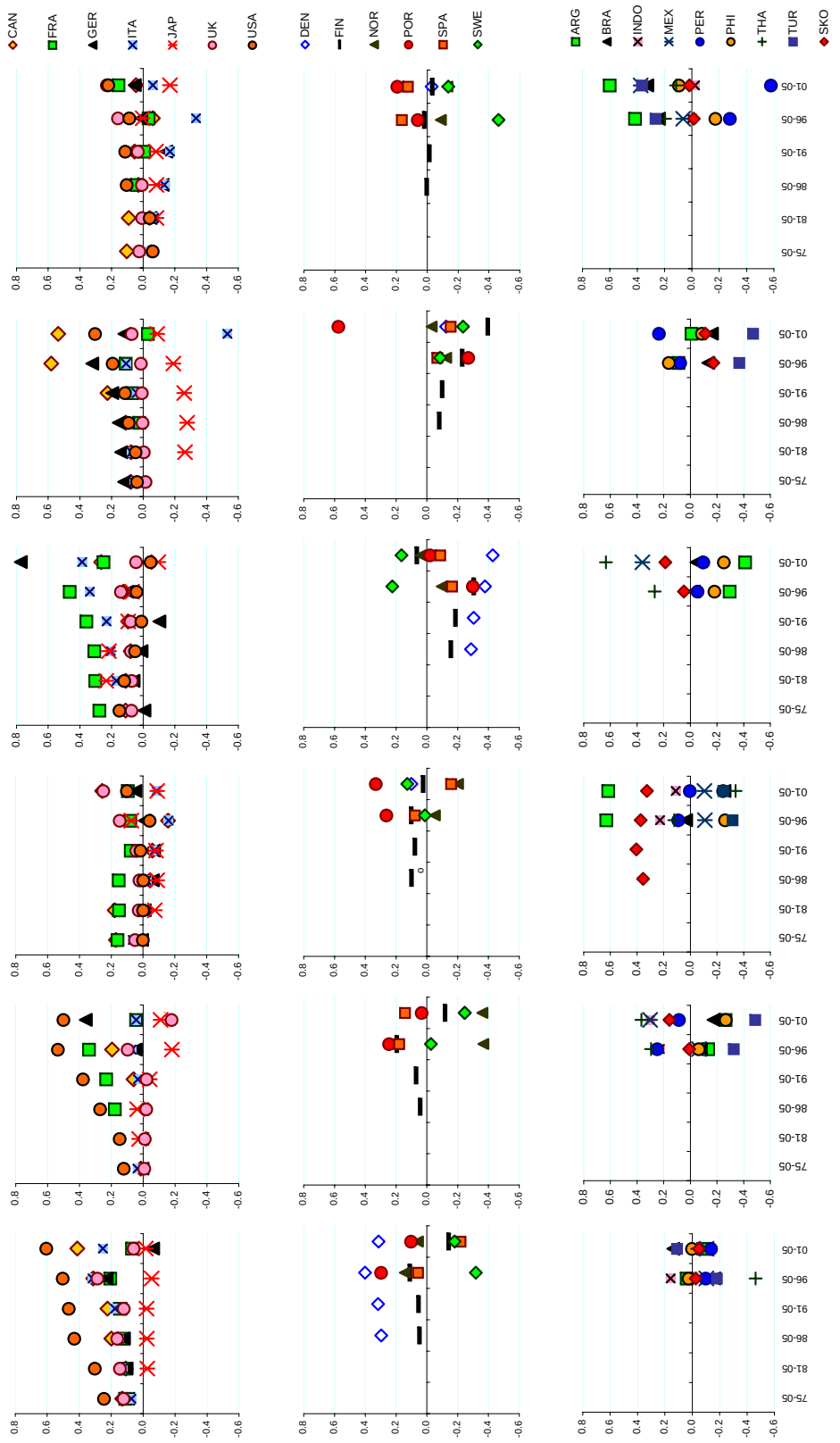

Figure 2: Disaggregated Flows: Correlations with Investment-to-GDP Ratios

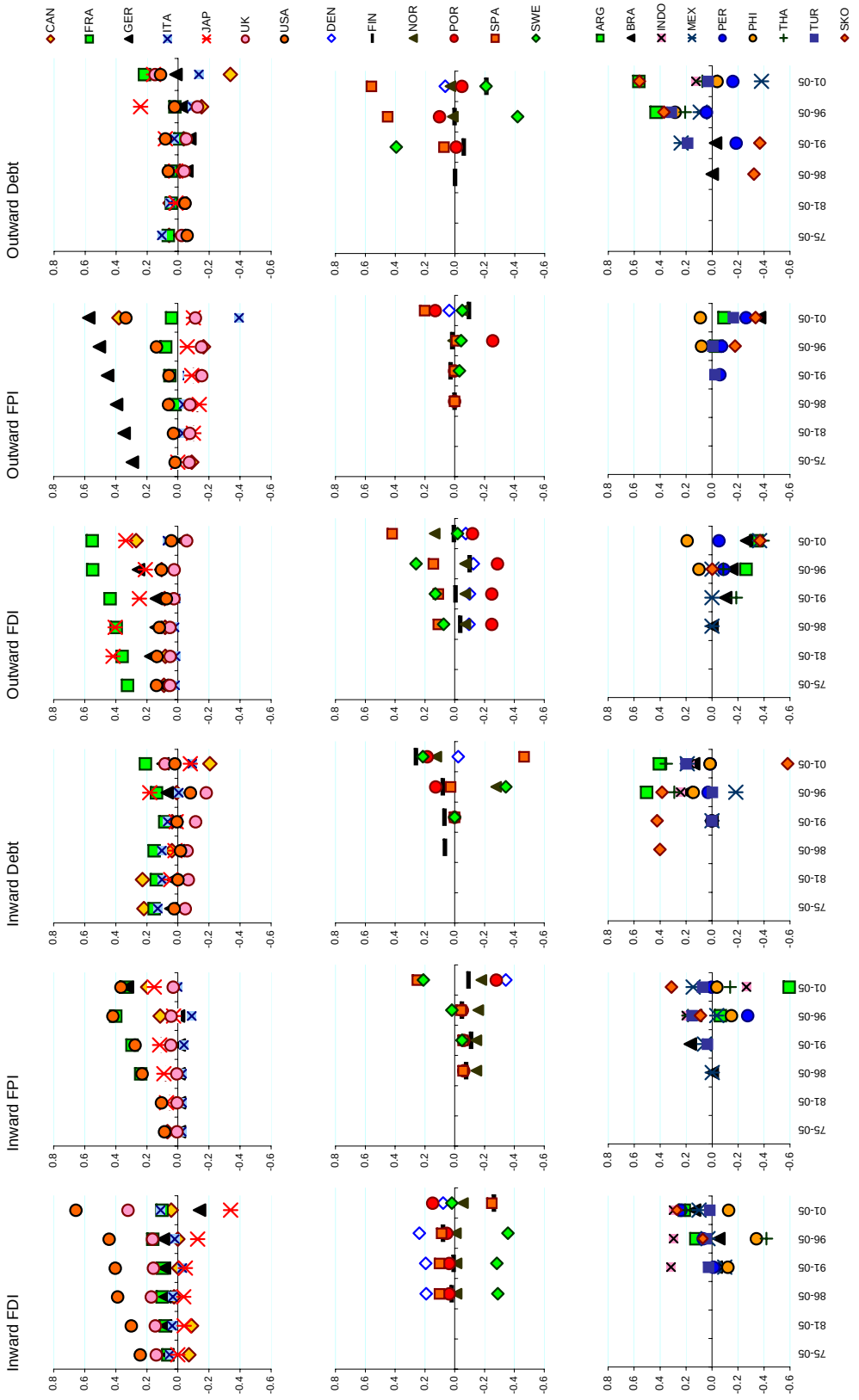

Figure 3: Aggregate Flows: Correlations with GDP and Investment-to-GDP Ratios