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CAPITAL FLOWS, PUSH VERSUS PULL FACTORS AND THE GLOBAL FINANCIAL CRISIS

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ABSTRACT

The causes of the 2008 collapse and subsequent surge in global capital flows remain an open and highly controversial issue. Employing a factor model coupled with a dataset of high-frequency portfolio capital flows to 50 economies, the paper finds that common shocks – key crisis events as well as changes to global liquidity and risk – have exerted a large effect on capital flows both in the crisis and in the recovery. However, these effects have been highly heterogeneous across countries, with a large part of this heterogeneity being explained by differences in the quality of domestic institutions, country risk and the strength of domestic macroeconomic fundamentals. Comparing and quantifying these effects shows that common factors ("push" factors) were overall the main drivers of capital flows during the crisis, while country-specific determinants ("pull" factors) have been dominant in accounting for the dynamics of global capital flows in 2009 and 2010, in particular for emerging markets.

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1. Introduction

The 2007-08 global financial crisis had been preceded for many years by substantial global imbalances in trade and capital flows. It is in particular the United States which was not only the origin of the financial crisis, but which had been among the economies globally relying most heavily on capital inflows to finance a growing trade deficit. Many observers argued before the crisis that such a status quo was unsustainable and that ultimately deficit countries, such as the United States, would see capital inflows dwindle and exchange rates and asset prices fall during an adjustment process. However, the crisis played out very differently, with capital of domestic and foreign investors flowing massively into US assets between July 2008 and April 2009, and in particular after the collapse of Lehman Brothers. Yet what has been striking about the crisis was not only its global reach, but also the high degree of heterogeneity with which it affected different countries, both among advanced economies as well as among emerging market economies.

Moreover, it was not only the global transmission of the 2007-08 crisis, but also the recovery period since 2009 that has sparked a controversy about the drivers of global capital flows. Some emerging market economies (EMEs) have experienced massive portfolio capital inflows over the past two years, raising concerns about their viability and effects on domestic economies, exchange rates and capital markets. EME policy-makers have stressed the importance of "push" factors, i.e. in particular monetary and fiscal policies in advanced economies, as the main culprits behind this surge in capital flows. By contrast, others have emphasized "pull" factors, such as real divergences between EMEs and advanced economies (AEs), as the main driver of the current pattern of capital flows. In fact, this controversy has become one of the core issues of debate in international fora, such as the G20 which is considering a code of conduct for capital flow management, including the imposition of capital controls to deal with volatile capital flows.

The objective of the paper is to analyze the role of different drivers of global capital flows during the crisis and the subsequent recovery. The focus is on two questions: first, how important have been common, global shocks for capital flows? And second, how relevant have been macroeconomic policies, institutions and financial policies in helping countries shield themselves from such global shocks? The first of the questions is informative about the role of push factors – if common global shocks explain a large part of the dynamics of global capital flows, then push factors are important. The second question allows gauging the relevance of pull factors – if capital flows are highly heterogeneous across countries, and if this differential pattern is accounted for by country-specific characteristics, then pull factors are relevant.

The paper's focus is at the micro level, i.e. at the level of individual investment funds (both mutual funds and hedge funds), across a broad geographic coverage of 50 countries and markets worldwide. The paper uses a novel dataset which stems from EPFR Global, which contains portfolio investment flows, allowing a distinction also between equity and bond portfolio investment flows. It contains weekly flows and geographic allocations by more than 14,000 equity funds and more than 7,000 bond funds, with USD 8 trillion of capital under management.

The first part of the paper intends to establish a number of stylized facts about the high-frequency dynamics of capital flows during the crisis and the recovery. The strength of EPFR data is not only its disaggregated information at the fund level, but crucially also the high time frequency. Compared to the pre-crisis period, the data shows remarkably strong divergences in capital flows across countries during the crisis, and more precisely a massive reallocation of capital from emerging markets (and a few advanced economies) to the US. The high data frequency allows gauging that this portfolio reallocation intensified substantially after a few

key events, such as the collapse of Lehman Brothers in mid-September 2008 or key policy decisions.

The second part of the paper aims to explain this heterogeneity of global capital flows during the financial crisis and the subsequent recovery. A factor model for the determinants of capital flows is formulated, distinguishing between different factors as well as allowing for a distinction of drivers during non-crisis times and those during the crisis. The focus is on the effect of a set of common global shocks – with a specific emphasis on liquidity and risk shocks as well as macro news shocks – as well as a set of idiosyncratic, country-specific shocks on capital flows. The findings show that the global factors account for a large share of the global capital flow pattern during the crisis. Importantly, the signs of the model parameters change substantially during the crisis episode. For instance, while an increase in risk before the crisis was associated with capital flows out of AEs and into EMEs, this effect reversed during the crisis inducing a substantial reallocation of capital from many EMEs into a few AEs. A similar shift in coefficients is also found for other common shocks. This evidence is thus consistent with the hypothesis that the dynamics of capital flows was primarily driven by safe-heaven flows during the crisis.

Another striking finding of the analysis is the large degree of heterogeneity with which different countries were affected by the same global shocks, in particular during the crisis and also the subsequent recovery. The third part of the paper analyses the role of potential determinants of these differences in sensitivity to common shocks. A distinction is made between macroeconomic fundamentals (growth, current account, public debt and deficits, short-term debt, etc.), the quality of countries' institutions and country risk, financial policies as well as the role of external exposure through trade and financial linkages.

The findings indicate that it has been the institutional quality, country risk together with the strength of macroeconomic fundamentals and policies that explain a large share of the heterogeneity of capital flows during the crisis. By contrast, countries' external (real and financial) exposure appears to have largely been irrelevant for understanding the global capital flow dynamics, including the retrenchment of capital during the crisis, in particular for emerging economies.

The final part of the paper attempts to quantify and compare the relative importance of common shocks ("push" factors) and country-specific determinants ("pull" factors). The findings indicate that common factors were more important overall as a driver of net capital flows for many countries in 2005-07, as well as in particular during the 2007-08 financial crisis. However, in the recovery period since March 2009, common factors appear to have become less important as drivers of global capital flows, whereas it is domestic pull factors that have come to dominate in explaining capital flows, in particular for countries in Emerging Asia and Latin America.

Putting these findings into perspective, the analysis of push factors versus pull factors as drivers of global capital flows in the present paper focuses on a relatively short period of time – a time span of about five years between end 2005 and end 2010 – while the discussion of push and pull factors has traditionally been made with reference to much longer cycles of capital flows. It is also important to highlight that this period of 2005 to 2010 has been in many ways extraordinary throughout for the dynamics of global capital flows, as a period of a sharp contraction of capital flows, in particular to some EMEs, during the 2007-08 crisis was followed by an equally extraordinary surge in capital flows to EMEs. Hence an important open issue is whether the current dynamics of global capital flows will continue well into the future, and what it implies for the risk of sudden stops and capital flow reversals with all its adverse implications for global growth and financial stability. But in particular because it is so

important to understand better the dynamics and risks of periods of financial stress, the findings of the current paper may be instructive about how future crisis may play out.

The paper has a number of implications for economic policy and for policy-makers. On the one hand, financial globalization and the exposure to common global factors have made countries more vulnerable to external and global shocks. Yet, on the other hand, the exposure to domestic risks has also been a relevant factor during the crisis and in the global capital flow surge thereafter, in particular those domestic risks related to poor macroeconomic fundamentals, policies and institutions. This implies that countries are far from innocent bystanders that are powerless in being exposed to volatile global markets, and that indeed they have tools to insulate to some extent their economies from adverse global shocks.

These findings have a bearing in particular on the current debate on how EMEs should deal with volatile capital flows. To the extent that capital flows are driven by global factors, some EME policy-makers have argued that this would justify the use of capital controls as well as policy interventions e.g. in FX markets. However, such policies may be misguided if the drivers of capital flows are mainly found in idiosyncratic, country-specific policies and conditions, which calls for policy-makers to rather focus on making their domestic economies more resilient by improving institutions, deepening financial markets and enhancing macroeconomic and maroprudential policies.

The paper is related to various strands of the literature. First, it relates to a growing literature on the 2007-2008 financial crisis, which has partly focused on the US and its policy responses (e.g. Calomiris 2008, Taylor 2009), while the literature on the global transmission of the crisis has been more limited (e.g. Blanchard, Das and Faruqee 2010, Rose and Spiegel 2011). Second, it links to the literature on capital flows during crises and other periods of extreme changes in capital flows, such as sudden stops, surges, retrenchments and capital flight.[1] A recent focus in this literature has been on gross capital flows. Forbes and Warnock (2010) distinguish between the four different types of extreme capital movements (surges, stops, flights and retrenchments), separating the activity by domestic and foreign residents, and their determinants. Milesi-Ferretti and Tille (2010) and Broner, Didier, Erce and Schmukler (2010) analyze the link between gross capital flows and crises, in particular the 2007-08 episode.

While recent work has underlined the importance of analyzing gross flows and distinguishing across asset classes, relatively little work so far has been undertaken on investment decisions and capital flows at the micro level of individual investors and funds. Notable exceptions are Calvet, Campbell and Sodini (2009), Froot and Ramadorai (2005), Hau and Rey (2008), and Jotikasthira, Lundblad, and Ramadorai (2010).

A third related strand of the literature is the work on determinants of capital flows, and in particular the distinction between global factors and domestic factors and their transmission channels. There is a large literature on the global transmission of past financial crises, with a strong interest in the role of different channels (e.g. Forbes and Rigobon 2002, Bekaert, Harvey and Ng 2005; Bae et al. 2003, Karolyi 2003, Dungey et al. 2005, Bekaert, Ehrmann, Fratzscher and Mehl 2010). Some of this work analyze the role and mostly finds strong evidence for the transmission of global shocks to financial markets and capital flows (Bacchetta and van Wincoop 2010, Gourio, Siemer and Verdelhan 2010), including shocks to liquidity (Brunnermeier 2009, Calvo 2009, Kalemli-Ozcan, Papaioannou and Perri 2010).

[1] Examples of recent key papers on capital flow surges are Reinhart and Reinhart (2009) and Cardarelli, Elekdag and Kose (2009); on sudden stops are Calvo (1998) and Calvo, Izquierdo and Meijía (2008); and on capital flight are Dooley (1988) and Rothenberg and Warnock (2010).

A specific angle of this literature on crisis focuses on the role of contagion, which is defined by most studies as transmission of shocks or crises above and beyond what domestic fundamentals as well as common shocks can explain. Specific examples including the implications for capital flows and asset prices, are Forbes and Rigobon (2002), Dungey, Fry, González-Hermosillo and Martin (2011), Broner, Gelos and Reinhart (2006) and Claessens and Forbes (2001). Bekaert, Ehrmann, Fratzscher and Mehl (2010) analyze the presence of contagion in equity markets during the 2007-08 financial crisis and find evidence that contagion was mostly domestic in nature, i.e. comovements mainly among domestic firms increased substantially.

As to the structure of the paper, the next section presents the data and aims at establishing a number of stylized facts about the high-frequency dynamics of global capital flows during the crisis. The third section of the paper outlines the empirical methodology. Section 4 presents the empirical findings on the determinants and the effects of common and idiosyncratic shocks on capital flows. Section 5 concludes.

2. Global fund-level data and stylized facts of capital flows

This section presents the data on which the analysis of the paper is based (section 2.1), and then outlines a number of key facts and characteristics of the high-frequency dynamics of global capital flows during and around the 2007-08 financial crisis (section 2.2).

2.1 The data on capital flows

The paper uses a dataset on portfolio capital flows and performance at the fund level, compiled by EPFR. It is a fairly novel database, which to the best of my knowledge, has so far been only used by one paper (Jotikasthira, Lundblad and Ramadorai 2010) and in a very different context. It contains daily, weekly and monthly flows by more than 16,000 equity funds and more than 8,000 bond funds; hence its focus being on different types of portfolio investment. There is some difference in coverage, with the data at a monthly frequency covering a somewhat larger number of funds. Although EPFR data captures only about 5-20% of the market capitalization in equity and in bonds for most countries, it is a fairly representative sample; Jotikasthira, Lundblad and Ramadorai (2010) make this point convincingly by showing in detail a close match between EPFR portfolio flows and portfolio flows stemming from total balance-of-payments data.

Importantly, EPFR data contains information on the total assets under management (AUM) at the end of each period, as well as allowing for a distinction between net capital flows (i.e. net of valuation changes) and valuation changes (due to asset returns and exchange rate changes) to calculate each period's change in AUM. Two important points about the data construction relate to the definition of net flows and the domicile of investors. Net flows in the EPFR information is defined as the change in AUM due to active increases or reductions, abstracting from potential portfolio changes within each fund. Moreover, it should be stressed that the domiciles for most of the funds covered by EPFR are in advanced countries. Table 1 provides an overview of the number of funds and total AUM by fund group available in the raw EPFR data set.

Table 1

This raw data is paired down and transformed into a sample that fits the purpose of the analysis for the present paper. As the main focus of the paper is on portfolio capital flows across countries, net capital flows are aggregated at the level of each recipient country. Moreover, the analysis below is conducted for data at weekly frequency. Weekly frequency is preferred over

data at monthly frequency, at which the effect of specific shocks and important crisis events on capital flows are harder to identify cleanly. Using data at a daily frequency has the drawback that it may not allow tracing the effect of specific shocks due to different trading times in different regions. Moreover, many fund managers are unlikely to make portfolio decisions at such high frequency.

Some data cleaning is done to avoid that the measures of capital flows are strongly influenced by outliers or the emergence or disappearance of individual funds from the sample. Small funds with less than USD 5 million are excluded, as well as funds that record at times extreme net inflows or net outflows, i.e. those with weekly net inflows above 50% or below -50% of total assets under management (AUM). Also those funds are excluded for which no geographic allocations information is available, i.e. for which no sufficient information exists on the countries in which they are invested.

Moreover, in order to have a stable sample of funds, the period analyzed is limited to start on 12 October 2005 and end on 22 November 2010. Only those funds are retained which are continuously reporting every week throughout this sample period. This means that funds are excluded that either appear or disappear from the sample during this period. Although e.g. including in the sample a fund which closes down, e.g. at the height of the financial crisis, and liquidates assets in recipient countries is indeed informative, there is no way to distinguish why a particular fund joins or exits the data sample, which may alternatively simply be due to an increase or decrease in the fund coverage by EPFR. Moreover, funds that report only for part of this sample period constitute merely about 1% of all observations and AUM.

A key strength of the data is the high frequency of reported flows. A second advantage is the broad geographic coverage which includes not only advanced economies (AEs) but many emerging market economies (EMEs). The allocation component of the data allows gauging which funds have invested in which countries and what types of assets (equities or bonds).

Overall, to my knowledge, this data source is the most comprehensive one of international capital flows, in particular at higher frequencies, and in terms of its geographic coverage at the fund level. It is thus well suited for the objective of the paper.

Table 2

Table 2 provides an overview of the coverage and some summary statistics of the data sample derived through the above steps from the EPFR fund-level data. It covers 50 countries, a majority of which are EMEs. Assets under management are in the billions of US dollars for almost all of the countries and asset classes, while the USA clearly dominates in terms of the size of asset holdings. The size of equity holdings is somewhat larger than bond holdings for most of the countries. Most of the analysis below is based on total portfolio holdings (the sum of equity and bond holdings for each recipient country), though some of the analysis also makes an explicit split between equities and bonds.

The middle set of columns provides an indication about the magnitude of weekly net capital flows, which are in absolute terms at around 0.4-0.5% of total assets under management (AUM). The standard deviation of weekly net flows is about 0.6%. The final two columns of the table show the cumulated, total net capital flows in the pre-crisis period, i.e. from November 2005 to August 2007, and in the crisis period after the collapse of Lehman Brothers in September 2008. While cumulated net capital inflows in the pre-crisis period were on average around 12% and net capital outflows around 10% during the crisis, these two periods show a remarkable degree of heterogeneity in net capital flows across countries. The analysis of the empirical sections below tries in particular to understand and explain this cross-country heterogeneity in net capita flows.

2.2 Stylized facts of high-frequency capital flows during crisis

I now turn to the key features and stylized facts of the data, with a specific focus on the dynamics and heterogeneity of capital flows during the financial crisis. In particular, this sub-section aims to draw out in more detail the cross-country heterogeneity that is already apparent from the aggregate data in Table 2.

Figures 1 – 2

Figures 1 and 2 show the high-frequency dynamics of capital flows during the financial crisis. The figures emphasize four key events through vertical lines: the start of the liquidity crunch on 7 August 2007 when markets first experienced serious liquidity problems; the collapse of Bear Stearns on 15 March 2008; the collapse of Lehman Brothers on 15 September 2008, and the intensification of the European sovereign debt crisis, which is here dated as 15 March 2010 though a precise timing of the latter is difficult. The figures highlight a number of striking stylized facts. First, they indicate the stark difference in the capital flow dynamics for advanced economies (AEs) and emerging market economies (EMEs). On aggregate, AEs experienced net capital outflows quite continuously after the start of the crisis in August 2007. In fact, net total portfolio outflows seemed to even have slowed initially after the Lehman collapse in September 2008 (Figure 1.A). By contrast, net portfolio flows to EMEs were hardly adversely affected at the beginning of the crisis as net inflows were positive through July 2008 and only then dropped substantially before and after the collapse of Lehman Brothers and well into early 2009.

Second, there is a significant divergence in the dynamics of net flows between equities and bonds. Figure 1.B shows that net flows into bonds underwent substantially larger swings than net flows for equities. In fact, net holdings of AE equities remained relatively stable throughout the crisis, and also only declined modestly for EME equities following the Lehman collapse before recovering strongly in 2009. By contrast, the Lehman event triggered substantial outflows out of EME bonds, by about 30% (excluding valuation changes) over a span of 4-5 months. However, investments in EME bonds subsequently recovered substantially, with AUM in this asset class almost doubling between March 2009 and the end of the sample in November 2010.

Third, there are also sharp cross-country divergences among AEs and among EMEs. Figure 2 shows that among AEs it was mainly the US that experienced little change in either equity flows or bond flows during the height of the crisis. By contrast, among AEs it was mainly euro area countries that recorded the strongest net outflows, in particular in bonds, throughout the crisis. Among EMEs, EM Europe seems to have suffered the strongest by registering the largest net outflows and slowest recovery in both equity and bond flows throughout the crisis and thereafter, while Latin American economies fared better.

Fourth, focusing on the period after the global financial crisis of 2007-08, it is striking that the European sovereign debt crisis of 2010 is hardly visible in the aggregate capital flows data at the regional level. As to EMEs, what stands out from Figure 2 is the enormous increase in net capital flows into EMEs since April 2009. Not only did net AUM (net of valuation changes) in EME equities increase by about 30-40 percentage points and in bonds almost double between the trough in March 2009 and the end of 2010, but total net AUM for both EME asset classes stood in late 2010 substantially above those before the start of the 2007-08 crisis.

Figures 3 – 4

Figures 3 and 4 provide a more detailed break-down of net capital flows, total and by asset class, for the six distinct period of the pre-crisis, crisis and post-crisis. They highlight in particular the difference of the three crisis sub-periods and how these differ from other sub-periods before and after the crisis.

Figure 5

Finally, Figure 5 shows the cross-country heterogeneity or dispersion in net capital flows, which is measured as the standard deviation of weekly net capital flows across countries, over a centered moving window of 6 months (normalized to have a mean of one for each group over the entire sample period). The figure indicates that capital flow dispersion was not particularly high within Advanced Europe or among other advanced economies e.g. during the period after the Lehman collapse. By contrast, net capital flows exhibited a very high degree of heterogeneity across EMEs during the height of the 2007-08 financial crisis. This is an important stylized fact because it underlines that the experience of countries with capital flows indeed differed markedly during the crisis.

In summary, two key stylized facts stand out from the high-frequency portfolio flow data. First, there has been a massive reallocation of portfolio capital during the 2007-08 financial crisis. In the early period of the crisis, most advanced economies experienced net outflows while EMEs recorded balanced flows into the summer of 2008. The collapse of Lehman Brothers then reversed this trend, with capital exiting EMEs on a massive scale and repatriating to the USA and some other advanced economies. This pattern was much stronger for bond flows than for equity flows. The second key stylized fact is that despite this overall pattern in capital flows, the heterogeneity and dispersion in capital flows across countries increased sharply during the height of the financial crisis, implying that investors did not flee regions (in particular EME regions) indiscriminately, but that they indeed did discriminate quite closely in their investment decisions.

3. Empirical methodology

The objective of the empirical analysis is to explain the global dynamics of capital flows during and around the 2007-08 financial crisis, and in particular the heterogeneity in capital flows across countries, as highlighted in the previous section.

The empirical model to get at these questions is a factor model with two types of factors – a set of global/common factors, and a set of domestic/idiosyncratic factors, $S_t = [S_t^G, S_{i,t}^D]$, in order to test whether portfolio capital flows during and around the 2007-08 crisis reflected common shocks, domestic/idiosyncratic shocks and to what extent an increased vulnerability at the country level:

$$f_{i,t} = E_{t-1}[f_{i,t}] + \beta_{i,t-1}' S_t + e_{i,t} \quad (1)$$

$$\beta_{i,t-1} = \beta_{i,0} + \beta_1' Z_{i,t-1} + \gamma_{i,t-1} D_t \quad (2)$$

$$\gamma_{i,t-1} = \gamma_{i,0} + \gamma_1' Z_{i,t-1} \quad (3)$$

where $f_{i,t}$ is the net capital flow to country i during week t, $E_{t-1}[f_{i,t}]$ is the expected net flows, measured as a function of lagged values of net flows and interest rate differentials, S_t is the vector of the observable factors, D_t a financial crisis dummy, and $Z_{i,t}$ a vector of determinants that explains differences in the factor loadings across countries. The sample period from 12 October 2005 to 22 November 2010 has about 266 weekly observations for equity and bonds

flows to 50 countries. The financial crisis D_t is defined from 7 August 2007 to 15 March 2009, with robustness tests specifically focusing on the period after the collapse of Lehman Brothers on 15 September 2008. As most of the common shocks are US variables, note that the US as a recipient country of capital flows is excluded from all model estimations. The factor model (1)-(3) is in the spirit of standard asset-pricing models and related to the work by Bekaert, Ehrmann, Fratzscher and Mehl (2010), who focus on equity market contagion and equity returns at the firm level during the 2007-08 financial crisis.

The first set of hypotheses to be tested relates to the coefficients on the factors ($\beta_{i,0}$, $\gamma_{i,0}$) as well as the role of the determinants in conjunction with these factors (β_1 , γ_1) on capital flows, and whether and how these coefficients have changed during the financial crisis. This allows us to understand the overall drivers and the transmission channels of the crisis. The inclusion of the crisis dummy in equation (2) allows for a change in the factor loadings during the crisis via γ in equation (2). Such change in the transmission during the crisis may be either due to an unconditional increase in the factor loadings ($\gamma_{i,0}$) or a change in the factor loadings conditional on the determinants $Z_{i,t}$ (γ_1).

The second main hypothesis is to gauge to what extent it has been drivers associated with push factors – effects of factors common to all countries – and to what extent drivers related to pull factors – effects specific to individual countries and their own characteristics – which accounts for the dynamics of capital flows during the crisis and non-crisis times.

Specifically, the contributions of push factors and of pull factors to net capital flows are derived from the factor model (1)-(3) in the following way:

$$\hat{f}_{i,t}^{G} = (\beta_{i,0} + \gamma_{i,0}\ D_t\ )'\ S_t^{G} \tag{4}$$

$$\hat{f}_{i,t}^{D} = E_{t-1}[\,f_{i,t}\,] + (\beta_1\,'\,Z_{i,t-1} + \gamma_1\ Z_{i,t-1}D_t\ )'\ S_t\ + (\beta_{i,0} + \gamma_{i,0}\ D_t\ )'\ S_t^{D} \tag{5}$$

where $\hat{f}_{i,t}^{G}$ is the contribution of push factors due to common shocks for each country *i*. $\hat{f}_{i,t}^{D}$ is the contribution of pull factors, which is the sum of the expected net flows, the component of net flows due to country-specific determinants $Z_{i,t}$, and the component due to country-specific/idiosyncratic factors. The total share of net capital flows accounted for by push factors and by pull factors for a particular country i during time t can then be calculated respectively as

$$X_{i,t}^{G} = \hat{f}_{i,t}^{G}\ /\ \hat{f}_{i,t}$$

$$X_{i,t}^{D} = \hat{f}_{i,t}^{D}\ /\ \hat{f}_{i,t}$$

Concerning the definitions of the different variables in the empirical model (1)-(3), I first turn to the set of common and idiosyncratic factors S_t, summary statistics of which are given in Table 3.A. The set of common shocks S_t consists of specific exogenous crisis events, measures of global risk and liquidity, as well as US macroeconomic news and US equity market returns.

Table 3 and Figure 6

The level of risk may substantially increase during the crisis, making investors shun risky assets and flee into safer assets, in particular government bonds in the US and other advanced economies. I proxy for changes to risk through the VIX index of the S&P500. Moreover, a liquidity squeeze and the freezing of credit markets during the crisis made it difficult for financial and non-financial institutions to obtain capital, and thus may have been key in

spreading or exacerbating the crisis (Adrian and Brunnermeier 2010, Brunnermeier and Pedersen 2009). I use the TED spread as a measure of liquidity.

As to the crisis event, the objective is to identify events that were important and largely exogenous to the dynamics of capital flows. Table 3.B shows the list of 8 key events which have been integral parts of the crisis dynamics and which allow analyzing how capital flows have reacted in the immediate aftermath of these shocks.

In addition, two macro news shocks are included, one for the US and one for each of the countries in the sample, in order to proxy developments on the real side of the economies. Macroeconomic news shocks are the unexpected components of announcements about key macroeconomic variables, such as GDP, industrial production, unemployment or the trade balance, defined as the difference between the announced value and the expected value based on the median expectation expressed in Bloomberg surveys prior to the releases. Based on 9 US-specific news, I construct a composite US macro shock, which is the weekly sum across these news (after standardizing each news variable to raise net capital flows into the domestic market by 1% in the pre-crisis period), and analogously a domestic news shock.

Table 3.A and Figure 6.A show summary statistics for these composite macro shocks and its components. The advantage of using such macro "shocks" is that not only can they be identified cleanly and separated from other shocks – in particular as there is a time series for all of them, with each announcement usually taking place once a month – but equally importantly, using these news we can gauge how a given shock has been transmitted before versus during the financial crisis, and thus whether the transmission process and the transmission channels have changed during the crisis. Figure 6.A shows that these US macro shocks are indeed white noise over time – as they should be, as they are based on the unexpected components of macro announcements – though in some periods news tend to be more often negative, such as after the Lehman collapse, or positive for some time.[2]

Finally, I include US equity market returns and domestic equity market returns as factors into the model. The inclusion of these two equity market returns into the factor model is meant to account for the fact that there is likely to be a relationship between flows and returns.

A crucial issue is the exogeneity of the factors. Crisis events (such as the default by Lehman Brothers) and the macroeconomic news shocks should be largely exogenous to cross-border capital flows, in particular given the definition of the latter as unexpected components of announcements. Yet, US returns, the Ted spread and the VIX may be influenced by capital flows and other developments in one of the 50 individual countries, though all three are US-specific variables and it is unlikely that capital flows to and from smaller economies may be important enough to influence US equity markets during a particular week. Hence, strictly speaking, the term "factor" is more appropriate than "shock" when thinking about the interpretations of the vector $S_{i,t}$ in the factor model (1)-(3).

As a final note on the vector of common and idiosyncratic factors, some of these factors may be correlated with one another. I attempt to reduce this potential problem by orthogonalising VIX and TED spread, which is done by regressing the VIX on the TED spread and using the residual as a pure measure of risk. Similarly, domestic equity returns are regressed on US returns and the residuals used as the measure of the domestic returns. Table 3.C shows a table with

[2] A large literature using such macro news focuses on analyzing how they affect asset prices, both in the United States and globally. A detailed account of the construction of the news component of the announcements and their financial market effects are provided in Andersen et al. (2007), Ehrmann and Fratzscher (2004, 2005), and Gürkaynak, Sack and Swanson (2005). The data source is Bloomberg, both for the announcements and for the surveys of market participants' expectations.

correlation coefficients across the different shocks, indicating the correlations across the seven factors are generally small.

Table 4

I next turn to the set of determinants $Z_{i,t}$ which may explain the transmission of a particular shock on net capital flows $f_{i,t}$. Table 4 provides summary statistics with definitions and data sources for all of the determinants. A distinction is made between four groups of determinants. The first set of variables primarily measures the external exposure via trade and financial openness, which has been pointed out by many researchers to play a role in explaining financial interdependencies (see e.g. Forbes and Chinn 2004, Kaminsky and Reinhart 2000, Baele and Inghelbrecht 2009, Bekaert and Harvey 1995). More specifically, the exposure variables included are trade openness (sum, of exports plus imports), the total stock of portfolio investment assets and the stock of portfolio investment assets (sourced from CPIS), the size of depth of domestic financial markets (proxied by the stock market capitalization) as well as the degree of de facto capital account openness (using the Chinn-Ito (2008) index). All variables, except the last one, are scaled by domestic GDP.

Second, proxies for institutions and country risk are included, such as quality of political institutions or financial risk (using ICRG measures), as well as the sovereign rating of a particular country. Third, I control for macroeconomic variables at the country level, such as a country's current account position, FX reserve holdings, the performance of the economy (GDP growth, inflation, interest rate), and the government budget balance, public debt and short-term external debt.

The hypothesis for their inclusion is that countries with good institutions and strong macroeconomic fundamentals may be less likely to experience sharp capital flow reversals during the crisis. As to the transmission of shocks, the prior is that better institutions and fundamentals may be instrumental in insulating a country from negative external shocks and hence capital outflows may be smaller, or a country with strong fundamentals may even experience net capital inflows during the crisis as a flight-to-safety phenomenon among investors starts to dominate investment decisions.

Fourth, I try to include the policy reaction of governments to the financial crisis and in particular their attempt to shield the domestic financial sector from the crisis. One striking feature of the crisis has been the massive policy response by policymakers, in particular the substantial financial policy interventions in the form of capital injections in both financial and non-financial firms, as well as broad set of new or extended deposit guarantees and debt guarantees in a number of countries. There is a growing literature showing that such measures have indeed been fairly effective in supporting individual financial institutions and even countries' financial systems.[3]

The hypothesis for the present paper is that these financial policy responses may have helped countries to be more insulated and less affected by shocks and capital retrenchment during the crisis. To get at this hypothesis, I investigate the effect of different types of financial policies – capital injections, deposit guarantees, debt guarantees, credit intervention, asset relief programmes and capital control measures – on the transmission process during the crisis. A key feature exploited for this analysis is that not all countries have seen such financial policies, and

[3] For instance, King (2009) provides an event-study analysis of the effects of such financial policies by governments on the stock market value of banks directly concerned.

moreover there are differences in the precise measures and timing with which these were implemented.[4]

4. Empirical results

This section presents the empirical results of the factor model. It starts by first estimating model (1)-(3) and outlining the findings for the effects of shocks on global capital flows (section 4.1) and the determinants that explain the cross-country heterogeneity in capital flows in response to these shocks (section 4.2). The section concludes by gauging the economic relevance of the various drivers associated with push and pull factors in explaining net capital flows during the 2007-08 crisis and its subsequent recovery (section 4.3).

4.1 Common and idiosyncratic factors as drivers of capital flows

The first step is to estimate the model (1)-(3) with the vector of shocks S_t, but without the determinants $Z_{i,t}$. Table 5 shows the results for the effect of shocks on capital flows in the non-crisis period ($\beta_{i,0}$) and for the additional effect during the crisis ($\gamma_{i,0}$) for each of the five common factors and two idiosyncratic factors. Recall that in model (1)-(3) $\gamma_{i,0}$ gives the difference in the effect of a particular factor during the crisis, while ($\beta_{i,0} + \gamma_{i,0}$) provides the overall effect during the crisis. The reported coefficients are averages across country-specific coefficients as specified in equations (1)-(3).

Table 5

The key crisis events had a significant negative effect on capital flows, yet only for EMEs and not for AEs. Looking at liquidity shocks, a rise in the TED spread, i.e. a worsening in liquidity conditions, induces net portfolio outflows. Yet the effect was smaller during the crisis than in the non-crisis period. However, this should not be interpreted that liquidity shocks have become less important as drivers of capital flows during the crisis as the magnitude of such shocks has increased enormously in the crisis.[5]

The response to changes in risk, as proxied by the VIX, during the crisis yields a striking result. While higher risk during the crisis is associated with some net portfolio outflows, there is a remarkable heterogeneity in the effect across country groups. While a rise in the VIX led to net outflows out of AEs before the crisis and into EMEs, this effect reversed during the crisis, when the sharp increase in global risk induced net inflows into AEs and net outflows out of EMEs. This suggests that the pricing of risk changed fundamentally during the crisis. The finding is consistent with the flight-to-safety phenomenon stressed as a key driver of global capital flows in the crisis.

In the non-crisis period, a positive US macro shock induces capital outflows – presumably as capital is repatriated into the US – while a positive domestic macro shock leads to net capital inflows into the domestic economy. Yet, the sign for domestic macro shocks changes in the

[4] The information stems from a variety of data sources, mainly from the BIS. It should be noted that it is not only advanced economies which implemented such policies, but a number of emerging markets did so as well, while some advanced economies implemented no or only a few of such policy measures. The magnitude and coverage of such financial policies of course differ significantly across countries. To the extent possible, I have derived measures about the size of capital injections relative to domestic GDP. However, the empirical findings are qualitatively unchanged whether we use simple dummy variables or such ratios in the estimation.

[5] See Figure 6.B for the (normalized) evolution of the TED spread over time, showing that at times during the crisis the TED spread rose by 5 standard deviation relative to the whole sample period.

crisis for AEs, suggesting that negative domestic shocks during the crisis triggered capital outflows out of EMEs but net inflows into AEs, e.g. a repatriation of capital from abroad of investors based in AEs. If one considers AEs as relatively saver, this finding is again consistent with the flight-to-safety hypothesis. This is further corroborated by the change in sign for US macro news, similarly indicating a repatriation of capital into the US in response to negative US macro shocks during the crisis.

Finally, positive US equity returns and domestic equity returns both lead to more capital inflows into all economies. The coefficients do not change markedly during the crisis, suggesting that the transmission mechanism of asset price changes to capital flows has not changed materially.

Tables 6 – 9

Table 6 shows the coefficients of a further disaggregation by region and underlines the high degree of heterogeneity across countries. Among regions, it is in particular Emerging Europe that is most adversely affected by the global/common shocks during the crisis. By contrast, in response to an increase in the Ted spread or the VIX, there are net capital inflows into Advanced Europe, consistent with the (relative) safe-heaven pattern of global capital flows emphasized above.

Table 7 provides a breakdown of portfolio flows into equity flows and bond flows. While the results for aggregate portfolio flows largely hold also for both asset classes, there are a few noteworthy differences. The first one relates to the sensitivity of flows to crisis events: the crisis events triggered substantial capital outflows out of equities in both advanced and emerging economies as well as out of EME bonds, but induced net inflows into bonds of advanced economies.

As a second feature, an increase in risk during the crisis led to a particular strong response in the form of net outflows out of EME bonds, but to some net inflows into AE equities. In particular, the much stronger sensitivity of EME bond flows to risk changes (as well as to event shocks and increases in the Ted spread) help explain the larger net outflows out of EME bonds as highlighted among the stylized facts in section 2. A third feature is the opposite sign for domestic macro shocks between equity and bond flow, implying that for AEs before the crisis negative domestic macro news induced a portfolio rebalancing by shifting fund flows from equities into bonds.

Table 8 gives the estimates for a robustness check in which the crisis period is reduced to capture only the post-Lehman period from 15 September 2008 till 14 March 2009, which was the period with the sharpest net capital outflows, in particular out of EMEs, as was shown in section 2. The findings are qualitatively similar to those of the benchmark model of Table 5, though capital flows are generally more sensitive during the Post-Lehman period to the various common and idiosyncratic shocks, suggesting that investors have reacted particular sensitively to new information during that period of turmoil. In particular the coefficients to liquidity shocks and to US macro shocks are substantially higher in the post-Lehman period.

Another potentially important issue is whether the European sovereign debt crisis in 2009 and 2010 has played a relevant role in the surge in capital flows to some EMEs. In other words, this crisis may well have functioned as a "push" factor of capital flows to EMEs. To test for this hypothesis formally, the benchmark model is extended to include key events of the European sovereign debt crisis as a separate variable.[6] The upshot of such an extension is that there

[6] These events are the first rumors about sovereign debt strains in Greece in February 2011, the first official Eurogroup statements acknowledging the issue in March 2010, the adverse market contraction

appears to be a slight positive effect of such events on capital flows to EMEs, but the coefficient is neither economically nor statistically significant. As an interpretation, these findings suggest that European sovereign debt events of 2009-10 have not had a global outreach, thus neither exerting a positive nor a negative effect of portfolio flows to EMEs.[7]

Table 9 provides a complementary perspective on the change in the parameters between the non-crisis and crisis periods. It shows the correlation coefficient between the non-crisis and crisis parameters for the 49 countries in the sample. What is most striking from the table is the strong negative correlation between non-crisis and crisis parameters for each shock (see the boxed cells in the table), which means e.g. that countries with large negative coefficients for risk shocks in the non-crisis period were those with the least negative (or most positive) coefficients during the crisis, and vice versa. This pattern holds across all common and idiosyncratic shocks.

Figure 7

This negative correlation implies that capital flows to countries that exhibited a high sensitivity to common shocks before the crisis – i.e. in many cases emerging economies in Europe, Asia and Latin America – also experienced the sharpest reductions or even reversals of these elasticities during the crisis. To shed more light on this issue, as well as to gauge the goodness of fit of the factor model, Figure 7 plots the actual cumulated flows during the crisis (vertical axis) against the fitted cumulated flows (horizontal axis) from the factor model (1)-(3). Figure 7.A is based on the estimation of the model without crisis interaction terms (but with common and idiosyncratic shocks); the figure in Panel B on the model without any common shocks (but with crisis interaction terms); and Figure 7.C on the full model with both crisis interaction terms and common shocks.

Figure 7.A highlights that the above-mentioned reduction of elasticities during the crisis was particularly strong for EMEs. Most EMEs lie above the 45-degree line, which means that the non-crisis parameters $\beta_{i,0}$ predict that EMEs would have been more strongly affected and experienced larger capital outflows than was actually the case. By contrast, most AEs lie below the 45-degree line indicating that the non-crisis model under-predicted the severity with which AEs were actually affected by the crisis.

However, this does not mean that common factors have become less important as overall drivers of capital flows during the crisis. In fact, common factors such as the Ted spread and the VIX have exhibited movements that were magnitudes larger during the crisis than before. Figure 7.B stresses this point by showing that when excluding the five common factors from the model (i.e. thus only including the domestic factors and the controls in factor model) the model does a very poor job in accounting for actual capital flows in the crisis. In fact, such a model strongly under-predicts the capital outflows during the crisis. Most importantly, the largest underprediction of such a model is for EMEs which are furthest below the 45-degree line.

Finally, Figure 7.C shows the model predictions with the full specification, indicating a fairly good fit of the model in accounting for global capital flow dynamics during the crisis, as well explaining well the large degree of heterogeneity in country-specific experiences with capital flows across the 49 countries in the sample.

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and policy reaction of early May 2010, related market events of July 2010, and two events in September and October 2010 about banking sector problems in Ireland.

[7] The empirical results are not shown here for brevity reasons, but are available upon request.

In summary, the empirical findings show that the drivers of capital flows during the crisis have changed substantially. While an increase in risk triggered net capital inflows into EMEs and net outflows out of AEs before and after the crisis, this relationship switched with the sharp rise in global risk during the crisis being associated with a repatriation of capital out of EMEs and into AEs. Also other common shocks, such as specific crisis events, a worsening in liquidity conditions and negative US macro news affected capital flows to EMEs more adversely than those to AEs. The evidence is, overall, consistent with a flight-to-safety phenomenon that has been widely cited in the literature as a key motivation of global capital flows during the 2007-08 financial crisis. Moreover, the evidence shows that common, global shocks have been important in explaining both the magnitude as well as the cross-country heterogeneity of capital flows during the 2007-08 financial crisis, with such common shocks having exerted a particularly large effect on EMEs.

4.2 Determinants of capital flows

What explains the high degree of heterogeneity in capital flows across countries? And in particular, what accounts for the change in the sign and size of the sensitivity of countries' capital flows to common and idiosyncratic shocks during the 2007-08 crisis? This section discusses the estimates of the factor model (1)-(3) when including the vector of instruments $Z_{i,t}$. As detailed in section 3, these instruments relate to a country's economic fundamentals (size of reserves, current account position, fiscal position, growth, etc.), its institutional environment (sovereign risk, institutional quality), its financial policies during the crisis, and its external exposure (through trade and financial linkages).[8]

Figure 8

The main question is whether and which of these instruments has been important during the crisis as a facilitator or insulator of capital flows in response to common and idiosyncratic shocks. A first look at the data is quite informative. Figure 8 is based on the parameter estimates of the analysis of the previous sub-section, i.e. without including instruments $Z_{i,t}$, and plots the crisis coefficients $\gamma_{i,0}$ for the effect of the crisis events on capital flows against four specific instruments $Z_{i,t}$ for each of the 49 countries the sample. The figures show a strikingly strong correlation pattern. Specifically, countries with a high sovereign rating and with a good quality of policy institutions experience much smaller sensitivity of their net capital flows to adverse crisis events.

A formal test for the role of instruments $Z_{i,t}$ is obtained by estimating the full factor model (1)-(3). More specifically, for instance, as crisis events triggered overall net capital outflows during the crisis (a negative coefficient in Tables 6-9), then $\gamma_1 > 0$ for a particular instrument $Z_{i,t}$ implies that a higher value of this instrument (i.e. better fundamentals or institutions, the implementation of financial policies or more openness/integration) helps to *reduce* the negative impact of these shocks on capital flows. The opposite is the case if the shock has a positive sign on capital flows overall, so that $\gamma_1 > 0$ means that the transmission of the shock is magnified. The second row of Tables 11 and 12 shows the expected signs of the coefficients for the instruments under the null that the instrument functions as a shock insulator or absorber, i.e. *reduces* the impact of the respective shock on capital flows.

The estimator used is a pooled OLS, with the estimation following an encompassing strategy starting from a full model including all determinants $Z_{i,t}$ and then in a stepwise procedure

[8] Note that all instruments $Z_{i,t}$ are defined so that a higher value means better fundamentals, better institutions, the implementation of financial policies, and more trade and financial integration. This is helpful so that the coefficients can be more easily be interpreted across variables.

excluding variables if they are not statistically significant at the 20% level, while also at each step testing whether already excluded variable become again statistically significant and need to be included.

Tables 10 – 11

Table 10 shows the estimates for the parameters β_1 when estimating the factor model (1)-(3) without the crisis parameters γ. Table 11 then provides the estimates for γ_1 when allowing for shocks and instruments to exert a different effect on capital flows during the crisis.

Table 10 indicates that – when estimating the model over both crisis and non-crisis periods – there are some systematic relationships between the quality of fundamentals or institutions, financial policies or openness, on the one hand, and the strength with which shocks affect global capital flows, on the other. The null hypothesis (shown in the second row of the table) consistent with a particular instrument $Z_{i,t}$ helping to reduce the effect of a specific shocks is in some cases confirmed, though the effects are modest in size.

Looking at Table 11, this finding changes substantially when allowing for instruments to exert a different effect on the shock transmission during the crisis. The null hypothesis is confirmed in more than 9 out of 10 cases. For instance, a better sovereign rating reduces the negative effect of a crisis event and of changes in the Ted spread or in risk (i.e. $\gamma_1 > 0$ in Table 11). Similarly, the positive coefficients for US or domestic macro news (i.e. a negative macro shock triggering capital outflows) becomes smaller during the crisis for countries with a good sovereign rating.

The same holds for several of the macroeconomic fundamentals and policy intervention variables, with the exception of FX reserves.[9] Moreover, comparing the estimates for γ_1 across shocks indicates that the instruments are more often statistically significant for common shocks (far fewer γ_1 are significant for the two idiosyncratic shocks). One interpretation of this is that these instruments do a better job in explaining the differences in the effects of common shocks than the effects of idiosyncratic shocks.

Figures 9 – 10

A number of additional tests are presented in Figures 9-10, which aim to highlight the economic relevance of the determinants $Z_{i,t}$ in explaining differences in capital flows during the non-crisis and crisis times. Figure 9 shows the response patterns of capital flows to common shocks during the crisis for different country groupings, where countries are grouped according to the strength of their fundamentals and institutions or the openness of their economies. Figure 10 shows a similar analysis for VIX changes, but also distinguishes between the pre-crisis and crisis transmissions. Both confirm that the differences in the strength of the shock transmission are quite substantial and of meaningful across fundamentals and institutions, yet are small for external exposure variables. Moreover, both sets of figures show dynamic response patterns by allowing for lagged effects of the shocks in the factor model (1)-(3), indicating that the effects exhibit some persistence for a number of weeks.

In summary, the main finding of this sub-section is that country-specific fundamentals and institutions are important for explaining differences in capital flows, and in particular during the

[9] The only fundamental that persistently has the opposite sign from the null is for FX reserve holdings, implying that countries with high reserve holdings suffered larger capital outflows during the crisis and were also more exposed to common and idiosyncratic shocks. This is somewhat unexpected, but is consistent with the fact that countries with high reserve holdings are generally EMEs, i.e. those with poorer institutional quality.

2007-08 crisis. More specifically, countries with a high institutional quality and strong macroeconomic fundamentals succeeded to insulate their financial markets from adverse common and idiosyncratic shocks during the financial crisis. By contrast, the external exposure of countries, either through trade or through finance, appears to have played at most a minor role in accounting for cross-country differences in the transmission of global shocks.

4.3 Economic relevance of drivers associated with push versus pull factors

The purpose of the final step of the analysis is to gauge the economic relevance of the identified effects and to compare the overall importance of different drivers associated with push factors versus pull factors in explaining global capital flows.

Table 12

Looking at the fitted values if the model is a first way to gauge how much of net capital flows can be accounted for by drivers associated with push factors – i.e. shocks that are common to all countries – and how much by drivers related to pull factors – i.e. factors specific to individual countries' policies, institutions and fundamentals. Using the definitions of equations (4) and (5), Table 12 shows actual and fitted net capital flows during each of three sub-periods (pre-crisis, crisis, and post-crisis) against the fitted cumulated flows from the factor model (1)-(3). The fitted net flows are also split up into a part explained by common factors $\hat{f}_{i,t}^{G}$ and a part accounted for by domestic factors $\hat{f}_{i,t}^{D}$, together with the shares of fitted net capital flows accounted for by common factors and by domestic factors calculated respectively as $X_{i,t}^{G} = \hat{f}_{i,t}^{G} \,/\, \hat{f}_{i,t}$ and $X_{i,t}^{D} = \hat{f}_{i,t}^{D} \,/\, \hat{f}_{i,t}$.

The main finding of Table 12 is that common factors are, overall, about as important as domestic factors as drivers as net capital flows over the period 2005-2010. However, there are some interesting differences across regions and over time. Importantly, while common factors appear to have been more important during the crisis – accounting for about 73% of net capital flows for the median country – domestic factors have come to dominate in explaining net capital flows since 2009. Looking at different regions, domestic factors have become particular important for EMEs in Latin America and Asia in the 2009-10 surge in capital flows to EMEs, accounting for most of the cumulated net capital flows during that period.

A number of caveats apply to these calculations. Although the fit of the model (1)-(3) is overall good, relevant common or idiosyncratic drivers may be excluded from the model. Moreover, the comparison of the fit of the model with actual net capital flows is done for the whole of the three sub-periods, which implies that the numbers of Table 12 provide overall figures, while over shorter periods there may indeed be significant changes as to whether common factors or domestic factors drive capital flows.

A second way to gauge the economic relevance of the drivers associated with various pull factors, is to estimate model (1)-(3) as an unconditional one in order to see whether and how the various country-specific determinants $Z_{i,t}$ may be related to capital flows at particular points in time. To do so, the factors S_t are dropped from the benchmark model, so that the model becomes:

$$f_{i,t} = E_{t-1}[f_{i,t}] + \beta_1 ' Z_{i,t-1} + e_{i,t} \qquad (6)$$

Since $Z_{i,t}$ are slowly changing over time (many having annual or quarterly frequency) and capital flows tend to be highly volatile, an estimation with weekly frequency yields little information about the relationship between these determinants and capital flows. The estimation of (6) is therefore conducted for longer sub-periods of the crisis and periods around the crisis, in particular the pre-crisis period (12 October 2005 through 7 August 2007), the crisis (8 August 2007 – 14 March 2009) and the post-crisis period (15 March 2009 – 22 November 2010) as discussed in section 2. Hence $f_{i,t}$ for this pure cross-section estimations are the cumulated, total capital flows to country i over each of these specific sub-periods. As before, the estimation follows an encompassing strategy starting from a full model including all determinants $Z_{i,t}$ and then in a stepwise procedure excluding variables that are not statistically significant at the 20% level, while also at each step testing whether already excluded variable become again statistically significant and need to be included.

Table 13

Table 13 shows the estimates of equation (6) for the three separate sub-periods. The columns labeled "decile" show the difference in the response of capital flows for a country with the determinant at its 90th percentile compared a country at its 10th percentile. The table again confirms the findings of the conditional analysis of the previous sub-section (where the analysis conditioned on various common or idiosyncratic shocks) that in particular countries with strong macro fundamentals and with good institutions experienced smaller outflows (or more capital inflows) during the crisis than countries with weak fundamentals and high country risk. More specifically, countries with a strong current account, a good fiscal position and relative lower short-term debt fared significantly better during the crisis in terms of capital flows. Among the institutional variables, it is in particular the sovereign rating and the quality of institutions that exerted a significant effect on capital flows during the crisis.

Most importantly, the effects of fundamentals and institutional factors on capital flows are sizeable. What is striking for these two sets of variables is the change in the sign of the coefficients in the crisis compared to the pre- or post-crisis periods. It implies that countries that were relatively more risky – e.g. a lower sovereign rating, worse institutions or higher short-term debt – experienced larger capital outflows during the crisis but also higher net inflows before and after the crisis. For instance, countries with a poor sovereign rating (10^{th} percentile) experienced 15.2% higher net capital outflows during the crisis but 9.2% larger net inflows in the 2009-10 recovery.

By contrast, there is no systematic evidence that either trade or financial integration and exposure explain any of the cross-sectional differences in capital flows during the crisis. However, there is some indication that more financial open economies experienced somewhat larger capital outflows, though the point estimate is marginally insignificant.

Figure 11

Figure 11 illustrates the relationship between total cumulated capital flows and sovereign ratings and the institutional quality across countries. The figures show a quite striking switch in the sign in the link between capital flows and the determinants from the crisis period to the pre- and post-crisis periods. For instance, Figure 11 shows that while a better rating meant smaller capital outflows during the crisis, the opposite relationship held both before the crisis and during the 2009-10 recovery. This is indeed intuitive as we have seen that it was particularly EMEs, i.e. those with generally worse sovereign ratings, which experienced that sharpest declines in capital flows during the crisis, yet also the strongest increases in capital inflows before and after the crisis. A similar switch in sign in the relationship is observed for the and for the quality of domestic institutions (Panels B and D) as well as other variables (Table 13).

5. Conclusions

Global portfolio capital flows have exhibited a collapse and substantial shift during the height of the 2007-08 crisis, and an even more sustained surge since the beginning of 2009. The paper has analyzed the drivers behind this collapse and surge over the past few years, building on a novel, high-frequency database of fund-level flows in portfolio equities and bonds. It has attempted to shed light in particular on the debate whether it has been push factors or pull factors that have been the main drivers behind this global capital flow pattern for a broad set of 50 advanced and emerging economies.

The findings indicate that common shocks – such as specific crisis events, changes to global liquidity and risk conditions – have exerted a substantial effect on global capital flows. Moreover, the effects of such global factors have changed markedly during the crisis. In particular the rise in risk and important crisis events triggered a reallocation of flows from many EMEs to some AEs during the crisis, while they have had the opposite effect before and after the crisis, consistent with a "flight-to-safety" hypothesis during the crisis.

The second main finding of the paper is that much of the cross-country heterogeneity to common shocks is related to country-specific determinants, and these effects are indeed economically meaningful.

The empirical results have implications for the ongoing policy debate about the drivers of capital flows. A highly contentious issue is whether it is push factors – i.e. shocks in advanced economies and common to all economies, or rather pull factors – i.e. factors that are specific to countries themselves, which have been driving capital flows over the past few years. The findings of the paper indicate that push factors in the form of shocks to liquidity and risk as well as to macroeconomic conditions and policies in advanced economies, in particular the US, have indeed exerted a significant effect on capital flows to EMEs as well as other advanced economies. Although these effects have been larger during the 2007-08 crisis, they have continued to exert a sizeable effect on global capital flows also during the subsequent recovery.

However, the findings of the paper also underline that the drivers of capital flows are strongly related to pull factors, and in particular countries' macroeconomic fundamentals, institutions and policies, which in fact have been the dominant drivers of capital flows in the 2009-10 recovery. By contrast, real and financial openness are found to play little or no role for the exposure and vulnerability of capital flows of countries to common global shocks emanating from advanced economies. Hence the implication of this finding is making the domestic economy more closed through capital controls may be largely ineffective, while it is rather sound macroeconomic policies and an improvement in the institutional setting that helps countries reduce their exposure to external shocks.

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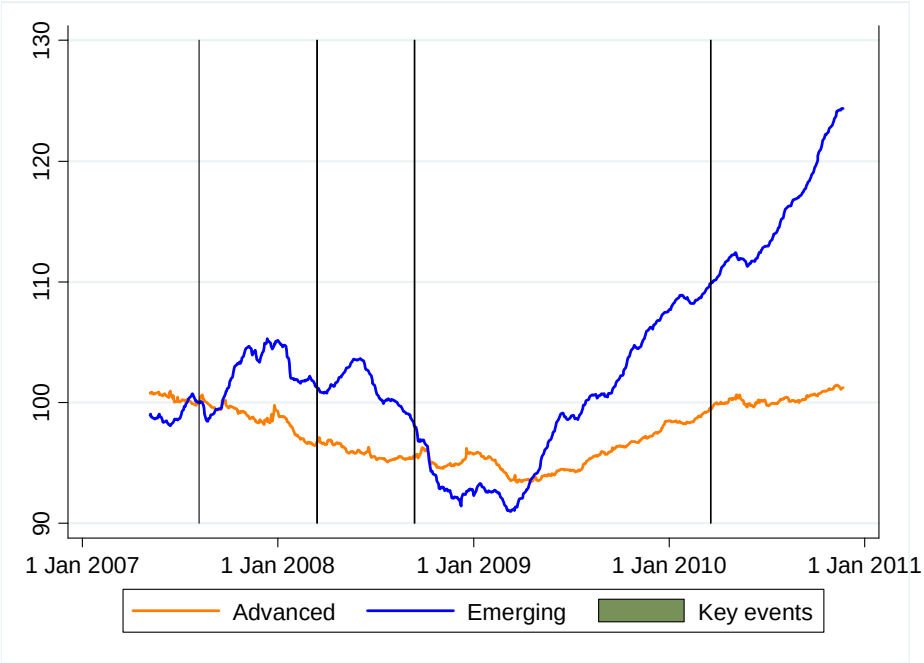
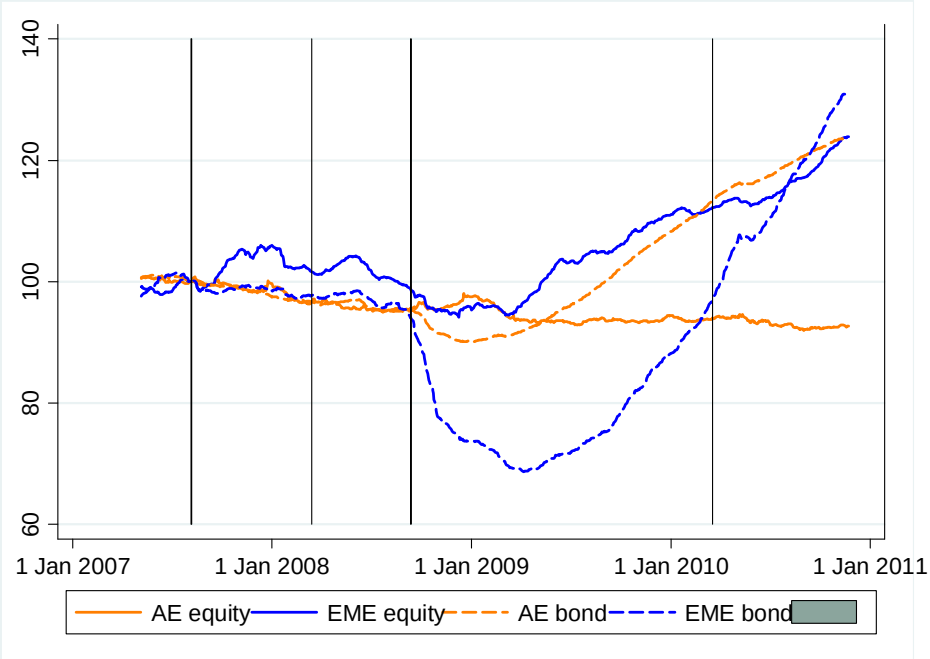
TABLES AND FIGURES

Figure 1: Capital flows during the crisis

A. Advanced versus emerging economies

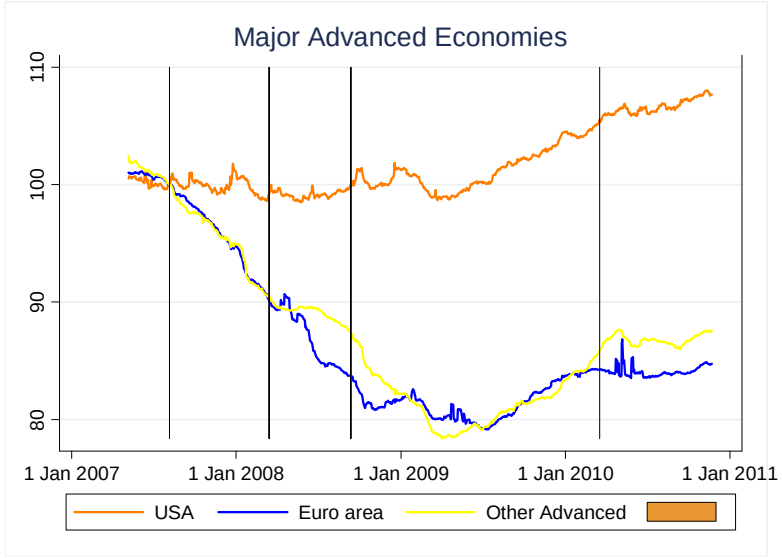


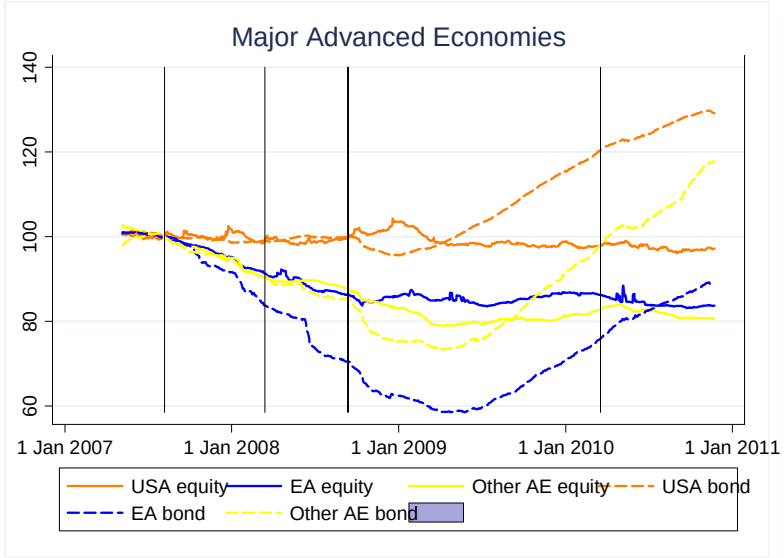
B. Equities versus bonds

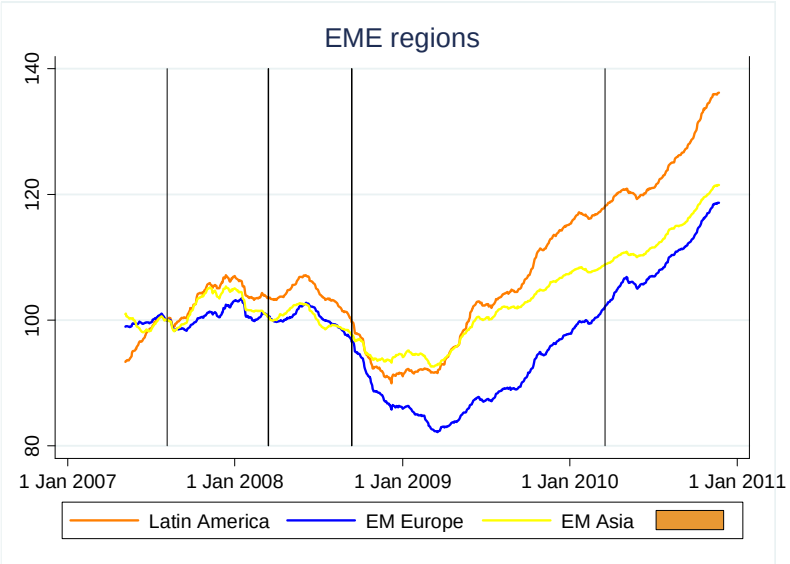


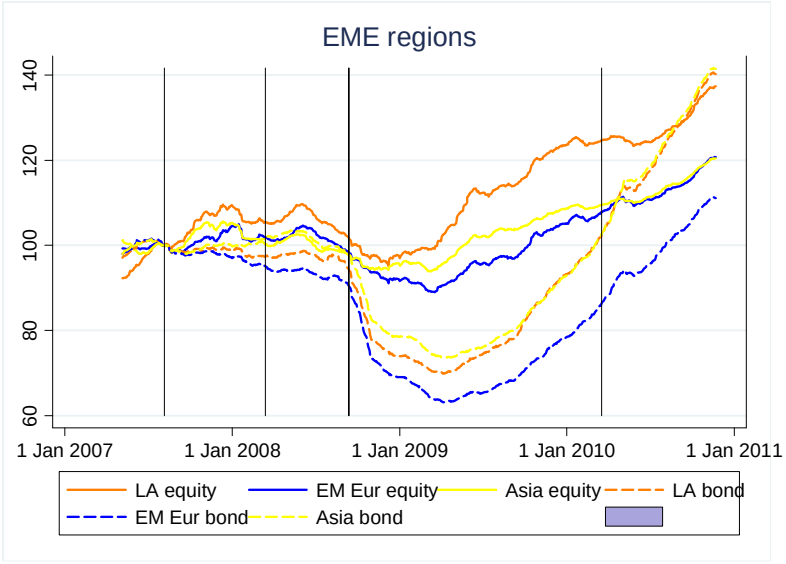
Notes: The figures show the cumulated total capital flows (net capital flows in USD to total assets under management) relative to the beginning of the crisis (7 Aug. 2007 = 100), distinguishing between advanced and emerging economies (panel A) and by type of portfolio investment (Panel B).

Figure 2: Capital flows during the crisis – breakdown by region and asset class



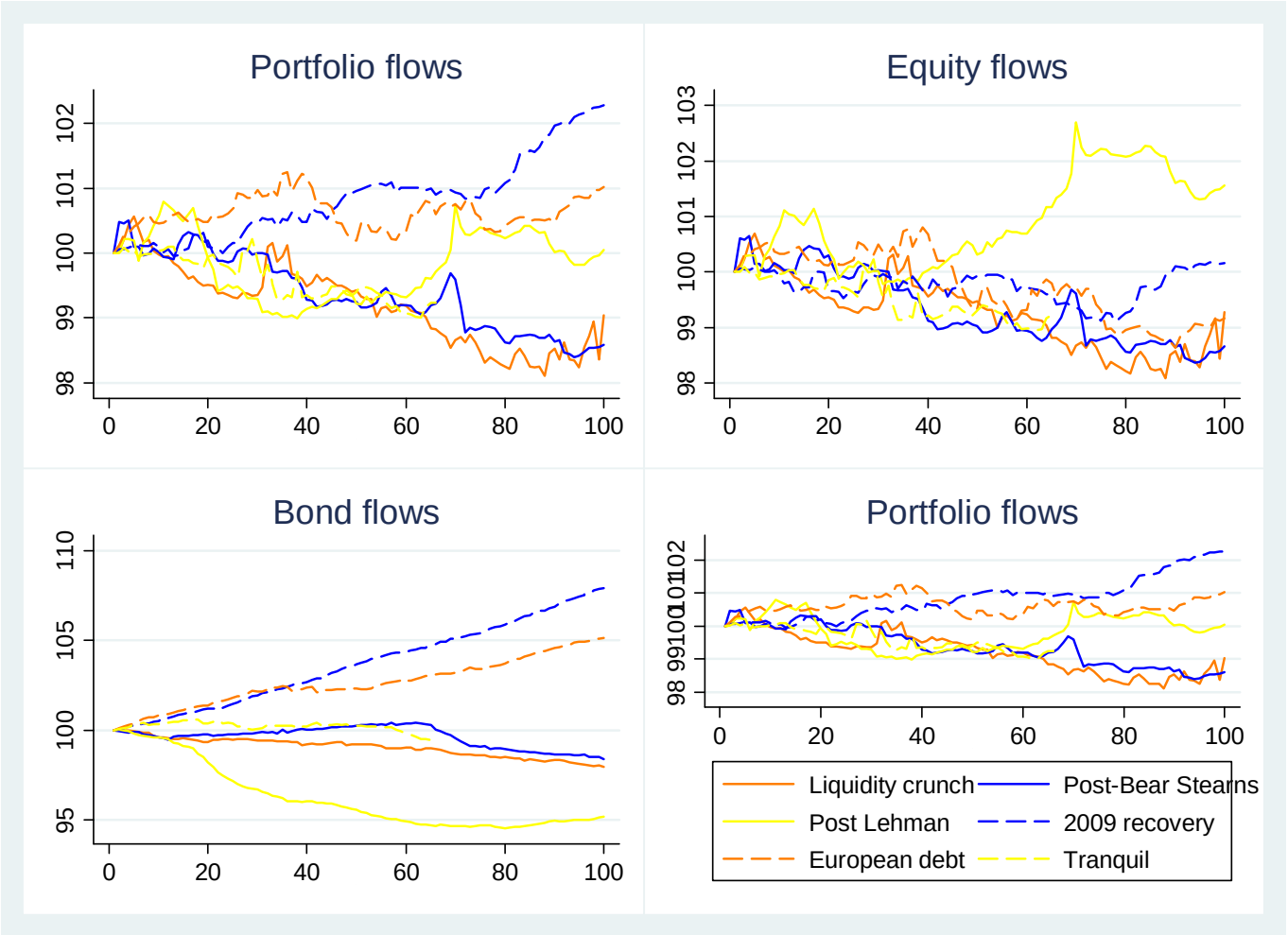






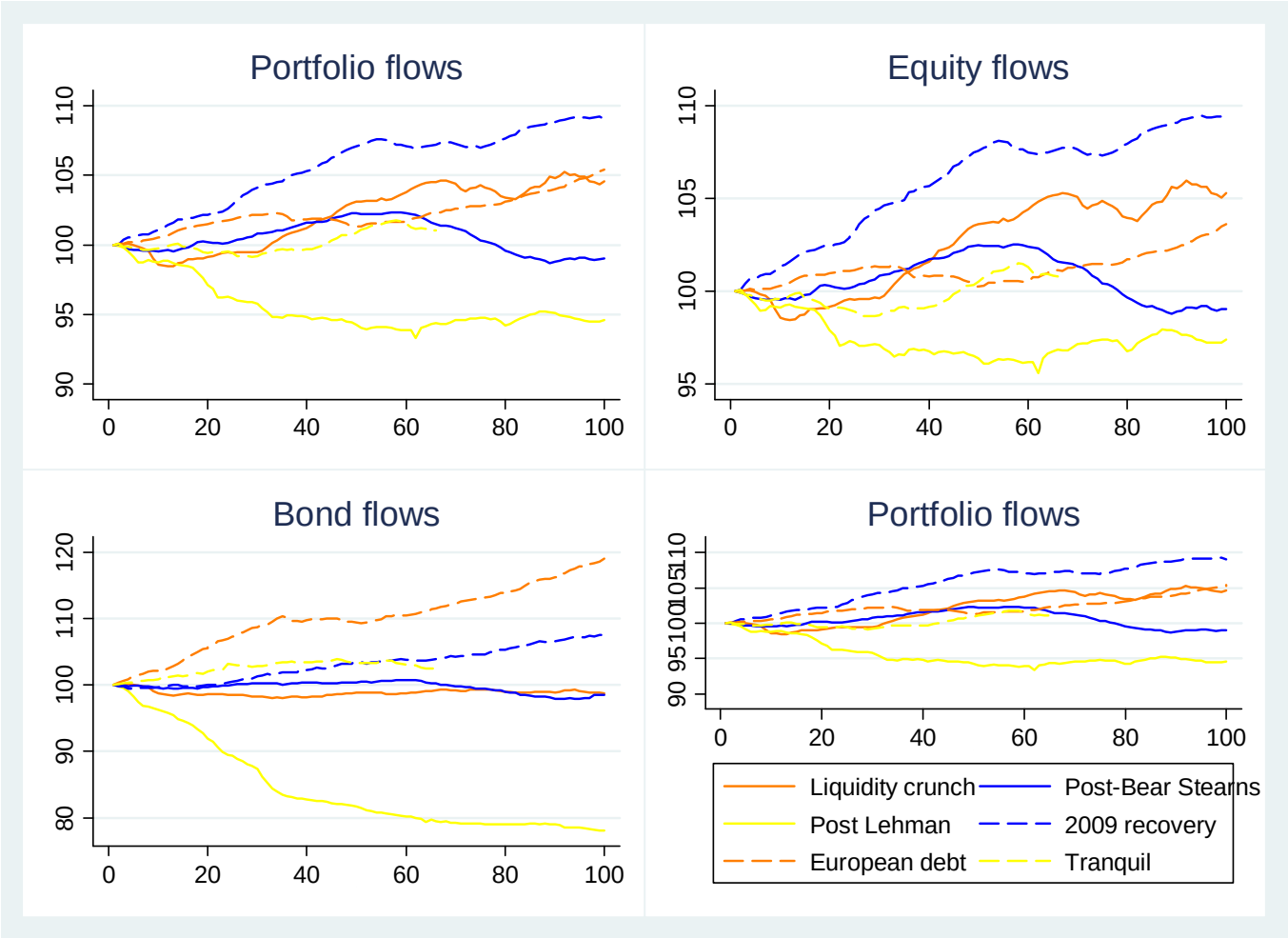
Notes: The figures show the cumulated total capital flows (net capital flows in USD to total assets under management) relative to the beginning of the crisis (7 Aug. 2007 = 100), providing a further breakdown within advanced and within emerging economies and by type of portfolio investment.

Figure 3: Capital flows during the crisis – event-study breakdown, Advanced economies



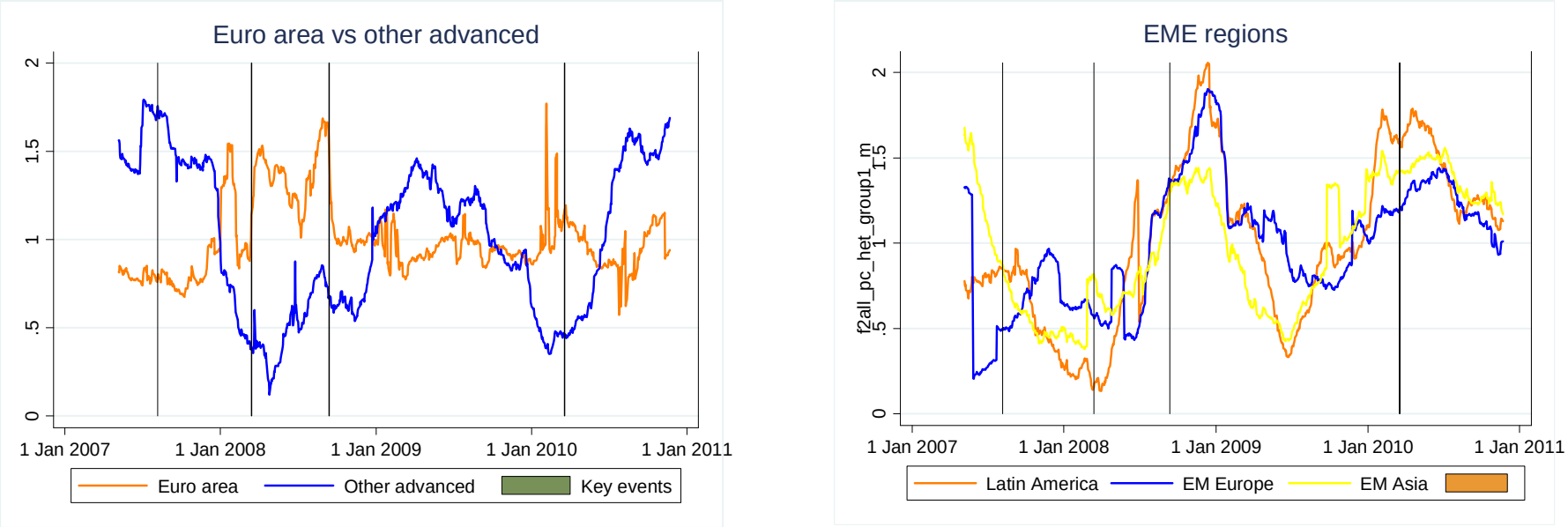
Notes: The figures show – for advanced economies – the cumulated total capital flows (net capital flows in USD to total assets under management) relative to the beginning of each sub-period (normalized to 100) providing a distinction across the six non-crisis and crisis regime periods. The horizontal axis shows the number of days after the beginning of the respective sub-period. Tranquil: 7 May 2007 – 7 Aug 2007; Liquidity crunch: 8 Aug 2007 – 14 March 2008; Post-Bear Stearns: 15 March 2008 – 14 Sept 2008; Post-Lehman: 15 Sept 2008 – 14 March 2009; 2009 recovery: 15 March 2009 – 14 March 2010; 2010 European/sovereign debt crisis: 15 March 2010 – 22 Nov 2010.

Figure 4: Capital flows during the crisis – event-study breakdown, Emerging economies



Notes: The figures show – for emerging economies – the cumulated total capital flows (net capital flows in USD to total assets under management) relative to the beginning of each sub-period (normalized to 100) providing a distinction across the six non-crisis and crisis regime periods. The horizontal axis shows the number of days after the beginning of the respective sub-period. Tranquil: 7 May 2007 – 7 Aug 2007; Liquidity crunch: 8 Aug 2007 – 14 March 2008; Post-Bear Stearns: 15 March 2008 – 14 Sept 2008; Post-Lehman: 15 Sept 2008 – 14 March 2009; 2009 recovery: 15 March 2009 – 14 March 2010; 2010 European/sovereign debt crisis: 15 March 2010 – 22 Nov 2010.

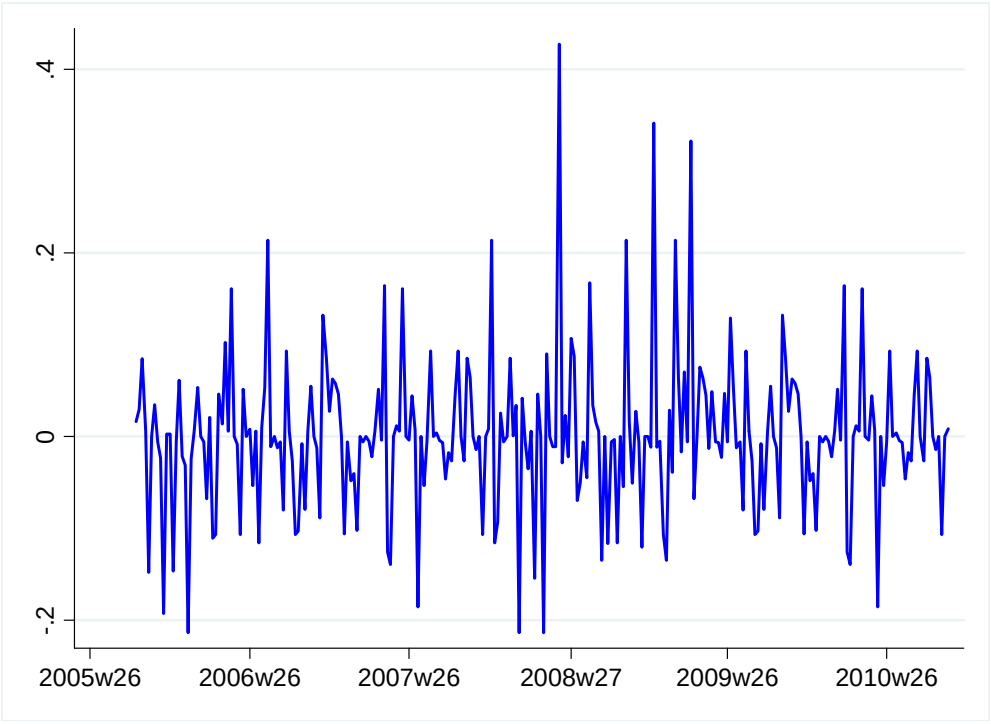
Figure 5: Dispersion in capital flows



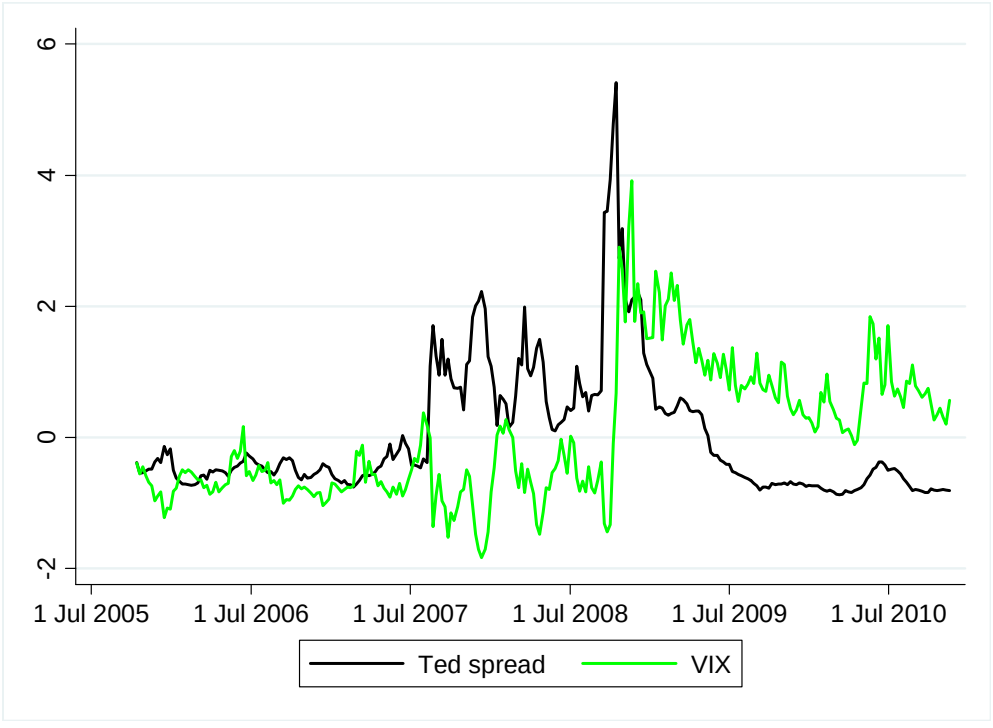
Notes: The figures show the dispersion – measured as the cross-section standard deviation – of cumulated total capital flows (net capital flows in USD to total assets under management) over 6-month (centered moving) windows, distinguishing within advanced and emerging economies. Each dispersion measure is normalized so as to be equal to one for the entire sample period.

Figure 6: Time-series evolution of US macroeconomic news, Ted spread and VIX

A. US macroeconomic news



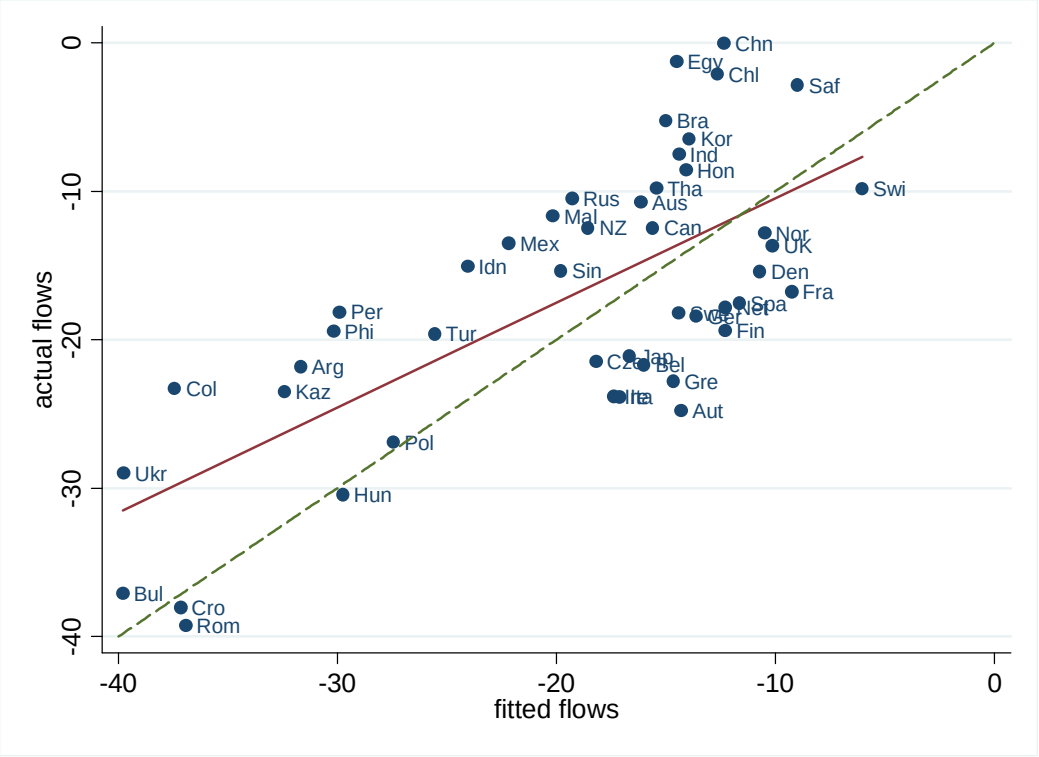
B. Ted spread and VIX



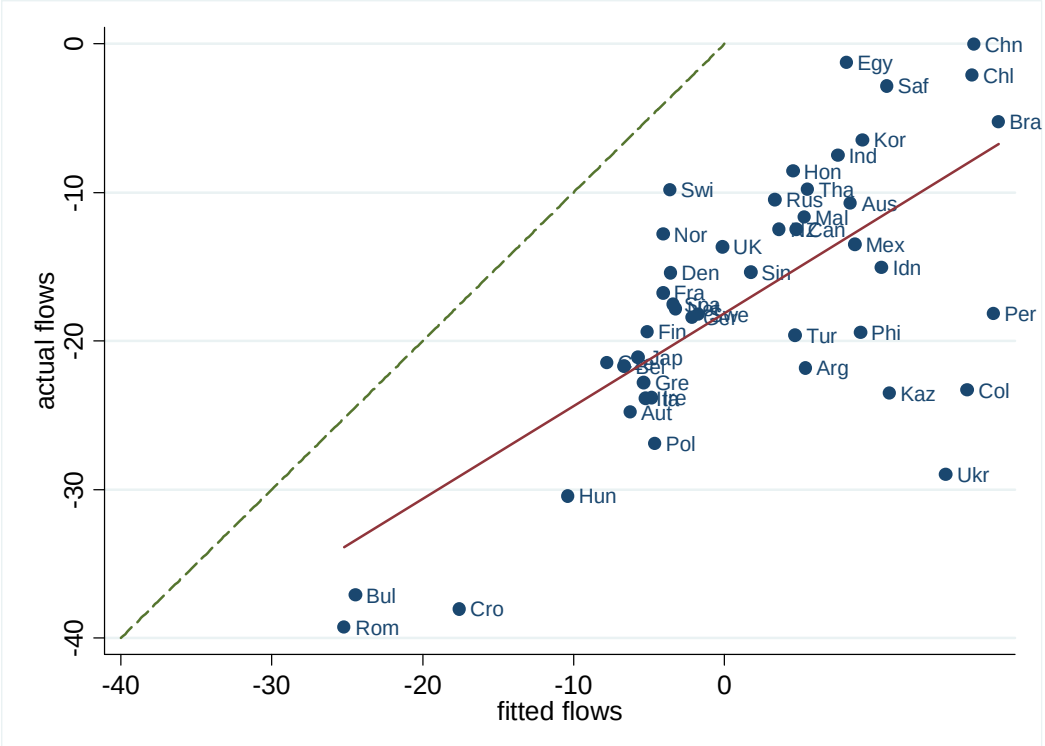
Notes: The figures show the evolution of US macroeconomic news (Panel A), Ted spread and VIX (Panel B). The latter two are normalized so as to have a zero mean and a standard deviation of unity.

Figure 7: Goodness of fit – actual versus fitted capital flows in crisis

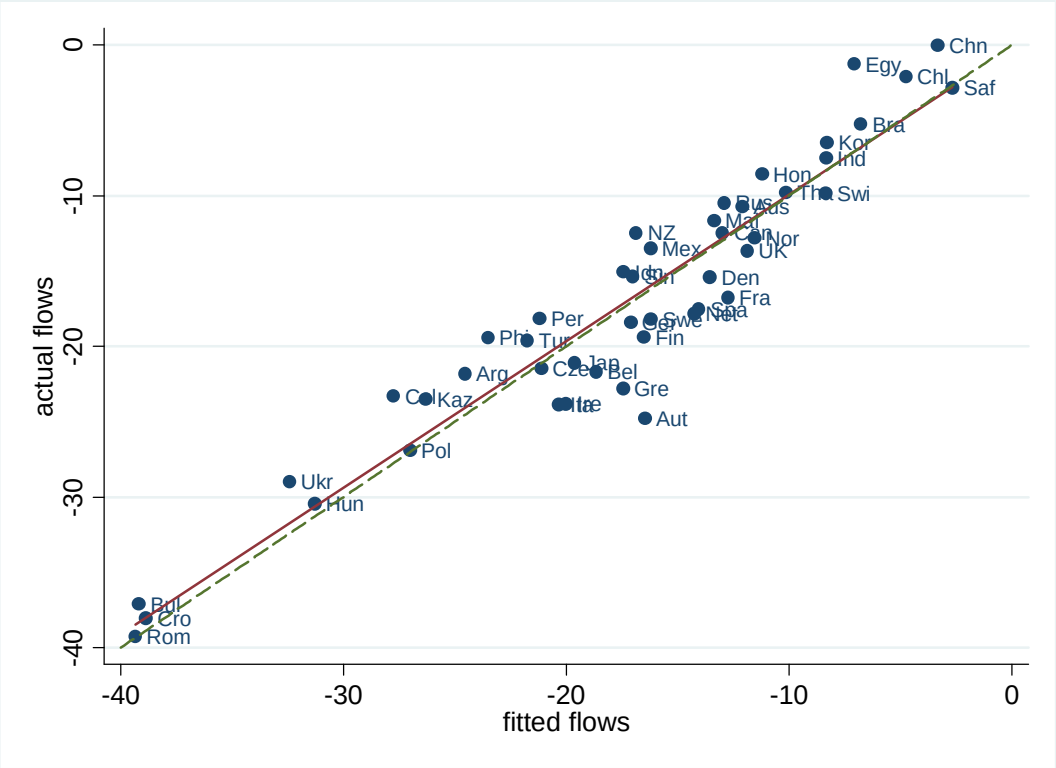
A. Factor model without crisis interaction terms



B. Factor model without common shocks

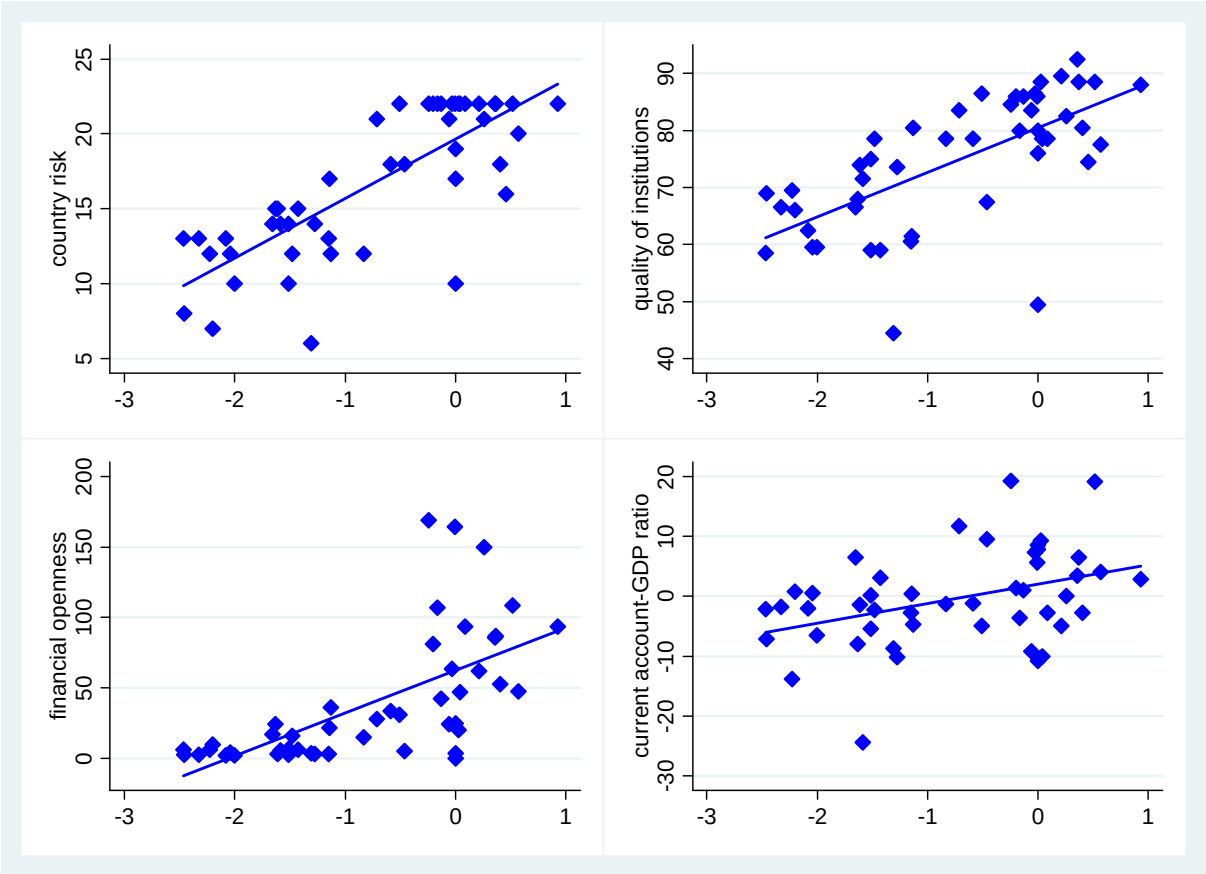


C. Factor model, full specification



Notes: The figures show the actual cumulated flows during the crisis (vertical axis) against the fitted cumulated flows (horizontal axis) from the factor model (1)-(3). The figure in Panel A is based on the estimation of the model without crisis interaction terms and with common and idiosyncratic shocks; the figure in Panel B on the model with crisis interaction terms but without any common shocks; and the figure in Panel C both with crisis interaction terms and with common shocks.

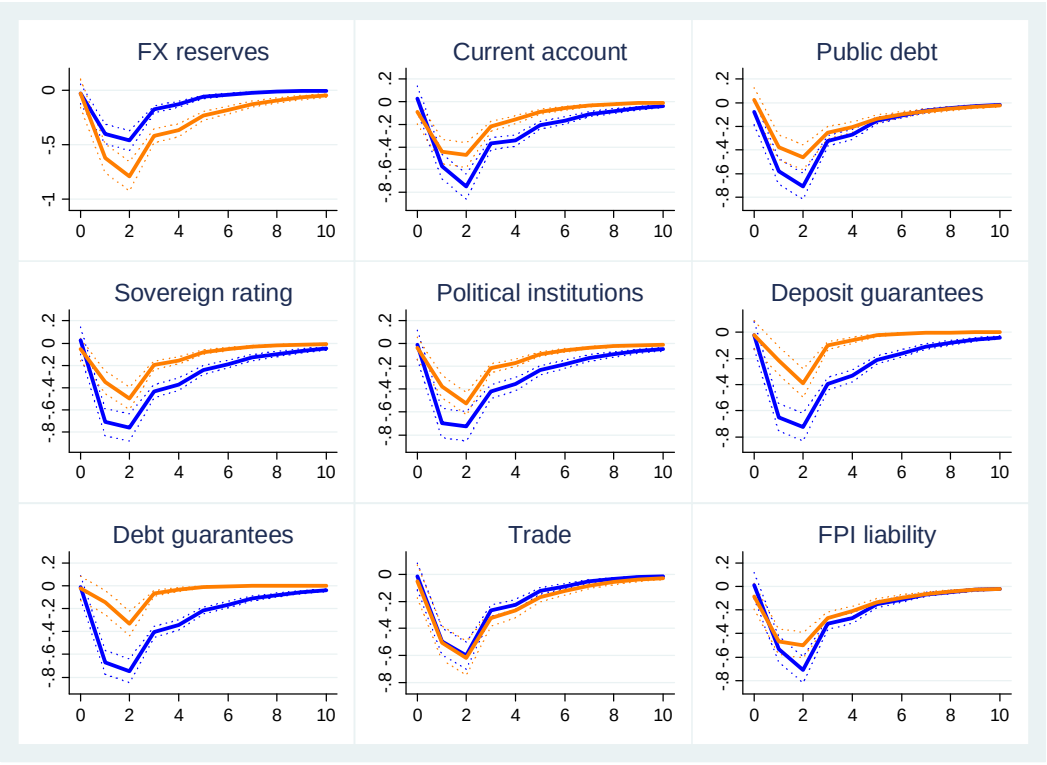
Figure 8: Determinants of effect of crisis events on capital flows



Notes: The figures show on the horizontal axis the response coefficients of portfolio capital flows to key crisis events for each of the countries in the sample; the vertical axis shows the values of the four respective determinants for each of the countries.

Figure 9: Determinants of capital flows during crisis – dynamic effects

A. Effect of crisis events



B. Effect of US macro shocks

(cont.)…

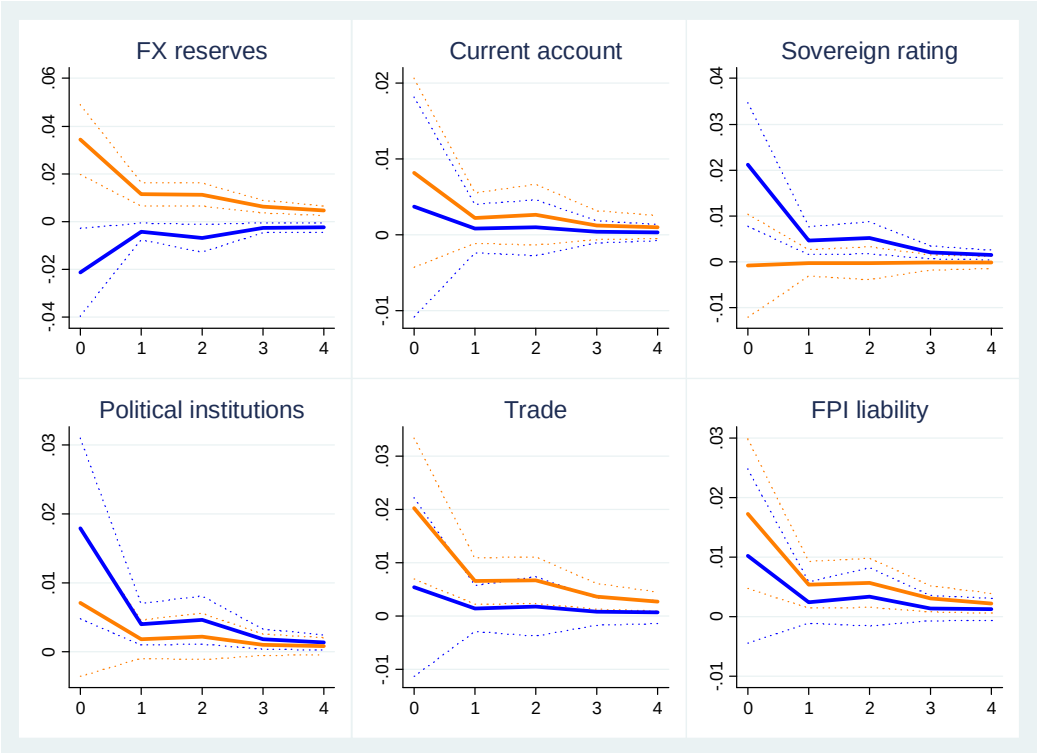
Figure 9 (cont.): Determinants of capital flows during crisis – dynamic effects

C. Effect of US equity markets

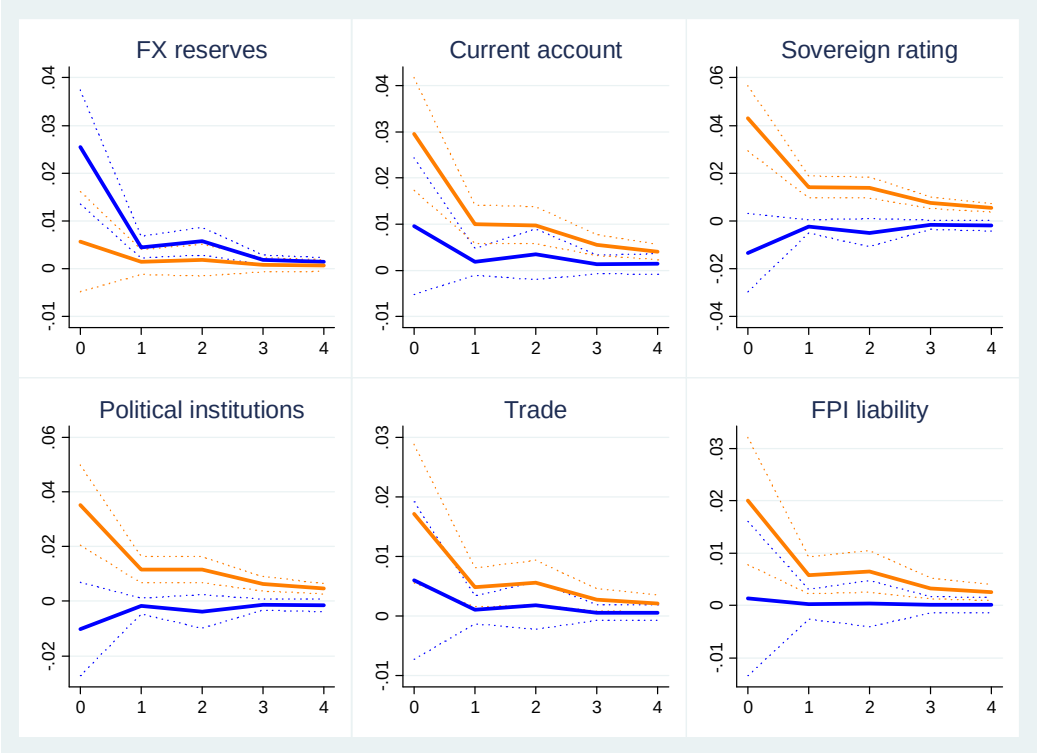
Notes: The figures show the dynamic response of portfolio capital flows over a window of 10 weeks – in Panel A to crisis events; in Panel B to US equity markets; and in Panel C to US macro shocks. The light/orange lines show the responses for countries with values above the cross-country average for the respective determinants; while the dark/blue lines show the corresponding responses for countries below the average. Dotted lines provide 90% confidence intervals.

Figure 10: Determinants of effect of changes in risk on capital flows

A. Good fundamentals, good institutions, open economy



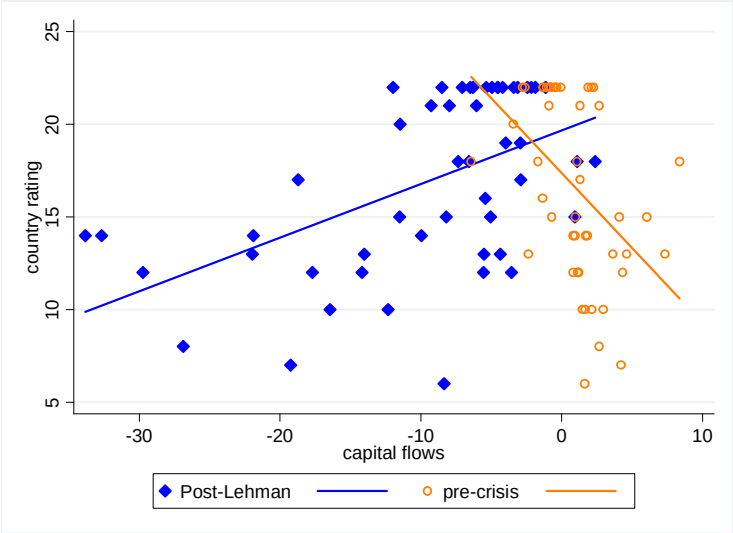
B. Poor fundamentals, poor institutions, closed economy



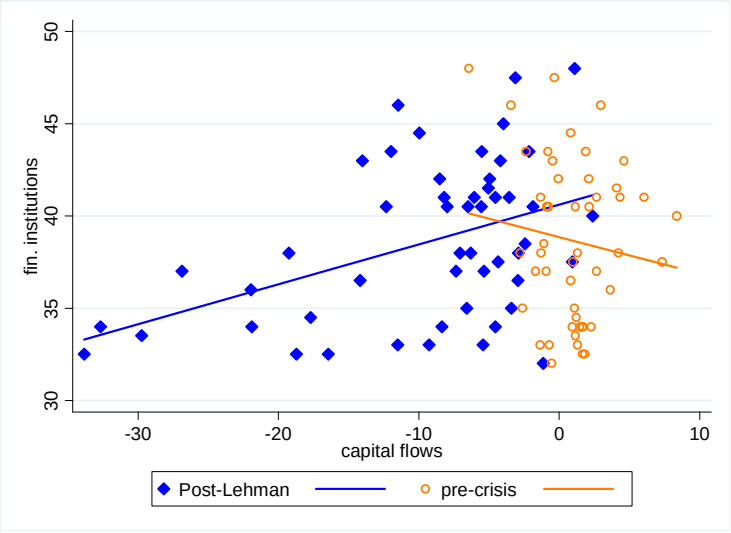
Notes: The figures show the effects of changes in risk (VIX) on portfolio capital flows over a window of 4 weeks. Panel A only includes countries that have good fundamentals (high reserves, string current account position), good institutions (high sovereign rating, good political institutions), or are open to trade and finance, relative to the average of the cross-country distribution. Panel B includes those countries below these respective averages. The light/orange lines show the responses in the non-crisis period, the dark/blue lines show those during the crisis. Dotted lines provide 90% confidence intervals.

Figure 11: Determinants of capital flows – Country risk/sovereign rating and quality of institutions

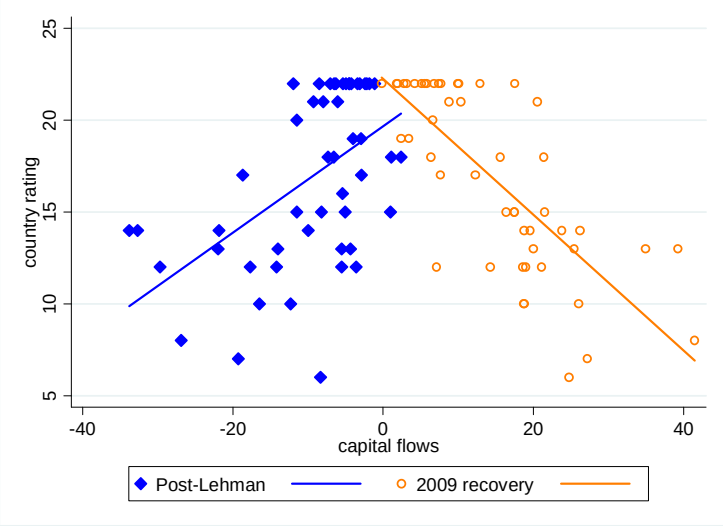
A. Post-Lehman versus pre-crisis period – Sovereign rating



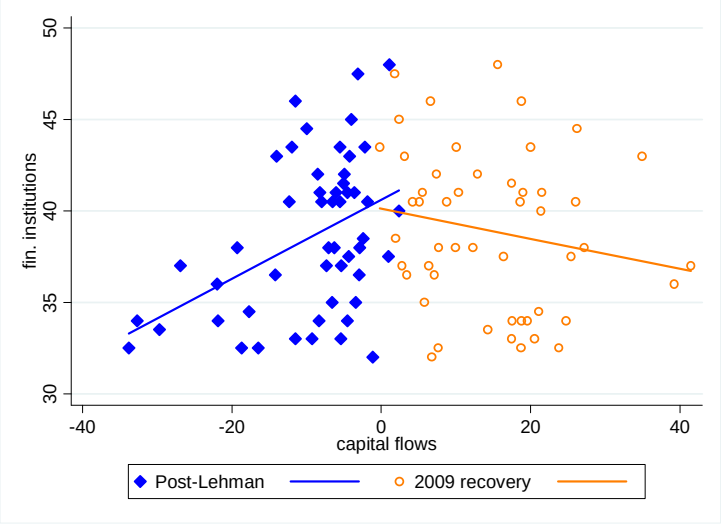
B. Post-Lehman versus pre-crisis period - quality of institutions



C. Post-Lehman versus 2009 recovery – Sovereign rating



D. Post-Lehman versus 2009 recovery - quality of institutions



Notes: The figure shows the distribution, across the full set of countries, for total capital flows (total net capital flows in USD over the entire period relative to total assets under management at the beginning of the period, in %) against the country rating (a higher value implying a better rating) at the beginning of each period for different sub-periods of the non-crisis and the crisis.

Table 1: EPFR fund-level portfolio flow database, November 2010

A. Equity Funds Database Coverage

Fund Group:	Daily Report # of Funds	Daily Report $US billions	Weekly Report # of Funds	Weekly Report $US billions	Monthly Report # of Funds	Monthly Report $US billions
Asia ex-Japan	1193	199	1211	206	1354	251
EMEA	479	40	487	42	543	42
GEM	743	251	745	272	866	322
Global	2989	752	3037	780	3908	1680
Japan	561	40	563	40	629	48
Latin America	229	50	231	54	236	63
Pacific	173	22	173	22	221	37
USA	5523	1624	5673	1820	6738	3276
Western Europe	1940	315	1944	317	2218	443
TOTAL	**13830**	**3294**	**14064**	**3552**	**16713**	**6163**

B. Bond Funds Database Coverage

Fund Group:	Daily Report # of Funds	Daily Report $US billions	Weekly Report # of Funds	Weekly Report $US billions	Monthly Report # of Funds	Monthly Report $US billions
Balanced	476	244	491	261	639	584
Emerging Markets	645	69	664	80	736	96
Global	1309	330	1330	341	1541	677
High Yield	534	123	547	136	704	221
Money Market	1617	2620	1721	2885	1879	3322
USA	2256	635	2492	706	2853	1349
TOTAL	**6837**	**4020**	**7245**	**4410**	**8352**	**6248**

Table 2: Summary statistics of EPFR weekly and cumulated net capital flows

	Assets under management (AUM), USD million			Weekly net capital flows, % of AUM			Cumulated net capital flows, % of AUM	
	Total	Equity 22 Nov 2010	Bond	Mean abs. flows	Mean	Std. dev.	Pre-crisis (12/10/05-7/8/07)	Crisis (Lehman) (14/8/08-14/3/09)
Argentina	6,663	1,940	4,722	0.50	0.15	0.64	28.53	-19.24
Australia	40,291	32,418	7,873	0.30	0.12	0.38	22.50	-5.38
Austria	8,679	5,262	3,417	0.37	-0.06	0.51	5.85	-5.78
Belgium	13,057	9,793	3,264	0.24	-0.05	0.32	6.45	-7.49
Brazil	136,570	117,967	18,603	0.50	0.19	0.66	29.19	-5.85
Canada	96,863	65,210	31,653	0.29	0.05	0.43	11.32	-7.84
Chile	7,802	6,021	1,781	0.52	0.21	0.65	27.99	-0.70
China	170,449	168,416	2,033	0.62	0.21	0.83	39.23	-0.29
Colombia	4,773	1,122	3,651	0.60	0.22	0.77	29.79	-21.79
Czech Republic	3,140	2,525	615	0.36	-0.09	0.52	-7.21	-14.66
Denmark	11,022	9,772	1,251	0.19	-0.03	0.26	10.53	-4.34
Egypt	4,394	3,474	920	0.44	0.13	0.56	4.96	-8.10
Finland	9,733	8,473	1,260	0.24	-0.06	0.32	9.15	-4.84
France	113,449	100,294	13,155	0.21	-0.05	0.28	8.44	-2.97
Germany	141,035	112,715	28,320	0.39	-0.01	0.79	7.57	-5.23
Greece	1,711	1,530	182	0.27	-0.06	0.39	8.36	-5.72
Hong Kong	50,073	48,406	1,667	0.36	0.09	0.47	21.02	-6.94
Hungary	6,292	2,827	3,466	0.48	-0.08	0.66	-8.19	-21.15
India	79,137	77,677	1,460	0.46	0.12	0.62	14.75	-5.80
Indonesia	28,660	17,997	10,663	0.41	0.13	0.50	12.48	-13.23
Ireland	10,079	6,248	3,830	0.25	-0.04	0.35	9.33	-7.00
Italy	37,082	19,854	17,228	0.26	-0.06	0.35	8.36	-6.72
Israel	5,766	5,477	289	0.54	0.07	0.36	4.71	-3.22
Japan	148,805	112,023	36,782	0.28	-0.05	0.37	10.28	-10.41
Kazakhstan	3,474	840	2,634	0.55	0.13	0.67	18.65	-19.40
Korea	75,450	67,651	7,799	0.38	0.12	0.47	13.06	-4.11
Lithuania	1,861	18	1,843	0.63	0.16	0.79	-0.62	-9.78
Malaysia	16,664	11,295	5,369	0.45	0.13	0.54	13.36	-6.72
Mexico	36,845	24,840	12,006	0.49	0.14	0.59	25.65	-8.84
Netherlands	46,010	35,096	10,914	0.21	-0.03	0.28	8.45	-4.56
New Zealand	2,192	188	2,004	0.29	0.08	0.51	15.36	-9.27
Norway	14,530	11,039	3,490	0.21	-0.01	0.33	11.29	-2.77
Peru	8,534	4,072	4,462	0.52	0.21	0.62	28.67	-14.98
Philippines	6,887	3,494	3,393	0.46	0.15	0.59	17.23	-18.24
Poland	16,055	7,067	8,988	0.47	-0.05	0.64	-8.41	-17.47
Portugal	1,784	1,659	125	0.24	-0.02	0.35	0.89	-3.44
Romania	561	333	228	0.53	-0.17	0.77	-8.22	-28.91
Russia	60,074	51,891	8,183	0.48	0.11	0.63	7.61	-11.35
Saudi Arabia	1,306	728	578	0.62	0.17	1.05	3.44	-18.08
Singapore	19,199	17,403	1,796	0.36	0.08	0.49	29.79	-11.58
South Africa	34,627	26,358	8,269	0.37	0.12	0.47	6.51	-0.49
Spain	27,596	22,037	5,559	0.25	-0.04	0.33	9.53	-3.55
Sweden	23,978	19,003	4,975	0.24	-0.01	0.31	13.03	-5.97
Switzerland	106,005	97,410	8,595	0.22	-0.02	0.40	8.56	-1.84
Taiwan	59,590	59,370	220	0.36	0.03	0.46	4.49	-3.93
Thailand	18,245	16,253	1,992	0.42	0.11	0.54	10.84	-5.96
Turkey	25,848	19,354	6,494	0.48	0.07	0.63	7.46	-16.67
UK	210,590	178,471	32,119	0.18	0.00	0.24	9.50	-2.27
USA	2,935,701	1,870,097	1,065,604	0.21	0.02	0.27	-0.51	-0.78
Vietnam	1,661	1,149	512	0.47	0.27	0.79	22.67	-6.69

Table 3: Summary statistics of shocks

A. Definitions and summary statistics

Variable	Definition / Unit	Obs.	Mean	std. dev.
Crisis events	Dummy variable	8		
Liquidity - TED	Ted spread, standardised	13300	0.000	1.000
Risk - VIX	VIX, orthog.to Ted, standardised	13300	0.000	1.000
US macro shock	Composite of indiv. US shocks	266	0.0013	0.0746
Domestic macro shock	Composite of indiv. dom. shocks	13300	-0.0004	0.0157
US equity returns	Weekly % returns, USD	266	0.0369	2.7062
Domestic equity returns	Weekly % returns, LC, orthog to US	13300	0.0000	3.2870
Individual US macro shocks:				
GDP	Quarterly YoY % change	56	0.071	0.407
Consumer confidence	index (around 100)	174	0.009	0.193
Housing starts	Monthly, in 1000	169	0.037	0.269
Industrial production	MoM % change	150	-0.031	0.765
NAPM / ISM	index (around 50)	172	-0.018	0.382
NF payroll employment	MoM change (100,000)	175	-0.001	0.007
Retail sales	in %	152	-0.024	0.842
Trade balance	in USD billion	175	0.001	0.138
Unemployment	in %	111	-0.018	0.115
Individual domestic macro shocks:				
Trade balance	in USD billion	2021	0.007	1.429
GDP	Quarterly YoY % change	983	0.015	0.392
Industrial production	MoM % change	2129	-0.029	0.416
Unemployment	in %	1675	-0.009	0.112

Sources: Bloomberg for all individual macro shocks as well as for equity returns (MSCI market indices).

B. List of crisis events

date	event
09 August 2007	First incidence of major liquidity squeeze in global money markets
14 March 2008	Bear Stearns near collapse - Fed arranges financing with JPMorgan Chase
13 July 2008	U.S. Treasury Department announces increase of credit lines of Fannie Mae and Freddie Mac
15 September 2008	Lehman Brothers declares bankruptcy, the largest ever in the United States
29 September 2008	U.S. House Rejects $700 Billion Financial-Rescue Plan
27 October 2008	Iceland's Kaupthing Bank Defaults on Its Samurai Bonds as Yields Hit 450%
14 November 2008	Freddie Mac Posts Record Loss, Asks Treasury for $13.8 Billion
09 December 2008	Goldman, UBS, Deutsche Bank Among 12 Banks Lowered by S&P

C. Correlations across shocks – full sample period

	Crisis events	Liquidity - TED	Risk - VIX	US macro shock	Domestic macro shock	US equity returns	Domestic equity returns
Crisis events	1						
Liquidity - TED	0.2849	1					
Risk - VIX	0.1317	0	1				
US macro shock	-0.0048	-0.0538	0.0205	1			
Domestic macro shock	0.0127	-0.0123	-0.0234	0.0139	1		
US equity returns	-0.1094	-0.2399	-0.1434	-0.0762	0.027	1	
Domestic equity returns	-0.0907	-0.0284	-0.035	0.0437	-0.0062	0	1

Table 4: Summary statistics of determinants

	Units	Definition	Source	Mean	Std. dev.	Min	Max
Macro fundamentals							
Growth	y-o-y growth rate, in %	GDP growth rate	IMF, Haver, Bloomberg	4.17	2.57	-8.79	12.23
FX reserves	% of GDP	Ratio of FX reserves to GDP	IMF, Haver, Bloomberg	15.88	18.79	0.04	97.58
Current account	% of GDP	Ratio of current account position to GDP	IMF, Haver, Bloomberg	-0.48	7.84	-24.37	24.27
Fiscal balance	% of GDP	Ratio of fiscal balance to GDP	IMF, Haver, Bloomberg	-2.15	4.19	-14.20	20.37
Inflation	in %	CPI inflation rate	IMF, Haver, Bloomberg	4.97	4.68	-1.30	33.50
ST interest rate	in %	3-month money market rate	IMF, Haver, Bloomberg	5.29	2.74	0.34	12.24
Public debt	% of GDP	Total government debt to GDP	IMF, Haver, Bloomberg	-45.78	21.28	-4.09	-191.97
Short-term debt	% of GDP	Short-term external debt to GDP	IMF, Haver, Bloomberg	-23.08	8.21	-4.42	-54.50
Bank credit growth	y-o-y growth rate, in %	Growth rate in credit to banks	IMF, Haver, Bloomberg	18.37	35.62	3.17	14.42
Institutions							
Sovereign rating	continuous variable, 6-22	Rating of country's sovereign debt, linear transformation	IMF, Haver, Bloomberg	16.72	4.82	6	22
Rating change	indicator	-1: downgrade; 0: no change; +1: upgrade	IMF, Haver, Bloomberg	0.00	0.01	-1	1
Financial institutions	index from 0-100	political risk index, higher number = better institutions	International Country Risk Guide (ICRG)	38.75	4.32	31	48
Political institutions	index from 0-100	financial risk index, higher number = better institutions	International Country Risk Guide (ICRG)	38.92	4.79	28	50
Policy interventions							
Capital controls	0-1 dummy	dummy=1 after announcement of policy measure	BIS, CGFS database (plus Bloomberg for missing countries)	0.01	0.11	0	1
Credit intervention	0-1 dummy	dummy=1 after announcement of policy measure	BIS, CGFS database (plus Bloomberg for missing countries)	0.04	0.19	0	1
Deposit guarantees	0-1 dummy	dummy=1 after announcement of policy measure	BIS, CGFS database (plus Bloomberg for missing countries)	0.08	0.28	0	1
Debt guarantees	0-1 dummy	dummy=1 after announcement of policy measure	BIS, CGFS database (plus Bloomberg for missing countries)	0.15	0.36	0	1
Asset relief	0-1 dummy	dummy=1 after announcement of policy measure	BIS, CGFS database (plus Bloomberg for missing countries)	0.06	0.23	0	1
Capital injection	0-1 dummy	dummy=1 after announcement of policy measure	BIS, CGFS database (plus Bloomberg for missing countries)	0.14	0.35	0	1
Exposure							
Trade	% of GDP	Ratio of exports plus imports to GDP	IMF, Haver, Bloomberg	87.27	87.22	30.60	473.00
FPI liability	% of GDP	Ratio of external portfolio liab. to GDP	IMF, CPIS	13.97	13.77	1.07	62.80
FPI assets	% of GDP	Ratio of external portfolio assets to GDP	IMF, CPIS	36.45	44.93	2.69	168.89
Market capitalisation	% of GDP	Ratio of equity market cap. to GDP	Bloomberg	73.55	114.26	13.40	381.80
KA openness	index	Inverse measure of restrictions on capital account, normalised	Chinn & Ito	1.94	1.01	1.14	2.50

Table 5: Effect of shocks on total portfolio capital flows – Crisis versus non-crisis period

	Full sample				Advanced economies				Emerging economies			
	Non-crisis		Crisis		Non-crisis		Crisis		Non-crisis		Crisis	
	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*
Common / global shocks												
Crisis events			-0.807 ***	*0.128*			0.134 *	*0.077*			-1.333 ***	*0.120*
Liquidity - TED	-0.340 ***	*0.044*	0.179 ***	*0.032*	-0.212 ***	*0.023*	0.189 ***	*0.027*	-0.404 ***	*0.069*	0.168 ***	*0.052*
Risk - VIX	0.010	*0.012*	-0.106 ***	*0.025*	-0.052 ***	*0.011*	0.077 ***	*0.017*	0.044 ***	*0.016*	-0.214 ***	*0.022*
US macro shocks	-0.703 ***	*0.089*	0.873 ***	*0.158*	-0.719 ***	*0.124*	0.800 ***	*0.122*	-0.670 ***	*0.129*	0.894 ***	*0.258*
US equity markets	0.096 ***	*0.006*	-0.009	*0.005*	0.051 ***	*0.003*	-0.004	*0.005*	0.125 ***	*0.005*	-0.011	*0.008*
Domestic shocks												
Domestic macro shocks	0.213	*0.568*	1.231	*1.373*	-0.259	*0.399*	-1.190 **	*0.591*	0.526	*0.936*	2.846 ***	*1.218*
Domestic equity markets	0.042 ***	*0.006*	-0.001	*0.005*	0.022 ***	*0.006*	0.002	*0.008*	0.057 ***	*0.008*	-0.003	*0.008*
Controls												
Lagged flows	0.394 ***	*0.019*	-0.023	*0.029*	0.306 ***	*0.039*	0.059	*0.049*	0.453 ***	*0.013*	-0.072 **	*0.034*
US interest rate change	0.756 ***	*0.046*	-0.446 ***	*0.050*	0.634 ***	*0.050*	-0.644 ***	*0.075*	0.838 ***	*0.069*	-0.303 ***	*0.053*
Dom. interest rate change	-0.005	*0.114*	0.087	*0.179*	0.247 *	*0.129*	0.187	*0.293*	-0.166	*0.171*	0.030	*0.244*
Constant	0.150 ***	*0.017*	-0.304 ***	*0.020*	0.067 ***	*0.013*	-0.282 ***	*0.015*	0.192 ***	*0.022*	-0.316 ***	*0.031*
Observations	13515											
R-squared	0.583											

Notes: The table shows the coefficients β_0 ("Non-crisis") and γ_0 ("Crisis") from the effect of the various common and domestic shocks on total portfolio flows, based on the estimation of the factor model without inclusion of instruments $Z_{i,t}$:

$$f_{i,t} = E_{t-1}[f_{i,t}] + \beta_{i,t-1}' S_t + e_{i,t} \qquad (1')$$

$$\beta_{i,t-1} = \beta_{i,0} + \gamma_{i,0} D_t \qquad (2')$$

The coefficients shown are averages across country coefficients. ***, **, * indicate statistical significance at the 1%, 5%, 10% levels, respectively.

Table 6: Effect of shocks on total portfolio flows by region – Crisis versus non-crisis period

	Emerging Asia		Emerging Europe		Latin America		Africa/Middle East		Advanced Europe		Other Advanced	
	Non-crisis	Crisis	Non-crisis	Crisis	Non-crisis	Crisis	Non-crisis	Crisis	Non-crisis	Crisis	Non-crisis	Crisis
Common / global shocks												
Crisis events		-0.935 ***		-1.606 ***		-1.531 ***		-1.507 ***		0.182 ***		-0.046
Liquidity - TED	-0.217 ***	0.095	-0.611 ***	0.212 ***	-0.515 ***	0.240	-0.208 ***	0.139 ***	-0.213 ***	0.215 ***	-0.210 ***	0.088 **
Risk - VIX	0.011	-0.153 ***	0.083 ***	-0.312 ***	0.028	-0.200 ***	0.086 ***	-0.175 ***	-0.064 ***	0.106 ***	-0.006	-0.033
US macro shocks	-0.422 **	0.109	-1.344 ***	2.275 ***	-0.346 *	0.522	-0.310 *	0.497	-0.809 ***	0.818 ***	-0.380 *	0.731 ***
US equity markets	0.114 ***	0.004	0.130 ***	-0.003	0.140 ***	-0.036	0.111 ***	-0.033 ***	0.050 ***	-0.007	0.054 ***	0.006 ***
Domestic shocks												
Domestic macro shocks	-0.182	5.580	0.868	0.924	0.626	4.336 ***	1.865 *	-4.891	-0.466	-1.335	0.519	-0.648
Domestic equity markets	0.073 ***	-0.012 *	0.035 ***	0.015	0.063 ***	-0.013	0.048 ***	0.003	0.020 ***	-0.002	0.029 ***	0.019
Controls												
Lagged flows	0.467 ***	-0.047	0.490 ***	-0.015	0.394 ***	-0.090	0.427 ***	-0.294 ***	0.285 ***	0.110 ***	0.387 ***	-0.130
US interest rate change	0.844 ***	-0.220 ***	0.741 ***	-0.248 ***	1.024 ***	-0.578 ***	0.675 ***	-0.132 *	0.628 ***	-0.691 ***	0.653 ***	-0.465 *
Dom. interest rate change	-0.224	0.515	-0.551 ***	0.117	0.334	-0.821	0.040	-0.022	0.299 *	-0.036	0.053	1.021
Constant	0.200 ***	-0.241 ***	0.103 ***	-0.409 ***	0.325 ***	-0.413 ***	0.123 ***	-0.081 ***	0.045 ***	-0.279 ***	0.146 ***	-0.297 ***
Observations	13515											
R-squared	0.583											

Notes: The table shows the coefficients β_0 ("Non-crisis") and γ_0 ("Crisis") from the effect of the various common and domestic shocks on total portfolio flows *by region*, based on the estimation of the factor model without inclusion of instruments $Z_{i,t}$. The coefficients shown are averages across country coefficients. ***, **, * indicate statistical significance at the 1%, 5%, 10% levels, respectively.

Table 7: Effect of shocks on equity versus bond flows – Crisis versus non-crisis period

	Full sample				Advanced economies				Emerging economies			
	Non-crisis		Crisis		Non-crisis		Crisis		Non-crisis		Crisis	
	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*
Equity portfolio flows												
Common / global shocks												
Crisis events			-0.855 ***	*0.113*			-0.080	*0.080*			-1.286 ***	*0.116*
Liquidity - TED	-0.097 ***	*0.022*	0.037	*0.025*	-0.091 ***	*0.022*	0.096 ***	*0.031*	-0.091 ***	*0.033*	-0.001	*0.037*
Risk - VIX	-0.021	*0.014*	-0.035	*0.024*	-0.093 ***	*0.009*	0.136 ***	*0.014*	0.017	*0.019*	-0.137 ***	*0.024*
US macro shocks	-0.607 ***	*0.089*	0.500 ***	*0.126*	-0.880 ***	*0.131*	0.842 ***	*0.132*	-0.427 ***	*0.116*	0.271	*0.188*
US equity markets	0.115 ***	*0.008*	-0.039 ***	*0.006*	0.052 ***	*0.004*	-0.015 **	*0.007*	0.153 ***	*0.007*	-0.051 ***	*0.008*
Domestic shocks												
Domestic macro shocks	0.180	*0.681*	0.452	*1.251*	0.534	*0.433*	-2.712 ***	*0.949*	-0.032	*1.132*	2.486	*1.968*
Domestic equity markets	0.049 ***	*0.006*	-0.011 **	*0.005*	0.028 ***	*0.007*	-0.006	*0.009*	0.066 ***	*0.008*	-0.014 **	*0.007*
Controls												
Lagged flows	0.334 ***	*0.022*	-0.080 ***	*0.028*	0.261 ***	*0.044*	0.044	*0.044*	0.387 ***	*0.021*	-0.156 ***	*0.032*
US interest rate change	0.992 ***	*0.061*	-0.506 ***	*0.055*	0.724 ***	*0.071*	-0.672 ***	*0.096*	1.172 ***	*0.080*	-0.380 ***	*0.059*
Dom. interest rate change	0.045	*0.136*	-0.014	*0.213*	0.455 ***	*0.159*	-0.010	*0.385*	-0.212	*0.196*	-0.018	*0.273*
Constant	0.073 ***	*0.014*	-0.158 ***	*0.009*	0.022 **	*0.011*	-0.181 ***	*0.011*	0.102 ***	*0.020*	-0.149 ***	*0.012*
Observations	13515											
R-squared	0.564											
Bond portfolio flows												
Common / global shocks												
Crisis events			-0.585 ***	*0.208*			0.948 ***	*0.255*			-1.450 ***	*0.136*
Liquidity - TED	-0.906 ***	*0.050*	0.524 ***	*0.048*	-0.664 ***	*0.055*	0.502 ***	*0.074*	-1.050 ***	*0.064*	0.540 ***	*0.067*
Risk - VIX	0.127 ***	*0.011*	-0.309 ***	*0.020*	0.128 ***	*0.018*	-0.154 ***	*0.018*	0.130 ***	*0.016*	-0.404 ***	*0.016*
US macro shocks	-0.243	*0.177*	1.057 ***	*0.249*	0.595 ***	*0.175*	0.164	*0.153*	-0.706 ***	*0.233*	1.556 ***	*0.379*
US equity markets	0.061 ***	*0.004*	0.059 ***	*0.006*	0.046 ***	*0.005*	0.038 ***	*0.009*	0.071 ***	*0.006*	0.070 ***	*0.008*
Domestic shocks												
Domestic macro shocks	-2.014 **	*0.942*	5.044 ***	*1.822*	-3.693 ***	*1.128*	2.531	*1.750*	-1.085	*1.414*	6.972 ***	*2.865*
Domestic equity markets	0.005	*0.004*	0.030 ***	*0.006*	-0.006	*0.007*	0.033 ***	*0.010*	0.012 ***	*0.005*	0.030 ***	*0.008*
Controls												
Lagged flows	0.403 ***	*0.032*	0.161 ***	*0.052*	0.386 ***	*0.056*	0.237 **	*0.121*	0.413 ***	*0.040*	0.118 ***	*0.043*
US interest rate change	0.048	*0.079*	-0.290 ***	*0.073*	0.029	*0.112*	-0.280 **	*0.132*	0.053	*0.114*	-0.298 ***	*0.092*
Dom. interest rate change	-0.593 ***	*0.152*	1.197 **	*0.597*	-0.906 ***	*0.175*	0.942 ***	*0.306*	-0.433 *	*0.227*	1.439	*1.001*
Constant	0.316 ***	*0.020*	-0.673 ***	*0.021*	0.252 ***	*0.017*	-0.733 ***	*0.043*	0.349 ***	*0.030*	-0.634 ***	*0.021*
Observations	13515											
R-squared	0.596											

Notes: The table shows the coefficients β_0 ("Non-crisis") and γ_0 ("Crisis") from the effect of the various common and domestic shocks on equity and bond portfolio flows, separately, based on the estimation of the factor model without inclusion of instruments $Z_{i,t}$. The coefficients shown are averages across country coefficients. ***, **, * indicate statistical significance at the 1%, 5%, 10% levels, respectively.

Table 8: Effect of shocks on total portfolio capital flows – Robustness: Post-Lehman as crisis period

	Full sample				Advanced economies				Emerging economies			
	Non-crisis		Crisis		Non-crisis		Crisis		Non-crisis		Crisis	
	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*
Common / global shocks												
Crisis events			-0.615 ***	*0.086*			-0.162 **	*0.080*			-0.869 ***	*0.109*
Liquidity - TED	-0.210 ***	*0.011*	0.020	*0.026*	-0.238 ***	*0.010*	0.200 ***	*0.023*	-0.194 ***	*0.016*	-0.086 ***	*0.025*
Risk - VIX	-0.018 *	*0.010*	0.004	*0.022*	-0.062 ***	*0.009*	0.140 ***	*0.025*	0.006	*0.014*	-0.085 ***	*0.021*
US macro shocks	-0.928 ***	*0.065*	1.806 ***	*0.181*	-0.693 ***	*0.083*	1.040 ***	*0.185*	-1.044 ***	*0.087*	2.184 ***	*0.242*
US equity markets	0.118 ***	*0.006*	-0.056 ***	*0.006*	0.081 ***	*0.004*	-0.039 ***	*0.006*	0.143 ***	*0.006*	-0.067 ***	*0.009*
Domestic shocks												
Domestic macro shocks	-0.867 *	*0.463*	-6.716 *	*4.061*	-1.230 ***	*0.514*	-0.963	*1.344*	-0.694	*0.721*	-10.808	*6.799*
Domestic equity markets	0.047 ***	*0.005*	-0.018 ***	*0.006*	0.033 ***	*0.005*	-0.022 ***	*0.008*	0.059 ***	*0.007*	-0.017 *	*0.009*
Controls												
Lagged flows	0.449 ***	*0.018*	-0.200 ***	*0.037*	0.462 ***	*0.040*	-0.146 ***	*0.053*	0.452 ***	*0.014*	-0.239 ***	*0.052*
US interest rate change	0.943 ***	*0.051*	-1.232 ***	*0.068*	0.704 ***	*0.037*	-1.136 ***	*0.097*	1.099 ***	*0.070*	-1.261 ***	*0.094*
Dom. interest rate change	-0.046	*0.085*	0.148	*0.487*	0.179	*0.129*	0.398	*0.326*	-0.192 *	*0.113*	0.000	*0.807*
Constant	0.081 ***	*0.017*	-0.388 ***	*0.050*	-0.018	*0.014*	-0.119 ***	*0.021*	0.132 ***	*0.020*	-0.530 ***	*0.065*
Observations	13515											
R-squared	0.523											

Notes: The table shows the coefficients β_0 ("Non-crisis") and γ_0 ("Crisis") from the effect of the various common and domestic shocks on total portfolio flows, based on the estimation of the factor model without inclusion of instruments $Z_{i,t.}$ The crisis period here is defined to be limited to the Post-Lehman period from 15 September 2008 till 14 March 2009. The coefficients shown are averages across country coefficients. ***, **, * indicate statistical significance at the 1%, 5%, 10% levels, respectively.

Table 9: Correlation pattern across coefficients of shock transmission – Crisis versus non-crisis period

	Crisis							Non-crisis					
Country coefficients of shocks to:	Crisis events	Liquidity - TED	Risk - VIX	US macro shocks	US equity markets	Domest. macro shocks	Domest. equity markets	Liquidity - TED	Risk - VIX	US macro shocks	US equity markets	Domest. macro shocks	Domest. equity markets
Crisis													
Crisis events	1												
Liquidity - TED	0.090	1											
	0.53												
Risk - VIX	**0.767**	**-0.245**	1										
	0.00	*0.08*											
US macro shocks	**-0.255**	0.142	**-0.344**	1									
	0.07	*0.32*	*0.01*										
US equity markets	-0.087	-0.108	-0.063	**0.380**	1								
	0.55	*0.45*	*0.66*	*0.01*									
Domestic macro shocks	**-0.279**	-0.039	-0.176	0.037	-0.001	1							
	0.05	*0.79*	*0.22*	*0.80*	*1.00*								
Domestic equity markets	-0.109	0.011	-0.203	**0.507**	**0.461**	**-0.312**	1						
	0.45	*0.94*	*0.15*	*0.00*	*0.00*	*0.03*							
Non-crisis													
Liquidity - TED	**0.349**	**-0.822**	**0.647**	**-0.475**	-0.081	-0.015	**-0.277**	1					
	0.01	*0.00*	*0.00*	*0.00*	*0.57*	*0.92*	*0.05*						
Risk - VIX	**-0.706**	**0.287**	**-0.752**	0.229	-0.012	0.179	0.106	**-0.521**	1				
	0.00	*0.04*	*0.00*	*0.11*	*0.93*	*0.21*	*0.46*	*0.00*					
US macro shocks	0.005	-0.139	0.150	**-0.828**	**-0.252**	-0.044	**-0.282**	**0.321**	0.063	1			
	0.97	*0.33*	*0.29*	*0.00*	*0.07*	*0.76*	*0.05*	*0.02*	*0.66*				
US equity markets	**-0.642**	-0.140	**-0.617**	-0.124	**-0.456**	0.217	**-0.283**	-0.118	**0.416**	0.151	1		
	0.00	*0.33*	*0.00*	*0.39*	*0.00*	*0.13*	*0.04*	*0.41*	*0.00*	*0.29*			
Domestic macro shocks	0.025	-0.050	-0.086	0.023	0.046	**-0.480**	0.190	-0.025	-0.091	-0.103	0.070	1	
	0.86	*0.73*	*0.55*	*0.88*	*0.75*	*0.00*	*0.18*	*0.86*	*0.52*	*0.47*	*0.63*		
Domestic equity markets	-0.125	**-0.355**	0.004	**-0.423**	**-0.244**	0.172	**-0.598**	**0.373**	-0.129	0.181	**0.529**	0.061	1
	0.38	*0.01*	*0.98*	*0.00*	*0.08*	*0.23*	*0.00*	*0.01*	*0.37*	*0.20*	*0.00*	*0.67*	

Notes: The table shows the correlations (together with their statistical significance in italics below) across the country coefficients of shock transmission during the crisis and the non-crisis period, based on the factor model (1)-(3) without inclusion of instruments $Z_{i,t}$. Bold numbers indicate significance at the 10% level.

Table 10: Determinants of shock transmission to capital flows – Non-crisis parameters

Shock to:	**Liquidity - Ted**	**Risk - VIX**	**US macro news**	**US equity market**	**Domestic macro news**	**Domestic equity market**
Null hypothesis:	$\beta_1 > 0$	$\beta_1 > 0$	$\beta_1 > 0$	$\beta_1 < 0$	$\beta_1 < 0$	$\beta_1 < 0$
	coef. *s.e.*	coef. *s.e.*	coef. *s.e.*	coef. *s.e.*	coef. *s.e.*	coef. *s.e.*
Macro fundamentals						
Growth	-0.167*** *0.025*			0.008** *0.003*	0.519* *0.274*	0.006*** *0.001*
FX reserves				-0.001** *0.001*		
Current account		0.000 *0.005*	0.027** *0.011*			
Fiscal balance			-0.038* *0.020*			-0.001 *0.000*
Inflation	-0.037*** *0.009*	0.008*** *0.002*				
ST interest rate						
Public debt	0.005** *0.002*			-0.028* *0.000*		
Short-term debt		0.002 *0.001*				
Institutions						
Sovereign rating			0.048** *0.022*			0.001 *0.001*
Rating change						
Financial institutions		-0.010*** *0.003*			0.150 *0.101*	
Political institutions	-0.028*** *0.007*		-0.026*** *0.008*		0.098 *0.070*	0.001*** *0.000*
Exposure						
Trade		0.001*** *0.000*		0.000* *0.000*		-0.000*** *0.000*
FPI liability			0.006 *0.004*	0.001 *0.000*	-0.041 *0.031*	
FPI assets	0.003** *0.001*		-0.004*** *0.001*	-0.000*** *0.000*		
Market capitalisation	0.001 *0.000*		-0.001* *0.001*	-0.000* *0.000*		0.000* *0.000*
KA openness		-0.022 *0.013*		-0.006* *0.003*		
Observations	12318					
R-squared	0.43					

Notes: The table shows the coefficients β_1 of the following model, which is based on the benchmark model (1)-(3), but excludes the crisis interactions:

$$f_{i,t} = E_{t-1}[f_{i,t}] + \beta_{i,t-1}' S_t + e_{i,t} \quad (1)$$

$$\beta_{i,t-1} = \beta_{i,0} + \beta_1' Z_{i,t-1} \quad (2)$$

It follows the encompassing approach of variable selection described in the text. The row labelled "Null hypothesis" provides the prior under which improved fundamentals, better institutions or more exposure provide insulation, i.e. reduce the impact of the respective shock. ***, **, and *, indicate statistical significance at the 1%, 5%, and 10%, levels, respectively.

Table 11: Determinants of shock transmission to capital flows – Crisis parameters

Shock to:	**Crisis event**		**Liquidity - Ted**		**Risk - VIX**		**US macro news**		**US equity market**		**Domestic macro news**		**Domestic equity market**	
Null hypothesis:	$\gamma_1 > 0$		$\gamma_1 > 0$		$\gamma_1 > 0$		$\gamma_1 < 0$		$\gamma_1 < 0$		$\gamma_1 < 0$		$\gamma_1 < 0$	
	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*	coef.	*s.e.*
Macro fundamentals														
Growth			0.127***	*0.046*			-0.202***	*0.055*					-0.377*	*0.189*
FX reserves	-0.831**	*0.308*			-0.004**	*0.002*	0.016***	*0.004*	0.099**	*0.044*	-0.133**	*0.051*	0.071***	*0.026*
Current account	1.295*	*0.675*	0.043**	*0.017*	0.013*	*0.007*	-0.050***	*0.015*			-0.397	*0.237*	-0.115**	*0.046*
Fiscal balance	2.423**	*1.113*	0.036**	*0.014*	0.092*	*0.052*	-0.078***	*0.023*	-0.411**	*0.186*				
Inflation	1.052*	*0.570*	0.088***	*0.024*	0.019***	*0.004*								
ST interest rate					-0.026	*0.016*			-1.952**	*0.945*			-0.539*	*0.302*
Public debt	0.04**	*0.002*	0.06*	*0.003*					0.000	*0.000*				
Short-term debt							0.018	*0.013*						
Institutions														
Sovereign rating	3.335***	*1.014*	0.058*	*0.033*	0.027***	*0.007*	-0.137***	*0.033*	-0.321**	*0.149*	-0.806*	*-0.462*		
Rating change														
Financial institutions									-0.627**	*0.249*	0.781	*0.496*		
Political institutions	2.105*	*-1.123*	0.040***	*0.013*	0.004**	*0.002*	0.024	*0.015*						
Policy interventions														
Capital controls	-24.422***	*7.631*			0.151***	*0.048*			-6.073***	*2.200*				
Deposit guarantees	1.302**	*0.486*	-0.196	*0.131*			-0.466**	*0.223*	-3.004*	*1.551*			-1.292*	*0.719*
Debt guarantees	1.050**	*0.408*	1.390***	*0.463*	-0.084	*0.053*					-7.526***	*2.371*	-1.280*	*0.644*
Capital injection			0.551***	*0.149*	0.173***	*0.046*					-4.701**	*2.186*		
Exposure														
Trade														
FPI liability									-0.087*	*0.050*				
FPI assets			-0.004	*0.003*			0.003*	*0.002*						
Market capitalisation	-0.169**	*0.070*	-0.002**	*0.001*	-0.001***	*0.000*			-0.016	*0.010*	0.012*	*0.007*		
KA openness														
Observations	12318													
R-squared	0.50													

Notes: The table shows the estimates for the parameters γ_1 of the model (1)-(3). It follows the encompassing approach of variable selection described in the text. The row labelled "Null hypothesis" provides the prior under which improved fundamentals, better institutions, policy interventions in the crisis or more exposure provide insulation, i.e. reduce the impact of the respective shock. ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, levels, respectively.

Table 12: Actual versus fitted net capital flows – common factors vs. domestic factors

	Actual net capital flows, % of AUM			Fitted net capital flows, % of AUM			Fitted -- common factors						Fitted -- domestic factors					
	Pre-crisis	Crisis	Post-crisis	Pre-crisis	Crisis	Post-crisis	Pre-crisis		Crisis		Post-crisis		Pre-crisis		Crisis		Post-crisis	
							% of AUM	% share fitted	% of AUM	% share fitted	% of AUM	% share fitted	% of AUM	% share fitted	% of AUM	% share fitted	% of AUM	% share fitted
ALL countries	12.7	-15.7	26.4	14.1	-16.0	22.8	9.2	65.4	-11.6	72.8	10.3	45.0	4.9	34.6	-4.4	27.2	12.6	55.0
EM Asia	18.3	-9.6	39.7	18.8	-9.2	34.6	9.1	48.3	-7.8	84.9	6.3	18.1	9.7	51.7	-1.4	15.1	28.3	81.9
EM Europe	9.2	-29.5	35.7	10.4	-30.4	29.7	9.0	86.6	-28.3	93.2	23.9	80.3	1.4	13.4	-2.1	6.8	5.9	19.7
Latin America	27.4	-14.0	53.6	32.4	-14.1	47.0	15.8	48.8	-21.2	150.0	17.3	36.9	16.6	51.2	7.1	-50.0	29.6	63.1
Africa/Middle East	1.5	-5.1	28.1	4.4	-5.5	23.8	4.8	109.3	-5.7	104.4	13.0	54.8	-0.4	-9.3	0.2	-4.4	10.8	45.2
Advanced Europe	8.7	-18.5	5.0	8.9	-18.8	4.4	8.1	90.8	-4.4	23.2	3.7	84.2	0.8	9.2	-14.5	76.8	0.7	15.8
Other advanced	14.3	-14.2	13.3	16.1	-14.9	11.9	12.2	76.1	-12.0	80.5	7.0	58.8	3.8	23.9	-2.9	19.5	4.9	41.2

Notes: The table shows the actual cumulated flows during each of the three sub-periods against the fitted cumulated flows from the factor model (1)-(3). The fitted net capital flows are split up into a part explained by common factors and a part accounted for by domestic factors, as outlined in equations (4)-(5):

$$\hat{f}_{i,t}^{G} = (\beta_{i,0} + \gamma_{i,0}\ D_t)'\ S_t^{G} \qquad (4)$$

$$\hat{f}_{i,t}^{D} = E_{t-1}[\,f_{i,t}\,] + (\beta_1'\ Z_{i,t-1} + \gamma_1\ Z_{i,t-1} D_t)'\ S_t\ + (\beta_{i,0} + \gamma_{i,0}\ D_t)'\ S_t^{D} \qquad (5)$$

where $\hat{f}_{i,t}^{G}$ is the contribution of common factors and $\hat{f}_{i,t}^{D}$ is the contribution of domestic factors, which is the sum of the expected net flows, the component of net flows due to country-specific determinants $Z_{i,t}$, and the component due to country-specific/idiosyncratic factors. The shares of fitted net capital flows accounted for by common factors and by domestic factors for a particular country i during time t can then be calculated as $X_{i,t}^{G} = \hat{f}_{i,t}^{G} \,/\, \hat{f}_{i,t}$ and $X_{i,t}^{D} = \hat{f}_{i,t}^{D} \,/\, \hat{f}_{i,t}$, respectively. The numbers shown in the table are averages across all 49 countries ("all") or across countries within a particular region.

Table 13: Determinants of portfolio capital flows – Cross-country estimations

	Pre-crisis			Crisis			Post-crisis		
	12 Oct 2005 - 7 Aug 2007			8 Aug 2007 - 14 Mar 2009			15 Mar 2009 - 22 Nov 2010		
	coef.	*s.e.*	decile	coef.	*s.e.*	decile	coef.	*s.e.*	decile
Macro fundamentals									
Growth	1.708**	*0.805*	11.22				0.808	*0.509*	5.31
FX reserves				-0.083*	*0.046*	-2.43			
Current account				0.253*	*0.135*	5.42			
Fiscal balance	0.650	*0.386*	6.50	0.201**	*0.095*	2.01	0.418**	*0.198*	4.18
Inflation	1.100	*0.717*	7.98	0.457*	*0.245*	3.31			
ST interest rate	0.882	*0.648*	5.46						
Public debt	-0.238**	*0.095*	-6.99						
Short-term debt	0.278	*0.211*	8.45	-0.203***	*0.055*	-6.08	0.197*	*0.101*	5.99
Bank credit growth									
Institutions									
Sovereign rating	-1.202*	*0.596*	-14.40	1.271***	*0.291*	15.25	-0.779***	*0.27*	-9.24
Rating change				8.688***	*2.253*	8.688	-3.620*	*1.984*	-3.62
Financial institutions									
Political institutions				1.081**	*0.400*	11.89			
Policy interventions									
Capital controls									
Credit intervention									
Deposit guarantees				6.235**	*3.007*	6.235	-9.461*	*5.214*	-9.46
Debt guarantees				5.998**	*2.323*	5.998			
Asset relief									
Capital injection				3.014	*1.866*	3.014	-8.023***	*2.2*	-8.02
Exposure									
Trade				-0.016**	*0.006*	-1.32			
FPI liability									
FPI assets									
Market capitalisation									
KA openness	-3.098**	*1.488*	-11.23	-0.612	*0.74*	-2.22	-1.125	*0.785*	-4.07
Constant	15.151***	*21.128*		-28.071***	*5.269*		32.883***	*4.524*	
Observations	49			49			49		
R-squared	0.52			0.71			0.78		

Notes: The table shows the coefficients for the cross-section estimation of $f_i = \alpha + \beta' Z_i + e_i$, across the full set of countries, with f_i the size of capital flows (net capital flows in USD relative to total assets under management at the beginning of the period, in %) and Z_i as a vector of independent variables. The estimation follows a backward stepwise procedure, where in each step the least significant variable is dropped (while in each step also testing whether already excluded variables become again significant at the 20% level), so that in the final encompassing model only variables significant at the 15% level are included. The table shows estimates for the pre-crisis, crisis, and post-crisis periods. The column labelled "decile" shows the difference in the response of capital flows for a country with the determinant at its 90th percentile compared a country at its 10th percentile. As most of the common shocks are US variables, note that the US is excluded from all model estimations. ***, **, * indicate statistical significance at the 1%, 5%, 10% levels, respectively.