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Push factors and capital flows to emerging markets: Why knowing your lender matters more than fundamentals

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PUSH FACTORS AND CAPITAL FLOWS TO EMERGING MARKETS: WHY KNOWING YOUR LENDER MATTERS MORE THAN FUNDAMENTALS

Eugenio Cerutti, Stijn Claessens, and Damien Puy

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and Damien Puy

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CONTENTS

TABLES AND FIGURES	iv
ABSTRACT	v
I. INTRODUCTION	1
II. DATA AND METHODOLOGY	4
A. Data Set	4
B. Econometric Framework	7
III. RESULTS	9
A. Factor Estimations, Factor Loadings, and Variance Decompositions	9
B. What Drives the Emerging Market Common Dynamics?	12
C. What Drives the Impact of Global Push Factors across Countries?	15
D. Robustness	16
IV. CONCLUSION AND POLICY IMPLICATIONS	22
APPENDIXES	23
REFERENCES	29

TABLES AND FIGURES

TABLES

1	Sample of Countries	5
2	Summary of Explanatory Variables for Market Characteristics	7
3	Variance Decomposition Results	10
4	Finding the Drivers of the Estimated Emerging Market Common Factors	14
5	Explaining Countries' Sensitivities to Push Factors	19
6	Bayesian Averaging Results	20
A1.1	Variable Definitions, Frequency, and Sources	24
A1.2	Raw Statistics	26

FIGURES

1	Inflows to Emerging Markets—BOP Raw Data, Aggregated for 34 Emerging Markets	5
2	Common Emerging Markets Factors—Gross versus Disaggregated Flows	9
3	Estimated Betas	12
4	Estimated Common Factor in Total Gross Inflows versus VIX	15
5	The Model versus the Global Financial Crisis, and versus the Taper Tantrum	17
6	Institutional Quality versus Correlations	21

ABSTRACT

This paper analyzes the behavior of gross capital inflows across 34 emerging markets (EMs), including eight Asian economies. We first confirm that aggregate inflows to EMs comove considerably. Three findings are reported: (i) the aggregate comovement conceals significant heterogeneity across asset types as only bank-related and portfolio bond and equity inflows comove; (ii) while global push factors in advanced economies mostly explain the common dynamics, their relative importance varies by type of flow; and (iii) the sensitivity to common dynamics varies significantly across borrower countries, with market structure characteristics (especially the composition of the foreign investor base and the level of liquidity) rather than a borrower country's institutional fundamentals strongly affecting sensitivities. Countries relying more on international funds and global banks are found to be more sensitive to push factors. Our findings suggest that EMs need to closely monitor their lenders and investors to assess their inflow exposures to global push factors.

Keywords: capital flows, emerging markets, global banks, mutual funds, push factors

JEL codes: F32, F36, G11, G15, G23

I. INTRODUCTION

Episodes of large, widespread waves of nonresident capital flowing to and from emerging markets (EMs) over the past decade continue to emphasize the importance of common factors in driving global capital flows. Following and extending the findings of Calvo, Leiderman, and Reinhart (1993, 1996) and related literature (among many others, Chuhan, Claessens, and Mamingi 1998), a number of recent papers have documented how global conditions can drive capital flows by nonresidents (gross inflows) to EMs, even more so than for advanced economies (e.g., Forbes and Warnock 2012; Fratzscher 2011). In the past few years, unconventional monetary policy in several advanced economies has been found to have driven much of the bond and equity inflows to EMs (e.g., Fratzscher, Lo Duca, and Straub 2013; IMF 2013a, 2013b). Although the importance of different push factors varies across studies, a consensus has emerged on the role of United States (US) monetary policy, the supply of global liquidity (especially in US dollars), and global risk aversion (Milesi-Ferretti and Tille 2011, Shin 2012, and Rey 2013, among others) in helping explain the high synchronicity of capital flows to EMs.

However, the literature has made less progress in understanding the mechanisms by which global factors impact EM capital inflows and how they do so differently across EMs. The sudden (and unexpected) deterioration in financial conditions in EMs during the so-called taper tantrum around May 2013 illustrated that not all EMs were equally exposed to changes in global conditions.¹ While almost all EMs experienced outflows during this episode, some were much less affected than others (Sahay et al. 2014). Shaghil, Coulibaly, and Zlate (2014) showed that this differentiation across EMs was not unique to the 2013 episode. This naturally raises the question of the reasons behind such heterogeneous responses. Why are some EMs more sensitive to push factors than others? Put differently, when economic and financial conditions in core countries change, why do some EMs always profit (or lose) more than others?

The expected normalization of monetary policy in the US in the near future has made these questions highly relevant for policy makers; in particular those in EMs. Unfortunately, as it stands, the current literature yields inconclusive and at times conflicting results. Some empirical evidence points to the importance of borrowers' macroeconomic and institutional fundamentals in dampening the effect of push factors. Ghosh et al. (2014), who focused on the determinants of surges in inflows to EMs, found that while global factors act as gatekeepers, local fundamental factors determine the final magnitude of the surge. In particular, macroeconomic fundamentals, such as external financing needs, capital account openness, and exchange rate regime, shape the final magnitude. Prachi et al. (2014) and Shaghil, Coulibaly, and Zlate (2014) found that during the tantrum episode, countries with better macroeconomic fundamentals (such as stronger fiscal balance, higher reserves or deeper financial markets) suffered less deterioration in exchange rates, equity prices, and bond yields.

In contrast, Aizenman, Binici, and Hutchison (2014) found that tapering over the very short term (24 hours following the announcement) was associated with a sharper deterioration of financial conditions in robust EMs than in fragile ones. Similarly, Eichengreen and Gupta (2014) did not find that better macroeconomic fundamentals (e.g., lower public debt, higher reserves, or higher economic growth) provided insulation during the tantrum episode. Rather, larger markets experienced more pressures, as investors were better able to rebalance their portfolios in such countries given their relatively large and liquid financial markets.

¹ Taper tantrum refers to the 2013 surge in US Treasury yields, which resulted from the Federal Reserve's use of tapering to gradually reduce the amount of money it was feeding into the economy. In reaction to news of this tapering, investors panicked and drew their money rapidly out of the bond market, thereby drastically increasing bond yields.

As such, the relative role of fundamental versus other financial market factors in affecting how global factors drive capital flows to EMs is still an open question. In part, the lack of consensus arises from different methodologies. With the exception of Ghosh et al. (2014), recent studies have focused on the dynamics of prices in—rather than flows to—recipient markets and have restricted their attention to very short-lived episodes of financial stress. And although Ghosh et al. (2014) studied flows, the authors restricted their attention to net capital flows, which, as the authors emphasized, follow very different dynamics from gross flows, and do not lead to the same policy conclusions. As a result, the empirical literature, in its current state, does not allow us to derive general conclusions about the (differential) impact of push factors on capital inflows to EMs.

This paper contributes to this debate by conducting a systematic analysis of the sensitivity of 34 EMs to global push factors using quarterly balance of payments (BOP) data for 2001–2013. To take into account the potential heterogeneity among different types of flows, we analyze total and disaggregated gross inflows separately. We use the standard BOP distinction between foreign direct investment (FDI) flows, portfolio equity flows, portfolio bonds flows, and other investment (OI) to banks and OI to nonbanks.² After compiling our panel data set, we use a latent factor model in the spirit of Kose et al. (2003) to extract the common dynamics in gross inflows (total and by component) to all EMs. As we will discuss, using a latent factor approach provides a more general way to identify commonality and avoids having to determine which specific factors drive the commonality. Interestingly, although we do show that the commonality identified this way relates in expected ways to the traditional push factors emphasized in the literature, we also find that typical observed proxies, such as the volatility index (VIX), can capture only a small fraction of the actual comovement we observe in the data. After estimating these common dynamics, we then study how the different EMs react to deviations in these (asset-specific) common factors.

Very generally, our results confirm the main findings in the literature. In particular, we find that gross inflows to EMs comove greatly across countries as a result of global (push) factors, and that the magnitude of these effects varies substantially across countries (see Koepke 2015 for a recent review). At the same time, our findings qualify these results in several important respects. First, we find that aggregate comovement conceals significant heterogeneity across asset types. Although bank-related and portfolio bond and equity inflows comove substantially across EMs, FDI, and OI to nonbanks do not.³ In addition, while traditional global push factors identified in the literature, such as US monetary policy, global liquidity, or risk aversion, help explain these common dynamics, their relative importance varies greatly by type of flow.

Second and more importantly, we find that the sensitivity to the common dynamics varies greatly across countries and within countries across different type of flows. Whereas some EMs display very low sensitivity to common dynamics in all types of flows, others, such as Brazil, Indonesia, South Africa, Thailand, and Turkey, are highly sensitive in all types. Another group, including countries such as India, Mexico, Pakistan, and the Philippines displays high sensitivity in only one type (or two). Examining

² Consistent with the residence criterion of balance of payments statistics, we use the term capital “inflows” to refer to changes in the financial liabilities of a domestic country vis-à-vis nonresidents. As such, inflows can be positive and negative during any given quarter as nonresidents can increase or reduce their financial exposures to a given country. Separately, residents can engage in “outflows,” i.e., change their net investment position abroad, which can be positive when they build up asset abroad, or negative when they run down assets. We do not analyze these resident outflows as we are interested in the factors driving international investors’ behavior vis-à-vis the country. The breakdown of OI into banks and nonbanks follows Milesi-Ferretti and Tille (2011), where OI to banks captures those OI transactions or holdings with banks as the domestic counterpart.

³ This is important since FDI constitutes the largest share of capital inflows in the EMs under study.

the sources of this heterogeneity, we find that financial market characteristics, such as liquidity in the recipient country and composition of the foreign investor bases, rather than macroeconomic or institutional fundamentals, most robustly explain the sensitivities. In line with Aizenman, Binici, and Hutchison (2014) and Eichengreen and Gupta (2014), we do not find that good fundamentals, in the form of high quality of institutions or low public debt, tend to provide insulation. Only in the case of portfolio bond inflows, do we find some macroeconomic fundamentals playing a statistically significant role. Countries with lower reserves, higher trade openness, and more flexible foreign exchange regimes tend to be more sensitive to global push factors. In the case of equity flows, we also find that the depth (or liquidity) of the local market plays a significant role in shaping the impact of global push factors, with liquid markets being substantially more sensitive to changes in global conditions. Finally, after controlling for all these characteristics, we find a strong and consistent role for the composition of the foreign investor base. Across bond, equity, and bank flows, we show that countries relying more on international funds (e.g., mutual funds and exchange-traded funds) and global banks among their nonresident investors are significantly more sensitive to global push factors.⁴ Overall, our findings suggest that EMs with deep financial markets and a high exposure to fickle investors, rather than those with more sound institutional or macroeconomic fundamentals, should expect to receive (or lose external funding when financial conditions in advanced economies improve (or deteriorate).

Our findings contribute to the literature in several respects. We are naturally connected to the literature on push factors and their impacts on EMs (see Forbes and Warnock 2012 for a review), although we rely on a different methodology. The use of latent factors (rather than observed proxies) to capture the true comovement in inflows circumvents the problem of choosing specific global factors whose significance has been found to vary widely across studies and samples.⁵ In fact, we find that the estimated factors tend to capture a much greater part of the comovement than traditional observed variables do (such as the VIX). Also, contrary to most contributions in this field, our analysis largely relies on disaggregated inflows. Besides highlighting the wide heterogeneity in the behavior of different types of flows, this approach makes clear that the sensitivity of EMs to push factors is not universal and identical across flows. In fact, most EMs are found to be exposed to push factors through one or two components only.

Second, our findings on the important roles of financial market characteristics for various types of inflows link to recent findings on the procyclical behavior of global investors, and related impact on the variability of EMs' external funding. As documented by Bruno and Shin (2015a and 2015b), large, international banks expand and contract their cross-border claims in part in response to monetary policy in advanced economies, notably in the US. As the global supply of credit expands (contracts), it tends to be directed at the margin toward (away from) EMs. Related, financial markets in economies more internationalized and with a larger foreign (bank) presence, which typically are EMs, have been found to be more affected by global monetary policy conditions (Cetorelli and Goldberg 2012a).⁶

⁴ We do want to emphasize that this finding does not mean that borrowers' fundamentals do not matter in shaping other properties of capital flows to EMs. As many contributions have convincingly shown (e.g., Alfaro, Kalemli-Ozcan, and Volosovych 2008), countries with poorer macroeconomic or institutional fundamentals tend to receive less capital inflows. We can confirm this result for our EM sample. Different from this "level" effect, however, our study concerns EMs' sensitivities to global push factors, where our findings suggest that the traditional "push factor" debate may have overstated the importance of fundamentals in shaping countries' sensitivities at the expense of other important determinants.

⁵ Even though the US VIX is often used as a proxy of global push factors, several papers have highlighted that this variable is often not statistically significant outside the global financial crisis, when it does not vary as much.

⁶ Cetorelli and Goldberg (2012b), Cerutti and Claessens (2014), Claessens and van Horen (2014) and others have shown that in periods of acute stress, global banks can play a large role in transmitting stress to emerging market economies, as during the 2007–2009 financial crisis.

As far as portfolio flows are concerned, investors such as mutual funds have been found to transmit shocks in advanced economies to a wide range of markets, and largely independently of the state of fundamentals. Raddatz and Schmukler (2012) and Puy (2013) have found that international fund flows, in particular for EMs, tend to be highly procyclical, with funds reducing their exposure to all countries when financial conditions deteriorate at home (i.e., in advanced markets), and increasing their exposure when conditions at home improve. Using data on global mutual funds, Jotikasthira, Lundblad, and Ramadorai (2012) also have found that funding shocks originating in advanced economies, i.e., where funds are domiciled, translate into fire sales (and purchases) for countries included in the portfolios, in particular for EMs. Although the behavior of specific classes of global investors (banks or funds) is now well documented and has been receiving increasing attention from policy makers, we are the first, to our knowledge, to show that the type of investor base and the state of development of the local financial markets importantly shape the responses to global monetary and financial developments for specific flows to EMs.

The rest of the paper proceeds as follows. Section II describes the data and the empirical methodology we use. Section III presents the results and puts our analysis in the context of existing theoretical and empirical literature. Section IV provides some robustness checks. The last section concludes with broader lessons and outstanding issues for policy and research.

II. DATA AND METHODOLOGY

This section introduces the dependent and independent variables we use and the various country characteristics we explore to explain the sensitivities of specific type of inflows to EMs to common dynamics. It also describes the econometric methodology.

A. Data Set

We study gross capital inflows to EMs with data obtained from the International Monetary Fund's Balance of Payment database, which cover transactions by foreign residents (a resident of the rest of the world) in a country's domestic financial instruments.⁷ These capital inflows data are reported both in total and by their components: FDI flows, portfolio equity flows, portfolio bonds flows, OI to banks and OI to nonbanks. FDI involves a controlling claim in a company (a stake of at least 10%), either by the setting up of new foreign operations or the acquisition of a company from a domestic owner. Portfolio investment covers holdings of bonds and equity that do not lead to a controlling stake. OI includes a broad residual array of transactions/holdings between residents and nonresidents, such as loans, deposits, trade credits and the like. Within this category, following Milesi-Ferretti and Tille (2011), we separate out those transactions or holdings in which the domestic counterpart is a bank from other counterparts.

We focus on quarterly capital inflows during Q12001–Q42013 for a set of 34 EMs (see Table 1 for the exact sample of countries). All series are measured in US dollars and normalized by the recipient country gross domestic product (GDP) (also measured in US dollars at a quarterly frequency).⁸ As an

⁷ Foreign investors' transactions, because of their volume and volatility, tend to affect heavily EM economic conditions (exchange rate, current account) and have therefore attracted most of the attention in the empirical literature (see for instance Broner et al. 2013).

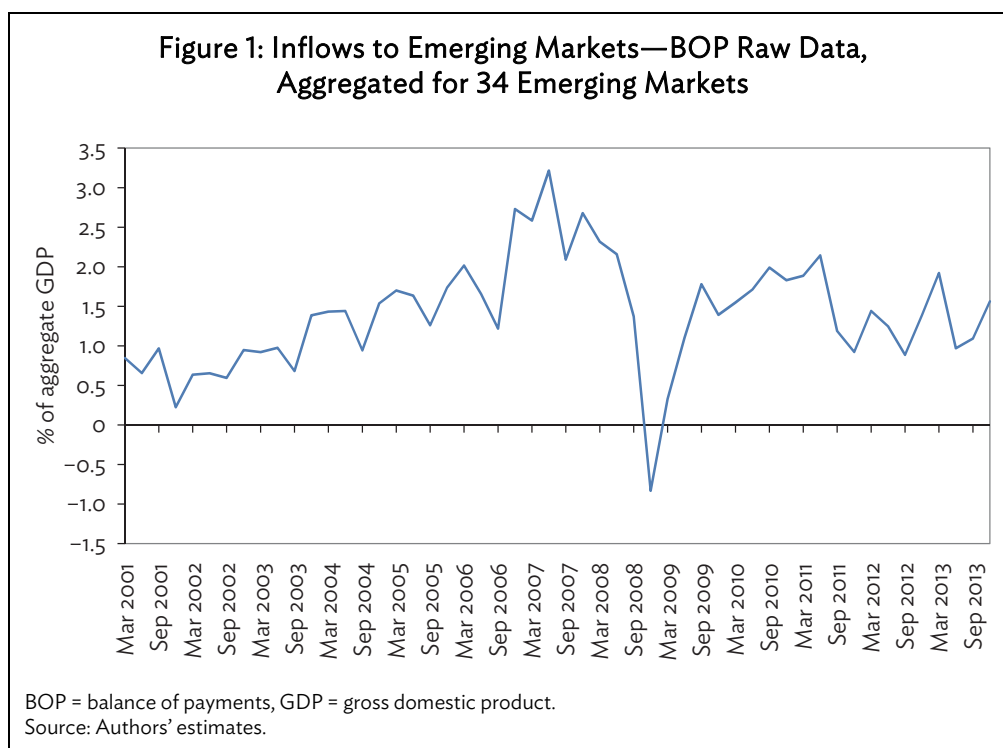
⁸ Even though BOP data are available before 2001, we start our analysis in early 2000s since it is also based on other capital inflow data set (e.g., Emerging Portfolio Fund Research [EPFR] fund flows), which do not have consistent coverage before the 2000s.

illustration, Figure 1 reports the (total) gross inflows to the 34 EMs in our sample over the period, where flows are expressed as a percentage of the aggregate GDP of the 34 countries.

Table 1: Sample of Countries

Latin America	Asia	Emerging Europe	Other
Argentina	India	Belarus	Turkey
Brazil	People's Republic of China	Kazakhstan	South Africa
Chile	Indonesia	Bulgaria	Israel
Colombia	Republic of Korea	Russian Federation	
Mexico	Malaysia	Ukraine	
Peru	Pakistan	Czech Republic	
Uruguay	Philippines	Slovak Republic	
Bolivarian Republic of Venezuela	Thailand	Estonia	
		Latvia	
		Hungary	
		Lithuania	
		Croatia	
		Slovenia	
		Poland	
		Romania	

Source: Authors' compilation.



The explanatory variables used in this paper fall in two broad categories: (i) variables that are used to identify push and pull factors, and (ii) variables capturing fundamentals and market characteristics that are used to evaluate the determinants behind EM sensitivities to the same push

factors. Variables in each group are presented below while definitions, sources, frequency, and summary statistics are reported in Appendix Tables A1.1 and A1.2.

In the case of push factors, we follow the literature and use the following variables: (i) the average GDP growth rate in four core economies (the euro area, Japan, the United Kingdom, and the US); (ii) the US VIX; (iii) changes in the expected US policy rate; (iv) the slope of the US yield curve (the difference between 10-year and the 3-month US government T-bill yields); and (v) the real effective exchange rate (REER) in the US. We also use push variables that are potentially specific to some types of capital inflows. For banking inflows, we use the US dealer bank leverage and TED spread (the difference between short-term interbank lending and government T-bill rates) to capture global banks' leverage and funding conditions. For bond inflows, we use the 10-year US government bond yield, which captures the cost of investing in cross-border bonds compared to the cost of investing in US bonds; and the (lagged) return of the JPMorgan Emerging Market Bond Index (EMBI) as a proxy for return-chasing in EM bond markets. For equity inflows, we use the (lagged) return in the MSCI Emerging Markets Index, to capture equity return-chasing in portfolio equity inflows.

To control for the presence of potential pull variables that are common to all EMs, we use an index of aggregate commodity prices and the (lagged) aggregate real GDP growth in EMs.

In the case of fundamentals and market characteristics, we follow once again existing literature. Macroeconomic fundamentals are captured by a country's trade openness, i.e., exports and imports as a percentage of GDP, the level of public debt (as a percentage of GDP), foreign exchange reserves (as a percentage of GDP), the foreign exchange regime (fixed versus the degree of floating), and its average real GDP growth rate. Institutional quality has a proxy in the International Country Risk Guide rule of law and investor protection indexes.

In contrast with the existing literature, however, we go further in assessing the financial characteristics of recipient markets. For each recipient country, and whenever possible, we assess the following four dimensions: (i) the degree of foreign openness, (ii) the size of the market, (iii) the liquidity of the market, and (iv) the composition of the foreign investor base. We identify proxy variables for each of these dimensions, with the exception of a liquidity measure for the market of OI to banks inflows, which is not applicable. For presentational simplicity, the table below summarizes the variables used for each dimension and type of flows, while Appendix A provides a detailed discussion of each variable.

Although most of the variables used to assess market characteristics are standard in the literature, we put forward some new ones that can serve as a proxy for the importance of some types of investors related to each specific capital inflows (Table 2). In particular, because a decomposition of BOP flows by type of foreign investor is not available, we compute, for each EM and each asset in our sample, the correlation between BOP-recorded inflows on the one hand, and inflows reported directly by specific types of investors on the other. As we do this for each type of flow, three correlations are computed for each country in our sample: (i) the correlation between BOP portfolio equity flows and equity flows coming from international equity funds reported by the financial data company Emerging Portfolio Fund Research (EPFR) Global, (ii) the correlation between BOP portfolio bond flows and bond flows coming from international bond funds reported by EPFR Global, and (iii) the correlation between BOP OI to bank flows and global bank flows reported by the Bank for International Settlements Locational International Banking Statistics. In all cases, we interpret a high correlation as a sign that funds and global banks account for most of the movements in capital inflows to (or out of) the given economy. For further details on the EPFR Global and Bank for International Settlements data sets, their coverage and how they relate to BOP-recorded flows, see Appendix B.

Table 2: Summary of Explanatory Variables for Market Characteristics

	Foreign Openness	Size	Liquidity	Composition of the Foreign Investor Base
Equity Market	Stock of foreign equity funding/GDP	Local size: Stock market capitalization/GDP	Stock market turnover (as % of market capitalization)	- Share of foreign equity funding coming from AEs
		Relative to EMs: Stock of foreign equity in country i / Total stock of foreign equity in the 34 EMs	Listed in MSCI benchmark (emerging or frontier)	- Correlation of BOP equity flows with EPFR equity flows
Bond Market	Stock of foreign bond funding/GDP	Local size: Bond market capitalization/GDP	Listed in EMBI benchmark	- Share of foreign bond funding coming from AEs
		Relative to EMs: Stock of foreign bond in country i / Total stock of foreign bond in the 34 EMs		- Correlation of BOP bond flows with EPFR bond flows
Banking Sector	Stock of foreign bank claims/GDP	Private credit/GDP		- Correlation of BOP bank flows with BIS global bank flows

AE = advanced economy, BIS = Bank for International Settlements, BOP = balance of payments, EM = emerging market, EMBI = Emerging Market Bond Index, EPFR = Emerging Portfolio Fund Research, GDP = gross domestic product, MSCI = Morgan Stanley Capital International.

Source: Authors' compilation.

B. Econometric Framework

In this section, we build on the methodology introduced by Kose, Otrok, and Whiteman (2003) and estimate the following latent factor model:

$$y_{i,t} = \beta_i^{EM} f_t^{EM} + \beta_i^{Region} f_t^{Region} + \varepsilon_{i,t}, \quad (1)$$

where $y_{i,t}$ is the (normalized) inflow of a specific type to country i in quarter t , f_t^{EM} is the (unobserved) factor affecting all EMs in our sample at time t , f_t^{Region} is the (unobserved) regional factor affecting all countries belonging to region j at time t , and β_i^{EM} and β_i^{Region} designate country-specific factor loadings measuring the responses of country i to the common EM and regional factors, respectively. Finally, $\varepsilon_{i,t}$ is an unobserved country-specific residual factor.

Because we allow factors to follow autoregressive (AR) processes, the model in (1) is in fact a dynamic latent factor model. More precisely, we assume that idiosyncratic factors follow an AR(p) process:

$$\varepsilon_{i,t} = \rho_{i,1}\varepsilon_{i,t-1} + \rho_{i,2}\varepsilon_{i,t-2} + \dots + \rho_{i,p}\varepsilon_{i,t-p} + u_{i,t}, \quad (2)$$

where $u_{i,t} \sim N(0, \sigma_i^2)$ and $E(u_{i,t}, u_{i,t-s}) = 0$ for $s \neq 0$ and the world and regional factors follow the respective AR(q) processes:

$$f_t^{EM} = \rho_1 f_{t-1}^{EM} + \rho_2 f_{t-2}^{EM} + \dots + \rho_q f_{t-q}^{EM} + u_t^{EM} \quad (3)$$

$$f_{j,t}^{Region} = \rho_{1,j} f_{t-1}^{Region} + \rho_{2,j} f_{t-2}^{Region} + \dots + \rho_{q,j} f_{t-q}^{Region} + u_{j,t}^{Region} \quad (4)$$

where $u_t^{EM} \sim N(0, \sigma_{EM}^2)$, $u_{j,t}^{Region} \sim N(0, \sigma_j^2)$ and $E(u_t^{EM}, u_{t-s}^{EM}) = E(u_{j,t}, u_{j,t-s}) = 0$ for $s \neq 0$.

Given that the factors are unobservable, standard regression methods do not allow for the estimation of the model. As a consequence, we rely on Bayesian techniques, as in Kose, Otrok, and Whiteman (2003), for the estimation. As is standard in the literature, as a first step, we normalize the sign of the factor/loadings by (i) restricting the loading on the world factor for the first country in our sample to be positive, and (ii) restricting the loadings on the regional factor for one country in each region to be positive. Second, to normalize the scales, we assume that each of the factor variances is equal to 1. Note that these normalizations do not affect the qualitative results and simply allow the identification of the model. In addition, we use Bayesian techniques with data augmentation to estimate the parameters and factors in (1)–(4). This implies simulating draws from complete posterior distribution for the model parameters and factors and successively drawing from a series of conditional distributions using a Markov Chain Monte Carlo procedure. Posterior distribution properties for the model parameters and factors are based on 300,000 Markov Chain Monte Carlo replications after 30,000 burn-in replications.

Following Kose, Otrok, and Whiteman (2003), we use the following conjugate priors when estimating the model:

$$(\beta_i^{EM}, \beta_i^{Region})' \sim N(0, I_2) \quad (5)$$

$$(\rho_{i,1}, \dots, \rho_{i,p})' \sim N(0, \text{diag}(1, 0.5, \dots, 0.5^{p-1})) \quad (6)$$

$$(\rho_1, \dots, \rho_q)' \sim N(0, \text{diag}(1, 0.5, \dots, 0.5^{q-1})) \quad (7)$$

$$(\rho_{1,j}, \dots, \rho_{q,j})' \sim N(0, \text{diag}(1, 0.5, \dots, 0.5^{q-1})) \quad (8)$$

$$(\sigma_i^2)' \sim IG(6, 0.001), \quad (9)$$

where $i=1, \dots, 34$ and IG denotes the Inverse Gamma distribution, implying a rather diffuse prior on the innovations variance. We also assume that the AR processes in (2)–(4) are stationary. In practice, in our implementation, we set the length of both the idiosyncratic and factor AR polynomials to 2. However, other (nonzero) values for p and q were tried with no substantial differences in the results. Similarly, reasonable deviations in priors did not generate any notable differences in the results presented below.

Beside estimating the factors, we are particularly interested in measuring the influence of the common EM factor on the different EMs in our sample. As a result, most of the analysis below will focus on explaining the cross-country heterogeneity we observe in (i) factor loadings β_i^{EM} , and (ii) variance decomposition θ_i^{EM} , where θ_i^{EM} denotes the share of variance in country i 's funding that is attributable to the common EM dynamic. It is computed as follows:

$$\theta_i^{EM} = \frac{(\beta_i^{EM})^2 \text{var}(f_t^{EM})}{\text{var}(y_{i,t})}. \quad (10)$$

Intuitively, the β_i^{EM} loadings measure the contemporaneous impact of a sudden change in the direction of common EM factors for country i , whereas the variance decomposition is an estimate of the share of the total variance of country i 's funding that can be attributed to the common EM dynamics over the sample period.

Finally, models are estimated using four regions, namely: (i) Latin America, (ii) Asia, (iii) Emerging Europe, and (iv) Other. Table 1 provides the composition of each region. Note that although

alternative regional decompositions could be used, the key results derived below are not sensitive to these decompositions as we focus on EMs' sensitivity to the common dynamics, captured through the β_i^{EM} or θ_i^{EM} , both of which are invariant to the regional classification.

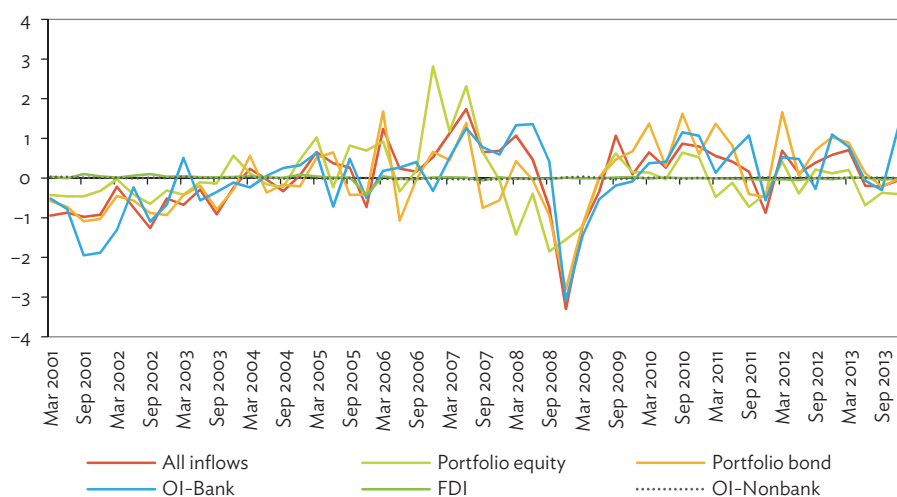
III. RESULTS

This section first presents the results of the factor estimation and discusses the cross-sectional dispersion we observe in the key statistics— β_i^{EM} and θ_i^{EM} —highlighted above. After relating estimated factors to typical observed variables emphasized in the literature, we turn to a discussion of country characteristics to help explain the sensitivities of countries to global factors.

A. Factor Estimations, Factor Loadings, and Variance Decompositions

The factor decomposition outlined in (1) yields the following three results. First, the model identifies precisely the commonality in (total) aggregated gross capital inflows to all EMs. Second, it shows that using total inflows conceals significant heterogeneity across assets. While portfolio equity flows, portfolio bond flows and OI to banks do comove across EMs, FDI and OI to nonbanks do not (Figure 2). Actually, with the exception of periods of global instability during which all flows go in the same direction, inflow dynamics can vary greatly across types of assets. This suggests, in turn, that different assets do not respond to the same driving (push or pull) forces, an aspect we analyze further in the next section. Third, the quantitative impact of the common EM dynamics varies a lot across markets and types of flows.

Figure 2: Common Emerging Markets Factors—Gross versus Disaggregated Flows



FDI = foreign direct investment, OI = other investment.

Notes: This figure plots the estimated common emerging market dynamics estimated using the model exposed in section II. The series All inflows reports the results of the comovement analysis obtained using total or aggregated gross inflows (not distinguishing by type of flow). Results by type of flows, i.e., equity, bond, other investments to banks, and nonbanks are also reported.

Source: Authors' estimates.

To show the heterogeneity in country responses, Figure 3 reports the β_i^{EM} coefficients estimated for equity, bond, and bank flows. In the case of equity flows, we find that a unit standard deviation in the common EM factor will generate, on impact, a unit standard deviation in equity flows to Pakistan and a 0.6 standard deviation in equity flows to India. In contrast, countries like Belarus, Estonia, or Latvia do not experience any significant change in their foreign equity funding. Similarly, although bond flows to Indonesia and South Africa react strongly to the common EM factor, bond flows to the People's Republic of China, Colombia, and Bulgaria are almost insensitive to the common dynamics.

Because the variance decompositions are a function of β_i^{EM} , the strong heterogeneity we observe in factor loadings naturally carries over to the variance decompositions. Table 3 reports the share of variance accounted for by the common EM factor and computed using equation (10). Intuitively, this variance decomposition provides a measure of the importance of this factor in driving the external funding of each country over the sample period. Note that because the model was not able to identify precisely any comovement structure in the FDI and OI to nonbank flows to EMs, only the results for portfolio equity and bond flows and OI to bank flows, as well as aggregate inflows, are reported.

Table 3 and Figure 3 highlight two important results. First, the impact of the common EM factors is large for a small number of countries—in particular for Asian countries—in the case of equity flows, whereas it is more evenly distributed across EMs for bond and bank flows. Second, substantial heterogeneity exists both across countries and across the different types of assets in the way common EM factors affect external funding. We can broadly identify three groups of EMs. The high sensitivity group contains countries that are relatively sensitive in all components, such as Brazil, Indonesia, South Africa, Thailand, and Turkey. The asymmetric group features countries with a high sensitivity in only one (or two) components, such as Pakistan, the Philippines, India, or Mexico. Finally, the insensitive group includes countries such as Chile, Estonia, and Latvia that display very low relative sensitivity in all components. Interestingly, the highest sensitivities across all asset types are in this group. For instance, in the case of Pakistan and the Philippines, more than half of the variance in equity funding is accounted for by the common EM factor, implying that, to a great extent, both countries receive (or lose) equity funding whenever other EMs do.

Table 3: Variance Decomposition Results
(%)

	Portfolio Equity		Portfolio Bond		OI-Bank		All Inflows	
	Global	Regional	Global	Regional	Global	Regional	Global	Regional
Latin America								
Argentina	25	7	12	11	29	5	12	20
Brazil	24	4	25	6	25	11	27	5
Chile	2	10	2	20	4	4	11	13
Colombia	1	12	1	20	8	6	1	32
Mexico	7	8	29	11	8	32	20	15
Peru	3	5	8	2	26	3	34	19
Uruguay	2	16	18	14	0	8	1	3
Bolivarian Republic of Venezuela	0	6	7	6	3	11	3	16
Average	8	8	13	11	13	10	14	15

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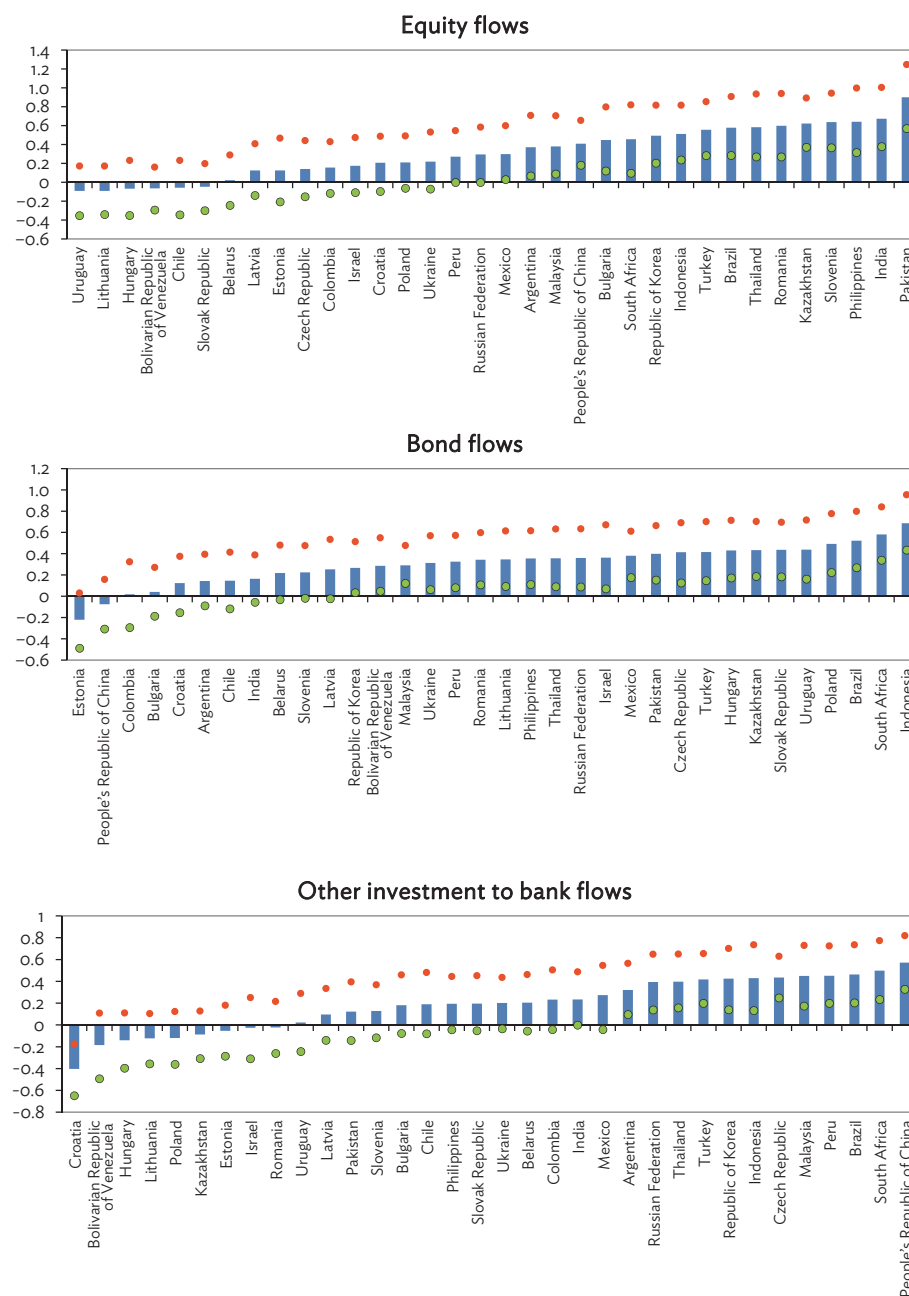
Table 3 continued

	Portfolio Equity		Portfolio Bond		OI-Bank		All Inflows	
	Global	Regional	Global	Regional	Global	Regional	Global	Regional
Asia								
India	35	16	4	34	7	2	55	4
People's Republic of China	18	4	2	3	35	7	28	1
Indonesia	18	8	43	9	23	23	21	8
Republic of Korea	7	12	11	2	19	38	50	12
Malaysia	18	4	16	6	22	38	39	45
Pakistan	60	18	13	7	1	2	2	10
Philippines	48	4	11	2	6	2	26	1
Thailand	32	15	17	21	20	7	53	13
Average	29	10	15	11	16	15	34	12
Emerging Europe								
Belarus	0	0	10	16	7	0	1	3
Kazakhstan	30	2	20	11	1	42	4	34
Bulgaria	16	62	1	2	5	38	6	60
Russian Federation	8	2	15	3	23	37	36	17
Ukraine	3	0	11	2	10	68	8	36
Czech Republic	1	10	17	10	21	6	1	12
Slovak Republic	1	1	16	3	5	9	0	2
Estonia	1	91	5	2	1	53	6	39
Latvia	1	1	5	46	4	59	11	50
Hungary	1	0	14	3	1	25	1	35
Lithuania	1	16	12	5	1	75	5	63
Croatia	3	0	1	5	15	2	2	36
Slovenia	35	1	4	2	5	64	17	40
Poland	1	3	22	9	1	24	32	11
Romania	30	1	11	10	2	60	8	69
Average	9	13	11	9	7	38	10	43
Other								
Turkey	22	20	26	3	37	6	36	5
South Africa	17	14	30	22	22	10	41	18
Israel	3	33	13	39	2	53	17	30
Average	14	22	23	10	20	23	24	29

OI = other investment.

Notes: This table reports, for each country in our sample, the (mean) of the share of variance accounted for by common and regional factors, as presented in section II. Results for aggregated inflows are reported under the column All Inflows. Results by type of flows are reported under the corresponding column.

Source: Authors' estimates.

Figure 3: Estimated Betas

Note: Lower and upper dots on each side of the reported betas report the 5th and 95th percentile of the posterior distribution, respectively.
 Source: Authors' estimates.

B. What Drives the Emerging Market Common Dynamics?

In this section, we investigate the role of potential push and pull (internal) factors driving the EM common factors estimated for the aggregate and each type of inflows in the previous section. In this

context, we estimate the following equations for the EM common factors on aggregated inflows and separately for portfolio bond, portfolio equity, OI to banks:

$$f_t^{EM} = \alpha Push_t + \beta Pull_t + \gamma Type\ Specific\ Factors_t + \varepsilon_t \quad (11)$$

where the vectors include the general push, pull, and type-specific variables presented in section II. Given the Q22001–Q42013 coverage of our sample, the total number of observations is 50.

The signs of the coefficients of push variables are expected to be negative. A slowdown in growth in advanced economies leads to an expansion of capital flows to emerging market economies, as investors take advantage of better growth opportunities and higher yields (e.g., Reinhart and Reinhart 2008). An increase in the VIX, i.e., increased uncertainty, is usually associated with a decrease of cross-border flows, as per Rey (2013). Similarly, an increase in the US REER likely reduces cross-border flows since borrowers become riskier and less solvent in US dollar terms as their currencies depreciate, as noted in Bruno and Shin (2015b). A flatter yield curve, reflecting less profitable investment opportunities at home, may also trigger a search for yield abroad. For example, banks, which borrow short term and lend long term, might turn to cross-border investments when the yield curve flattens, as also found by Cerutti, Claessens, and Ratnovski (2014). Finally, higher expected policy rates would reduce cross-border flows to EMs since the opportunity and funding costs are expected to increase for investors. Most of the precrisis literature has used the level of a short-term rate, such as the US policy rate, but, following more recent analysis (e.g., Koepke 2014), we use the change in expected US policy rates, also to deal with the fact that the policy rate has been very stable in recent years.

The expected sign of coefficients attached to commodity prices and to growth in EM economies are both positive. Since many EMs are net exporters of commodities, higher commodity prices improve EMs' economic perspectives and thus likely boost cross-border flows.⁹ With regard to the type- (or asset-) specific factors, the coefficients for return chasing variables and bank leverage are all expected to be positive since a high leverage indicates a lower perceived risk and higher willingness and capacity of banks to lend (Adrian and Shin 2014, Bruno and Shin 2015a).

The actual regression results (Table 4) indicate that almost all coefficients, when statistically significant, have the expected signs. Among the push variables, VIX and REER are the most robust factors behind the commonality in aggregate inflows and in the various types of capital inflows (see columns 1, 5, 9, and 13). In contrast, the slope of the yield curve, the GDP growth rate of core countries, or the expected policy are only significant in some cases.¹⁰ The explanatory power of the VIX is, however, very much driven by the global financial crisis, as shown in Figure 4. When using pull factors only, we find the price of commodities to be the only significant variable across the various types of capital inflows, with EM growth only significant in the case of OI to bank and total inflows (see columns 2, 6, 10, and 14). When push and pull variables are used simultaneously, the same results are found (see columns 3, 7, 11, and 15).¹¹

⁹ Reinhart and Reinhart (2008) found evidence of a statistically significant and positive relationship between commodity prices and capital inflows between 1967 and 2006.

¹⁰ The significant coefficient on Group of Four GDP growth on the bank regression is opposite to the expected one, but it could be capturing the fact that higher growth rates in core economies often tend to increase global bank funding (e.g., more deposits, and the like), which could trigger positive cross-border flows.

¹¹ The only exception is EM GDP growth, which seems to lose explanatory power and even flip signs when used with more variables. It is excluded in some regressions for this reason.

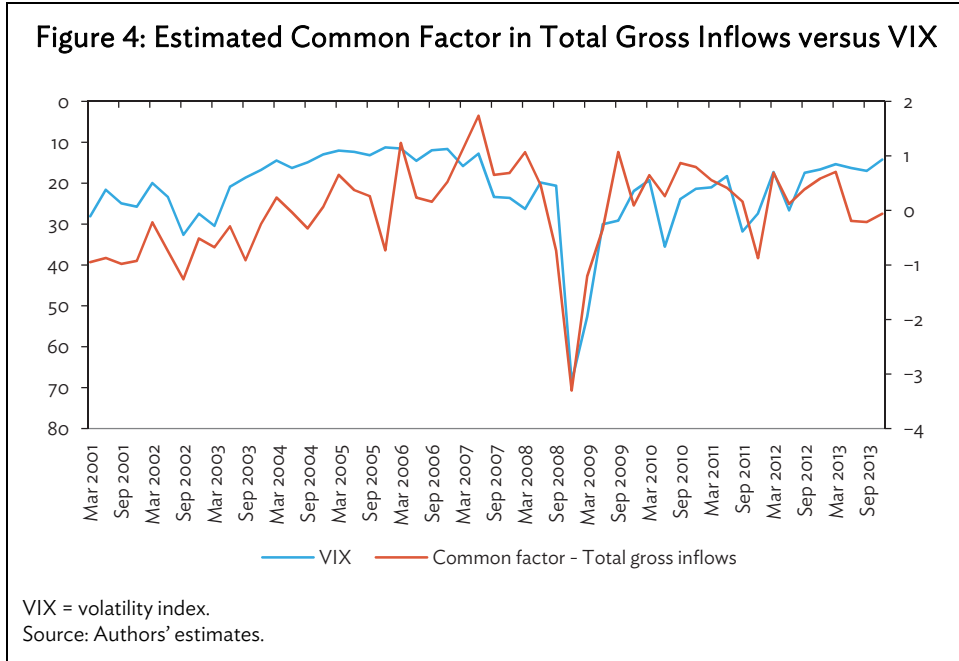
Table 4: Finding the Drivers of the Estimated Emerging Market Common Factors

Variables	Bank				Bond				Equity				Total			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Core_GDP_Growth	0.132*** (0.0387)		0.0736* (0.0412)	0.0547 (0.0426)	-0.00808 (0.0543)		-0.0416 (0.0583)	-0.0308 (0.0627)	0.0527 (0.0535)		0.0588 (0.0526)	0.0329 (0.0532)	0.0789* (0.0418)		0.00857 (0.0388)	-0.0351 (0.0417)
US VIX	-0.0313*** (0.0105)		-0.0161 (0.0112)	0.00183 (0.0154)	-0.0516*** (0.00997)		-0.0356*** (0.0106)	-0.0353*** (0.0104)	-0.0273*** (0.00839)		-0.0218* (0.0130)	-0.0232* (0.0116)	-0.0397*** (0.0108)		-0.0209** (0.00991)	0.00264 (0.0167)
Exp. change in policy rate	-0.117 (0.265)		-0.101 (0.232)	-0.00785 (0.253)	-0.325 (0.289)		-0.194 (0.304)	-0.198 (0.289)	0.0101 (0.342)		0.126 (0.370)	-0.0690 (0.333)	-0.401* (0.235)		-0.372* (0.214)	-0.415* (0.206)
US yield_curve	-0.0110 (0.0702)		-0.127 (0.104)	-0.0374 (0.107)	0.118 (0.114)		-0.1000 (0.167)	-0.0131 (0.126)	-0.258** (0.110)		-0.392** (0.147)	-0.268** (0.108)	-0.0820 (0.0849)		-0.233** (0.102)	-0.164 (0.132)
US REER	-0.0592*** (0.00995)		-0.0567*** (0.0115)	-0.0855*** (0.0188)	-0.0386*** (0.00755)		-0.0454*** (0.00942)	-0.0172 (0.0121)	0.00337 (0.00807)		-0.00481 (0.00903)	0.00386 (0.00808)	-0.0358*** (0.00776)		-0.0334*** (0.00940)	-0.0617*** (0.0182)
Commodityprice_pch		0.0561*** (0.0119)	0.0314** (0.0119)	0.0282** (0.0124)		0.0451*** (0.0121)	0.0241* (0.0129)	0.0291** (0.0133)		0.0222* (0.0129)	0.00262 (0.0153)	-0.00673 (0.0156)		0.0552*** (0.0131)	0.0382*** (0.00954)	0.0279** (0.0119)
L.RGDP_EM_growth		0.0988** (0.0439)	-0.0396 (0.0551)	-0.0399 (0.0600)		0.00976 (0.0530)	-0.120** (0.0530)			0.0530 (0.0508)	-0.0896* (0.0530)			0.0896* (0.0448)	-0.0551 (0.0417)	-0.0153 (0.0445)
Global_bank_leverage				0.0682** (0.0335)												0.0569 (0.0516)
TED				-0.527** (0.261)												-0.778** (0.292)
US 10 bond yield								-0.240* (0.135)								0.0382 (0.130)
L.EMBI_growth								0.0330* (0.0165)								-0.00357 (0.0139)
L.MSCI_growth												0.0153** (0.00592)				0.0195 (0.0125)
Observations	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
R-squared (overall)	0.660	0.415	0.710	0.731	0.510	0.238	0.569	0.580	0.396	0.091	0.421	0.436	0.643	0.468	0.733	0.789
R-squared (push variables)	0.660	-	0.477	0.477	0.510	-	0.420	0.330	0.396	-	0.363	0.327	0.643	-	0.454	0.381
R-squared (pull variables)	-	0.415	0.233	0.234	-	0.238	0.149	0.144	-	0.091	0.058	0.026	-	0.468	0.279	0.227
R-squared (type variables)	-	-	-	0.021	-	-	-	0.106	-	-	-	0.083	-	-	-	0.181

EM = emerging market, EMBI = Emerging Market Bond Index, GDP = gross domestic product, MSCI = Morgan Stanley Capital International, REER = real effective exchange rate, US = United States, VIX = volatility index.

Notes: This table reports the results of the regressions of the emerging market common factors (portfolio bond, portfolio equity, other investment to banks, and total flows) on the set push, pull, and type-specific variables presented in section II, during Q2 2001–Q4 2013, and as stated in equation 11 in the main text. Definitions, sources, and frequency of all variables are presented in Appendix Table A1.1. Columns (1), (5), (9), and (13) report the results when push variables are used as regressors. Columns (2), (5), (10), and (14) report results only when push variables are used. Columns (3), (7), (10), and (15) report results when both push and pull variables are used. Finally, columns (4), (8), (12), and (16) report results when also type-specific variables are added to pull and push variables. Robust standard errors are in parentheses. Asterisks denote significant coefficients, with ***, **, * indicating significance at the 1%, 5%, and 10% level, respectively. R-squared at the group level are calculated based on the Shapley decomposition.

Source: Authors' estimates.



In terms of explanatory power, we find that push factors dominate pull factors, even when asset-specific variables are included in the regressions (see columns 4, 8, 12, and 16), even though the latter themselves are also statistically significant and with the expected sign. As reported in the group level R^2 s, push factors account for about 65% of the overall R^2 s in the case of OI banks, about 60% of the R^2 s for portfolio bonds, and about 75% in the case of portfolio equity flows. In sum, the analysis of the drivers of the EM common dynamic clearly indicate that, as expected, various global push variables play a major role, but with the relative importance of some factors varying across types of flows.

C. What Drives the Impact of Global Push Factors across Countries?

Next, we investigate what makes a country more sensitive (or immune) to changes in push factors. Why do some countries always gain (or lose) more inflows relative to other countries when conditions in core countries change? We take an agnostic approach and investigate whether macroeconomic and institutional fundamentals or financial market characteristics might explain such heterogeneity. In practice, this means that we regress the estimated factor loadings β_i^{EM} for each asset (separately) on our two sets of fundamental-related and market-structure-based variables introduced in Section II (see further Appendixes A and B for a thorough discussion of the variables). The following cross-sectional regression is estimated for each type of flow separately:

$$\beta_i^{EM} = \alpha \cdot \text{Fundamentals}_i + \beta \cdot \text{Market characteristics}_i + \varepsilon_i \quad (12)$$

Before turning to our key findings, we acknowledge that our benchmark regression results are subject to some limitations. By construction, estimations are based on a small sample of 34 cross-country observations (for each asset). Given the sample size, using all (14) fundamental-related and market-structure-based variables at once is practically infeasible. To overcome these constraints, we use the following strategy: we first regress the β_i^{EM} on the fundamentals and market variables separately. We then combine variables that are significant in each category (if any) in one regression. To confirm that this procedure yields stable results, a Bayesian Model Averaging exercise is performed in the next

section. At this point however, we emphasize that all results presented below are very robust to the issue of model uncertainty.

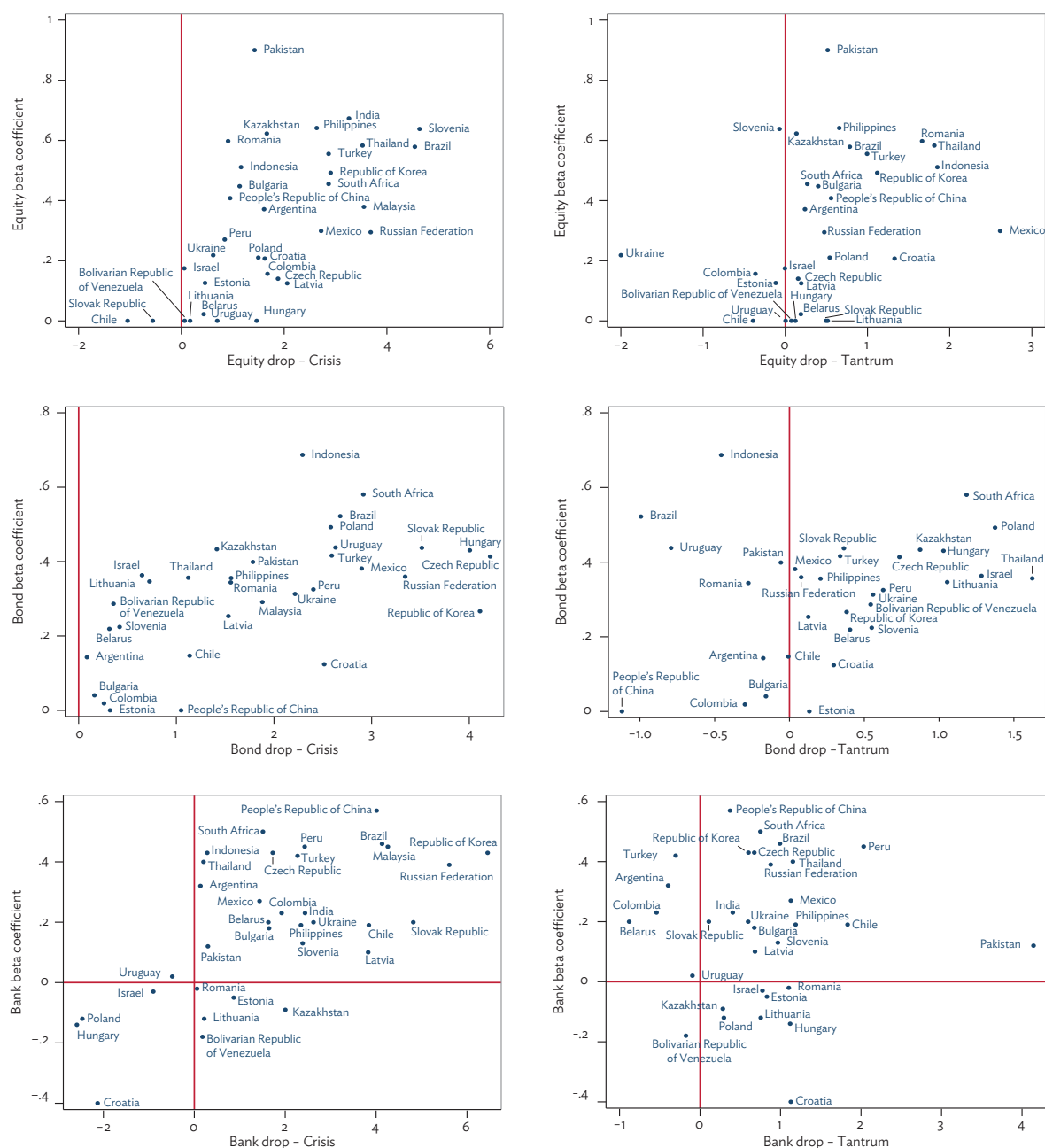
Table 5 provides the benchmark results, which are as follows. First, for the case of equity and bank flows, higher betas do not coincide with weaker fundamentals such as lower growth, higher debt, or poor institutions (columns 1–3 and 7–9).¹² As far as bond flows are concerned (columns 4–6), we find that countries with higher reserves, higher trade openness, and more flexible foreign exchange regimes are more sensitive to global push factors. Second, we find that our proxies for the importance of global investors (international mutual funds in the case of equity and bond flows, and global banks in the case of OI to bank flows) are highly significant and suggest a potentially strong quantitative impact for all types of assets. For instance, we find that going from a zero to a perfect correlation increases the predicted response to a shock in the common EM factor by 0.45 for equity, 0.24 for bonds, and 0.75 for banks. Given the general levels of the betas, as also depicted in Figure 3, these are large effects. Third, equity markets that are more liquid (as measured by the turnover ratio) and belong to the MSCI Frontier Markets Index have a higher beta. Altogether, we also find that most of the cross-sectional variation in loadings can be explained by the market-related variables.

To sum up, the results show that EMs' sensitivity to the common dynamics varies across countries and type of flows; with the nature of the investor base having the more important role in explaining the cross-country differences in the case of equity and bank flows, and also, although to a lesser extent, in the case of bond flows. Macroeconomic fundamentals (e.g., foreign currency reserves, trade openness, and the type of exchange rate regimes) seem to be playing a key role in the case of bond flows. However, there is no robust evidence that good macroeconomic (e.g., public debt, growth) or institutional fundamentals (e.g., investment climate and rule of law) have a role in explaining EM different sensitivities to global push factors.

D. Robustness

This section provides some robustness checks. We first show that the estimated betas used in the regression are not only a reflection of the global financial crisis, but that they also reflect outcomes during other periods of sharp variations in global push factors. When comparing factor loadings with actual retrenchments in capital flows during the global financial crisis and the taper tantrum, we find that, in the overwhelming majority, countries with higher betas suffered a deeper retrenchment in flows in both episodes. This positive relationship is illustrated in Figure 5, which plots the beta coefficients for each asset on the y axis against the actual loss in funding experienced during the global financial crisis (left panel) and the taper tantrum (right panel). This finding shows that our approach is indeed capturing the actual sensitivity of most EM countries during periods of sharp movements in global push factors.

¹² Only the bank flows measure seems to be sensitive to the choice of the exchange rate in column 7, but this result disappears once we control by market structure variables (column 9).

Figure 5: The Model versus the Global Financial Crisis, and versus the Taper Tantrum

Notes: The left panel reports the cumulative drop in equity (bond or bank) inflows for each emerging market during the global financial crisis against the corresponding beta coefficient (on the y-axis, as presented in section III and Figure 4). The right panel plots the same beta coefficient against the cumulative drop experienced in any given asset during the taper tantrum episode. In the case of the global financial crisis, the cumulative drop is computed at the peak of the crisis, namely Q4 2007 and Q1 2008. In the case of the tantrum, because the retrenchment was experienced in June/July 2013 and was very short-lived, some countries experienced a dip in Q3 2013 whereas others were affected in Q4 2013 (or both). To circumvent this issue, we measure the cumulative drop over the taper tantrum as the minimum value among these two quarters. Note, however, that although the other procedure yield different quantitative assessment of the dip experienced, the general picture is invariant to the method chosen.

Source: Authors.

Second, we demonstrate that the variables shown to be significant in the benchmark regression analysis are very robust to changes in covariates. Given the limited cross section at our disposal and the larger number of explanatory variables, the simple strategy we used to identify robust correlates might lead to misleading results. To address this issue of model uncertainty, we use a Bayesian Model Averaging (BMA) for each regression.¹³ In practice, BMA methods run the maximum combination of models and provide estimates and inference results that take into account the performance of the variable not only in the final reported model but over the whole set of possible specifications. After performing this robustness test, we find that the significant variables in the base regressions are always the most robust variables in the Bayesian averaging exercise (Table 6).

Third, we find that institutional fundamentals are not themselves driving the importance of global investors (fund or bank) in our sample. In particular, one could expect that countries with strong institutional fundamentals attract more global investors to begin with. As a result, the correlation variables that we found to be significant could be an indirect proxy for the quality of local institutions. However, we do not find any relation between the correlations used in the previous sections and the institutional quality of recipient markets, as measured by the value of the law and order and investor protection metrics computed by the International Country Risk Guide (Figure 6).

¹³ From a technical point of view, the BMA technique used here follows Fernandez, Ley, and Steel (2001).

Table 5: Explaining Countries' Sensitivities to Push Factors

	Equity Beta			Bond Beta			Bank Beta		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Fundamentals									
Trade openness	-0.000236			0.00179**		0.00110**	0.000708		
Debt/GDP	0.00163			0.00193			-0.00104		
Reserves/GDP	0.00190			-0.00450		-0.00559***	0.00567		
FX regime	0.0192			0.0315***		0.0203**	0.0342**		0.00766
Average growth	0.0508			0.0122			0.0486		
Investor protection	-0.0114			-0.00423			0.000348		
Law and order	-0.0199			-0.0256			-0.0696		
Market Characteristics									
Foreign openness		0.000124			0.00281			-0.00306	
Local market size (% of GDP)		0.000714						0.000733	
Relative market size		-0.00328			0.00608				
MSCI EM benchmark (dummy)		-0.0648			0.0233				
MSCI frontier benchmark (dummy)		0.228***	0.242***						
Turnover ratio		0.00176***	0.00170***						
Share of funding from AE		0.00167			0.00108				
Correlation with EPFR (or BIS) flows		0.474***	0.454***		0.260**	0.241**		0.705***	0.75***
Constant	0.0123	-0.0369	0.0637	-0.0130	0.110	0.101	-0.207	0.146	0.0994
R-squared	0.244	0.546	0.521	0.409	0.288	0.429	0.324	0.520	0.530

AE = advanced economy, BIS = Bank for International Settlements, EM = emerging market, EPFR = Emerging Portfolio Fund Research, FX = foreign exchange, GDP = gross domestic product, MSCI = Morgan Stanley Capital International.

Notes: This table presents the results of the estimation of the regression of emerging market sensitivities in each type of flow on the set of macro, institutional, and market characteristics presented in section II, Appendix A, and Appendix B. Definitions, sources, and frequency of all variables are presented in Appendix Table A1.1. Columns (1), (4), and (7) report the results when only macroeconomic and institutional fundamentals are used as regressors. Columns (2), (5), and (8) report results only when market characteristics are used. Finally, columns (3), (6), and (9) report results when using as regressors the variables that are found significant in each subgroup. For a robustness check of this approach and corresponding results, see section IV.

Source: Authors.

Table 6: Bayesian Averaging Results

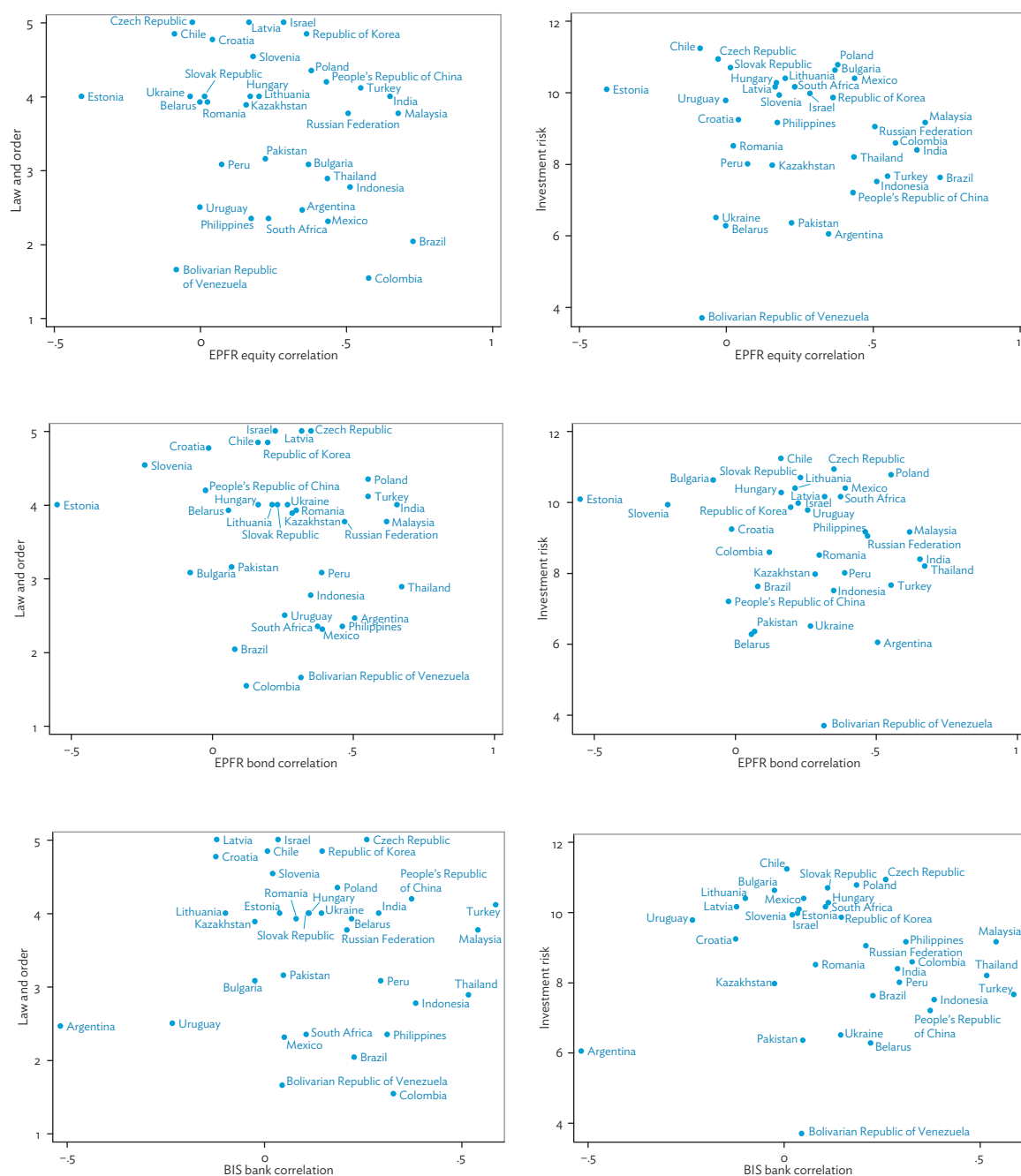
Equity-Bayesian Averaging	Coef.	t-stat	PIP	Bond-Bayesian Averaging	Coef.	t-stat	PIP	Bank-Bayesian Averaging	Coef.	t-stat	PIP
Trade/GDP	0.000	-0.17	0.09	Trade/GDP	0.000	0.30	0.15	Trade/GDP	-0.041	-0.79	0.47
Debt/GDP	0.000	0.04	0.07	Debt/GDP	0.000	0.24	0.12	Debt/GDP	-0.024	-0.4	0.21
Reserves/GDP	0.000	-0.02	0.07	Reserves/GDP	-0.001	-0.41	0.21	Reserves/GDP	0.023	0.25	0.14
FX regime	0.002	0.29	0.13	FX regime	0.019	1.34	0.73	FX regime	0.048	0.19	0.12
Average growth	0.008	0.43	0.22	Average growth	-0.001	-0.14	0.10	Average growth	-0.017	-0.05	0.1
Investor protection	-0.003	-0.27	0.13	Investor protection	0.000	-0.05	0.09	Investor protection	-0.129	-0.2	0.12
Law and order	-0.009	-0.34	0.17	Law and order	-0.001	-0.13	0.09	Law and order	0.105	0.16	0.1
Foreign equity stock/GDP	0.000	0.17	0.09	Foreign bond stock/GDP	0.001	0.27	0.14	Foreign OI stock	-0.004	-0.12	0.1
Local equity size	0.000	0.17	0.09					Private credit/GDP	0.027	0.52	0.29
Relative equity size	0.000	0.07	0.08	Relative market size	0.000	0.13	0.10				
MSCI benchmark (dummy)	0.000	-0.01	0.09	EMBI benchmark (dummy)	0.007	0.25	0.12				
MSCI frontier benchmark (dummy)	0.184	1.48	0.77								
Turnover ratio	0.001	1.45	0.77								
Share of equity funding from AE	0.000	0.24	0.11	Share of bond funding from AE	0.000	0.26	0.13				
Correlation w/ EPFR equity flows	0.325	1.39	0.74	Correlation w/ EPFR bond flows	0.102	0.70	0.41	Correlation w/ BIS flows	37.545	4.09	0.99

AE = advanced economy, BIS = Bank for International Settlements, EMBI = Emerging Market Bond Index, EPFR = Emerging Portfolio Fund Research, FX = foreign exchange, GDP = gross domestic product, MSCI = Morgan Stanley Capital International, OI = other investment, PIP = post-inclusion probability.

Notes: Given our limited cross section, standard regression methods could fail to select robust relations. To address this issue and confirm the significance of the variables highlighted in section III, we use a Bayesian Model Averaging technique presented in Fernandez, Ley, and Steel (2001). Intuitively, the objective of model averaging is to address the problem of model uncertainty by (i) running the maximum combination of models, and (ii) providing estimates and inference results that take into account the performance of the variable not only in the final reported model but over the whole set of specifications. In practice, these two steps boil down to estimate a parameter of interest conditional on each model in the model space and computing the unconditional estimate as a weighted average of the conditional estimates. This Table 6 reports the results of the Bayesian Averaging obtained for the equity, bond, and bank regressions presented in section III.C. Along with coefficient and t-statistics, it reports individual PIPs. In line with Magnus, Powell, and Prufer (2010), variables with the highest PIPs are considered as robust. Overall, we find that our key results (i.e., those related to market characteristics) are very robust to the variation in the set of regressors.

Source: Authors' estimates.

Figure 6: Institutional Quality versus Correlations



BIS = Bank for International Settlements, BOP = balance of payments, EPFR = Emerging Portfolio Fund Research, ICRG = International Country Risk Guide.

Notes: Figure 6 plots the proxies used for institutional quality against the BOP correlation with EPFR and BIS flows computed for each country in our sample. We use the ICRG law and order and investor protection ratings to proxy for institutional quality. The first, second, and third panel reports are dedicated to equity, bond, and bank correlations respectively.

Source: Authors.

IV. CONCLUSION AND POLICY IMPLICATIONS

After analyzing the sensitivity of 34 EMs to global push factors, we find that the cross-country differences in EM sensitivities to global push factors are, to a great extent, a function of market characteristics. In particular, the nature of a country's foreign investor base (the larger the role of international mutual funds in the case of equity and bond flows, and global banks in the case of bank inflows) explains the higher sensitivity of some EMs to global push factors. Macroeconomic fundamentals, in particular the type of foreign exchange regime, seem to be playing a key role in explaining cross-country sensitivities; but only in the case of bond flows. Last, but not least, we do not find evidence that institutional fundamentals (e.g., investor protection, rule of law) or standard measures of macroeconomic performance (higher growth, lower debt) have a role in explaining EM different sensitivities to global push factors.

Although these results have potentially important implications for EMs, they require careful interpretation. First, we emphasize that our findings do not mean that borrowers' fundamentals do not matter in shaping other crucial properties of capital flows to EMs. As a number of contributions have convincingly shown (e.g., Alfaro, Kalemli-Ozcan, and Volosovych 2008), countries with macroeconomic or institutional deficiencies tend to receive less capital inflows, a result we confirm in our EM sample. Different from this level effect, however, our findings suggest that the traditional push factor debate may have overstated the importance of fundamentals in shaping sensitivities to external shocks, at the expense of other important determinants. In other words, good fundamentals do not assure a country's insulation from global financial shocks. From a policy perspective, this implies that authorities in EMs should put effort into collecting information about their foreign investor base and the role of large funds (or asset management companies) in it. While systematic and reliable information on the decomposition of foreign holdings by type of investors is still insufficient, despite recent efforts (see for instance Arslanalp and Tsuda 2014), our analysis already shows that some measures can be created and used to assess countries' sensitivities.

Finally, we emphasize that further research is needed to understand the final macroeconomic impact of push factors at the country level. Although some countries might be highly sensitive to push factors, a number of parameters could dampen the overall impact of such waves of positive (or negative) inflows. For instance, the presence of a large pool of domestic investors absorbing the assets from foreigners leaving the country in times of stress could mitigate the final price and overall financial and economic impacts of sudden pressure in flows. A notable example among EMs in this respect is Malaysia, which is found to be sensitive to push factors in all assets in our analysis, but where negative inflows in times of stress are usually offset by local institutional investors repatriating foreign assets (IMF 2013b). Examination of the discrepancies between how flows and asset prices react to global push factors, and of the connected local institutional setup, constitute useful avenues that we leave for further research.

APPENDIXES

Appendix A. Details on Market Structure Variables

Since not all variables are applicable (or available) for all assets classes, we provide below a summary of the variables chosen to proxy for these dimensions, as well as their definition. Sources are presented in Appendix Table A1.1.

- **Foreign Openness** and **size** measures are based on stock variables and are used to proxy for the amount of foreign funding received and the size of the local market. To distinguish between the local and the relative size of a given market, the stock of foreign equity (or bond) in any given country is normalized (i) by the GDP of the recipient market, and (ii) by the total of foreign equity (or bonds) into the 34 EMs considered in this paper.
- **Liquidity** measures are standard and rely on trading data when available. For equity markets, we use the turnover ratio, measured by the total value of shares traded every year divided by the average market capitalization. Because trading statistics are not available for all 34 bond markets on a consistent basis, we proxy for the liquidity of bond markets by creating a dummy variable which captures the membership of country to the key EM benchmarks—the JPMorgan Emerging Market Bond Index (EMBI) for bonds and the MSCI Emerging Markets Index for equities.
- The **Composition of the Foreign Investor Base** captures two characteristics of the lender profile of EMs. First, we control for the source of funds by computing the share of the total stock of foreign equity (or bond) funding that is coming from advanced economies.¹⁴ Second, we proxy for the importance of international funds and international (or global) banks in the foreign investor base. Because a decomposition of BOP stocks or flows by type of lender type is not available, we compute, for each country in our sample, the correlation between BOP-recorded equity (or bond) flows and EPFR-recorded flows, which capture flows from mutual funds in advanced economies to (or out of) emerging markets (EMs). For bank flows, we use BIS locational statistics and compute the correlation between BOP-recorded bank flows and BIS- recorded flows. In both cases, we interpret a high correlation as a sign that funds and global banks account for most of the movements in capital flows to and from any given economy. For details on EPFR and BIS data sets, their coverage and how they relate to BOP-recorded flows, see Appendix B.

¹⁴ This includes G10 countries as well as key financial or offshore centers (Luxembourg, Ireland, Cayman, Barbados, Bahamas, Guernsey, and Jersey).

Table A1.1: Variable Definitions, Frequency, and Sources

Variable	Definition	Frequency	Source
Capital Flows			
Capital inflows	Gross inflow as % GDP, total and by component	Quarterly	IMF Balance of Payment Statistics
Global bank flows	Inflow as % GDP	Quarterly	Bank of International Settlements-Locational Statistics
Mutual fund flows	Inflow as % GDP	Quarterly	EPFR
Push/Pull factor analysis			
Real GDP growth	In %, QoQ, unweighted average of the US, euro area, Japan, and the UK	Quarterly	IMF WEO
US VIX	CBOE S&P500 Volatility VIX	Quarterly	Datastream
Expected change in policy rate	Difference between policy rate and 30-day Federal funds 6-month futures	Quarterly, average of monthly figures	Datastream and Cleveland Fed
US yield curve	10 year/3 month US Treasury yield spread	Quarterly	Datastream
US REER	US real effective exchange rate	Quarterly	IMF WEO
Commodity prices	Growth rate, QoQ	Quarterly	IMF WEO
US dealer bank leverage	(Equity+Total liabilities)/Equity	Quarterly	US Fund Flows
US TED spread	3-month TED spread (LIBOR-Treasury bill)	Quarterly	Datastream
10Y bond yield	10-year US Treasury yield	Quarterly	Datastream
MSCI returns	Return in the MSCI EM index	Quarterly	Datastream
EMBI returns	Return in EMBI index	Quarterly	Datastream
Macroeconomic and Institutional fundamentals			
Trade openness	(Export + Import)/GDP	Average over 2001–2013	World Development Indicators
FX regime*	Index from 1 to 13	Average over 2001–2013	Ilzetzki, Reinhart, and Rogoff (2004)
Public debt	as % GDP	Average over 2001–2013	World Development Indicators
Reserves	as % GDP	Average over 2001–2013	World Development Indicators
Real GDP growth	%, annual	Average over 2001–2013	World Development Indicators
Rule of law*	Index from 1 to 10	Average over 2001–2013	ICRG
Investor protection*	Index from 1 to 10	Average over 2001–2013	ICRG
Market Characteristics			
Foreign openness	Stock of foreign equity, bond, or bank claims/GDP	Average over 2001–2013	IIP
Stock market capitalization	Stock market capitalization/GDP	Average over 2001–2013	World Bank Financial Development Database

continued on next page

Table A1.1 continued

Variable	Definition	Frequency	Source
Bond market capitalization**	Bond market capitalization/GDP	Average over 2001–2013	World Bank Financial Development Database
Private credit	Bank credit to the private sector/GDP	Average over 2001–2013	World Bank Financial Development Database
Stock market turnover	Sum of all shares traded over the period / Stock market capitalization	Average over 2001–2013	World Bank Financial Development Database
Share of funding coming from AEs	Sum of bond (equity) coming from AEs and financial centers***/Total bond (equity) funding	Average over 2001–2013	CPIS
MSCI EM	Country listed in the MSCI emerging index over the sample period	Dummy	Morgan Stanley
MSCI FM	Country listed in the MSCI frontier market index over the sample period	Dummy	Morgan Stanley
EMBI EM	Country listed in the EMBI emerging index over the sample period	Dummy	JP Morgan

AE = advanced economy, CBOE = Chicago Board Options Exchange, CPIS = Coordinated Portfolio Investment Survey, EMBI = Emerging Market Bond Index, EM = emerging market, EPFR = Emerging Portfolio Fund Research, FM = frontier market, FX = foreign exchange, GDP = gross domestic product, ICRG = International Country Risk Guide, IIP = International Investment Position, IMF = International Monetary Fund, LIBOR = London Interbank Offered Rate, MSCI = Morgan Stanley Capital International, QoQ = quarter on quarter, REER = real effective exchange rate, UK = United Kingdom, US = United States, VIX = volatility index, WEO = World Economic Outlook.

Notes:

* In the case of ICRG ratings, a higher value of the index indicates better institutions. For the foreign exchange regime, a higher value implies a more flexible exchange rate.

** Bond market capitalization data are not available for all countries in the sample. When used on the restricted sample however, the bond market capitalization is not found significant.

*** See Table 1 for the list of source countries.

Source: Authors' compilation.

Table A1.2: Raw Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Fundamentals					
Trade openness	34	80.52	41.22	23.99	187.30
Public debt	34	40.69	19.08	5.95	79.21
Reserves	34	19.58	9.37	6.96	44.33
Exchange rate regime	34	8.29	3.04	2.00	13.00
Average growth	34	4.76	1.73	0.78	9.94
Investor protection	34	8.83	1.73	3.69	11.23
Rule of law	34	3.59	1.01	1.54	5.00
Equity Market Characteristics					
Foreign openness - Equity	34	6.88	7.01	0.07	24.59
Relative market size - Equity	34	2.94	4.66	0.00	17.36
Stock market capitalization	33	43.19	40.52	0.49	190.54
MSCI EM country	34	0.59	0.50	0.00	1.00
MSCI FM country	34	0.29	0.46	0.00	1.00
Stock market turnover	33	49.59	59.50	0.96	226.99
Share of equity funding from advanced economies	34	67.19	22.72	12.48	95.67
BOP equity correlation with EPFR flows	34	0.24	0.26	-0.41	0.73
Bond Market Characteristics					
Foreign openness - Bond	34	10.04	6.48	0.12	30.47
Relative market size - Bond	34	2.94	4.22	0.00	19.27
EMBI country	34	0.65	0.49	0.00	1.00
Share of bond funding from advanced economies	34	67.27	16.74	23.25	92.09
BOP bond correlation with EPFR flows	34	0.26	0.26	-0.55	0.67
Banking Market Characteristics					
Foreign openness - Other investment	34	36.29	19.08	4.32	96.40
Private credit/GDP	32	63.39	29.11	24.57	138.60
BOP OI-Bank correlation with BIS flows	34	0.13	0.22	-0.52	0.59

BIS = Bank for International Settlements, BOP = balance of payments, EM = emerging market, EMBI = Emerging Market Bond Index, EPFR = Emerging Portfolio Fund Research, FM = frontier market, GDP = gross domestic product, MSCI = Morgan Stanley Capital International, OI = other investment.

Source: Authors' estimates.

Appendix B. Balance of Payments Flows, EPFR Fund Flows, and BIS Banking Flows

This appendix presents the key properties of the other capital flows data set based on dealer data used in this paper, the EPFR global data set and BIS locational banking statistics, and their connection with BOP-recorded flows. In both cases, we argue that using the correlation between each of these data sets and its counterpart in the BOP statistics approximates well the importance of such intermediaries in driving capital flows to emerging markets.

To proxy for the importance of funds (in particular, mutual funds) in driving portfolio flows recorded in the BOP, we use the EPFR Global data set. EPFR Global tracks the performance and asset allocation of a vast number of equity and debt funds domiciled in developed countries and important offshore financial centers. Over time, its coverage has increased significantly, and now reaches a wide range of industries and territories. As of 2013, the EPFR global was collecting information from more than 29,000 equity funds and 18,000 fixed-income funds, representing \$20 trillion of assets invested in over 80 mature and emerging markets.

As a result of its extensive coverage and quality,¹⁵ EPFR Global has been widely used in recent seminal contributions about funds behavior, in particular in the country flows format used in this paper (e.g., Raddatz and Schmukler 2012; Jotikasthira, Lundblad, and Ramadorai 2012; Fratzscher 2011; and others). In particular, given that most of the funds followed by the EPFR Global data set are located in advanced economies and account for a significant share of the external funding received by EMs, the country flows data set has proved to be a good (high frequency) proxy of total gross inflows in (or out) of emerging economies. For instance, Miao and Pant (2012) show that EPFR fund flows correlate well with BOP-recorded capital flows into emerging markets, thereby suggesting that when funds play an important role in the foreign investor base of a given country, EPFR flows act as a timely and accurate proxy for overall portfolio flows.

On the other hand, two important methodological issues prevent us from simply retrenching EPFR flows from BOP-recorded flows to assess the importance of funds. First, EPFR only covers a fraction of the mutual fund industry. Second, because EPFR fund flows are based on dealer transactions, recorded flows are not always consistent with the residency criteria used to record transactions in the BOP data. For instance, when a fund dedicated to India and located in the US sells an Indian bond to another nonresident (which is not covered by EPFR), this sale is recorded as an outflow from India in the EPFR data, but does not generate a negative inflow in India's BOP. As a result, the discrepancy between BOP and EPFR flows can sometimes be large: for a thorough discussion, see Koepke and Mohammed (2014). Relying on the correlation, rather than share in gross inflows, allows us to circumvent these issues.

To proxy the importance of global banks in driving nonresident gross inflows to banks, as recorded in the BOP, we use the BIS International Banking Statistics. These track internationally active banks' foreign positions through two main data sets: the BIS Consolidated Banking Statistics and the BIS Locational Banking Statistics (LBS). We use the BIS LBS instead of BIS Consolidated Banking Statistics because the first data set provides data following the same residency principle as the one used in BOP data; see Cerutti et al. (2012) for further details). LBS captures the cross-border positions of all banks—

¹⁵ The EPFR data set has been found to be a reliable data source. Comparing total net assets and monthly returns of a subsample of EPFR funds to the Centre for Research in Security Prices mutual fund data, Jotikasthira, Lundblad, and Ramadorai (2012) found only minor differences between EPFR and the Centre for Research in Security Prices data sets. See Puy (2013) for a thorough discussion of EPFR data set.

defined as deposit-taking corporations, except the central bank in the Balance of Payments Manual (BPM6)—domiciled in the reporting area (about 40 countries, mostly advanced economies and financial centers), including gross position vis-à-vis their foreign affiliates, against borrower countries.

From the LBS data, based on publicly available data, it is possible to breakdown how much are the gross inflows going to the banking and nonbanking sector of each borrower country. The evolution of the global banks' claims (as reported by BIS) against the banking sector of each borrower country in our sample is the series that we correlate with OI to banks in order to define the correlation variable used as proxy for the composition of the foreign investor base. Since LBS largely reflects the position of prominent international banking centers (e.g., Minoiu and Reyes 2013 find that the top globally connected lenders in the LBS data set are banks operating in Belgium, France, Germany, Japan, Switzerland, the United Kingdom, and the US) we interpret a high correlation between the selected LBS series and OI to banks in a given EM country as signaling a larger activity of global banks in that borrower country. In addition to global banks, BOP figures also include nonbanks and banks located outside BIS reporting countries (e.g., the People's Republic of China) as lenders.

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Push Factors and Capital Flows to Emerging Markets: Why Knowing Your Lender Matters More Than Fundamentals

The paper analyzes the gross capital inflows' behavior across 34 emerging markets (EMs). It finds that aggregate inflows to EMs comove considerably, that countries relying more on international funds and global banks are more sensitive to push factors, and that EMs need to closely monitor their lenders and investors to assess their inflow exposures to global push factors. While global push factors in advanced economies mostly explain the common dynamics, their relative importance varies by type of flow. Meanwhile, the sensitivity to common dynamics varies significantly across borrower countries, affected strongly by market structure characteristics rather than their institutional fundamentals.

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