

Ride the Wild Surf: An investigation of the drivers of surges in capital inflows^{*a}

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Abstract

Over the last 15 years, gross inflows to industrial and developing countries have enjoyed a wild ride. After reaching record highs in the run-up to the global financial crisis, they collapsed dramatically in 2008-9. As signs of global recovery reappeared, capital inflows resumed although at different speeds. The recovery in flows was faster and sharper in developing countries. This paper aims at understanding the (domestic and external) drivers of these surges in gross inflows using quarterly data for 71 countries from 1970 to 2010. We find that domestic and external factors have a significant explanatory power in driving surges of inflows. This finding holds for the sample of industrial countries whereas domestic factors play a significantly larger role in explaining surges to developing countries. Zooming into our findings shows that: (a) overvalued currencies tend to attract massive capital inflows, (b) surges to either industrial or developing countries are driven by regional contagion, (c) strong growth and natural resource abundance are key to attract inflows of foreign capital into developing countries, and (d) lower policy uncertainty about the global economy tend to trigger surge episodes.

Keywords: Gross capital flows, Surges

JEL Codes: E32, E51, F21, F32

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1. Introduction

Global capital flows have been on a wild ride and this is reflected in the substantial increase of cross-border asset trade over the past fifteen years. Figure 1 shows that gross capital inflows to both industrial and developing countries surged considerably during the pre-crisis period. Gross inflows to industrial countries went up from 9 percent of GDP in 2001 to 24 percent of GDP in 2007 while gross inflows to developing countries increased from 2 to 12 percent over the same period. In the wake of the global financial crisis, global capital flows retrenched dramatically and, as the world economy recovered, they regained momentum —especially in developing countries.¹

This paper aims to understand what drives the observed global trends in capital flows. Are these massive inflows of foreign capital being pulled by favorable growth prospects and sound macroeconomic policies in the recipient countries? Or are they being by lower returns and greater risk appetite in advanced economies? An analysis of the drivers of surges in gross inflows is important not only for their consequences on real economic activity but also for their impact on financial stability.

Surges of private inflows, when led by higher FDI rather than portfolio investment, tend to boost growth in manufacturing activity; most notably, among industries dependent on external financing (Aizenman and Sushko 2011). In addition, massive inflow of foreign capital may lead to credit build-up and asset price booms and, in some cases, end up in a systemic banking crisis (Tornell and Westermann, 2002; Barajas et al. 2009; Calderón and Servén, 2011; Calderón and Kubota, 2012). The global financial sector is not only expanding but also intermediating gross financial assets and liability flows that are rapidly moving across borders. The dynamics of net flows (and their counterpart in the current account) cannot always capture these movements. Therefore, it is important to manage gross flows for financial stability. Gross financial flows are becoming larger than their corresponding current account balances in countries that are financially globalized. The analysis of gross flows enables the identification of countries with greater intensity of cross-border asset trading and, hence, more susceptible of financial instability (Johnson, 2009). Rising gross flows can be a conduit for development opportunities and may reflect more efficient risk diversification across the globe and lower portfolio risk for a country's investors. At the same time, increasing cross-border financial transactions tend to propagate *interconnected counterparty risks* across the system; thus, heightening systemic risks in times of turmoil (Cecchetti, 2011).

The sharp increase in two-way trade of debt-type instruments explains the greater intensity of cross-border financial transactions. Debt securities also carry risks to financial stability for the involved countries regardless of their current account balance (Gourinchas, 2011). Negative shocks to global liquidity will sharply increase counterparty risks and potentially destabilize the

¹ Milesi-Ferretti and Tille (2011)

financial system. For instance, rollover risks will rise in countries with greater share of short-term liabilities. Liquidity problems can easily propagate and lead to insolvency of financial institution and the ensuing contagion can spread rapidly across national borders (Obstfeld, 2012).

Recent efforts in the literature have focused on the synchronization of real and financial cycles across economies (Claessens, Kose and Terrones, 2012). Rapid financial intermediation may foster growth; typically, through higher TFP growth rather than capital deepening (Levine, 2005). However, it can also lead to greater volatility and higher incidence of financial crises (Kaminsky and Reinhart, 1999; Gourinchas and Obstfeld, 2012). In turn, credit booms can be the outcome of surges in private capital inflows (Bruno and Shin, 2013; Calderón and Kubota, 2012) and the rapid leverage build up has preceded periods of financial instability and crisis (Borio and Disyatat, 2011; Gourinchas and Obstfeld, 2012).

It is imperative for policymakers to fully understand their impact on financial markets because surges of gross inflows statistically precede excessive monetary expansions, credit booms, asset price bubbles and overvalued currencies and then those risks could raise the economy's vulnerability to currency and maturity mismatches. This has led to a renewed debate on the implementation of macro-prudential policies to manage systemic risks and, more specifically, contain systemic risks associated to excessive credit creation. These tools are implemented to decouple or mitigate the relationship between surges in inflows and the incidence of credit booms. In this context, a mixed policy toolkit (with complementary monetary and macro-prudential policy measures), along with a sound regulatory framework, is required to manage large capital inflows (Balakrishnan et al., 2012).²

Our goal is to examine whether pull and/or push factors drive surges in gross capital inflows. We conduct Probit and Complementary log-log panel regression analysis for a sample of 71 countries using quarterly data from 1970 to 2010.³ As we observe from Figure 1, sharper gross inflows (and outflows) are not necessarily matched by movements in net inflows. We indirectly test this hypothesis by comparing the ability of pull and push factors in driving surges in gross inflows relative to surges in net inflows. In general, our findings support that both pull and push factors would help explain the massive flow of funds from foreign investors. For instance, financial factors at home (as proxied by the real exchange rate overvaluation) and abroad (as measured by proxies of global policy uncertainty and global stock market volatility) play a greater role in explaining surges in gross inflows rather than surges in net inflows. This finding is consistent with the greater two-way debt flows experienced by countries across the world (and mainly associated to financial developments).

² In spite of the prescription of a mixed policy toolkit, it is still recommended the use of conventional macroeconomic instruments as the first line of defense against large-scale capital flows (Chowdhury and Keller, 2012).

³ We evaluate the incidence of surges for a sample of quarterly data of 71 countries from 1970 to 2010. When running our regression analysis: (a) the sample of countries is reduced to 69 or 67 due to the lack of availability of information for the pull and push factors, and (b) we run the regression from 1975 to 2010 (that is, for the post-Bretton Woods era).

The main message of this paper is that both domestic and external factors drive surges in gross and net private capital inflows. Higher growth leads to surges of gross inflows in the domestic economy. The incidence of surge episodes is reduced in countries with more flexible exchange rate regimes. Current account developments are a robust predictor of surges in net inflows, therefore, higher current account deficits bring about a greater amount of foreign financing. On the other hand, overvalued currencies play a greater role in explaining surges in gross flows. Surges robustly tend to happen in countries with natural resource abundance. Foreign investors tend to deploy financing funds to primary commodity exporting countries depending upon, among other things, the evolution of commodity prices, including fuel, mineral ores and metals. Surges are more likely to occur in countries with greater financial openness, and these episodes are mostly driven by surges in debt rather than in equity inflows. Push factors, as captured by global policy uncertainty and global stock market volatility, predict subsequent surges in both net and gross inflows from the external economy to the domestic economy. Regional contagion also drives the higher incidence of surges. Strong economic growth and natural resource abundance attract foreign investors to pull massive capital flows into developing countries. Domestic factors are the major driving force of surges in the developing countries while domestic and external factors induce surges in the industrial countries.

This paper consists of 5 sections. Section 1 motivates the topic of surges in gross inflows. Section 2 documents the literature on the surges in capital inflows while Section 3 describes the data and methodology. Section 4 reviews the econometric methodology and presents the empirical evidence with limited dependent variable techniques while Section 5 concludes.

2. Literature review

This section reviews the literature on the pull and push drivers of capital inflows. The recent literature focuses on the domestic and external factors influencing the flow of foreign financing into the domestic economy by evaluating the drivers and consequences of extreme movements in capital inflows; namely, surges in capital inflows (also labeled in the literature as either capital flow bonanzas or capital flow booms). Most of these studies look at entry of net inflows whereas most recent studies analyze surges of gross inflows.

The empirical literature initially focused on the internal and external drivers of capital inflows to developing countries; also known as pull and push factors, respectively. The amount of capital flows to developing countries is assumed to be influenced the global environment (push factors such as world real interest, world market returns and volatility, global risk aversion, among others), and domestic economic conditions—including, economic performance, quality of macroeconomic policies and institutions, among others (Fernández-Arias, 1996).

This strand of the literature finds that economic conditions that are external to developing countries play a larger role in driving capital inflows (e.g. Fernández-Arias, 1996; Calvo, Leiderman and Reinhart, 1993) and, consequently, developing countries are vulnerable to

changes in foreign investor sentiment and to shocks in the external environment. More specifically, one of their main findings is that inflow of foreign financing into developing countries is largely pushed by low returns in advanced economies rather than pulled by country-specific factors. More recent evidence using mutual funds data across 50 countries tend to confirm the aggregate macroeconomic results. Fratzscher (2012) uses weekly information of portfolio investment flows to find push factors such as global liquidity and risk are the main drivers of capital inflows during the 2007-8 global crisis and the post-financial crisis recovery. He also shows that pull factors such as the quality of institutions and macroeconomic fundamentals help explain the inflow of capital into emerging markets only during the post-recovery period.

The literature also characterizes the extreme movements in capital inflows and investigates the non-linear relationship between pull-push drivers and massive (in and/or out) waves of capital flows. An initial attempt in the literature identifies capital flow bonanzas using annual information of net capital inflows (Reinhart and Reinhart, 2009; Cardarelli, Elekdag, and Kose, 2010). These studies find that capital flow bonanzas are persistent and are typically disrupted by a crisis episode —say, an abrupt reversal, banking, currency and inflation crises, or sovereign default episodes (Reinhart and Rogoff 2008).⁴ Furthermore, these studies put emphasis on the evolution of pull factors during the bonanza period: massive (net) inflows of foreign capital are associated with an acceleration of economic growth, the deterioration of the current account and a real exchange rate appreciation (Cardarelli et al. 2010).

On the other hand, recent papers have investigated the role of pull and push factors during episodes of massive inflows of foreign capital (*i.e.* surges). Ghosh, Kim, Qureshi and Zalduendo (2012) identify more than 300 surges in (net) capital inflows among 56 emerging market economies over the past 30 years.⁵ They find that push factors, captured by lower US interest rates and lower global risk aversion, play a major role in explaining the likelihood of inflow surges. Pull factors like the quality of institutions and economic growth may also help predict the incidence and the magnitude of future surges.

Unlike the research reviewed so far, Forbes and Warnock (2012a b) use gross flows to identify episodes where domestic and foreign investors increase or decrease significantly their flow of capital into or out of the domestic economy (*i.e.* surges, stops, flights, and retrenchment episodes). Calderón and Kubota (2012) show that foreign and domestic investors' decisions are driven by different factors and have dissimilar responses to shocks and policies. The data of

⁴ Sula (2010) find that sudden stops in emerging markets are more likely to take place if preceded by massive surges in capital inflows. This probability is even higher if: (a) surges are accompanied by widened current account deficits and overvalued real exchange rates, and (b) surges are mainly driven by debt-type inflows. Agosin and Huaita (2011, 2012) also find that net capital inflows sow the seeds of sudden stops in Latin America.

⁵ Ghosh et al. (2012) identify more than 300 surges in (net) capital inflows. These episodes are highly synchronized in different periods: (a) the early 1980s (when US monetary policy contracted and the Latin America debt crisis erupted), (b) the early 1990s (as LAC economies stabilized and emerged from the crisis), and (c) the mid-2000s (as emerging markets recovered from the Asian financial crisis and the devaluation of the Russian ruble).

gross inflows and outflows collected by Forbes and Warnock (2012 a b) is quarterly for more than 50 emerging and advanced economies from 1980 to 2009. They differentiate between sharp portfolio shifts of domestic vis-à-vis foreign investors. Their findings show that push factors are the main drivers of surges in gross inflows: decreased economic uncertainty, greater risk appetite, loose monetary policies in the advanced world and sustained global growth will raise the likelihood of massive inflows from foreign investors in emerging markets. Economic growth is the key pull factor explaining gross inflow surges (Forbes and Warnock 2012a). By type of flows of driving the surges, lower risk aversion and regional contagion tend to affect the likelihood of surges if the increases in gross flows are mainly attributed to debt-type flows — say, bonds and banking flows (that is, debt-led surges). On the other hand, equity-led surges (i.e. surges driven by FDI and portfolio equity increases) do not have a systematic association with either pull or push factors; therefore, they are more likely to be idiosyncratic (Forbes and Warnock 2012b).

Powell and Tavella (2012) also examine the role of push and pool factors in influencing the likelihood of surges in gross inflows that end up in a banking crisis.⁶ They find that the composition of capital inflows among emerging markets plays a key role: countries that experience a greater entry of portfolio and banking inflows are more prone to financial crisis.⁷ From a policy perspective, their findings show that the likelihood of surges ending up in gross reversals can be mitigated in countries with greater reserve accumulation and better financial oversight.

3. Defining Surges in Capital Flows

This section describes the methodology used to identify episodes of surges in gross private capital inflows using quarterly data information for 71 countries (23 industrial economies and 48 developing countries) from 1975 to 2010. We then describe the sources of data used to obtain our data on capital flows. Finally, we count the number of surge episodes using alternative criteria for these massive inflows and two different measurements: the first measure uses the overall amount of gross inflows whereas the second one considers only the private component of gross inflows. The identification criteria follows in this paper is: (a) CDMN criterion adapted from Cowan, De Gregorio, Micco and Neilson (2008), and (b) FW criterion as implemented in Forbes and Warnock (2012a, b).

3.1 Methodology

⁶ Broner et al. (2013) show that the volatility of gross capital flows has become extensive over during financial crises and that massive gross inflows tend to precede both domestic and global crisis, with the size of the surge being larger in the run-up to global crisis

⁷ This finding is analogous to that found by Calderon and Kubota (2009).

We first describe the procedure to identify episodes of surges in gross private inflows.⁸ Private inflows are computed as the overall inflows minus its public sector component—that is, gross other investment (OI) inflows associated to OI general government and monetary authority inflows.⁹ Our first criterion to identify surge episodes in gross inflows mainly follows the methodology implemented by Forbes and Warnock (2012a, b)—which we denote as the FW criterion. According to this criterion, we first compute the cumulative sum of gross inflows over the last four quarters (i.e. cumulative annual inflows in period t). We denote C_t , as the sum of quarterly gross capital inflows (GIF) over the last four quarters. In addition, we define ΔC_t as the year-over-year changes in C_t . We can express these variables as follows:

$$C_t = \sum_{i=0}^3 GIF_{t-i}, t = 1, 2, \dots, n$$

where:

$$\Delta C_t = C_t - C_{t-4}, t = 5, 6, \dots, n$$

Next, we calculate the rolling mean and standard deviation of ΔC_t for each country. Surges in gross inflows are defined as periods when ΔC_t increases more than one standard of deviations above its rolling mean. Consequently, the end of surge periods indicates that ΔC_t drops below one standard of deviation above its rolling mean. Therefore, surges in gross capital inflows are captured by a dummy variable that takes the value of one whenever the conditions stated above hold, and zero otherwise.

We apply similar criteria as stated above to gross inflows as a ratio to GDP. This is in line with our second identification criterion—which follows the strategy outlined in Cowan, De Gregorio, Micco and Neilson (2008). We use gross overall inflows and we divide them by GDP. The identification of surges in gross capital inflows normalized by GDP is denoted as the CDMN-criterion to define inflow surges. We then divide the amount of gross inflows by the amount of real GDP. More specifically, we take the one-year (4-quarter) lagged value of real GDP.¹⁰

3.2 Data and Episode Counting

Our database comprises quarterly information on both net and gross private capital inflows for 71 countries (23 industrial economies and 48 developing countries) from 1975q1 to 2010q4. We collect data on the amount of both net and gross private capital inflows as well as its different

⁸ Note that we focus on surges in gross inflows rather than those in net inflows. Surges in net inflows can be driven by: (i) foreign investors pouring new financial resources into the domestic economy, or (ii) domestic investors shifting their portfolio back to the domestic economy (i.e. an increase in portfolio home bias). This paper focuses on the behavior of foreign investors and on policy implications to address issues related to inflows of foreign financing. Therefore, we use gross rather than net capital inflows.

⁹ For the same of completeness, and especially for developing countries, we have also identified surges in “net” capital inflows. See Table 1 for the number of episodes in net inflows vis-à-vis gross inflows.

¹⁰ We also divide the amount of gross inflows to the actual (rather than lagged) GDP. The episode count as well as the empirical analysis with these episodes of surges are not reported but is available upon request.

components —foreign direct investment (FDI), portfolio investment (PI) (in equity and debt securities), and other investment (OI). In turn, the database also includes the components of gross private OI inflows —such as OI banking inflows, and OI other sector inflows.

Based on the different components of the net and gross private capital inflows, we distinguish between equity-based vis-à-vis debt-based gross capital inflows. Equity-based inflows are defined as the sum of FDI inflows and portfolio inflows in equity securities. Debt-based gross inflows, on the other hand, are the sum of portfolio inflows in debt securities and other investment (OI) inflows from the foreign private sector. The data on capital flows is collected from the IMF's Balance of Payments Statistics. We normalize gross capital flows by the permanent component of GDP (in US dollars at current prices). The GDP data is gathered from the World Bank's World Development Indicators (WDI) and the permanent component of GDP is then computed with the Hodrick-Prescott filter (HP filter).

Frequency of surges in private inflows. Our first step is to identify the number of episodes of surges in private capital inflows from our quarterly database on gross capital inflows. Table 1 enumerates the number of these episodes by: (a) different criteria to identify surges (CDMN vs. FW), (b) different groups of countries (industrial vs. developing), and (c) different types of private flows —namely, debt- vs. equity-type inflows.

The CDMN-definition identifies overall 248 surge episodes in **gross** private inflows —of which 71 episodes take place in industrial economies and 177 in developing countries. Nearly three quarters of surges in private flows (181) are debt-driven while 67 surge episodes are driven by surges in private equity inflows. When we look at the FW-defined episodes, two-thirds of surges in private inflows are debt-driven (134) while nearly one third of episodes are driven by gross equity inflows (64). Our identification of surges in capital inflows shows that regardless of the definition or group of countries, surges are mainly driven by surges in debt-based gross inflows. Indeed, the proportion of surges driven by private debt flows is greater among industrial countries than in developing countries regardless of the criteria to identify the surge. For instance, more than 2/3 of private inflow surges are debt-driven among developing countries compared to 4/5 among industrial countries.

Compared to surges in gross flows, we also calculate surges in **net private inflows** following the same criteria. In Table 1 there are fewer episodes of surges in net inflows than surges in gross inflows. For instance, we identify 248 episodes of surges in gross inflows using the CDMN criteria vis-à-vis 201 episodes of surges in net inflows. Consequently, this finding is driven by the greater amount of episodes of surges in gross inflows relative to net inflows found in emerging markets. At the same time, greater intensity of two-way capital flows experienced by these countries since the 2000s is yielding a higher likelihood of surges in gross inflows taking place rather than surges in net inflows. Clearly, most of the episodes of surges in gross inflows are driven by surges in debt inflows as it is also in the case of surges in gross flows; however, equity inflows play a larger role in driving surges in net inflows. Equity-driven inflows explain

52 percent of the surges in net private inflows for all countries. This share is even larger for developing countries (55 percent or 68 out of 123 episodes).

The FW-definition, on the other hand, identifies 198 surge episodes in gross private inflows for all countries (of which 52 and 146 episodes take place in industrial countries and developing countries, respectively). Approximately, 68 percent of the total surges are driven by debt-type inflows while the remaining 32 percent is driven by equity-type inflows. Regardless of any definition of inflow surges about 68-73 percent of episode in gross private inflows are debt-driven while about 27-32 percent of surge episodes are equity-driven. We also find 169 episodes of surges in net inflows using the FW criterion —with 90 of these episodes being driven by equity surges (53 percent). Accordingly, the share of equity-driven surges in net inflows is greater than or equal to 50 percent for both industrial and developing countries.

Finally, Figure 2 depicts the evolution of gross surges from 1970-99 to 2000-11. It shows that gross surges have increased sharply over the last decade: 30 percent of the episodes took place in 1970-99 whereas the remaining 70 percent occurred in the last decade. The share of episodes taking place among industrial countries as a share of the total ones has increased over the last decade —from nearly 20 to 30 percent of total episodes. There is also a greater frequency of equity-driven surges as this proportion has increased from 10% in 1970-99 to almost 20% in 2000-11.

Main features of surges in private inflows. Table 2 characterizes the main features of surges in CDMN-defined surges in private gross inflows by computing their average duration and median amplitude. The duration of surges in gross inflows is similar across country groups over time. If we compare the periods 1970-99 and 2000-11, the differences are negligible. For instance, the duration of surges decreased from an average of 3.7 quarters in 1970-99 to 3.6 quarters in the period 2000-11. Over the period 1970-2011, surges tend to last 3.5 quarters among industrial countries while the average duration of surges for developing countries is 3.6 quarters.

Next, we compute the median amplitude of surges in gross inflows, as well as selected percentiles of the distribution of surges —specifically, the 25th and 75th percentile (that is, bottom and top quartile).¹¹ The amplitude of those surges for the representative country over the period 1970-2011 is nearly 1.3 times as much as its standard deviation. Furthermore, the range of fluctuation of the depth of surges is the 25th and 75th percentiles of the amplitude of the surge are 1.1 and 1.5 times as much as their standard deviation, respectively. On the other hand, the median amplitude of the surges in gross inflows among industrial countries is 1.3 times as much as its standard deviation while that of developing countries is 1.2 times. In both country groups, we find that the amplitude of the surge has somewhat increased. For instance, it grew from 1.2 to 1.3 times as much as the standard deviation for developing countries from 1970-99 to 2000-11.

¹¹ Other selected percentiles were estimated. The results are not reported but available upon request.

Concordance between surges in gross inflows and boom-bust financial cycles. Table 3 shows the percentage of gross inflow surges that coincide with lending booms. Although there is no unique method to identify lending booms, we use two criteria; one, Mendoza and Terrones (2008, 2012) and another, Gourinchas, Valdes and Landarretche (2001), which we call MT-booms and GVL-booms respectively. As inflows of foreign capital can help predict the likelihood of credit booms, Calderón and Kubota (2012) find that on average 16 percent of gross surges tend to coincide with the MT-lending boom. On the other hand, that share in terms of the likelihood to the total episodes increases sharply to approximately 40 percent when using the GVL-booms. Therefore, our findings based on the GVL definition of booms find that the percentage of surges coinciding with lending booms is greater among developing countries. For instance, one out of every two surges in gross inflows is accompanied by a lending boom while one out of every three for industrial countries. We also find that the probabilities to coincide gross surges with GVL-lending booms has increased from 1975-99 to 2000-11 among industrial countries while it has declined for developing countries after 2000.

The last two columns of Table 3 show the percentage of surges in gross inflows that are followed by either a sudden stop and/or a banking crisis. Consequently, those columns show the proportion of gross inflows that are followed either by turmoil or a soft landing. Over the period 1970-2011, we find that one out of two surges in gross inflows (52.5 percent) end up in a sudden stop among developing countries. On the other hand, the share of gross surges that are followed by a sudden stop is smaller among industrial countries as 1 out of 3 surges (34.1 percent) ends up in a sudden stop although the likelihood of gross inflow surges followed by a sudden stop has declined over the last decade. Finally, our results show that 20.5 percent of gross surges tend to precede a full-blown banking crisis over the period 1970-2011 (roughly 1 out of every 5 episodes) although its proportion has declined over the last decade for developing countries (from 38 percent in 1970-99 to 10 percent in 2000-11). Moreover, it has increased for industrial countries (from 9 to 27 percent over the same periods).

4. Regression analysis

This section reviews the econometric methodology implemented to assess the drivers of surges in gross capital inflows. More specifically, it discusses the limited dependent variable techniques applied in our empirical analysis such as the linear probabilistic model (Probit) and the complementary log-log model (*cloglog*). Then, we describe the definition and sources of data of the different drivers of surges in gross inflows, including push vis-à-vis pull factors. Finally, it presents a detailed analysis of the empirical results.

4.1 Econometric Methodology

Our main goal is to evaluate the determinants of surges in gross capital inflows by estimating panel Probit and cloglog models. The distinction between the Probit and cloglog models is not trivial. Complementary log-log models are typically used when a probability of the event is very small or very large. In contrast to logit and probit, the cloglog function is asymmetric (or, more specifically, not symmetric around zero). When compared to logit and probit models, cloglog assumes that the cumulative distribution function is asymmetric —i.e. approaching to 0 slowly but approaching 1 faster. On the one hand, the Probit model assumes that observations are temporally independent while time series and cross section data with a binary dependent variable is identical to grouped duration data that could be temporally dependent. On the other hand, the cloglog model is the exact grouped or interval-censored duration analogue of the Cox proportional hazard model (Jenkins, 2008). The cloglog model can fall directly out of the continuous time Cox model (Beck, Katz and Tucker, 1998; Jenkins, 2008) while the Cox proportional hazard is commonly used. Indeed, the advantage of the Probit (or logit) modeling is their flexibility to extend the various ways to allow the model to deal with cross sectional dependence, and to combine and derive the logistic analogue of cloglog (Beck, Katz and Tucker, 1998; Williams, 2009).

Our binary dependent variable, *Surge*, takes the value of **1** whenever there are surges in gross inflows (as identified by the criteria specified above) and **0**, otherwise. This model captures the likelihood of surges taking place in a country *i* at a specific time period *t*. The matrix of explanatory variables *X* comprises forcing variables that influence the outcome variable, *Surge*. Therefore, our probabilistic model (*Probit*) takes the form $P(\text{Surge}=1 / X) = \Phi(X' \beta)$, where the left-hand side of the equation represents the probability *P* of a surge taking place given the set of forcing variables *X*, and Φ is the *Probit* function. In contrast, the specification $P(\text{Surge} = 1 / X) = 1 - e^{-e^{X'\beta}}$ models the probability *P* of a surge taking place given the set of forcing variables *X*, and $1 - e^{-e^{X'\beta}}$ is the *cloglog* function.

The goal of our empirical assessment is to estimate the vector β of parameters by maximum likelihood. We first specify our panel *Probit* model as a latent variable model and assume that there is a random variable *Surge** such that $\text{Surge}^* = X'\beta + \xi$, where ξ represents the error term, and *Surge** indicates whether this latent variable is non-zero (i.e. *Surge* is equal to one if there is a credit boom, and 0 otherwise).

Our first specification —the *Probit* regression equation— takes the following form:

$$P(\text{Surge} = 1 / X) = \mu_i + \mathbf{b}\mathbf{X}_{it} + \xi_{it}$$

where \mathbf{X} is the matrix of explanatory variables —which comprises our set of pull and push factors that drive gross capital inflows. In addition, μ_i captures the country-specific effect, and ξ_{it} is the error term. The matrix of parameters \mathbf{b} captures the coefficient estimates of the drivers of

gross inflows. Note that all control variables are lagged so as to avoid likely reverse causality issues.

Our second specification —the complementary log-log or *cloglog* model, is:

$$P(\text{Surge} = 1 / X) = \omega_i + \mathbf{c}(\mathbf{L})\mathbf{X}_{it} + v_{it}$$

where ω_i captures country-specific effects, and v_{it} is the error term while the matrix \mathbf{c} contains the coefficients of the determinants of capital inflows (summarized in the matrix \mathbf{X}).¹²

4.2 Sources of data for the regression analysis

Our set of explanatory variables is divided into two groups: pull vs. push factors. The criteria to define surges in inflows are described in subsection 3.1 when the sources of the data on capital inflows are described in subsection 3.2. If the country exhibits attractive domestic conditions, foreign capital may increasingly flow into the domestic economy. Profitable investment opportunities in the domestic economy and better country creditworthiness will “*pull*” capital inflows as sustained gross inflows are also attributed to good economic fundamentals and sound domestic policies (Fernandez-Arias, 1996). In contrast, capital inflows are mostly “*pushed*” by external factors —and, particularly, monetary and fiscal policies in industrial countries (Elekdag and Wu, 2011; Fratzscher, 2012). In this case, surges in inflows to the domestic economy are partly influenced by lower interest rates in industrial countries (Calvo, Leiderman, and Reinhart, 1993).

Pull Factors. They comprise domestic factors that make the recipient economy attractive to foreign investors. It includes outcome and policy variables that capture macroeconomic performance (growth in real GDP, inflation, exchange rate flexibility, and the current account balance), developments in the domestic financial sector (as captured by the evolution of the domestic credit and the exchange rate), international integration (i.e. trade and financial), among others.

A barometer of the performance in real economic activity is the growth rate of real GDP although a multiple set of indicators capture macroeconomic performance. The data on quarterly GDP (in local currency at constant prices) is collected from various sources —DataStream, Haver Analytics and national statistical institutions and central banks. We use the seasonally adjusted data on quarterly GDP —and, more specifically, the annual growth rate in real GDP.¹³ We next include some indicators of the macroeconomic policy framework. The inflation rate — as proxy of monetary stability— is measured by the (year-over-year) percentage change of the consumer price index (CPI) where the data is from the IMF’s International Financial Statistics

¹² Analogously, all control variables are lagged to avoid reverse causality problems.

¹³ If the source provides only the non-seasonally adjusted real GDP, we use the non-parametric X-12 ARIMA Census approach to adjust for seasonal components.

(IFS). The flexibility of the exchange rate arrangements, on the other hand, is proxied by the *coarse* classification of exchange rate regimes developed by Reinhart and Rogoff (2004) and updated by Ilzetki, Reinhart and Rogoff (2009). This coarse indicator goes from 1 to 6, and higher values indicate a more flexible exchange rate arrangement (with 1 signaling hard pegs and 6 pure floats). We also include the current account balance —as a proxy for external imbalances. It is measured as the ratio of the current account of the balance of payments to GDP which data comes from the IFS.

Financial markets may play a crucial role in driving the likelihood of surging foreign capital inflows, therefore, we include developments in domestic financial markets that are captured by the formation of booms in credit and asset prices. Leverage is one of the key variables to measure financial markets development as proxied by growth in credit to GDP). In credit markets, we compute the growth rate of the credit to GDP ratio from WDI—which takes positive value whenever credit growth exceeds the growth in real economic activity. Overvalued asset prices are captured by the degree of real exchange rate overvaluation —which is roughly measured as the deviation of the real effective exchange rate (REER) index from its HP-filtered trend. The index of the real exchange rate comes from IFS and higher (lower) values for this index indicate a real appreciation (depreciation) of the currency.

Countries with greater linkages to the world goods and asset markets are arguably more prone to surges in inflows. Consequently, trade openness is measured as the ratio of export and import to GDP from WDI. Financial openness, on the other hand, is computed as the ratio of gross inflows and gross outflows to GDP from IFS data. The likelihood of surges is not only determined by the extent of international integration but also the mode of integration, therefore, on the trade side, it is important to include an indicator of commodity trade. We measure *natural resource abundance* as the trade balance per capita of primary exports (such as agricultural raw materials, food, fuel and mineral ores and metals). In the case of financial openness, we then distinguish between equity-driven gross inflows and debt-driven gross inflows that are expressed as a ratio to GDP.

Push Factors. This group of determinants are external factors —more specifically, indicators capture trade-related external factors (say, growth in external demand), finance-related external factors (say, international interest rate and global risk aversion), and financial contagion.

Trade-related external shocks are proxied by the growth rate of the foreign country. These are computed by the weighted average of the GDP growth of the main trading partners of the corresponding country. The weights are estimated using the bilateral trade between the corresponding country and each partner.

Finance-related external shocks are proxied by indicators of performance and volatility in financial markets in advanced countries. The world real interest rate is proxied by the money market rate of the monetary anchor country —as suggested by Di Giovanni and Shambaugh

(2008), and the data is from IFS. Global risk aversion is proxied by the VXO index —as a measure of implied volatility computed using 30-day S&P 100 index at the money options. Higher values of the VXO indicate rising global risk aversion. Performance in stock markets of advanced economies is proxied by (average annual) returns to the US S&P 500 index while their volatility is computed as standard deviation of annual returns. Note that these two indicators are computed using monthly information of the S&P 500 index.¹⁴

Policy uncertainty in the advanced world will also affect the behavior of foreign investors and, hence, the likelihood of surges. Baker, Bloom and Davis (2013) build an index of U.S. economic policy uncertainty by combining three groups of measures: (i) newspaper coverage of policy-related economic uncertainty (from the 10 major US newspapers), (ii) number and size of federal tax code provisions set to expire in subsequent years, and (iii) disagreement among economic forecasters in the Philadelphia Federal Reserve’s Survey of Professional Forecasters.¹⁵ Finally, foreign investors can be driven not only by the fundamentals of the domestic country but also by the regional contagion —this implies favorable economic prospects of other countries in the same region. We create a regional contagion dummy that takes the value of 1 for the domestic country in period t if another country in the same region experienced a surge over the past two years.

Before embarking upon our regression analysis, Table 4 presents a simple correlation analysis between the ratio of (net and gross) private inflows and a wide array of pull and push factors driving these flows. The numbers below the diagonal of the matrix represent the correlation analysis for the full sample of countries while those above the diagonal are correlations for the sample of developing countries. This table highlights the following four results: (a) comovement between gross and net inflows is greater among developing countries (0.52), (b) the correlation between GDP growth and private flows is greater when looking at net rather than gross inflows, (c) the converse holds for the correlation between inflows and CPI inflation, and (d) global risk aversion and advanced countries’ policy uncertainty are negatively correlated with the size of flows worldwide.

4.3 Empirical Analysis

In this section we assess the factors that drive the likelihood of surges in net and gross private capital inflows. We argue that both pull and push factors can help explain the massive flow of

¹⁴ Robustness analysis includes the leverage of US security brokers and dealers as another push factor driving inflows of foreign finance —as suggested by Bruno and Shin (2013). This leverage ratio is defined as the ratio of equity and total liabilities to equity, using the information from the U.S. flow of funds. The econometric results are not reported here but are available in Calderón and Kubota (2014).

¹⁵ A more detailed description of the construction of this index could be found in Baker, Bloom and Davis (2013). The data can be downloaded from www.policyuncertainty.com. Alternatively, we also used a global market uncertainty index based on the monthly standard deviation of daily stock returns of advanced economies (i.e. United States, Japan, Italy, France, the United Kingdom, and Germany). This indicator is based on common movements among these indexes and the data was obtained from Bloom, Kose and Terrones (2013). Econometric results with this index are not reported here but are discussed in Calderón and Kubota (2014).

funds from foreign investors. Therefore, we test whether determinants based on pull and push factors help explain surges in net inflows and/or gross inflows. We are interested in uncovering differences in the relationship between capital flows and their pull-push factors at different levels of capital inflows, and we pay closer attention to country-year observations that have experience rapid expansions in the ratio of gross inflows to GDP (which is the base of our CDMN definition). Therefore, we first investigate whether there is a non-linear relationship between the ratio of gross private inflows to GDP and its corresponding pull and push drivers. Testing non-linearities in the nexus between private inflows and their determinants is undertaken using quantile regression analysis.¹⁶ Table 5 presents these estimates for the different deciles in the distribution of gross private inflows (as a share of GDP); namely, from the lowest decline (10th percentile) to the largest one (90th percentile) —including the median of the distribution (50th percentile).¹⁷

Table 5 reports the results from the quantile regression analysis. It assess the relationship between gross private inflows (as a ratio to GDP) and the corresponding fundamentals (push and pull factors) at the aforementioned percentiles of the distribution of the dependent variable. Our evidence shows that the behavior of fundamental changes depends on the percentile of the distribution of capital flows. For instance, countries with more rigid exchange rate regimes highly likely prone to experience a massive increase in capital flows. The negative correlation between the current account and private inflows decreases and even becomes insignificant in the event of a sharp inflow of private capital. The relationship between increases in the leverage of the financial system and capital flows is positive and greater for massive inflows. An analogous result for financial openness shows that overall (domestic and foreign) financial variables (rather than real sector ones) tend to have a greater correlation with capital flows in the event of massive inflows while real fundamentals lose significance.

4.3.1 Panel Probit analysis

Table 6 reports the empirical estimates for the incidence of surges in net private inflows. Higher growth rate in the domestic economy tend to precede a surge of gross net inflows significantly, and this finding also holds for developing countries. Our findings show that current account movements appear to matter for the incidence of surges in net private inflows. Consequently, current account deficits tend to trigger surges in net inflows (and this is partly motivated by the need to finance external imbalances). In most cases, the flexibility of the exchange rate arrangement does not play a significant role in inducing a surge in net flows.

When looking at developments in the financial sector, on the one hand, we find that shifts in the leverage of the domestic financial system (as proxied by growth in credit to GDP) do not have a major influence in the probability of a surge in net flows taking place. On the other hand, an

¹⁶ Similar analysis is undertaken by Ghosh et al. (2012) using net inflows and annual data.

¹⁷ Note: the median regression is the closest relationship to more typical levels.

overvalued real exchange rate has explanatory power on the likelihood of a subsequent surge in net inflows; most notably, among developing countries.

Regarding outward orientation of the economy, trade openness does not play a significant role in predicting subsequent net surges (except for the full sample of countries using the FW criterion) while natural resource abundance have some explanatory power—but it appears to be driven by industrial countries. International financial integration does play a role in signaling surges of net inflows—and, in this case, it is the integration of advanced countries to world capital markets driving this effect. When looking at the structure of foreign liabilities (that comes along with the openness to world financial markets), our findings show that the debt-related inflows tend to increase the likelihood of surges while the relationship with equity inflows is not robust across methods or sample of countries.

Our results from examining the impact of external factors on the probability of surges in net inflows find that foreign growth (as a proxy of trade-related shocks) has a positive coefficient although it is only significant for the sample of developing countries (when using the FW criterion). Increases in the world real interest rate, furthermore, mostly have a negative and significant coefficient because a greater return for assets abroad will reduce the probability of surges in net inflows to the domestic economy. Indeed, this is particularly important for developing countries. Although global risk aversion, global policy uncertainty and world financial market volatility (as proxied by the S&P 500 returns volatility) tend to display a negative coefficient, it is significant only for the first two indicators when surges are defined using the FW criterion. Consequently, greater global risk aversion would reduce the likelihood of surges—although this impact is not robust. Higher returns in S&P 500 may lead to a reduced likelihood of surges in net inflows and contagion in financial markets (as proxied by a greater synchronization in surges across geographical areas) would raise that likelihood.

Table 7, on the other hand, presents a similar set of regressions like Table 6 when the dependent variable captures the incidence of surges in gross (rather than net) inflows. Columns [1]-[3] present the evidence for gross surges using the CDMN criterion while columns [4]-[6] show the results for the FW-defined gross surges. As it was the case of surges in net inflows, we consistently find that higher GDP growth would increase the likelihood of future surges in gross inflows, and that this is mainly driven by the economic performance of developing countries.

Surges in gross inflows are more likely to take place in countries with smaller current account surpluses or running deficits. Countries running current account deficits need large inflows of foreign finance to prevent imbalances in the balance of payments. Ideally, if widened deficits in the current account are financed by equity-related capital flows rather than loan-related flows, a country can prevent sudden reversals during downturns. On the other hand, CPI inflation and the flexibility of exchange rate regime do not have a robust relationship with the incidence of surges in gross private inflows. If we focus on surges in the ratio of gross inflows to GDP—columns [1]-[3]—inflation has a positive coefficient while the exchange rate flexibility has a negative and significant coefficient (regardless of the sample). These results indicate that surges in

inflows are less likely to happen in countries with flexible exchange rate arrangements and, remarkably, in countries with low and stable inflation.

Domestic financial cycles may have a crucial impact on the likelihood of surges in gross flows. Those cycles are typically characterized by an expansion of credit in domestic markets and a sharp real overvaluation. Our finding, first, suggests that an increase in the financial leverage of the domestic economy, as measured by the growth of private credit in excess of GDP, is not a sufficient predictor of surges in gross inflows. Then, analysing this finding with the results from Calderón and Kubota (2013) together, gross inflows have predictive power over the incidence of credit booms despite of different explanatory power over the probability of surges during credit expansions. On the other hand, the extent of overvaluation of the real exchange rate has a robust positive relationship with the likelihood of surges in gross private inflows regardless of the sample of countries and the criteria used to define the dependent variable. As a result, surges in gross inflows are more likely to take place whenever there are buoyant asset prices (as captured by overvalued domestic currencies).

The extent of integration of the domestic economy to the world markets of goods and assets may explain the higher proneness of a country to inflow surges. In Table 7 we test the significance of trade and financial openness —as well as their composition— in driving the gross inflow surges. Regarding international trade integration, we find that trade openness (as proxied by the value of exports and imports as a ratio to GDP) has a positive and significant coefficient for the full sample of countries and for developing countries when defining surges using the FW criterion. With this criteria, surges are more likely to happen in countries with greater trade integration; most notably, among developing countries. Furthermore, for the composition of trade, we robustly find that countries with natural resource abundance tend to be more prone to surges in capital flows. Consequently, primary commodity exporters are attractive to foreign investors may be related to the evolution of commodity prices —specially, fuel, mineral ores and metals. Finally, we find that surges are more likely to occur in countries with greater financial openness and that these episodes are mostly driven by surges in debt rather than equity inflows.

Our findings for push factors reveal that surges of inflows in the domestic economy are significantly more likely to take place when external growth increases, and if a massive inflow of private capital is flowing into the region where the domestic country is located. Higher world growth (or, more specifically, higher growth in the trading partners) would also raise the likelihood of foreign investors to invest abroad by diversifying their portfolio internationally and, therefore, that would push up the probability of inflow surges to the domestic economy. Additionally, the coefficient of our proxy for the regional contagion in inflow surges is robustly positive. Thus, inflow surges in regional neighboring countries would increase the likelihood of subsequent inflow surges in the domestic economy.

The world interest rate and the volatility of S&P 500 returns have a significant negative impact. These findings imply that the incidence of massive inflows of foreign capital is greater if the world interest rate is lower and the volatility of S&P 500 returns is reduced. As a consequence,

lower returns to foreign assets and lower global risk aversion (as captured by lower volatility of S&P 500 returns) would encourage foreign investors to shift their portfolios out of their own countries. An analogous result for the index of policy uncertainty, surges are less likely to take place when global policy uncertainty is heightened. The effect of policy uncertainty in the global economy appears to be stronger and more robust when explaining surges in gross rather than net inflows. This effect might be driven by developments in the 2000-11 period, as policy uncertainty and two-way capital flows have considerably increased.¹⁸

The following is the main four highlights in differences between industrial and developing countries from our estimation results of the likelihood of both net and gross surges in private inflows:

First, the current account balance is a more robust predictor of surges in net inflows for developing countries. The health of the external account would explain surges in (net and gross) inflows for industrial economies while it may robustly play a role in determining net surges for developing countries.

Second, a greater degree of RER overvaluation will raise the proneness of both net and gross in developing countries, and induce surges of gross inflows in industrial countries. Furthermore, the extent of financial openness plays a key role in determining surges in industrial countries while the composition of that financial openness (as measured by the size of equity- and debt-related inflows) matters for developing countries.

Third, the likelihood of surges taking place in industrial countries is more likely to happen in countries with less flexible exchange rate arrangements; however, the opposite result is found for developing countries: massive inflows are more likely to happen if they have floating rates —as they typically accompany sound monetary policy frameworks.

Finally, indicators of global risk aversion and policy uncertainty in the global economy play a greater role in explaining surges in gross inflows rather than those in net inflows, and this impact is mostly driven by industrial countries.

4.3.2 Complementary log-log analysis

We test the robustness of our empirical estimates by examining the drivers of the likelihood of surges in (net and gross) private capital inflows using the *complementary log-log* model (cloglog). Forbes and Warnock (2012a, b) employ this methodology to assess the determinants of capital flow waves in and out of the domestic economy (that is, surges, stops, flights and retrenchments). In an analogous fashion to our Probit analysis, Table 8 shows the regression results for surges in net inflows while Table 9 presents those for surges in gross inflows.

¹⁸ Alternatively, the leverage of US brokers and dealers is a robust predictor of the subsequent occurrence of surges in both net and gross inflows. This is consistent with Bruno and Shin (2013) who argue that the greater leverage of US financial institutions has led to a massive increase of capital inflows in the global economy. These econometric estimates are presented in Calderón and Kubota (2014).

Surges of net private inflows. The likelihood of surges in net inflows increases whenever real economic activity increases, and/or if the domestic economy is running a current account deficit, especially in developing countries. Real overvaluation of the domestic currency helps explain a higher likelihood of a sharp increase in net inflows among developing countries while growth in credit to GDP is not a robust driver for surges in net inflows. Surges in net private inflows are, indeed, pulled by abundance of natural resources and by greater integration to world capital markets. The latter effect is driven by the more rapid accumulation of net debt inflows.

Push factors increase the probability of surges in net inflows. For example, higher real world interest rate would reduce the probability of net inflow surges into the domestic economy. On the other hand, greater return and volatility of the U.S. stock market (S&P 500) is negatively associated with the proneness of surges in net inflows.

Surges of gross private inflows. Our results support that outstanding economic performance would help predict future massive inflows of capital regardless of any criteria used for their definition. In most regressions, current account balance has a negative and significant coefficient, therefore, the larger the deficits in current account the more likely foreign capital will flow to the domestic economy (most notably, to finance these imbalances). On the other hand, surges in inflows will be less likely in countries with more rigid exchange rate regimes with using the CDMN criterion.

On the financial sector front, real appreciation of the domestic currency (beyond their equilibrium levels) helps predict the occurrence of surges in capital inflows although we fail to find a significant impact on surges in gross inflows of the rapid expansion of credit. Greater trade openness also lead to greater likelihood of inflows of capital —with natural resource abundant countries experience a higher probability of surges taking place when using the FW criterion. Finally, greater international financial integration is more likely to increase the likelihood of surges in inflows among industrial economies. The composition of gross capital inflows plays a critical role in predicting these episodes: debt-type inflows are robustly more likely to precede them.

Push factors also have a major contribution to the likelihood of inflow surges. Greater external growth and lower world interest rates help predict future surges. Lower returns and lower volatility return in global stock markets (as signal of lower return and risk aversion in world financial markets) may encourage foreign investors to shift their portfolios outside of their own country —although the impact is not robust across samples due to country specific heterogeneity. Finally, surges in neighboring countries tend to anticipate the massive inflows into the domestic economy.

4.3.3 Robustness analysis

This section conducts two different types of robust analysis: first, we examine whether pull and push factors affect differently the start and the end of surges in gross private inflows. We run our

cloglog regressions with the dependent variables being binary variables that take a value of one either in the first quarter of the surge (start of episode) or one in the final quarter (end of episode). Second, we compute the marginal effects of pull and push factors from our regression analysis.

Triggering the start or end of surges in gross private inflows. Table 10 tests the impact of pull and push factor on influencing the start of a surge episode (see columns [1] and [4] for the CDMN and FW criteria) and the end of the surge episode (see columns [3] and [6] for the CDMN and FW criteria). For comparison we replicated the pull-push drivers of the incidence of surges from Table 9 in columns [2] and [5]. Therefore, we highlight the role of these pull and push drivers in influencing the likelihood of the beginning and the end of the episode of massive gross inflow of foreign financing. We first find that greater RER overvaluation will signal the end of the surge –regardless of the criteria used to define the episode. This implies that the domestic currency is more likely to become overvalued in real terms throughout the episode rather than triggering the start of the surge. On the other hand, rising debt inflows will signal not only the start but also the end of episodes of gross inflow surges. Therefore, this confirms that a sharp build-up in debt securities also characterize surges in gross inflows.

Regarding push factors, it is crucial to emphasize that a reduction in global policy uncertainty would only trigger the beginning of a surge in gross inflows while an increase in global risk aversion would precede the end of that episode. Financial contagion associated to massive inflows into the region also helps trigger and continues throughout the episode although this is not robust to the termination of the surge.

Marginal effects. Table 11 reports the marginal effects of pull and push factors on the likelihood of surges in gross (overall and private) capital inflows. We compute the marginal effects for selected specifications in Tables 3 and 4 for the sample of all countries and developing countries, respectively. By focusing on the overall contribution of push factors to the likelihood of overall inflow surges with the CDMN-defined surges in inflows, the relative contribution of pull factors (vis-à-vis push factors) is greater.

5. Conclusions

This paper aims to examine the drivers of surges in gross private capital inflows for a sample of 71 countries using quarterly data from 1970 to 2010. We conduct Probit and complementary log-log panel regression analysis, and we also conduct empirical analysis with net flows to compare with gross flows. Our findings show that domestic and external factors (pull and push factors, respectively) drive surges in (both net and gross) capital inflows. Pull and push factors significantly contribute to a higher incidence of surges in industrial countries and, surprisingly, we show that pull factors represent a major driving force of surges in developing countries.

- Surges of capital flows from 1970 to 2010 tend to be recurrent and have an average duration of approximately 3.5 quarters.¹⁹ There are no differences in terms of average duration of these episodes across groups of countries. However, they differ greatly in terms of their depth both across countries and over time. The recent increase in the amplitude of surges, especially during the 2000s, reflects the increasing volatility of capital flows and, more generally, financial cycles.
- In fact, gross surges are highly likely to accompany lending booms—with a degree of coincidence varying with the definition of lending boom (approximately, 16 percent for MT-lending booms and almost 40 percent for GVL-booms). In addition, the degree of synchronization between inflow surges and GVL-lending booms have recently increased in industrial countries and decreased in developing countries. Over the past three decades, surges end up in a sudden stop in half of gross inflow episodes for developing countries and in one third for industrial countries. As a result, our regression analysis highlights the following results: pull and push drivers help explain the likelihood of episodes of surge in both net and gross inflows regardless of any criteria to define these surges, any sample of countries and whether we use overall or private inflows.
- Pull factors—including, domestic growth, current accounts, exchange rate flexibility, natural resource abundance, and the composition of capital inflows—contribute significantly to explain surges of inflows.
- Current account developments tend to play a larger role explaining surges in net inflows. Our estimates suggest that a greater current account deficit would help trigger a surge in net inflows—as flows of foreign capital come to the domestic economy to finance the external imbalance.
- Overvalued currencies in emerging markets rather than the rapid expansion of domestic credit tend to attract massive capital inflows. This emphasizes the importance of the exchange rate channel among developing countries and the fact that surges in inflows may precede credit booms, as argued by Calderon and Kubota (2012) and not the other way around.
- Push factors—including global policy uncertainty, S&P 500 returns and volatility—play an important role in driving surges of inflows, especially this result holds for industrial countries.
- A massive inflow of capital in one country tends to propagate into similar (neighboring) countries. Regional contagion is a robust predictor of inflow surges in a country.
- Declining policy uncertainty in the global economy may trigger surges in capital inflows while increases in global risk aversion would end to those episodes.

Our discussion contends that understanding the drivers of surges in inflows is of crucial due to its long-term effects on growth and, more importantly, their destabilizing effects on domestic

¹⁹ Note that the time period for the regression analysis corresponds that of the post-Bretton Woods era; that is, from 1975 to 2010. Due to lack of availability of information for all the pull and push factors, the sample is reduced to 69 or 67 countries (depending upon the specification).

financial markets. As credit booms —and, especially, those that end up in financial crises— are preceded by surges in gross inflows (and, more specifically, surges in cross-border banking inflows), implementing policies that decouple capital inflows and credit expansions will help manage systemic risks (Calderón and Kubota, 2013).

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Table 1
Episodes of Surges in Private Capital Inflows

Sample: 71 countries, 1970-2011 (quarterly data)

Criterion	NET Inflows			GROSS Inflows		
	Total	Debt-driven	Equity-driven	All	Debt-driven	Equity-driven
I. Cowan-De Gregorio-Micco-Neilson (CDMN)						
ALL Countries	201	97	104	248	181	67
Industrial Countries	78	42	36	71	56	15
Developing countries	123	55	68	177	125	52
II. Forbes-Warnock (FW)						
ALL Countries	169	90	79	198	134	64
Industrial Countries	72	40	32	52	42	10
Developing countries	97	50	47	146	92	54

Note: Episodes of surges in private capital inflows re defined as periods where the annualized variation in private inflows (either net or gross) is greater than one standard deviation above its rolling mean. Surge episodes will end when that annual variation in gross inflows drops below that threshold. The CDMN criterion uses the ratio of private inflows to GDP while the FW criterion employs the annualized amount of private inflows.

Table 2**Characterization of episodes of surges in private gross inflows: Duration and amplitude***Sample: 71 countries, 1970-2011 (quarterly data)*

	Period	Episodes	Duration (quarters)	Amplitude (in S.D.)		
				Median	25th %-ile	75th %-ile
All Countries	1970-2011	259	3.57	1.27	1.13	1.48
	1970-1999	77	3.53	1.21	1.09	1.36
	2000-2011	182	3.38	1.33	1.14	1.54
Industrial Countries	1970-2011	75	3.47	1.33	1.20	1.53
	1970-1999	17	3.43	1.24	1.13	1.35
	2000-2011	58	3.48	1.35	1.20	1.55
Developing Countries	1970-2011	184	3.64	1.24	1.10	1.46
	1970-1999	60	3.72	1.18	1.09	1.34
	2000-2011	124	3.60	1.27	1.12	1.48

Note: Surges in gross inflows are defined as periods when the annual variation in gross inflows is greater than one standard deviation above its rolling mean. Surge episodes will end when that annual variation in gross inflows drops below that threshold. We use the CDMN definition in panel I of Table 1. We report the average duration (in quarters) and the median amplitude -as well as selected percentiles in the distribution.

Table 3**Surges in Private Gross Inflows: Coincidence with Boom-Bust Cycles in Finance***Sample: 71 countries, 1970-2011 (quarterly data)*

Sample	Period	Episodes of gross inflow surges 1/	% of Gross Surges coinciding with			% Surges preceding	
			Net Inflow Surges	Lending Booms 2/		Sudden Stops 3/	Banking Crises 3/
				MT Criteria	GVL Criteria		
All Countries	1970-2011	259	0.735	0.165	0.420	0.450	0.205
	1975-1999	77	0.730	0.286	0.444	0.492	0.270
	2000-2011	182	0.737	0.109	0.409	0.431	0.175
Industrial Countries	1970-2011	75	0.573	0.159	0.317	0.341	0.220
	1975-1999	17	0.435	0.304	0.261	0.391	0.087
	2000-2011	58	0.627	0.102	0.339	0.322	0.271
Developing Countries	1970-2011	184	0.847	0.169	0.492	0.525	0.195
	1975-1999	60	0.900	0.275	0.550	0.550	0.375
	2000-2011	124	0.821	0.115	0.462	0.513	0.103

Note: 1/ Surges in gross inflows are defined as periods when the annual variation in gross inflows is greater than one standard deviation above its rolling mean. Surge episodes will end when that annual variation in gross inflows drops below that threshold. We use the CDMN definition in panel I of Table 1. 2/ Lending booms are defined according to the methodology implemented by Mendoza and Terrones (2008, 2012) -MT definition- and that of Gourinchas, Valdes and Landarretche (2001) -GVL definition. 3/ Sudden stop is defined following the methodology in Guidotti, Sturzenegger and Villar (2004) and implemented for quarterly data in Calderon and Kubota (2013) while the dating of banking crises is obtained from Laeven and Valencia (2010, 2012).

Table 4
Surges in Private Inflows, Pull and Push Factors: Panel Correlation Analysis

	Net Inflows	Gross Inflows	GDP Growth	CPI Inflation	Exch. Rate Regime	Current Account	Trade Openness	Financial Openness	Net. Res. Abundance	REER Overval.	Credit-GDP growth	Equity Gross Infl.	Debt Gross Infl.	Foreign Growth	World real int. rate	Global risk aversion	Policy Uncertainty	Surge Synchr.	S&P 500 Returns	S&P 500 Retr. Volat.
Net Inflows	1	0.516	0.161	-0.078	-0.170	-0.347	-0.079	0.070	-0.239	0.046	0.060	0.080	0.695	0.031	-0.036	-0.135	-0.149	0.066	0.003	-0.121
Gross Inflows	0.055	1	0.045	-0.106	-0.185	-0.134	0.257	0.180	-0.233	0.029	0.048	0.369	0.445	0.074	-0.106	-0.115	-0.128	0.063	0.028	-0.082
GDP Growth	0.120	0.017	1	-0.024	-0.065	-0.089	0.053	0.080	-0.056	0.082	-0.025	0.034	0.049	0.176	0.017	-0.135	-0.111	0.062	-0.008	-0.145
CPI Inflation	-0.003	-0.047	0.002	1	0.417	0.003	-0.213	-0.256	0.088	-0.069	0.227	-0.189	-0.097	-0.028	0.146	-0.093	0.037	-0.009	0.033	-0.070
Exchange rate regime	-0.013	-0.116	-0.028	0.381	1	0.140	-0.226	-0.272	0.109	-0.093	0.033	-0.237	-0.158	-0.032	0.081	-0.041	0.082	-0.022	0.028	-0.007
Current Account	-0.118	0.071	-0.082	-0.027	0.077	1	0.269	0.002	0.166	-0.102	-0.045	-0.026	-0.183	0.147	-0.083	0.019	0.039	-0.010	0.014	0.038
Trade openness	-0.005	0.098	0.081	-0.153	-0.220	0.245	1	0.377	-0.230	-0.013	0.014	0.554	0.198	0.115	-0.230	0.003	-0.064	0.053	-0.088	-0.001
Financial openness	-0.019	0.114	-0.032	-0.307	-0.253	0.100	0.206	1	-0.208	0.022	-0.012	0.371	0.171	0.094	-0.270	0.019	-0.028	0.039	-0.064	0.029
Nat. Res. Abundance	0.060	-0.253	-0.030	0.009	0.123	0.088	-0.075	-0.022	1	-0.014	0.004	-0.163	-0.348	-0.053	0.048	-0.017	0.001	0.008	0.019	-0.011
REER overvaluation	0.016	0.009	0.071	-0.066	-0.081	-0.091	-0.013	0.018	-0.007	1	0.032	0.059	0.044	-0.034	0.026	0.012	-0.021	0.017	-0.051	-0.019
Growth in credit-GDP	0.038	0.022	-0.010	0.219	0.027	-0.044	0.019	-0.010	0.002	0.033	1	0.043	0.045	0.030	0.019	-0.016	-0.008	0.050	-0.005	-0.033
Equity gross inflows	0.037	0.868	0.011	-0.044	-0.109	0.097	0.098	0.118	-0.286	0.010	0.032	1	0.250	0.095	-0.229	-0.039	-0.122	0.104	-0.089	-0.051
Debt gross inflows	0.343	0.651	0.039	-0.061	-0.134	-0.010	0.140	0.129	-0.239	0.035	0.054	0.723	1	-0.006	-0.016	-0.031	-0.037	0.111	-0.064	-0.010
Foreign growth	0.080	-0.016	0.222	0.006	0.053	0.081	0.089	-0.005	-0.053	-0.023	0.042	-0.017	0.010	1	0.089	-0.303	-0.329	0.027	-0.066	-0.448
World real interest rate	0.019	-0.081	0.009	0.151	0.109	-0.113	-0.216	-0.284	-0.002	0.029	0.016	-0.081	-0.039	0.105	1	-0.119	-0.158	-0.034	0.041	-0.115
Global risk aversion	-0.119	-0.055	-0.120	-0.076	-0.036	0.008	0.009	0.007	-0.004	0.002	-0.015	-0.041	-0.058	-0.285	-0.140	1	0.530	-0.029	-0.147	0.726
Policy uncertainty index	-0.123	-0.061	-0.130	0.031	0.067	0.021	-0.065	-0.046	-0.003	-0.026	-0.013	-0.041	-0.083	-0.341	-0.103	0.530	1	-0.020	-0.011	0.512
Surge synchronization	0.029	0.046	0.050	-0.017	-0.034	0.009	0.039	0.064	-0.003	0.021	0.038	0.041	0.071	0.031	-0.065	-0.018	-0.022	1	-0.014	-0.056
S&P 500 Returns	0.008	0.028	-0.012	0.025	0.024	0.012	-0.083	-0.052	0.003	-0.036	-0.011	-0.018	-0.062	-0.066	0.030	-0.147	-0.011	-0.003	1	0.050
S&P 500 Return Volatility	-0.108	-0.031	-0.148	-0.055	-0.006	0.019	-0.003	0.008	-0.005	-0.016	-0.041	-0.024	-0.054	-0.443	-0.120	0.726	0.512	-0.045	0.050	1

Note: Number below (above) the diagonal represent pairwise correlation between the variables for the sample of all (developing) countries.

Table 5

Private Capital Inflows, Pull and Push Factors: A Quantile Regression Analysis

Dependent Variable: Gross private inflows (as a share of GDP)

Sample: 69 countries, 1970-2011 (quarterly information)

	Selected Quantiles								
	10%	20%	30%	40%	50%	60%	70%	80%	90%
<i>I. Pull Factors</i>									
<i>Macroeconomic performance</i>									
Growth in real GDP	0.00232***	0.00209***	0.00207***	0.00191***	0.00174***	0.00144***	0.00103**	0.000417	-0.000259
(YoY %, lagged)	(0.000483)	(0.000489)	(0.000344)	(0.000337)	(0.000278)	(0.000300)	(0.000431)	(0.000449)	(0.000522)
CPI Inflation	-0.0216***	-0.00435	-0.00319	0.00329	0.00608	0.00734	0.00944	0.0147**	0.0413***
(%, lagged)	(0.00679)	(0.00716)	(0.00496)	(0.00500)	(0.00424)	(0.00467)	(0.00659)	(0.00604)	(0.00661)
Exchange rate regime	0.00142	-0.00291	-0.00299*	-0.00349**	-0.00319**	-0.00299*	-0.00458**	-0.00647***	-0.00794***
(lagged)	(0.00238)	(0.00236)	(0.00172)	(0.00174)	(0.00147)	(0.00159)	(0.00233)	(0.00242)	(0.00296)
Current Account Balance	-0.234***	-0.169***	-0.0925***	-0.0827***	-0.135***	-0.109***	-0.0706**	-0.0722**	-0.0424
(% GDP, lagged)	(0.0320)	(0.0315)	(0.0223)	(0.0229)	(0.0192)	(0.0211)	(0.0308)	(0.0334)	(0.0380)
<i>Financial Sector</i>									
Credit growth in excess of GDP	0.0396*	0.0464**	0.0463**	0.0412**	0.0315**	0.0247*	0.0288	0.0375**	0.113***
(%, lagged)	(0.0221)	(0.0220)	(0.0201)	(0.0182)	(0.0140)	(0.0147)	(0.0195)	(0.0187)	(0.0215)
REER Overvaluation	-0.0139	0.0182	-0.00156	-0.00343	-0.0220	-0.0352**	-0.0361	-0.0391*	-0.0203
(lagged)	(0.0245)	(0.0261)	(0.0186)	(0.0187)	(0.0156)	(0.0167)	(0.0236)	(0.0237)	(0.0267)
<i>Trade Openness</i>									
Foreign trade	-0.0295***	-0.00455	-0.0101	-0.000759	0.00955	0.0213***	0.0464***	0.0781***	0.0978***
(% GDP, lagged)	(0.0111)	(0.0124)	(0.00917)	(0.00936)	(0.00777)	(0.00826)	(0.0120)	(0.0122)	(0.0151)
Natural resource abundance	0.0116***	0.00940***	0.00602***	0.00560***	0.00512***	0.00407***	0.00159	0.00395**	0.00149
(lagged)	(0.00188)	(0.00200)	(0.00154)	(0.00156)	(0.00134)	(0.00141)	(0.00199)	(0.00198)	(0.00208)
<i>Financial Openness</i>									
Financial Openness	0.000762	0.00260	0.000666	0.00252	0.00419***	0.00489***	0.00465**	0.00513**	0.00472*
(% GDP, lagged)	(0.00200)	(0.00216)	(0.00157)	(0.00160)	(0.00134)	(0.00144)	(0.00206)	(0.00211)	(0.00249)
Equity Gross Inflows	0.602***	0.546***	0.722***	0.754***	0.750***	0.774***	0.837***	0.844***	0.870***
(% GDP, lagged)	(0.00716)	(0.00652)	(0.00437)	(0.00508)	(0.00398)	(0.00409)	(0.00582)	(0.00621)	(0.00587)
Debt Gross Inflows	-0.0377***	0.131***	0.272***	0.358***	0.379***	0.389***	0.431***	0.501***	0.645***
(% GDP, lagged)	(0.0144)	(0.0124)	(0.00879)	(0.00830)	(0.00664)	(0.00691)	(0.0101)	(0.0112)	(0.0148)
<i>II. Push Factors</i>									
<i>Trade-related</i>									
Foreign growth	0.758***	0.434***	0.173*	0.180**	0.146*	0.143*	0.0725	0.0487	-0.0238
(%, lagged)	(0.102)	(0.118)	(0.0896)	(0.0910)	(0.0756)	(0.0810)	(0.114)	(0.114)	(0.129)
<i>Finance-related</i>									
World real interest rate	-0.161**	-0.207**	-0.168***	-0.229***	-0.250***	-0.298***	-0.275***	-0.245***	-0.264**
(%, lagged)	(0.0774)	(0.0872)	(0.0636)	(0.0656)	(0.0552)	(0.0606)	(0.0888)	(0.0921)	(0.109)
Global Risk Aversion	-0.0168***	-0.00567	-0.0126***	-0.0116**	-0.00938**	-0.00733*	-0.00686	-0.0111*	-0.00292
(in logs, lagged)	(0.00611)	(0.00649)	(0.00474)	(0.00482)	(0.00404)	(0.00438)	(0.00626)	(0.00638)	(0.00759)
Policy Uncertainty Index	-0.00524	-0.0191**	-0.0208***	-0.0186***	-0.0209***	-0.0235***	-0.0274***	-0.0289***	-0.0424***
(lagged)	(0.00784)	(0.00894)	(0.00664)	(0.00675)	(0.00566)	(0.00607)	(0.00861)	(0.00864)	(0.0101)
S&P 500 Returns	0.300***	0.241***	0.184***	0.187***	0.166***	0.168***	0.161***	0.157***	0.143***
(%, lagged)	(0.0244)	(0.0244)	(0.0168)	(0.0167)	(0.0137)	(0.0147)	(0.0207)	(0.0204)	(0.0236)
S&P 500 Return Volatility	-0.0191	-0.0218	0.0561	0.0635	0.0321	0.0366	0.0914	0.132*	0.103
(lagged)	(0.0591)	(0.0705)	(0.0537)	(0.0562)	(0.0471)	(0.0508)	(0.0712)	(0.0722)	(0.0848)
<i>Contagion</i>									
Surge synchronization	0.00977	0.00574	0.00395	-0.00187	-0.00214	-0.000471	-0.00772	-0.00922	-0.0110
(lagged)	(0.00822)	(0.00881)	(0.00646)	(0.00659)	(0.00551)	(0.00593)	(0.00839)	(0.00846)	(0.0101)
No. Observations	4,439	4,439	4,439	4,439	4,439	4,439	4,439	4,439	4,439
No. Countries	67	67	67	67	67	67	67	67	67

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See note in Table 1 for the definition of surges.

Table 6**Surges in NET Private Inflows, Pull and Push Factors: A Panel Probit Analysis**

Dependent Variable: Binary variable that takes the value of one whenever there is a surge in gross inflows

Sample: 69 countries, 1970-2011 (quarterly information)

	CDMN Criterion			FW Criterion		
	ALL Countries [1]	Industrial Countries [2]	Developing Countries [3]	ALL Countries [4]	Industrial Countries [5]	Developing Countries [6]
<i>I. Pull Factors</i>						
<i>Macroeconomic performance</i>						
Growth in real GDP (YoY %, lagged)	0.0469*** (0.00825)	-0.0121 (0.0223)	0.0629*** (0.00963)	0.0336*** (0.00975)	-0.0555** (0.0276)	0.0547*** (0.0116)
CPI Inflation (%, lagged)	0.202* (0.113)	9.437*** (2.190)	0.0522 (0.126)	0.137 (0.133)	7.982** (3.225)	-0.0302 (0.151)
Exchange rate regime (lagged)	-0.0322 (0.0336)	-0.0539 (0.0577)	0.0159 (0.0432)	0.0634 (0.0404)	-0.00118 (0.0712)	0.174*** (0.0532)
Current Account Balance (% GDP, lagged)	-1.368*** (0.452)	-1.043 (0.854)	-1.172** (0.558)	-2.742*** (0.516)	-2.758*** (1.052)	-2.526*** (0.636)
<i>Financial Sector</i>						
Credit growth in excess of GDI (%, lagged)	0.477 (0.401)	-0.452 (0.998)	0.771* (0.459)	0.199 (0.512)	-1.066 (1.260)	0.595 (0.630)
REER Overvaluation (lagged)	0.939** (0.477)	0.592 (1.020)	1.091* (0.575)	2.083*** (0.554)	0.326 (1.200)	2.641*** (0.686)
<i>Trade Openness</i>						
Foreign trade (% GDP, lagged)	0.112 (0.0843)	-0.0673 (0.304)	-0.00741 (0.105)	0.355*** (0.115)	0.219 (0.385)	0.0916 (0.145)
Natural resource abundance (lagged)	0.0592** (0.0249)	0.0507** (0.0244)	0.00754 (0.0774)	0.0681** (0.0292)	0.0682** (0.0298)	-0.0162 (0.0955)
<i>Financial Openness</i>						
Financial Openness (% GDP, lagged)	0.0647** (0.0276)	0.406*** (0.0832)	-0.0153 (0.0365)	0.145*** (0.0381)	0.608*** (0.147)	0.0811 (0.0499)
Equity Gross Inflows (% GDP, lagged)	-0.124 (0.0761)	-0.0569 (0.103)	2.537*** (0.671)	-0.211** (0.0902)	-0.0860 (0.119)	3.317*** (0.771)
Debt Gross Inflows (% GDP, lagged)	0.543*** (0.173)	0.289 (0.262)	0.640** (0.249)	0.792*** (0.196)	0.410 (0.297)	1.229*** (0.313)
<i>II. Push Factors</i>						
<i>Trade-related</i>						
Foreign growth (%, lagged)	1.377 (2.056)	3.953 (3.652)	2.683 (2.711)	2.220 (2.472)	2.468 (4.462)	8.885** (3.452)
<i>Finance-related</i>						
World real interest rate (%, lagged)	-4.124*** (1.540)	-11.59*** (2.686)	-0.104 (2.292)	-11.23*** (2.025)	-18.04*** (3.633)	-9.333*** (2.948)
Global Risk Aversion (in logs, lagged)	0.00966 (0.113)	-0.102 (0.180)	0.0760 (0.158)	-0.158 (0.133)	-0.476** (0.215)	0.147 (0.188)
Policy Uncertainty Index (lagged)	-0.134 (0.167)	-0.175 (0.282)	0.0901 (0.231)	-0.463** (0.198)	-0.588* (0.338)	-0.317 (0.279)
S&P 500 Returns (%, lagged)	-0.670 (0.475)	-1.374* (0.727)	0.137 (0.656)	-2.376*** (0.527)	-3.311*** (0.843)	-1.504** (0.734)
S&P 500 Return Volatility (lagged)	-0.392 (1.264)	0.182 (1.941)	0.241 (1.789)	-0.641 (1.557)	0.978 (2.481)	-0.662 (2.275)
<i>Contagion</i>						
Surge synchronization (lagged)	1.111*** (0.116)	0.854*** (0.165)	1.326*** (0.168)	0.951*** (0.121)	0.745*** (0.182)	1.113*** (0.173)
No. Observations	67	22	45	67	22	45
No. Observations	4359	1857	2502	4359	1857	2502

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See note in Table 1 for the definition of surges.

Table 7**Surges in GROSS Private Inflows, Pull and Push Factors: A Panel Probit Analysis**

Dependent Variable: Binary variable that takes the value of one whenever there is a surge in gross inflows

Sample: 69 countries, 1970-2011 (quarterly information)

	CDMN Criterion			FW Criterion		
	ALL Countries [1]	Industrial Countries [2]	Developing Countries [3]	ALL Countries [4]	Industrial Countries [5]	Developing Countries [6]
<i>I. Pull Factors</i>						
<i>Macroeconomic performance</i>						
Growth in real GDP (YoY %, lagged)	0.0576*** (0.00906)	0.0195 (0.0256)	0.0728*** (0.0104)	0.0447*** (0.0107)	-0.0250 (0.0338)	0.0501*** (0.0137)
CPI Inflation (%, lagged)	0.320*** (0.120)	9.682*** (2.450)	0.111 (0.136)	0.252* (0.149)	10.04** (4.033)	0.120 (0.185)
Exchange rate regime (lagged)	-0.0749** (0.0366)	-0.208*** (0.0683)	0.0227 (0.0470)	0.0581 (0.0468)	-0.198* (0.103)	0.195*** (0.0667)
Current Account Balance (% GDP, lagged)	-2.039*** (0.495)	-2.706*** (1.043)	-1.408** (0.599)	-2.595*** (0.564)	-2.272* (1.246)	-0.406 (0.845)
<i>Financial Sector</i>						
Credit growth in excess of GDI (%, lagged)	0.425 (0.466)	0.0164 (1.116)	0.564 (0.550)	1.015* (0.571)	0.575 (1.478)	0.609 (0.782)
REER Overvaluation (lagged)	2.136*** (0.532)	2.245* (1.170)	1.745*** (0.645)	4.857*** (0.632)	7.969*** (1.618)	3.375*** (0.828)
<i>Trade Openness</i>						
Foreign trade (% GDP, lagged)	0.0961 (0.102)	0.111 (0.348)	-0.274** (0.129)	0.648** (0.296)	0.586 (0.520)	1.136*** (0.407)
Natural resource abundance (lagged)	0.0821*** (0.0263)	0.0803*** (0.0291)	0.159* (0.0940)	0.171*** (0.0492)	0.138*** (0.0479)	0.101 (0.157)
<i>Financial Openness</i>						
Financial Openness (% GDP, lagged)	0.0904*** (0.0300)	0.335*** (0.0907)	-0.0370 (0.0411)	0.236*** (0.0485)	0.537*** (0.180)	0.0808 (0.0690)
Equity Gross Inflows (% GDP, lagged)	0.00133 (0.0821)	0.200* (0.121)	6.652*** (0.846)	-0.338*** (0.127)	-0.153 (0.170)	15.95*** (1.509)
Debt Gross Inflows (% GDP, lagged)	0.461** (0.185)	-0.295 (0.314)	1.104*** (0.317)	1.545*** (0.317)	0.453 (0.403)	6.708*** (0.986)
<i>II. Push Factors</i>						
<i>Trade-related</i>						
Foreign growth (%, lagged)	4.109* (2.293)	10.86** (4.627)	2.378 (2.969)	9.270*** (3.073)	17.01*** (6.286)	11.15** (4.543)
<i>Finance-related</i>						
World real interest rate (%, lagged)	-4.855*** (1.683)	-12.10*** (3.035)	0.119 (2.538)	-13.27*** (2.356)	-20.09*** (4.488)	-11.85*** (3.889)
Global Risk Aversion (in logs, lagged)	0.0739 (0.118)	0.207 (0.191)	-0.124 (0.169)	-0.181 (0.146)	-0.570** (0.245)	-0.267 (0.235)
Policy Uncertainty Index (lagged)	-0.445** (0.179)	-0.809** (0.317)	0.151 (0.250)	-1.064*** (0.224)	-1.789*** (0.417)	-0.282 (0.346)
S&P 500 Returns (%, lagged)	-0.0949 (0.554)	-0.0344 (0.907)	0.162 (0.752)	-3.734*** (0.659)	-5.611*** (1.259)	-2.481*** (0.921)
S&P 500 Return Volatility (lagged)	-3.508** (1.467)	-6.230*** (2.412)	-0.659 (2.012)	-7.443*** (2.147)	-8.877** (3.671)	-3.399 (3.349)
<i>Contagion</i>						
Surge synchronization (lagged)	2.164*** (0.140)	2.487*** (0.231)	1.926*** (0.191)	1.555*** (0.127)	1.680*** (0.194)	1.423*** (0.199)
No. Countries	67	22	45	67	22	45
No. Observations	4444	1862	2582	4444	1862	2582

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See note in Table 1 for the definition of surges.

Table 8**Surges in NET Private Inflows, Pull and Push Factors: A Complementary Log-Log Regression Analysis***Dependent Variable: Binary variable that takes the value of one whenever there is a surge in gross inflows**Sample: 69 countries, 1970-2011 (quarterly information)*

	CDMN Criterion			FW Criterion		
	ALL Countries	Industrial Countries	Developing Countries	ALL Countries	Industrial Countries	Developing Countries
	[1]	[2]	[3]	[4]	[5]	[6]
<i>I. Pull Factors</i>						
<i>Macroeconomic performance</i>						
Growth in real GDP	0.0735***	-0.0236	0.0885***	0.0702***	-0.102**	0.0843***
<i>(YoY %, lagged)</i>	(0.0115)	(0.0375)	(0.0128)	(0.0118)	(0.0473)	(0.0167)
CPI Inflation	0.424**	17.11***	0.101	0.364**	18.06***	-0.0602
<i>(%, lagged)</i>	(0.177)	(3.727)	(0.212)	(0.182)	(5.772)	(0.284)
Exchange rate regime	-0.0451	-0.0860	0.01000	-0.0556	0.0110	0.263***
<i>(lagged)</i>	(0.0566)	(0.0982)	(0.0720)	(0.0571)	(0.129)	(0.0911)
Current Account Balance	-2.566***	-2.198	-2.965***	-2.921***	-5.231***	-5.554***
<i>(% GDP, lagged)</i>	(0.756)	(1.413)	(0.918)	(0.759)	(1.802)	(1.072)
<i>Financial Sector</i>						
Credit growth in excess of GDI	-0.142	-0.977	1.265*	0.715	-3.060	1.262
<i>(%, lagged)</i>	(0.739)	(1.849)	(0.690)	(0.625)	(2.464)	(1.082)
REER Overvaluation	0.507	0.519	2.111**	1.574**	-0.268	4.985***
<i>(lagged)</i>	(0.814)	(1.741)	(0.960)	(0.798)	(2.143)	(1.175)
<i>Trade Openness</i>						
Foreign trade	0.0641	-0.0867	0.00298	0.211	0.657	0.283
<i>(% GDP, lagged)</i>	(0.145)	(0.508)	(0.175)	(0.139)	(0.701)	(0.260)
Natural resource abundance	0.0931**	0.0889**	0.0425	0.102**	0.131***	-0.00223
<i>(lagged)</i>	(0.0427)	(0.0385)	(0.123)	(0.0415)	(0.0508)	(0.166)
<i>Financial Openness</i>						
Financial Openness	0.0628	0.758***	-0.0214	0.102**	1.201***	0.146*
<i>(% GDP, lagged)</i>	(0.0468)	(0.160)	(0.0608)	(0.0466)	(0.277)	(0.0874)
Equity Gross Inflows	-0.239**	-0.103	3.435***	-0.209*	-0.123	4.646***
<i>(% GDP, lagged)</i>	(0.120)	(0.172)	(1.028)	(0.115)	(0.195)	(1.179)
Debt Gross Inflows	0.854***	0.483	0.873**	0.818***	0.635	1.825***
<i>(% GDP, lagged)</i>	(0.262)	(0.427)	(0.363)	(0.250)	(0.478)	(0.447)
<i>II. Push Factors</i>						
<i>Trade-related</i>						
Foreign growth	1.713	4.969	6.133	4.625	1.244	14.12**
<i>(%, lagged)</i>	(3.702)	(6.403)	(4.823)	(3.435)	(8.351)	(6.240)
<i>Finance-related</i>						
World real interest rate	-8.884***	-21.07***	-0.725	-6.849***	-36.97***	-16.57***
<i>(%, lagged)</i>	(2.716)	(4.641)	(3.839)	(2.579)	(6.571)	(4.990)
Global Risk Aversion	0.474**	0.195	0.0868	0.0394	-0.111	0.405
<i>(in logs, lagged)</i>	(0.195)	(0.312)	(0.260)	(0.157)	(0.383)	(0.314)
Policy Uncertainty Index	-0.549**	0.000594	0.120	-0.109	-0.423	-0.383
<i>(lagged)</i>	(0.272)	(0.454)	(0.366)	(0.263)	(0.553)	(0.448)
S&P 500 Returns	-0.702	-1.034	0.523	..	-2.726**	-1.035
<i>(%, lagged)</i>	(0.644)	(0.945)	(0.832)	..	(1.094)	(0.913)
S&P 500 Return Volatility	-5.284**	-4.724	-0.335	..	-8.526*	-4.251
<i>(lagged)</i>	(2.584)	(3.825)	(3.411)	..	(5.111)	(4.578)
<i>Contagion</i>						
Surge synchronization	1.627***	1.204***	1.713***	1.566***	1.155***	1.465***
<i>(lagged)</i>	(0.139)	(0.218)	(0.193)	(0.140)	(0.257)	(0.222)
No. Countries	67	22	45	67	22	45
No. Observations	4355	1857	2498	4355	1857	2498

*Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. See note in Table 1 for the definition of surges.*

Table 9**Surges in GROSS Private Inflows, Pull and Push Factors: A Complementary Log-Log Regression Analysis**

Dependent Variable: Binary variable that takes the value of one whenever there is a surge in gross inflows

Sample: 69 countries, 1970-2011 (quarterly information)

	CDMN Criterion			FW Criterion		
	ALL Countries	Industrial Countries	Developing Countries	ALL Countries	Industrial Countries	Developing Countries
	[1]	[2]	[3]	[4]	[5]	[6]
<i>I. Pull Factors</i>						
<i>Macroeconomic performance</i>						
Growth in real GDP (YoY %, lagged)	0.0945*** (0.0132)	0.0302 (0.0424)	0.0944*** (0.0132)	0.0574*** (0.0180)	-0.0495 (0.0503)	0.0584*** (0.0178)
CPI Inflation (%, lagged)	0.175 (0.222)	15.97*** (4.268)	0.177 (0.222)	0.188 (0.322)	16.49** (6.573)	0.190 (0.319)
Exchange rate regime (lagged)	0.0325 (0.0785)	-0.343*** (0.116)	0.0313 (0.0786)	0.233** (0.105)	-0.242 (0.155)	0.245** (0.104)
Current Account Balance (% GDP, lagged)	-2.725*** (0.961)	-3.924** (1.621)	-2.694*** (0.966)	-0.637 (1.244)	-2.788 (1.787)	-0.805 (1.254)
<i>Financial Sector</i>						
Credit growth in excess of GDI (%, lagged)	0.944 (0.888)	0.409 (1.743)	0.942 (0.888)	1.246 (1.299)	1.512 (2.012)	1.241 (1.302)
REER Overvaluation (lagged)	2.897*** (1.060)	3.770* (2.019)	2.885*** (1.061)	5.989*** (1.304)	12.26*** (2.532)	5.978*** (1.304)
<i>Trade Openness</i>						
Foreign trade (% GDP, lagged)	-0.452** (0.215)	0.208 (0.586)	-0.438** (0.213)	2.511*** (0.538)	1.448* (0.880)	2.246*** (0.496)
Natural resource abundance (lagged)	0.258* (0.147)	0.146*** (0.0498)	0.261* (0.147)	0.458** (0.205)	0.194*** (0.0649)	0.425** (0.202)
<i>Financial Openness</i>						
Financial Openness (% GDP, lagged)	-0.0303 (0.0692)	0.575*** (0.169)	-0.0307 (0.0693)	0.107 (0.111)	0.968*** (0.289)	0.122 (0.111)
Equity Gross Inflows (% GDP, lagged)	10.20*** (1.291)	0.293 (0.179)	10.18*** (1.290)	28.11*** (2.671)	-0.235 (0.244)	27.89*** (2.673)
Debt Gross Inflows (% GDP, lagged)	1.747*** (0.474)	-0.354 (0.475)	1.762*** (0.477)	11.91*** (1.416)	0.602 (0.589)	11.61*** (1.404)
<i>II. Push Factors</i>						
<i>Trade-related</i>						
Foreign growth (%, lagged)	4.551 (5.310)	16.27** (7.964)	4.677 (5.340)	19.94*** (7.653)	30.27*** (10.11)	19.62*** (7.618)
<i>Finance-related</i>						
World real interest rate (%, lagged)	1.156 (4.362)	-18.87*** (4.996)	0.961 (4.371)	-17.38*** (5.899)	-32.40*** (6.860)	-16.16*** (5.867)
Global Risk Aversion (in logs, lagged)	-0.301 (0.287)	0.329 (0.327)	-0.288 (0.287)	-0.426 (0.361)	-0.780** (0.397)	-0.566 (0.365)
Policy Uncertainty Index (lagged)	0.311 (0.401)	-1.448*** (0.487)	0.307 (0.402)	0.269 (0.524)	-1.837*** (0.581)	0.293 (0.516)
S&P 500 Returns (%, lagged)	0.561 (0.960)	0.303 (1.293)	0.698 (0.955)	0.594 (1.104)	-4.278*** (1.594)	-0.374 (1.064)
S&P 500 Return Volatility (lagged)	-2.286 (4.055)	-9.469** (4.572)	-2.506 (4.066)	-5.558 (5.852)	-17.44*** (6.650)	-2.860 (5.756)
<i>Contagion</i>						
Surge synchronization (lagged)	2.512*** (0.207)	3.090*** (0.238)	2.504*** (0.206)	1.796*** (0.248)	2.444*** (0.244)	1.820*** (0.250)
No. Countries	67	22	45	67	22	45
No. Observations	4440	1862	2578	4440	1862	2578

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See note in Table 1 for the definition of surges.

Table 10**Surges in GROSS Private Inflows, Pull and Push Factors: Looking at the horizon**

Dependent Variable: Binary variable that takes the value of one whenever there is a surge in gross inflows

Sample: 69 countries, 1970-2011 (quarterly information)

	CDMN Criterion			FW Criterion		
	Start [1]	Incidence [2]	End [3]	Start [4]	Incidence [5]	End [6]
<i>I. Pull Factors</i>						
<i>Macroeconomic performance</i>						
Growth in real GDP (YoY %, lagged)	0.0419** (0.0204)	0.0945*** (0.0132)	0.0440** (0.0203)	0.0542*** (0.0181)	0.0574*** (0.0180)	0.0577*** (0.0186)
CPI Inflation (%, lagged)	0.228 (0.315)	0.175 (0.222)	0.219 (0.335)	0.358 (0.294)	0.188 (0.322)	0.0495 (0.374)
Exchange rate regime (lagged)	-0.0706 (0.0845)	0.0325 (0.0785)	-0.0559 (0.0843)	-0.114 (0.0813)	0.233** (0.105)	-0.0859 (0.0806)
Current Account Balance (% GDP, lagged)	0.456 (1.227)	-2.725*** (0.961)	-1.053 (1.198)	1.008 (1.182)	-0.637 (1.244)	-0.222 (1.156)
<i>Financial Sector</i>						
Credit growth in excess of GDI (%, lagged)	0.832 (1.094)	0.944 (0.888)	0.521 (1.456)	0.372 (1.214)	1.246 (1.299)	0.585 (1.379)
REER Overvaluation (lagged)	0.464 (1.564)	2.897*** (1.060)	4.088*** (1.537)	0.943 (1.539)	5.989*** (1.304)	5.955*** (1.474)
<i>Trade Openness</i>						
Foreign trade (% GDP, lagged)	-0.154 (0.209)	-0.452** (0.215)	0.0244 (0.195)	-0.153 (0.184)	2.511*** (0.538)	-0.0311 (0.180)
Natural resource abundance (lagged)	-0.0110 (0.0545)	0.258* (0.147)	0.0144 (0.0517)	-0.0101 (0.0523)	0.458** (0.205)	0.00681 (0.0496)
<i>Financial Openness</i>						
Financial Openness (% GDP, lagged)	0.0167 (0.0682)	-0.0303 (0.0692)	0.0723 (0.0681)	0.0548 (0.0652)	0.107 (0.111)	0.0925 (0.0655)
Equity Gross Inflows (% GDP, lagged)	-0.273 (0.187)	10.20*** (1.291)	-0.139 (0.170)	-0.340* (0.175)	28.11*** (2.671)	-0.156 (0.142)
Debt Gross Inflows (% GDP, lagged)	0.805* (0.424)	1.747*** (0.474)	0.663* (0.375)	0.961** (0.375)	11.91*** (1.416)	0.638** (0.311)
<i>II. Push Factors</i>						
<i>Trade-related</i>						
Foreign growth (%, lagged)	-2.014 (6.565)	4.551 (5.310)	1.009 (6.335)	6.859 (5.956)	19.94*** (7.653)	8.410 (5.608)
<i>Finance-related</i>						
World real interest rate (%, lagged)	-5.247 (5.323)	1.156 (4.362)	-5.018 (5.102)	-4.656 (4.767)	-17.38*** (5.899)	-5.762 (4.621)
Global Risk Aversion (in logs, lagged)	0.619 (0.384)	-0.301 (0.287)	0.755** (0.380)	-0.275 (0.296)	-0.426 (0.361)	-0.0881 (0.294)
Policy Uncertainty Index (lagged)	-1.454*** (0.531)	0.311 (0.401)	-0.736 (0.514)	-0.980** (0.494)	0.269 (0.524)	0.0937 (0.485)
S&P 500 Returns (%, lagged)	0.160 (1.576)	0.561 (0.960)	-1.283 (1.330)	0.189 (1.245)	0.594 (1.104)	-0.905 (1.960)
S&P 500 Return Volatility (lagged)	-16.11*** (6.132)	-2.286 (4.055)	-13.89** (5.679)	-13.12** (5.413)	-5.558 (5.852)	-9.25* (5.596)
<i>Contagion</i>						
Surge synchronization (lagged)	1.376*** (0.253)	2.512*** (0.207)	0.507 (0.349)	0.770** (0.306)	1.796*** (0.248)	1.539*** (0.236)
No. Countries	67	67	67	67	67	67
No. Observations	4440	4440	4440	4440	4440	4440

Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See note in Table 1 for the definition of surges.

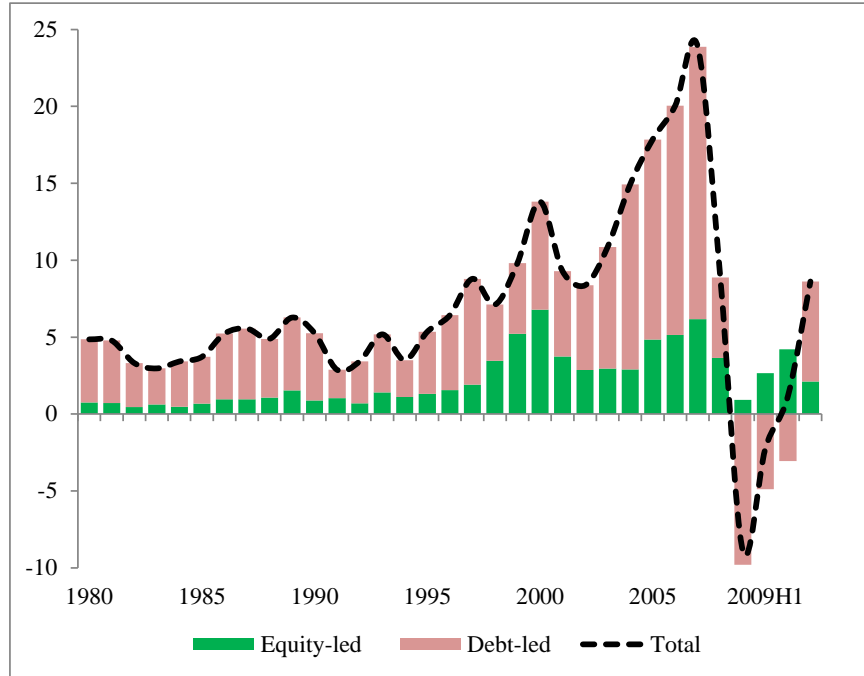
Table 11**Surges in Inflows, Pull and Push Factors: Marginal Effects***Dependent Variable: Binary variable that takes the value of one whenever there is a surge in gross inflows**Sample: 69 countries, 1970-2011 (quarterly information)*

	ALL COUNTRIES		DEVELOPING COUNTRIES	
	CDMN	FW	CDMN	FW
	Criterion	Criterion	Criterion	Criterion
	[1]	[2]	[3]	[4]
<i>I. Pull Factors</i>				
<i>Macroeconomic performance</i>				
Growth in real GDP	0.0088 **	0.0031 **	0.0108 **	0.0004
<i>(YoY %, lagged)</i>	(0.001)	(0.001)	(0.002)	(0.001)
CPI Inflation	0.0488 **	0.0175	0.0194	0.0011
<i>(%, lagged)</i>	(0.018)	(0.011)	(0.018)	(0.002)
Exchange rate regime	-0.0110 **	0.0042	0.0025	0.0008
<i>(lagged)</i>	(0.006)	(0.004)	(0.006)	(0.001)
Current Account Balance	-0.3187 **	-0.1818 **	-0.0970	-0.0033
<i>(% GDP, lagged)</i>	(0.075)	(0.068)	(0.080)	(0.008)
<i>Financial Sector</i>				
Credit growth in excess of GDP	0.0686	0.0774 *	0.0410	0.0004
<i>(%, lagged)</i>	(0.070)	(0.046)	(0.078)	(0.005)
REER Overvaluation	0.3315 **	0.3355 **	0.2396 **	0.0184
<i>(lagged)</i>	(0.082)	(0.110)	(0.090)	(0.030)
<i>Trade Openness</i>				
Trade Openness	0.0178	0.0647 **	-0.0462 **	0.0093
<i>(% GDP, lagged)</i>	(0.016)	(0.025)	(0.018)	(0.015)
Natural resource abundance	0.0127 **	0.0136 **	0.0172	0.0005
<i>(lagged)</i>	(0.004)	(0.004)	(0.012)	(0.001)
<i>Financial Openness</i>				
Financial Openness	0.0142 **	0.0186 **	-0.0009	0.0005
<i>(% GDP, lagged)</i>	(0.005)	(0.006)	(0.005)	(0.001)
Equity Gross Inflows	-0.0001	-0.0195	0.8132 **	0.0909
<i>(% GDP, lagged)</i>	(0.013)	(0.015)	(0.125)	(0.147)
Debt Gross Inflows	0.0730 **	0.1177 **	0.1354 **	0.0439
<i>(% GDP, lagged)</i>	(0.028)	(0.032)	(0.039)	(0.070)
<i>II. Push Factors</i>				
<i>Trade-related</i>				
Foreign growth	0.6139 *	0.6169 **	0.4260	0.0576
<i>(%, lagged)</i>	(0.351)	(0.313)	(0.428)	(0.101)
<i>Finance-related</i>				
World real interest rate	-0.6841 **	-0.8872 **	-0.1985	-0.0789
<i>(%, lagged)</i>	(0.250)	(0.330)	(0.332)	(0.129)
Global Risk Aversion	0.0136	-0.0053	-0.0117	0.0003
<i>(in logs, lagged)</i>	(0.018)	(0.011)	(0.023)	(0.002)
Policy Uncertainty Index	-0.0642 **	-0.0429 **	0.0065	-0.0004
<i>(lagged)</i>	(0.026)	(0.020)	(0.032)	(0.002)
S&P 500 Returns	0.0239	-0.1142 *	0.0032	0.0005
<i>(%, lagged)</i>	(0.064)	(0.059)	(0.074)	(0.005)
S&P 500 Return Volatility	-0.4547 *	-0.4884 **	-0.0311	-0.0477
<i>(lagged)</i>	(0.244)	(0.208)	(0.297)	(0.081)
<i>Contagion</i>				
Surge synchronization	0.6899 **	0.3274 **	0.5871 **	0.0549
<i>(lagged)</i>	(0.043)	(0.072)	(0.074)	(0.065)
No. Observations	4444	4444	2582	2582
No. Countries	67	67	45	45

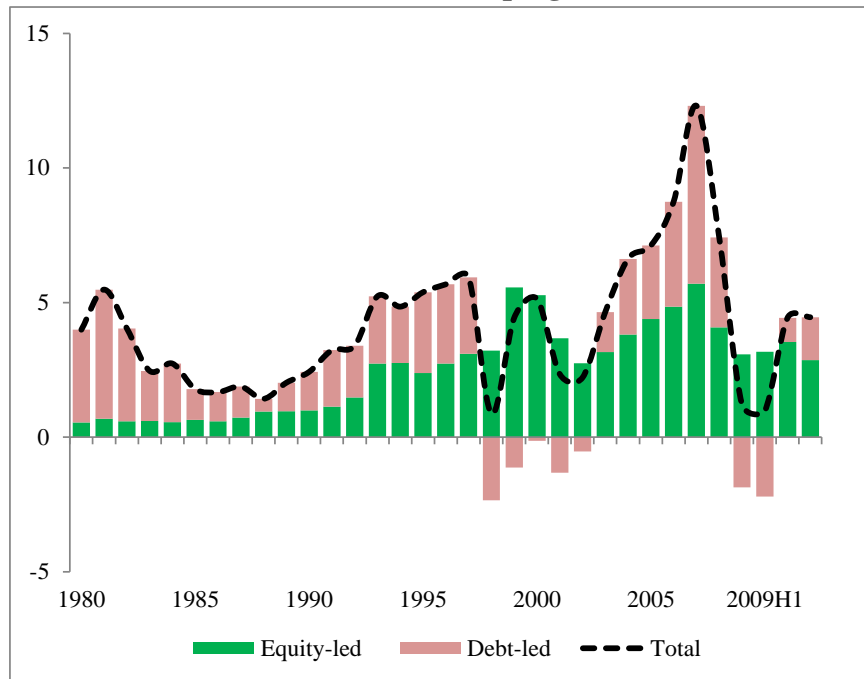
Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. See note in Table 1 for the definition of surges.

Figure 1
Gross Inflows (% of aggregate GDP)

1.1 Gross inflows to industrial countries



1.2 Gross inflows to developing countries



Source: International Monetary Fund – International Financial Statistics

Figure 2
Evolution of Surges in Gross Inflows over time
(Share of total episodes over time)

