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Abstract

Using a quarterly panel of 98 advanced as well as emerging and developing countries from 1990 to 2017, this paper shows that domestic variables are significantly related to the probability of incurring sharp reversals in capital inflows controlling for global push factors. In particular, negative growth shocks combined with high levels of leverage in the domestic private sector are a significant determinant of sudden stops. This is in line with real business cycle models including an occasionally binding credit constraint and income trend shocks.

Keywords: international capital flows, sudden stops, financial stability.

JEL Classification numbers: E32, F30, F32, F34, G15.

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Non-technical summary

Sharp reversals in capital inflows, so called sudden stops, are associated with dire economic outcomes. They have been shown to go hand in hand with sharp current account adjustments and real exchange rate depreciations which regularly result in financial instability and significant output losses, as well as increasing unemployment. The potential reasons behind such sudden stops are still subject to debate in the literature. The global financial crisis (GFC) has drawn attention to global push factors such as changes in global risk aversion, which are outside the control of domestic policy makers in countries experiencing sudden stops. However, more recent literature has shown that since the GFC, extreme capital flow movements have become less correlated with these so called push factors and that, in fact, global, regional and domestic variables previously used in the literature are less able to explain large movements in international capital flows (Forbes and Warnock, 2020).

This paper extends the analysis of sudden stop episodes to the post-crisis period and to a larger set of countries than previously analysed in the literature. Using this extensive dataset, domestic variables are found to be significantly related to the probability of incurring sharp reversals in gross capital inflows. In particular, negative growth shocks combined with high levels of leverage in the domestic private sector are found to be a significant determinant of sudden stops. More precisely, I find that, at elevated levels of leverage in the domestic economy, a one standard deviation growth shock increases the probability of incurring a sudden stop by substantially more than when leverage is at its median or lower. This holds when global and contagion factors are accounted for. The result is also robust to including other potential domestic drivers of sudden stops like the fiscal balance, government debt levels, financial openness and exchange rate regime measures, the stock of reserve assets, as well as to excluding the GFC from the sample.

This paper therefore provides empirical evidence in support of theoretical work stressing the importance of domestic variables in determining sudden stop episodes complementing the recent empirical literature which found a predominant role for global factors. The evidence found in this paper is consistent with recent additions to the theoretical literature on real business cycle models with occasionally binding collateral constraints (Akinci and Chahrour, 2018; Seoane and Yurdagul, 2019; Flemming et al., 2019). In these models expected income gains in the future, either through an observable component in productivity or persistent shocks to trend income growth, lead agents to increase leverage, not internalizing externalities on aggregate debt in the economy. Hence, when the expected productivity gains are not actually realised or an unforeseen negative shock hits the economy, the constraint is more likely to bind. Therefore, sudden stops in capital inflows should be more likely for economies with high levels of leverage which exhibit a negative growth shock, precisely as found in this paper. By limiting excessive credit growth, countercyclical macroprudential policy could, hence, also serve to reduce the susceptibility of capital inflows to sudden stops.

1 Introduction

Are countries prey to the tides of global capital movements or can domestic policies tame some of the adverse consequences of financial globalisation? This question has been subject to debates by academics and policymakers and there is no clear consensus . It is particularly important to understand whether sharp reversals in capital inflows, so called sudden stops, can be avoided by domestic policymakers because of the dire economic outcomes they are associated with. In particular, sudden stops have been shown to go hand in hand with abrupt current account adjustments and real exchange rate depreciations which regularly result in financial instability and significant output losses, as well as increasing unemployment (Calvo, 1998; Calvo et al., 2004, 2008; Cavallo et al. 2015; Rothenberg and Warnock, 2011, Romelli et al., 2018).

Starting with Calvo et al. (1993, 1996) the empirical literature on the drivers of international capital flows distinguishes global 'push' factors from country-specific 'pull' factors.[1] In this framework, push factors are usually understood to entail common factors, i.e. monetary and fiscal policies, as well as risk aversion in core advanced economies, which are outside the control of individual recipient country policymakers. Conversely, pull factors are borrowing-country specific economic and policy characteristics. Forbes and Warnock (2012) conclude that most factors related to capital flow volatility are indeed global factors outside the control of most countries' domestic policy space. For portfolio flows, Fratzscher (2012) finds that "push" factors were the main drivers of capital flows during the global financial crisis (GFC). However, institutional quality and country risk together with the strength of macroeconomic fundamentals are found to explain a large share of the heterogeneity of capital flows during the GFC. More recent work by, e.g. Cerutti et al (2019) suggests that merely a quarter of the variation in capital flows is driven by global factors leaving the rest to be explained by other causes. In fact, Forbes and Warnock (2020) find that, since the GFC, the link between global push factors and extreme capital flow movements has weakened and these episodes have become more idiosyncratic. The focus on global factors that emerged in the literature after the GFC is also somewhat at odds with real business cycle (RBC) models explaining sudden stops by a combination of high leverage and adverse productivity shocks in the domestic economy triggering occasionally binding credit constraints (Mendoza, 2010; Akinci and Chahrour, 2018, Flemming et al., 2019; Seoane and Yurdagul, 2019).

This paper sheds new light on the role of domestic factors as drivers of sudden stops by combining analysis of these sharp reversals in gross capital inflows with novel data on domestic economic developments in a large sample of countries. More specifically, I combine Balance of Payments (BOP) data from the IMF with the recently published dataset by Kose et al. (2017) providing broad country

[1] See Kaminsky (2019) for a recent survey of the literature on international capital flows.

coverage for debt sustainability indicators to construct a quarterly panel of 98 advanced (AE) as well as emerging and developing (EMDE) countries (31 AEs and 67 EMDEs) for the period 1990 to 2017. Further combining these data with global drivers of capital flows identified in the literature (Forbes and Warnock, 2012; Habib and Venditti, 2019), as well as with additional domestic controls, this paper extends the analysis of sudden stop episodes to the post-crisis period and to a larger set of countries than previously analysed in the literature.

Employing this novel and extensive dataset in a complementary logarithmic regression framework, domestic variables are found to be significantly related to the probability of incurring sharp reversals in gross capital inflows. In particular, negative growth shocks combined with high levels of leverage in the domestic private sector are found to be a significant determinant of sudden stops. This is in line with recent theoretical postulations by Akinci and Chahrour (2018), Flemming et al. (2019), and Seoane and Yurdagul (2019), as well as the empirical literature on debt cycles and crises (Gourinchas and Obstfeld, 2012; Schularick and Taylor, 2012). More precisely, I find that, at elevated levels of leverage in the domestic economy, a one standard deviation growth shock increases the probability of incurring a sudden stop by 3.5 percentage points. This is equivalent to a 36 percent increase in the unconditional probability of 9.7 percent and 60 percent larger than the effect of a one standard deviation shock in global risk aversion, measured by the VIX index of implied volatility on US equity options.

This paper is related to a wide range of literature on international capital flows. First, and most directly, it contributes to the empirical analysis of sudden stops.[2] Prior to the GFC, the empirical literature on sudden stops focused on domestic factors to explain the incidence of sudden stops finding some evidence for the role of debt and openness (Calvo et al, 2004). The GFC spawned a renewed interest in capital flow volatility and the most influential studies point out two important short-comings of the previous literature. First, the focus on net inflows does not allow to differentiate between actions of foreign and domestic investors (Rothenberg and Warnock, 2011; Forbes and Warnock, 2012; Milesi-Ferretti and Tille, 2011; Broner et al., 2013).[3] Second, global factors play a significant role in explaining

[2] The concept of sudden stops in capital inflows was first introduced in the theoretical contribution by Calvo (1998).

[3] Cavallo et al. (2015) find that sudden stops in gross capital inflows can be detrimental to GDP growth even when they are not associated with stops in net inflows. The authors disaggregate sudden stops by dissecting gross capital flows by functional instrument category and show that some types of flows are more disruptive than others. In particular, they find that sudden stops which combine falls in net flows and those that are driven by abrupt reductions in other investment inflows are indeed the most disruptive because they are associated with larger declines in GDP.

the occurrence of sudden stops in gross capital inflows.[4] In fact, Forbes and Warnock (2012) conclude that most domestic factors only have a limited correlation with capital flow volatility and that capital controls do not seem to shield an economy against capital flow waves.[5] Lo Duca (2012) shows that domestic factors actually gain importance in periods of heightened global market tensions but that when global market tensions become extreme they can induce panics which render regional developments insignificant. In a recent study on sudden stops of international fund flows, Li et al. (2018) show that global, contagion, and domestic factors are all related to the likelihood of sudden stops. Everett and Galstyan (2020) show that domestic factors are equally important to push factors in source countries in the context of bank portfolio holdings. Forbes and Warnock (2020) show that, since the GFC, extreme capital flow movements have become less correlated with global push factors such as changes in global risk aversion. In fact, global, regional and domestic variables previously used in the literature are found to be less able to explain large movements in international capital flows such as sudden stops in the extended post-GFC sample period. This paper adds to the literature by showing that domestic leverage cycles combined with negative growth shocks are significantly associated with the probability of incurring sudden stops in overall gross capital inflows. This holds when global and contagion factors are accounted for. The result is also robust to including other potential domestic drivers of sudden stops like the fiscal balance and government debt levels, as well as financial openness, the stock of reserve assets, and the exchange rate regime. It is also robust to excluding the GFC from the sample.

Second, this paper therefore provides empirical evidence in support of theoretical work stressing the importance of domestic variables in determining sudden stop episodes complementing the recent empirical literature which found a predominant role for global factors.[6] Akinci and Chahrour (2018), Flemming et al. (2019), and Seoane and Yurdagul (2019) develop real business cycle models with occasionally binding collateral constraints based on García-Cicco et al. (2010) and Mendoza (2010). In these models expected income gains in the future, either through an observable component in productivity or persistent shocks to trend income growth, lead households to increase leverage, not internalizing externalities on aggregate debt in the economy. Hence, when the expected productivity gains are not actually realised or an unforeseen negative shock hits the economy, the constraint is

[4] See, for example, Rey (2013, 2016), Cerutti et al., (2019), McQuade and Schmitz (2019) for a discussion of global factors as determinants of international capital flows.

[5] Forbes and Warnock (2012b) show that these results also hold for episodes disaggregated into debt and equity led episodes showing that most episodes of extreme capital flow movements are debt-led.

[6] Theoretical contributions on the role of push factors include Bacchetta et al. (2012), Gourio et al. (2011), Bruno and Shin (2015) on risk, Giannetti (2007), Brunnermeier (2009) and Calvo (2009) on liquidity/credit, as well as Dedola and Lombardo (2012) and Devereux and Yetman (2010) on leverage.

more likely to bind. Therefore, sudden stops in capital inflows should be more likely for economies with high levels of leverage which exhibit a negative growth shock, precisely as found in this paper.

This paper is structured as follows. Section 2 describes the main data source for gross capital inflows, discusses the methodology used to identify sudden stop episodes, and presents some stylised facts on these sharp reversals in capital inflows. Subsequently, the role of domestic leverage and productivity shocks as determinants of sudden stops are discussed in section 3 deriving hypotheses which are tested using the methodology outlined in section 4. The results are discussed in section 5 and buffeted with robustness checks and extensions in section 6 before section 7 concludes.

2 Sudden Stops in Capital Flows

As mentioned above, the distinction of international capital flows into flows by foreign and domestic investors has been shown to be crucial in order to gain a more nuanced understanding of capital flow volatility. For example, Broner et al. (2013) show that gross in- and outflows are positively correlated and procyclical, i.e. domestic agents invest abroad when foreigners invest in a country, and more so during expansions. Moreover, Forbes and Warnock (2012) show that using gross instead of net flows yields fundamentally different results regarding drivers of extreme capital flow episodes. Eichengreen and Gupta (2016) show that decreases in investment by non-residents is typically behind sudden stops in net inflows since residents' stabilizing reaction, i.e. a reduction in gross outflows, is not sufficient to offset the reduction in gross inflows. I follow this literature and focus on sharp reversals in gross capital inflows.

Data on gross capital inflows are gathered from the IMF's quarterly International Financial Statistics (IFS).[7] In accordance with BPM6 standards these inflows are recorded by national agencies on a residency principle and reported to the IMF. Gross capital inflows denote net occurrence of financial liabilities, i.e. gross liability flows net of repayments. Hence, these inflows are usually interpreted as net purchases of domestic assets by foreign agents. Inflows are reported by functional category, i.e. foreign direct investment (FDI), portfolio equity investment (PE), portfolio debt investment (PD), as well as other investment (OI). I construct a measure of capital inflows by summing flows reported in the individual categories.[8]

Following Forbes and Warnock (2012), I define sudden stops in capital inflows as follows. Let F_t denote the four-quarter rolling sum of capital inflows into a particular country in quarter t. Then ΔF_t is the year on year change in this smoothed measure of quarterly inflows, i.e.

[7] Note that inflows reported in the IMF IFS exclude exceptional financing.

[8] Inflows in financial derivatives are excluded from the analysis due to sparse reporting and relatively small size. Furthermore, I exclude countries with less than 10 years of consecutive data.

$$F_t = \sum_{i=0}^{3} GROSSINFLOW_{t-i}, \text{with } t = 4,5, \dots, T \text{ and} \quad (1)$$

$$\Delta F_t = F_t - F_{t-4}, \text{with } t = 8,7, \dots, T. \quad (2)$$

A country is then defined to exhibit a sudden stop episode, $e_{it} = 1$, if ΔF_t falls one standard deviation below its moving historical mean provided it reaches two standard deviations below the mean at some point and the episode lasts longer than one quarter. The episode ends when gross inflows are no longer at least one standard deviation below the mean.[9] The moving mean and corresponding standard deviations are computed over five year windows. Figure 1 illustrates this definition for Argentina. The blue line is the year on year change in four quarter sums of gross capital inflows as defined in equation (1) and the yellow and red lines illustrate the thresholds for mean capital inflows being one or two standard deviations below the moving mean, respectively. According to the definition of sudden stops outlined above, three periods are identified as sudden stop episodes for Argentina between 1990 and 2017 and highlighted in shaded grey, i.e. 1998Q4 to 1999Q4, 2001Q1 to 2002Q2 (both during the Argentine Great Depression), and 2008Q3 to 2009Q4 (the GFC). Table A1 in the appendix lists all episodes identified using this definition of sudden stops for the sample used in the further analysis.

Figure 2 shows the percentage of countries in a sudden stop episode in a respective quarter over time. Generally, sudden stops tend to come in waves (Forbes and Warnock, 2012) with higher numbers of countries experiencing an episode simultaneously during periods of major economic crises such as the early 1990s recession, the Asian financial crisis, the dot-com bubble bust, as well as the GFC. While this highlights the potential role for global and contagion factors as determinants of sudden stop episodes, the fact that sudden stops are also identified outside of these major global crisis years suggests a role for domestic factors as well. It also becomes apparent that sudden stops are not purely a phenomenon observed in EMDEs but that they are also common in AEs.

Table 1 summarizes the incidence of sudden stop episodes during sub-periods and across AEs and EMDEs. The unconditional probability of observing a sudden stop episode in any given quarter throughout the sample is 9.7 percent. AEs exhibit sharp reversals of gross capital inflows relatively more often which reflects the higher volatility of gross flows in high-income countries documented in the literature (Broner et al., 2013), as well as the fact that the period during which sudden stops where

[9] While the definition by Forbes and Warnock is the most commonly used one, there are, of course, alternative definitions of sudden stop episodes. Cavallo et al. (2015) use the definition by Calvo et al. (2004) and Forbes and Warnock (2012) but, i.a., distinguish sudden stop events by conditioning on extreme events simultaneously happening in gross outflows and net flows. Results for this alternative definition and for episodes in which the reduction in flows amounted to at least 5% of a recipient country's GDP are qualitatively similar (see section 6 and Table A9).

most prevalent – the GFC – affected AEs more severely (Lane and Milesi-Ferretti, 2011). Sudden stops last for slightly more than 5 quarters on average. It is worth noting that not all sharp reversals in gross inflows coincide with sudden stops in net inflows (Cavallo et al., 2015). In fact, only around 53 percent of sudden stop episodes go hand in hand with sharp reversals in net inflows. However, the reductions in gross inflows typically make up sizeable fractions of GDP, especially for AEs but also for EMDEs. The fact that the share of episodes during which the decline in gross inflows exceeded 5 percent of GDP is significantly higher in the post-crisis period reflects the growing size of capital flows that went hand in hand with financial globalisation. Taken together Table 1 and Figure 2 illustrate that while sudden stop episodes have not become more prevalent over time the size of the "turnaround", and the corresponding potential for adverse economic outcomes, has increased (Eichengreen and Gupta, 2016).

3 Potential Drivers of Sudden Stops

3.1 Leverage, Productivity Shocks, and Sudden Stops

Akinci and Chahrour (2018) develop a small open economy RBC model with an occasionally binding collateral constraint showing that the probability of sudden stops increases when households receive good news about the domestic economy, i.e. expected productivity gains in the future. More precisely, the representative agent in Akinci and Chahrour (2018) faces labour augmenting productivity shocks that are observed contemporaneously but don't affect productivity until sometime in the future in addition to contemporaneous productivity shocks usually implemented into RBC models. These positive news shocks boost output contemporaneously since firms, which are fully owned by households, have the incentive to increase labour demand today for an expected future productivity increase because it is costly to adjust labour.[10] Therefore, anticipated productivity gains lead to a permanent but gradual increase in output incentivising households to borrow from abroad, bringing the economy closer to the borrowing constraint. When the expected productivity gains are not actually realised or an unforeseen negative productivity shock hits the economy, the constraint is therefore more likely to bind.[11] Seoane and Yurdagul (2019) and Flemming et al. (2019) show that a

[10] In short, Akinci and Chahrour (2018) combine the open economy RBC model in García-Cicco et al. (2010) with a collateral constraint as in Mendoza (2010) and augment it to include adjustment costs to both labour and debt, as well as gradual detrending of labour in the utility function.

[11] With a binding constraint, agents will lower debt and capital holdings (in domestic firms) simultaneously, which is how the model delivers the qualitative patterns surrounding sudden stop episodes, as defined by Akinci and Chahrour (2018): (i) the cyclical component of GDP is at least one-and-a-quarter standard deviations below its trend level, (ii) the reversal in the trade balance-to-GDP ratio (which is equivalent to balance on foreign debt flows) is at least one-and-a-quarter standard deviations above average.

model with trend income shocks can generate similar dynamics of overborrowing in the run up to sudden stops. Hence, sudden stops in capital inflows should be more likely for economies with high levels of leverage which exhibit a negative growth shock.

In order to test this hypothesis, I measure leverage in the economy using domestic credit to the private sector (share of GDP) taken from Kose et al. (2017) and growth shocks as deviations in quarterly real GDP growth from its four quarter growth trend based on data from the IMF's IFS database (Forbes and Warnock, 2012). While very simple, this definition of a growth shock has the advantage of being available for a wide set of countries. In addition, it is very closely correlated with a finer measure of growth shocks based on historical forecast data from the IMF WEO database constructed using the difference between realized growth rates and forecast growth rates for a respective period (Figure A1).[12]

3.2 Other Domestic Factors

Other country characteristics might also be related to the probability of experiencing a sudden stop. To control for other potential domestic drivers, I gather data on the fiscal balance measured in percent of GDP, the government debt to GDP ratio, as well as the sovereign rating of a particular country, all taken from Kose et al. (2017).[13] The prior is that unsustainable public finances might lead to sudden stops if investors lose confidence (Calvo et al., 2004). In addition, measures of financial openness are included to account for the fact that more financially open economies might, on the one hand, be more prone to exhibit sudden stops due to external shocks or domestic vulnerabilities (Eichengreen and Gupta, 2016). On the other hand, an open financial account might increase resilience due to a more diversified portfolio of creditors insulating the economy from idiosyncratic shocks to specific lenders (Edwards, 2004). I measure financial openness by total assets and liabilities over GDP (Lane and Milesi-Ferretti 2007). It is important to note that more financially open economies tend to have higher levels of debt as shown in the pairwise correlations in Table A4. Finally, I also include GDP per capita from the IMF IFS as an additional control for the level of development.

3.3 Global and Contagion Factors

In order to control for the important role of global and contagion factors identified by Forbes and Warnock (2012), I include the same set of variables to capture them as used in the original study.

[12] In order to obtain quarterly frequency, quarter two values use the spring WEO forecast while quarter four values are based on the autumn forecast figures. The missing quarters are interpolated. Using this measure of growth shocks considerably reduces the country sample (to 69) but leaves results in tact (available upon request).

[13] The data in the Kose et al (2017) database are at annual frequency and are linearly interpolated to quarterly frequency.

Global factors include global risk captured by the Volatility Index (VIX) calculated by the Chicago Board Options Exchange, measures of global liquidity and interest rates, as well as global growth in real GDP, all based on data from the IMF IFS. The VIX is widely used in the literature to capture global uncertainty or risk aversion (e.g. Forbes and Warnock, 2012; Fratzscher, 2012; McQuade and Schmitz, 2019). Changes in global liquidity are captured by year-on-year growth in global money supply, i.e. the sum of M2 in the US, euro area, and Japan, as well as M4 in the UK.[14] Global interest rates are represented by the average rate on long-term government bonds in the US, euro area, and Japan. Global growth is measured by quarterly global growth in real economic activity.

Contagion is captured by the exposure-weighted average of rest-of-the-world episodes. Contagion may work through trade and financial channels (Born and Enders, 2019). Hence, episodes in other countries are weighted by country *i*'s exports (relative to its total exports) to the trade partner country exhibiting a sudden stop episode in period *t*. Contagion through trade channels is then captured by the sum of episodes in trade partner countries weighted by their share in country *i*'s exports. Contagion through financial channels is measured in the same way using international bank claims as a proxy for financial ties. Bilateral trade data are from the IMF's Direction of Trade Statistics (DOTS) and banking exposures are from the BIS Locational Banking Statistics (LBS).[15] All variables used in the following regression analysis and their respective sources are summarized in Table A2 in the appendix.

Figure 3 serves as an illustration of how upswings in domestic leverage cycles combined with negative growth shocks can go hand in hand with sudden stops in gross capital inflows. It depicts the evolution of the year on year change in gross capital inflows (blue line), the stock of private non-financial sector credit to GDP (yellow line), as well as growth shocks (green line) around the sudden stop episode in Peru between 1998q2 and 1999q4. In the two years preceding the onset of the sudden stop episode private non-financial sector credit increased substantially from 20.2 to 26.8 percent of GDP. At the end of 1997 GDP growth began to fall below trend reaching its trough in 1998q2 simultaneous to the onset of the sudden stop episode. This suggests that the economy might indeed have reached a binding borrowing constraint due to a negative growth surprise as suggested by the mechanism laid out in Akinci and Chahrour (2018). However, the episode also coincides with a spike in the VIX (red line) which highlights the need for a more formal test of the various proposed determinants of sudden stops which is carried out in the regression analysis below.

[14] All converted into US dollars using exchange rate data from the IMF IFS.

[15] Note that financial links might be captured imperfectly since only 48 countries currently report to the BIS LBS. However, these include all major international banking centres such that contagion through international banks should be captured sufficiently well.

4 Empirical Methodology

Following Forbes and Warnock (2012), I regress the dummy variable indicating whether a country is exhibiting a sudden stop episode at any given point in time between 1990Q1 and 2018Q1 on a set of global, contagion, and domestic variables.

$$Prob(e_{it} = 1) = F(\beta_1 Debt_{i,t-1} + \beta_2 GrowthShock_{i,t-1} + \beta_3 Debt_{i,t-1} * GrowthShock_{i,t-1} + \varphi_{t-1}^{Domestic} B_D + \varphi_{t-1}^{Contagion} B_C + \varphi_{t-1}^{Global} B_G) \quad (3)$$

As detailed in section 3, sudden stops in capital inflows should be more likely for economies with high levels of leverage which exhibit a negative productivity shock according to Akinci and Chahrour (2018). Hence, $Debt_{i,t-1}$ and $GrowthShock_{i,t-1}$ are the main variables of interest denoting domestic private sector indebtedness and the measure of growth shocks in country *i*, respectively. Because the theoretical models outlined above suggest that the aggregate collateral constraint should be more likely to bind for combinations of negative productivity shocks and high levels of aggregate debt, I expect a negative sign for β_3, i.e. on the interaction term between domestic private sector indebtedness and the measure of growth shocks.

To control for other drivers of sudden stops, sets of additional domestic factors, contagion factors, as well as global factors are included, summarized in the terms $\varphi_{t-1}^{Domestic}$, $\varphi_{t-1}^{Contagion}$, and φ_{t-1}^{Global}. As outlined in equation (3), all independent variables are lagged by one quarter. Because sudden stops are relatively rare events (almost 90 percent of the sample are zeros) I estimate equation (3) using the complementary logarithmic framework, again following Forbes and Warnock (2012).[16]

In the baseline estimations, I start with a relatively parsimonious set of explanatory variables. Besides the main variables of interest mentioned above I include controls for financial openness and GDP per capita, i.e. the domestic variables which showed the highest pairwise correlations with the main variables of interest (Table A4). In addition, I control for the level of government indebtedness. The other potential domestic drivers of sudden stops are included in robustness checks.[17] In addition to these domestic factors, I include measures of contagion and global factors as outlined above. This selection of explanatory variables leaves an unbalanced panel of 98 countries (31 AEs, 67 EMDEs). For these countries data is available for 62 countries before 2000 (24 AEs, 38 EMDEs) and the remaining countries enter the sample from 2000 onwards.[18]

[16] This framework assumes that sudden stop episodes follow an extreme value distribution with F(.) being the according cumulative distribution function. The results are robust to using a logit or probit framework instead.

[17] See Table A8 and section 6 for results including all domestic variables.

[18] Table A3 shows the date of the first observation entering the regression analysis for each country. The results are robust to using the more balanced panel for 58 countries in Forbes and Warnock (2020).

5 Results

Table 2 shows the results of estimating equation 3. In general, domestic factors are revealed to be significantly associated with the occurrence of sudden stop episodes alongside contagion and global factors. In particular, higher levels of private sector indebtedness and negative growth shocks are found to be significantly positively related to the probability of incurring a sudden stop episode (column 1). The interaction term between domestic debt levels and growth shocks added in column 2 shows the expected sign indicating that sudden stops in capital inflows are indeed more likely for economies which exhibit a negative productivity shock when levels of leverage in the domestic economy are high.[19] This result is robust to the inclusion of country fixed effects in columns 3 and 4.[20] Moreover, the inclusion of the interaction term renders the coefficient on growth shocks insignificant implying that the shocks do not matter per se but combined with high levels of leverage they raise the probability of the economy hitting a binding borrowing constraint. In fact, the effect of growth shocks is found to be asymmetric since only negative growth shocks show a significant coefficient as documented in Table A5.

In line with Forbes and Warnock (2012), other domestic factors are found to be less robust in their predictive power regarding the occurrence of sharp reversals in gross capital inflows. While the ratio of government debt to GDP shows a positive sign, it does not reach conventional levels of significance in any of the specifications in Table A8. Higher de facto financial openness is associated with a lower likelihood of incurring a sudden stop in columns 1 and 2, this result seems to be driven by unobserved time invariant country characteristics since it becomes insignificant when country fixed effects are included. GDP per capita, which acts as a control for the level of economic development in the regression, is found to be positively related to the incurrence of sudden stops reflecting the higher unconditional probability for AEs documented in Table 1.

Turning to contagion and global factors, Table 2 shows that sudden stops in capital inflows are more likely to happen when important trade partners also exhibit a sudden stop. Contagion does not seem to be a major factor with regard to financial channels. In addition, global factors are confirmed to be significant determinants of sharp reversals in gross capital inflows. In line with Forbes and Warnock (2012), I find that increases in global uncertainty, higher global interest rates, and lower global growth momentum go hand in hand with an increased likelihood of sudden stops.

In order to assess how well the selected variables explain the occurrence of sudden stops I follow the literature on (external) financial crises using the Area Under the Receiver Operating Characteristic

[19] A similar interaction term of growth shocks with levels of government debt to GDP is not significant.

[20] Because these fixed effects become a perfect predictor of the probability of experiencing a sudden stop for countries which never experienced one, these countries drop out of the sample.

(AUROC) (Catao and Milesi-Ferretti, 2014; Schularick and Taylor, 2012). The ROC plots the fraction of true positives that a given model signals against the fraction of false positives along all threshold settings determining when the estimated probability of a sudden stop would be interpreted as a signal for an impending sudden stop. The AUROC, in turn, provides a measure of the extent to which the model's signals outperform an uninformative "coin toss" (AUROC = 0.5). The selected explanatory variables provide relatively high AUROC values of 0.75 even without country fixed effects given the broad country sample. The inclusion of fixed effects increases the AUROC to 0.82. This implies that the selected variables exhibit predictive power that are in line with other models used in the literature. Schularick and Taylor (2012), for example, find values of 0.72 in their baseline specification.[21]

In order to assess the economic significance of the respective explanatory variables, Table 3 shows the marginal effects of the specification including fixed effects (Table 2, column 4) evaluated at different points in the distribution. The estimated marginal effects of the domestic variables are economically significant and similar in magnitude to those of the global factors. Columns 1 and 2 report the marginal effects evaluated at the 25 percentile and the mean of private sector credit, respectively. The marginal effects are not significantly different between these levels of leverage in the domestic economy. The estimates suggest that a one standard deviation growth shock increases the probability of incurring a sudden stop by 2 percentage points, which is equivalent to a 20.6 percent increase compared to the unconditional probability of 9.7 percent. By comparison, a one standard deviation increase in the VIX increases the predicted probability of a sudden stop by 1.1 percentage points, i.e. by 11.3 percent. As discussed above, the significance of the interaction term between domestic credit and growth shocks implies that the latter should matter more if an economy exhibits elevated levels of leverage. Column 3 reports estimates of the marginal effects for levels of domestic private sector credit to GDP in the 75 percentile. As expected, the marginal effects of a negative growth shock are found to be higher. A one standard deviation growth shock increases the predicted probability of incurring a sudden stop by 3.5 percentage points or by 36 percent. Hence, with domestic private sector credit to GDP in the 75 percentile, a one standard deviation growth shock increases the predicted probability of a sudden stop episode by 75 per cent more than with domestic private sector credit to GDP at the median or lower.

Taken together the results suggest a decisive role of the level of leverage in the economy in determining the probability of incurring sudden stops because high levels of debt increase the adverse impact of negative productivity shocks. This is in line with the empirical and theoretical literature which suggests that leverage cycles are the most powerful predictors of sudden stops and financial crises (Gourinchas and Obstfeld, 2012; Schularick and Taylor, 2012; Akinci and Chahrour, 2018).

[21] Probit estimations of the specifications in Table 5 yield pseudo R^2 values between 0.15 and 0.23.

6 Robustness and Extensions

6.1 Robustness

The robustness of the results presented in the previous section is assessed using a battery of sensitivity tests. First, a main endogeneity concern regarding the domestic variables is that a reversal in capital inflows and the accompanying reversals in the real exchange rate drive the slowdown in credit growth and the dismal growth performance rather than growth shocks and leverage increasing the likelihood of a sudden stop. To some extent this concern is already alleviated by the fact that the explanatory variables enter the regressions lagged by one period. However, since sudden stop periods span several quarters (by definition), including all quarters following the onset of a sudden stop might still give rise to erroneous conclusions regarding the direction of causality (Eichengreen and Gupta, 2016). Dropping all quarters following the onset of a sudden stop episode as suggested by Eichengreen and Gupta (2016) leaves the results intact with virtually unchanged coefficient estimates for the main variables of interest (Table A6).[22] Furthermore, including a lagged version of the dependent variable alongside several other additional explanatory variables leaves the coefficient on the interaction term between growth shocks and domestic credit unchanged and significant (Table A8, columns 3 and 4).[23]

Second, the GFC period might be driving the results to a large extent, given that close to 30 percent of all sudden stop observations are from this period (Figure 1). Table A7 shows that the results are robust to excluding the GFC (2008-2009) from the sample. More specifically, the point estimates for the interaction between domestic leverage and growth shocks are virtually unchanged from the baseline estimates in Table 2 although the reduction of available sudden stop observations reduces the precision of the estimation slightly. Interestingly, the coefficient estimates on the global variables are reduced in size by excluding the GFC from the sample causing the global growth in liquidity to lose significance throughout and the VIX in some instances. Global growth and interest, however, remain highly significant.

Third, the relatively parsimonious selection of domestic variables might give rise to concerns that unobserved factors might be behind the results. However, the wide range of other additional explanatory factors considered in Table A8 are mostly insignificant.[24] Notable exceptions are the fiscal

[22] Notably, this exercise renders the coefficient on global growth insignificant.

[23] The coefficient estimate on the lagged dependent variable is positive and highly significant reflecting the fact that sudden stop episodes are persistent (by definition).

[24] Countries with a larger stock of reserves might increase investor confidence given their increased ability to withstand the impact of a sudden stop and might hence face a lower probability of sudden stops occurring in the first place (Eichengreen and Gupta, 2016). Quinn et al. (2011) show that de facto and de jure measures of financial openness capture different facets of financial openness. Hence, I include the index developed by Chinn

balance and changes in the sovereign rating which both exhibit a negative sign statistical significance (columns 1 and 2). This implies that sudden stops might be preceded by widening fiscal deficits and downgrades of sovereign credit ratings. However, including the lagged dependent variable renders the coefficient on the fiscal balance insignificant highlighting the fact that governments might endogenously respond to sudden stops in capital inflows (columns 3 and 4). As an additional robustness check, a control for preceding surges in capital inflows is included to account for the possibility that sudden stops might simply be the result of large gross inflows in the past, which have also been shown to drive domestic credit growth (Lane and McQuade, 2014). A surge in capital inflows is defined symmetrically to a sudden stop (Forbes and Warnock, 2012) and enters the regression lagged by eight quarters.[25] The results depicted in columns (5) and (6) highlight that sudden stops are indeed often preceded by surges in capital inflows as the coefficient is positive and highly significant. However, the coefficients on domestic growth shocks and their interactions with domestic leverage levels remain largely unchanged and significant. Finally, the specifications in columns (7) and (8) control for the Global Stock Market Factor (GSMF) developed by Habib and Venditti (2019) which has been shown to be tightly connected to a global cycle in capital flows.[26] This measure, which is also closely correlated with alternative measures of the global financial cycle (e.g. Miranda-Agrippino and Rey (2019) and Bonciani and Ricci (2018)), might therefore capture additional global drivers of sudden stops. In line with expectations, decreases in the GSMF, which reflect downturns in the global financial cycle, are indeed associated with a heightened probability of sudden stop episodes. Since the results for domestic growth shocks and their interactions with domestic leverage levels remain statistically significant in this specification as well, concerns that omitted factors, at the domestic or global level, might be driving the results are alleviated.[27]

Fourth, the results are robust to alternative definitions of sudden stop episodes (Table A9). Cavallo et al. (2015) show that sudden stops in gross capital inflows that coincide with stops in net inflows are particularly detrimental. Using this alternative definition leaves the main results unchanged (columns 3 and 4). In addition, statistical significance on the variable measuring contagion through the trade channel increases indicating that contagion might be more important for reversals in gross flows that also affect net flows. In order to restrict episodes to the most economically meaningful ones, columns

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and Ito (2008) as a measure of de jure openness. A measure of the flexibility of the exchange rate regime is taken from Ilzetzki et al. (2019).

[25] Specifications with alternative lag structures yield qualitatively similar results and leave the main results unchanged.

[26] The GSMF is extracted as the common latent factor driving a panel of 63 country level stock market returns.

[27] The results are, furthermore, robust to a 95% winsorisation of the data which should mitigate the impact of extreme outliers.

5 and 6 consider only those episodes were the reversal in flows exceeded 5% of GDP on average. This reduces the number of sudden stop quarters by 28 percent but leaves the results unchanged.

6.2 Extensions

Table A10 presents results for an extension of the previous analysis in which the sample is split into AEs and EMDEs and sudden stop episodes are separated into debt and equity led episodes. More precisely, a sudden stop is equity (debt) led when gross inflows were predominantly (i.e. > 50 percent) equity (debt) flows during the respective episode (Forbes and Warnock, 2012b).[28] In line with Forbes and Warnock (2012b), I find that the vast majority (75 percent) of sudden stop episodes is fuelled by debt, not equity flows. These tests reveal some interesting heterogeneity showing that growth shocks combined with high levels of leverage are predominantly a driver of sudden stops in EMDEs (columns 1 and 2). However, the combination of high indebtedness and negative growth surprises also holds considerable explanatory power for sudden stop episodes in AEs that are dominated by equity flows (column 5). Conversely, the interaction term is significant for episodes that are primarily driven by debt flows for EMDEs. This might be related to the fact that intermediation of debt flows by banks and other financial institutions in AEs might give rise to sudden stops that are unrelated to developments in the domestic economy for these countries.

Turning to other explanatory variables, it is noteworthy that the financial channel seems to be driving contagion effects for sudden stop episodes dominated by equity inflows (column 5). Since the sample of countries experiencing this type of sudden stops is predominantly made up of countries with a large and globally integrated financial sector, this is in line with theoretical results in, for example, Born and Enders (2019) who find that the financial channel dominated the trade channel in transmitting the GFC for countries with large financial centres. Furthermore, Table A10 highlights some interesting heterogeneity in the effect of global variables across types of episodes and countries. Global risk aversion, proxied by the VIX, is only significant for equity led episodes, suggesting that spikes in risk aversion of global investors predominantly correlate with retrenchments of equity investments. Debt led episodes, in comparison, seem to be more driven by developments in global liquidity and interest rates, which is in line with the findings of Bruno and Shin (2015) who highlight that global banks transfer liquidity from financial centre countries to regional banks world-wide.

7 Conclusion

This paper provides a fresh look at the covariates of sudden stops in gross capital inflows by combining data on capital flows with a novel database by Kose et al. (2017) on domestic factors potentially driving

[28] Equity inflows include FDI and portfolio equity flows while debt inflows include portfolio debt and other investment inflows.

sharp reversals in capital flows. Using a broader country sample than the previous literature, i.e. a quarterly panel of 98 advanced as well as emerging and developing countries from 1990 to 2018, this paper shows that while global factors can be confirmed to be an important driver of episodes of sudden stops in gross capital inflows, domestic variables are also significantly related to the probability of incurring sharp reversals in capital inflows. The interaction between the level of leverage and negative growth shocks highlights the importance of domestic factors in determining sudden stops in gross capital inflows in line with predictions in real business cycle models with occasionally binding capital constraints and trend shocks (Akinci and Chahrour, 2018; Seoane and Yurdagul, 2019; Flemming et al., 2019). The fact that leverage in the domestic economy tends to amplify susceptibility sudden stops in capital inflows has important policy implications. By limiting excessive credit growth, countercyclical macroprudential policy could also serve to reduce the susceptibility of capital inflows to sudden stops, in line with theoretical postulations by Flemming et al. (2019). Therefore, policymakers should make use of the macroprudential policy toolkit to "curtail the damaging extremes of domestic financial cycles" (Carney, 2019).

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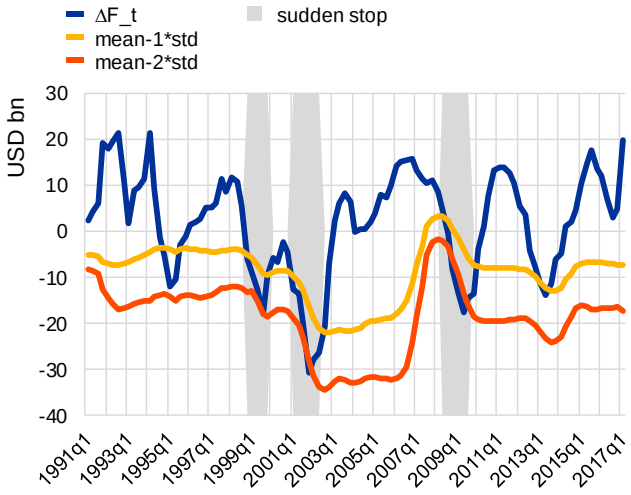
Figures and Tables

Table 1: Incidence of sudden stops in ...

	... gross inflows (% of total observations)			... net inflows (% of gross inflow stops)			... gross flows (decline > 5 % of GDP) (% of gross inflow stops)		
	All countries	AEs	EMDEs	All countries	AEs	EMDEs	All countries	AEs	EMDEs
1990q1 - 2018q1	9.7	13.0	7.6	53.0	46.8	59.5	73.6	81.2	65.5
Pre-GFC	7.1	10.3	4.7	47.0	38.6	60.8	63.4	64.5	61.8
Post-GFC	9.7	11.5	8.8	54.8	51.4	57.2	81.2	97.1	70.1
GFC	36.0	57.4	25.4	63.2	55.4	72.0	80.7	92.6	67.4

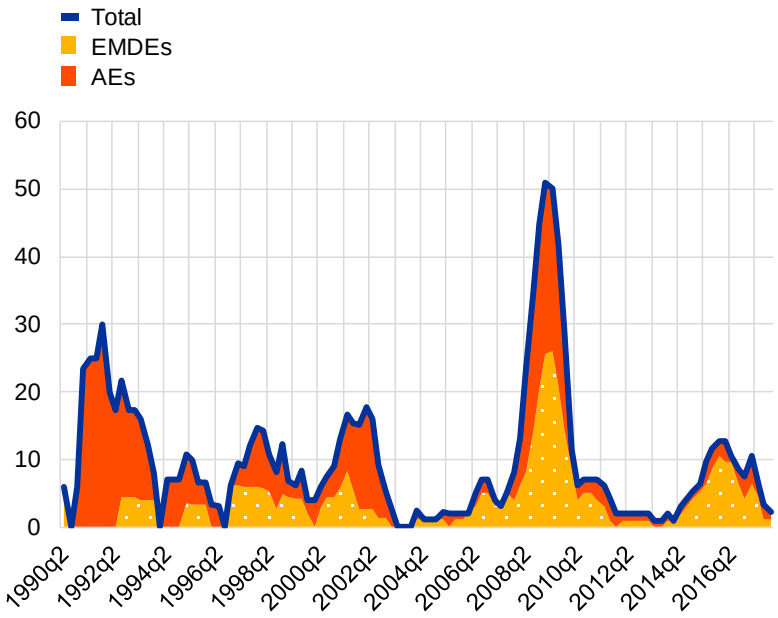
Note: Global Financial Crisis (GFC) defined as period between 2008q1 and 2009q4. Country classification according to IMF.

Figure 1: Identifying sudden stops for Argentina



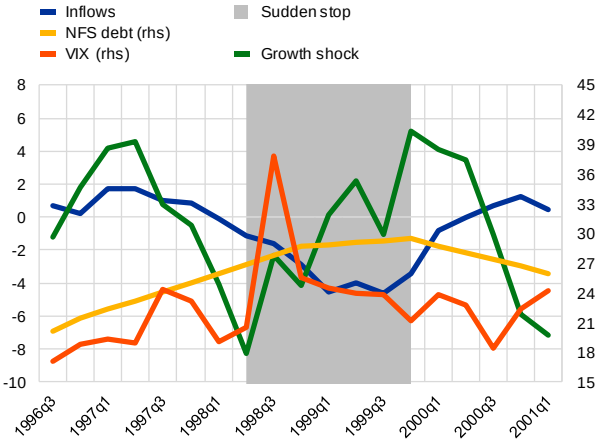
Note: ΔF_t denotes the year on year change in four quarter moving sums of gross capital inflows. A sudden stop is defined as a period in which ΔF_t falls 1 standard deviation (std) below its 5 year moving average and 2 std below its mean for at least 1 quarter. The episde ends when ΔF_t recovers to above 1 std deviation below the mean (Forbes and Warnock, 2012).

Figure 2: Percent of countries in a sudden stop episode



Note: sudden stop episodes defined following Forbes and Warnock (2012). Country groups according to IMF definition.

Figure 3: Leverage cycle, growth shock, and sudden stop in Peru



Note: the evolution of the year on year change in gross capital inflows, the stock of private non-financial sector credit to GDP (NFS debt), GDP growth deviations from trend (growth shock), and global risk aversion (VIX), around the sudden stop episode in Peru between 1998q2 and 1999q4 identified according to Forbes and Warnock (2012).

Table 2: Baseline results

VARIABLES	(1)	(2)	(3)	(4)
	Sudden stop indicator (P(e_it = 1))			
Domestic				
Private sector credit	0.481***	0.352*	0.874**	0.743*
	(0.177)	(0.197)	(0.378)	(0.393)
Growth shock	-0.084***	-0.036	-0.085***	-0.032
	(0.021)	(0.030)	(0.024)	(0.033)
Private sector credit x Growth shock		-0.079**		-0.080**
		(0.032)		(0.040)
Government debt to GDP	-0.190	-0.194	-0.451	-0.436
	(0.205)	(0.209)	(0.502)	(0.503)
De facto fin. openness	-0.198**	-0.208**	0.062	0.054
	(0.100)	(0.104)	(0.252)	(0.254)
GDP p.c.	0.122	0.138	0.828***	0.839***
	(0.085)	(0.085)	(0.269)	(0.269)
Contagion				
Trade channel	0.478***	0.443***	0.590*	0.576*
	(0.130)	(0.134)	(0.342)	(0.334)
Financial channel	0.195	0.099	0.439	0.748
	(0.268)	(0.303)	(0.972)	(1.230)
Global				
VIX	0.022***	0.020***	0.025***	0.023***
	(0.006)	(0.006)	(0.006)	(0.006)
Liquidity growth	-0.025**	-0.022*	-0.027**	-0.024**
	(0.011)	(0.011)	(0.012)	(0.012)
Interest rates	0.154***	0.154***	0.386***	0.386***
	(0.055)	(0.055)	(0.102)	(0.100)
Growth	-0.216***	-0.212***	-0.217***	-0.210***
	(0.043)	(0.045)	(0.052)	(0.055)
Observations	7,478	7,478	6,727	6,727
of which sudden stops	726	726	726	726
Time period	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1
Sample	All	All	All	All
Country FE	no	no	yes	yes
AUROC	0.752	0.754	0.816	0.816

Note: coefficient estimates of a complementary log-log estimation of equation (3). Sudden stop episodes, as well as global and contagion control variables are defined following Forbes and Warnock (2012). All explanatory variables are lagged by one quarter. Robust standard errors (clustered at the country-level) in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

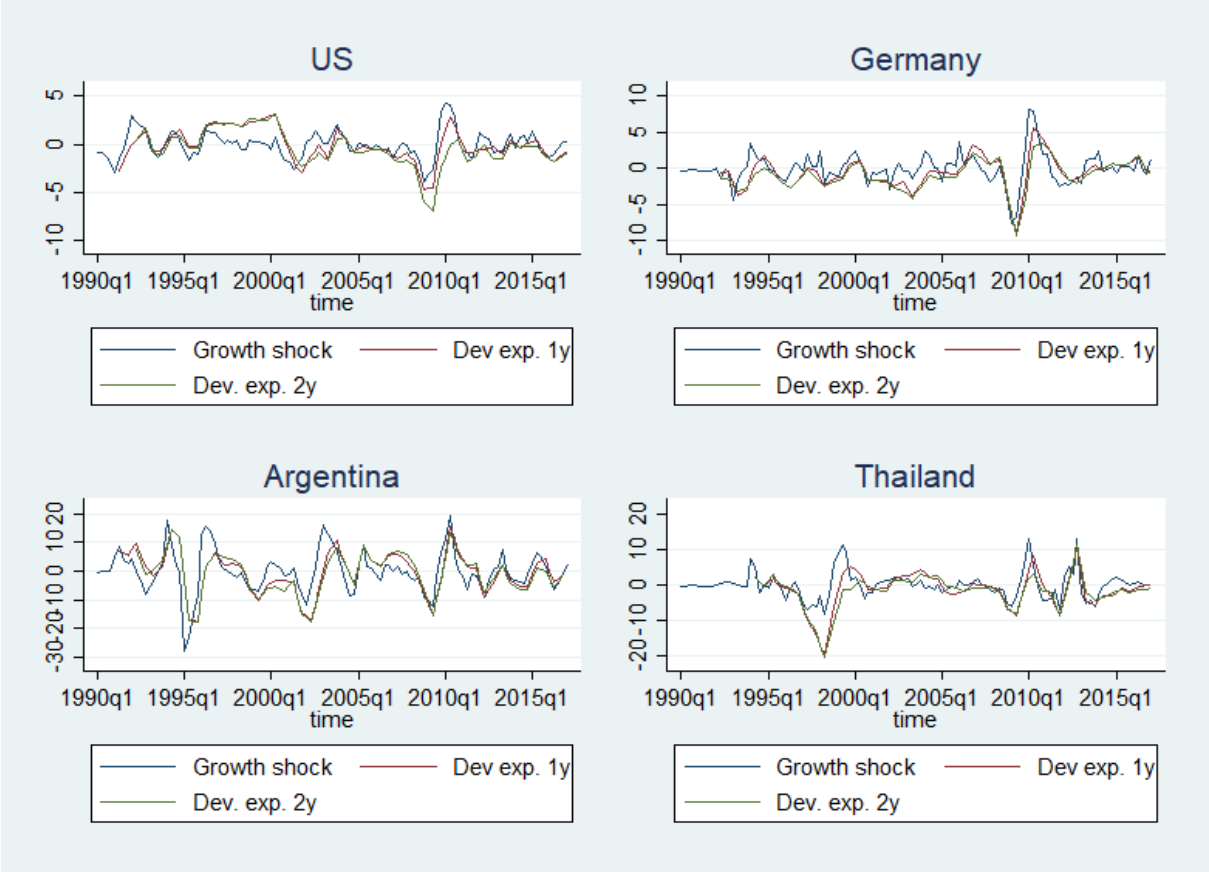
Table 3: Marginal effects

	(1)	(2)	(3)
	dP/dx with private sector credit		
		at	
VARIABLES	p25	mean	p75
Domestic			
Private sector credit	0.038**	0.035***	0.064*
	(0.016)	(0.011)	(0.036)
Growth shock	-0.021***	-0.019***	-0.035***
	(0.006)	(0.006)	(0.011)
Government debt to GDP	-0.013	-0.012	-0.022
	(0.018)	(0.017)	(0.031)
De facto fin. openness	0.006	0.006	0.010
	(0.021)	(0.019)	(0.035)
GDP p.c.	0.103***	0.094***	0.173***
	(0.035)	(0.036)	(0.057)
Contagion			
Trade channel contagion	0.012*	0.011*	0.019*
	(0.007)	(0.006)	(0.012)
Financial channel contagion	0.002	0.002	0.004
	(0.007)	(0.007)	(0.012)
Global			
VIX	0.013***	0.011***	0.021***
	(0.004)	(0.003)	(0.007)
Liquidity growth	-0.007***	-0.007***	-0.012**
	(0.003)	(0.002)	(0.005)
Interest rates	0.058***	0.052***	0.096***
	(0.016)	(0.016)	(0.031)
Growth	-0.023***	-0.021***	-0.038***
	(0.005)	(0.006)	(0.009)
Observations	5,962	5,962	5,962
	1990q1-	1990q1-	1990q1-
Time period	2018q1	2018q1	2018q1
Sample	All	All	All
Country FE	yes	yes	yes

Note: marginal effects of the specification including fixed effects (Table 2, column 4) evaluated at different points in the distribution of private sector credit. All variables standardized around zero mean and standard deviation of 1.

Appendix

Figure A1: Measuring growth shocks



Note: comparison of the simple measure of growth shocks to two measures based on historical forecast data, one comparing realized growth rates in period t to the IMF WEO forecast for this period made one year (Dev exp. 1y) and the other one made two years (Dev exp. 2y) before period t.

Table A1: List of sudden stop episodes

Advanced Economies			**EMDEs**					
Country	Start	End	Country	Start	End	Country	Start	End
Australia	Q4-1997	Q4-1998	Argentina	Q4-1998	Q4-1999	Philippines	Q2-1992	Q3-1992
Australia	Q2-2005	Q4-2005	Argentina	Q1-2001	Q2-2002	Philippines	Q1-2008	Q1-2009
Belgium	Q4-2008	Q4-2009	Argentina	Q3-2008	Q4-2009	Poland	Q4-2008	Q3-2009
Canada	Q1-1991	Q1-1992	Armenia, Republic of	Q2-2010	Q2-2011	Romania	Q4-2008	Q1-2010
Canada	Q2-1995	Q2-1996	Azerbaijan, Republic of	Q2-2015	Q1-2016	Russian Federation	Q4-2008	Q4-2009
Canada	Q2-2008	Q2-2009	Belarus	Q1-2012	Q1-2013	Russian Federation	Q2-2014	Q2-2015
Cyprus	Q4-2009	Q3-2011	Bolivia	Q2-2000	Q3-2001	South Africa	Q1-1973	Q1-1974
Denmark	Q2-1992	Q2-1993	Bolivia	Q3-2006	Q2-2007	South Africa	Q1-1982	Q1-1983
Estonia	Q4-1998	Q3-1999	Bolivia	Q3-2014	Q3-2015	South Africa	Q2-1985	Q3-1986
Estonia	Q2-2008	Q4-2009	Brazil	Q3-2008	Q3-2009	South Africa	Q3-1998	Q3-1999
Estonia	Q2-2015	Q1-2016	Bulgaria	Q1-2009	Q2-2010	South Africa	Q3-2008	Q3-2009
Finland	Q2-1991	Q3-1992	Bulgaria	Q4-2015	Q1-2016	South Africa	Q3-2015	Q2-2016
Finland	Q2-2001	Q1-2002	Cambodia	Q1-2009	Q4-2009	Sri Lanka	Q4-1983	Q4-1984
Finland	Q2-2009	Q1-2010	Chile	Q2-2000	Q2-2001	Sri Lanka	Q1-2008	Q2-2009
Finland	Q4-2012	Q4-2013	Chile	Q2-2009	Q4-2009	Sri Lanka	Q4-2009	Q1-2010
France	Q1-1991	Q1-1992	Colombia	Q2-2008	Q2-2009	Sri Lanka	Q3-2010	Q4-2010
France	Q1-2002	Q4-2002	Colombia	Q3-2015	Q1-2016	Tajikistan	Q1-2009	Q3-2009
France	Q4-2007	Q3-2009	Costa Rica	Q1-2009	Q1-2010	Thailand	Q1-1992	Q1-1993
Germany	Q2-1994	Q1-1995	Costa Rica	Q3-2014	Q4-2015	Thailand	Q4-1996	Q2-1998
Germany	Q1-2001	Q2-2002	Croatia	Q3-2010	Q3-2011	Thailand	Q3-2008	Q2-2009
Germany	Q3-2008	Q4-2009	Czech Republic	Q2-2006	Q4-2006	Tonga	Q3-1989	Q3-1990
Greece	Q2-2006	Q4-2006	Czech Republic	Q1-2009	Q4-2009	Turkey	Q2-1994	Q2-1995
Greece	Q2-2010	Q3-2011	El Salvador	Q3-2004	Q1-2005	Turkey	Q2-2001	Q1-2002
Iceland	Q2-2001	Q2-2002	Ethiopia	Q3-2007	Q3-2008	Turkey	Q3-2007	Q4-2009
Iceland	Q2-2008	Q4-2009	Georgia	Q1-2009	Q1-2010	Uganda	Q3-2006	Q2-2007
Israel	Q1-2001	Q2-2002	Hungary	Q4-1996	Q2-1997	Ukraine	Q4-2008	Q1-2010
Israel	Q4-2007	Q2-2009	Hungary	Q1-2009	Q3-2010	Venezuela, Republica	Q2-2006	Q4-2006
Israel	Q4-2011	Q3-2012	India	Q4-2015	Q1-2016			
Italy	Q4-1991	Q4-1993	Indonesia	Q4-2008	Q3-2009			
Italy	Q4-2000	Q3-2002	Indonesia	Q3-2015	Q1-2016			
Italy	Q4-2007	Q3-2009	Jordan	Q3-1992	Q4-1993			
Ireland	Q2-2008	Q3-2009	Jordan	Q3-2007	Q4-2008			
Japan	Q4-2008	Q4-2009	Kazakhstan	Q1-2008	Q1-2009			
Korea, Republic of	Q3-1997	Q4-1998	Kazakhstan	Q1-2015	Q1-2016			
Korea, Republic of	Q2-2008	Q3-2009	Lebanon	Q3-2010	Q2-2011			
Latvia	Q3-2008	Q1-2009	Lebanon	Q4-2015	Q1-2016			
Latvia	Q2-2015	Q1-2016	Lesotho	Q4-1991	Q2-1992			
Lithuania	Q4-1999	Q3-2001	Lesotho	Q3-1998	Q3-1999			
Lithuania	Q4-2008	Q1-2009	Lesotho	Q4-2010	Q1-2011			
Malta	Q3-2008	Q4-2009	Lesotho	Q2-2016	Q1-2017			
Netherlands	Q4-1990	Q1-1992	Macedonia, FYR	Q4-2006	Q3-2007			
Netherlands	Q1-2002	Q1-2003	Macedonia, FYR	Q4-2013	Q2-2014			
Netherlands	Q2-2008	Q4-2009	Malaysia	Q4-2005	Q3-2006			
New Zealand	Q3-2008	Q3-2009	Malaysia	Q3-2008	Q3-2009			
Norway	Q4-1997	Q1-1998	Mauritius	Q3-2008	Q2-2009			
Norway	Q3-2001	Q2-2002	Mexico	Q4-1994	Q4-1995			
Norway	Q1-2008	Q1-2010	Moldova	Q2-2009	Q2-2010			
Portugal	Q3-1992	Q3-1993	Moldova	Q4-2014	Q4-2015			
Portugal	Q4-2002	Q1-2003	Mongolia	Q2-2013	Q4-2014			
Portugal	Q1-2005	Q2-2005	Namibia	Q3-2007	Q4-2007			
Portugal	Q1-2011	Q4-2011	Nepal	Q4-1986	Q1-1987			
Slovenia	Q3-2008	Q4-2009	Nepal	Q2-1990	Q2-1991			
Spain	Q2-1994	Q2-1995	Nicaragua	Q3-2000	Q3-2001			
Spain	Q4-2001	Q3-2002	Pakistan	Q1-1995	Q4-1995			
Spain	Q4-2007	Q4-2009	Pakistan	Q3-1997	Q3-1999			
Sweden	Q1-1997	Q3-1997	Pakistan	Q2-2008	Q2-2009			
Sweden	Q4-2008	Q4-2009	Panama	Q4-2008	Q4-2009			
Sweden	Q1-2015	Q3-2015	Panama	Q1-2016	Q1-2017			
Switzerland	Q1-2008	Q1-2009	Panama	Q1-2016	Q1-2017			
United Kingdom	Q1-1991	Q2-1992	Peru	Q4-1983	Q3-1984			
United Kingdom	Q4-2001	Q3-2002	Peru	Q2-1998	Q4-1999			
United Kingdom	Q2-2008	Q3-2009	Peru	Q4-2008	Q3-2009			
United States	Q4-2001	Q3-2002	Philippines	Q4-1983	Q3-1984			
United States	Q1-2008	Q2-2009						

Table A2: Definition of variables and sources

Variable	Source	Comments
Sudden stop episode $e_{it} = 1$	Author's calculations based gross capital inflows data from quarterly IMF IFS and BOP statistics.	Episodes defined following Forbes and Warnock (2012).
Global risk (VIX)	Datastream	CBOE measure of 30 day expected volatility based on mid-quote prices of S&P 500 Index (call and put options).
Global liquidity	FRED, IMF IFS	Sum of (USD converted) M2 in the United States, Euro-zone, and Japan and M4 in the United Kingdom.
Global interest rates	IMF IFS	Average rate on long-term government bonds in the United States, core euro area, and Japan.
Global growth	IMF IFS	Year on year change in real global economic activity.
Financial links contagion	IMF BOP, IMF WEO BIS LBS, author's calculations	Sudden stop episode in foreign countries weighted by bilateral banking links.
Trade links contagion	IMF BOP, IMF WEO, IMF DOTS, author's calculations	Sudden stop episode in foreign countries weighted by bilateral trade links.
Financial openness (de facto)	Lane and Milesi-Ferretti (2007)	Total assets and liabilities over GDP.
Financial openness (de jure)	Chinn and Ito (2006)	[0,1] closed to open. Based on information on cross-border financial transaction restrictions reported in the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions.
Fiscal balance (percent of GDP)	Kose et al. (2017)	
Change in foreign currency long-term sovereign debt ratings	Kose et al. (2017), author's calculations	Q-o-q change in index ranging from 1 to 21 [best].
Domestic credit to private sector (percent of GDP)	Kose et al. (2017)	
Growth shock	IMF IFS, author's calculations	Deviations from four quarter growth trend
Exchange rate regime	Ilzetzki et al. (2019)	Index [1, 14], higher values indicate higher flexibility

Table A3: First observation for panel regression analysis

Advanced Economies		**Emerging Market Economies**			
First observation	Country	First observation	Country	First observation	Country
Jan-1990	United States	Apr-1990	Turkey	Jan-1999	Moldova
	United Kingdom		Argentina		Ukraine
	Denmark		Brazil		Cambodia
	France		Guatemala		Russian Federation
	Germany		Mexico	Jan-2000	Albania
	Italy		Bahamas, The		Kazakhstan
	Ireland		Jordan		Lesotho
	Netherlands		Bangladesh		Tonga
	Norway		Sri Lanka	Jan-2001	Colombia
	Sweden		India		El Salvador
	Canada		Indonesia		Myanmar
	Finland		Nepal		Vietnam
	Greece		Pakistan		Uganda
	Iceland		Philippines		Belarus
	Portugal		Thailand		Macedonia, FYR
	Spain		Ethiopia	Jan-2002	Georgia
	Israel		Seychelles	Jan-2003	Panama
	Korea, Republic of		Sudan		Cabo Verde
Jan-1994	Australia		Vanuatu		Mongolia
Oct-1997	Slovenia		Papua New Guinea	Jan-2004	Costa Rica
Jan-1998	Estonia	Apr-1991	Peru		Malaysia
	Lithuania	Jan-1993	Bolivia		Namibia
Jan-1999	Czech Republic	Jan-1995	Hungary		Azerbaijan, Republic of
	Slovak Republic	Jan-1996	Chile	Jan-2005	Paraguay
	Latvia		Romania		Uruguay
Jan-2000	Malta	Jan-1997	Nicaragua		Mauritius
	Singapore		Bulgaria		Fiji
Jan-2001	Japan	Jan-1998	Ecuador		Poland
Jan-2004	Switzerland		South Africa	Jan-2006	Belize
Jan-2005	New Zealand		Armenia, Republic of		Mozambique
Jan-2006	Cyprus		Croatia		Bosnia and Herzegovina
Jan-2007	Belgium	Jan-1999	Venezuela	Jan-2007	Lebanon
			Lao		Tajikistan
			Kyrgyz Republic		

Note: first observation entering the baseline regression analysis in table 1. Country classification according to IMF.

Table A4: Pairwise correlations

	Private sector credit	Growth shock	Government debt to GDP	Fiscal balance	De facto fin. openness	De jure fin. openness	GDP p.c.	NFA/GDP	Reserve assets/GDP	Exchange rate regime	Sovereign rating change
Private sector credit	1.00										
Growth shock	0.00	1.00									
Government debt to GDP	0.23	0.03	1.00								
Fiscal balance	0.10	0.00	-0.37	1.00							
De facto fin. openness	0.63	0.01	0.24	0.15	1.00						
De jure fin. openness	0.48	0.00	0.13	0.11	0.44	1.00					
GDP p.c.	0.77	-0.02	0.18	0.11	0.56	0.56	1.00				
NFA/GDP	0.09	0.01	-0.02	0.14	0.26	0.14	0.13	1.00			
Reserve assets/GDP	-0.07	0.01	0.10	0.11	0.21	-0.09	-0.11	0.11	1.00		
Exchange rate regime	0.02	-0.01	-0.07	0.09	-0.17	-0.15	0.01	0.08	0.07	1.00	
Sovereign rating change	-0.08	0.11	-0.11	0.11	-0.06	0.00	-0.04	0.04	0.03	0.02	1.00

Note: pairwise correlations between domestic variales.

Table A5: Negative and positive growth shocks

VARIABLES	(1)	(2)	(3)	(4)	(5)
	Sudden stop indicator (P(e_it = 1))				
Domestic					
Private sector credit	0.840**	0.604	0.883**	0.929**	0.650
	(0.384)	(0.406)	(0.395)	(0.391)	(0.396)
Growth shock (negative)	-0.097***	-0.033			-0.030
	(0.030)	(0.035)			(0.033)
Private sector credit x Growth shock (negative)		-0.109**			-0.099**
		(0.043)			(0.039)
Growth shock (positive)			-0.112**	-0.031	-0.029
			(0.055)	(0.089)	(0.078)
Private sector credit x Growth shock (positive)				-0.098	-0.031
				(0.084)	(0.060)
Government debt to GDP	-0.303	-0.326	-0.314	-0.301	-0.319
	(0.511)	(0.517)	(0.503)	(0.500)	(0.508)
De facto fin. openness	0.149	0.130	0.223	0.219	0.142
	(0.285)	(0.288)	(0.292)	(0.293)	(0.290)
GDP p.c.	1.498***	1.418***	1.559***	1.569***	1.397***
	(0.477)	(0.481)	(0.480)	(0.481)	(0.478)
Contagion					
Trade channel	0.634*	0.610*	0.659*	0.659*	0.614*
	(0.357)	(0.346)	(0.371)	(0.370)	(0.350)
Financial channel	0.438	0.755	0.353	0.413	0.791
	(1.030)	(1.276)	(0.934)	(0.993)	(1.262)
Global					
VIX	0.024***	0.022***	0.029***	0.029***	0.023***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Liquidity growth	-1.279*	-1.124*	-1.298**	-1.295**	-1.092*
	(0.664)	(0.662)	(0.650)	(0.652)	(0.654)
Interest rates	0.269**	0.278***	0.308***	0.310***	0.287***
	(0.105)	(0.103)	(0.099)	(0.099)	(0.101)
Growth	-0.219***	-0.209***	-0.235***	-0.234***	-0.202***
	(0.054)	(0.057)	(0.051)	(0.052)	(0.056)
Observations	6,727	6,727	6,727	6,727	6,727
of which sudden stops	726	726	726	726	726
Time period	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1
Sample	All	All	All	All	All
Country FE	yes	yes	yes	yes	yes

Note: coefficient estimates of a complementary log-log estimation of equation (3). Sudden stop episodes, as well as global and contagion control variables are defined following Forbes and Warnock (2012). All explanatory variables are lagged by one quarter. Robust standard errors (clustered at the country-level) in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Only first quarter of sudden stop episode

VARIABLES	(1)	(2)	(3)	(4)
	Sudden stop indicator (P(e_it = 1))			
Domestic				
Private sector credit	0.461***	0.396**	0.557	0.418
	(0.166)	(0.175)	(0.392)	(0.415)
Growth shock	-0.058*	-0.004	-0.063*	0.003
	(0.031)	(0.038)	(0.035)	(0.044)
Private sector credit x Growth shock		-0.087**		-0.094***
		(0.034)		(0.033)
Government debt to GDP	-0.115	-0.113	-0.275	-0.295
	(0.205)	(0.209)	(0.477)	(0.473)
De facto fin. openness	-0.140	-0.159	0.269	0.296
	(0.103)	(0.099)	(0.333)	(0.351)
GDP p.c.	0.021	0.032	0.848***	0.871***
	(0.071)	(0.070)	(0.264)	(0.267)
Contagion				
Trade channel	0.568***	0.563***	0.746	0.749
	(0.148)	(0.147)	(0.612)	(0.612)
Financial channel	0.009*	0.011	0.009	0.025**
	(0.005)	(0.007)	(0.009)	(0.013)
Global				
VIX	0.027***	0.025***	0.029***	0.029***
	(0.008)	(0.008)	(0.008)	(0.008)
Liquidity growth	-0.013	-0.012	-0.015	-0.014
	(0.026)	(0.026)	(0.026)	(0.026)
Interest rates	0.139***	0.139***	0.403***	0.409***
	(0.051)	(0.051)	(0.114)	(0.113)
Growth	-0.013	-0.005	-0.044	-0.034
	(0.060)	(0.061)	(0.077)	(0.078)
Observations	6,776	6,776	6,025	6,025
of which sudden stops	169	169	169	169
Time period	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1
Sample	All	All	All	All
Country FE	no	no	yes	yes

Note: coefficient estimates of a complementary log-log estimation of equation (3). Sudden stop episodes, as well as global and contagion control variables are defined following Forbes and Warnock (2012). Only the first quarter of a sudden stop is included, all subsequent quarters are dropped. All explanatory variables are lagged by one quarter. Robust standard errors (clustered at the country-level) in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A7: Excluding the Global Financial Crisis

VARIABLES	(1)	(2)	(3)	(4)
	Sudden stop indicator (P(e_it = 1))			
Domestic				
Private sector credit	0.395**	0.312	0.964**	0.856*
	(0.192)	(0.212)	(0.469)	(0.461)
Growth shock	-0.072***	-0.026	-0.064**	-0.022
	(0.023)	(0.033)	(0.025)	(0.032)
Private sector credit x Growth shock		-0.078*		-0.068*
		(0.041)		(0.041)
Government debt to GDP	-0.183	-0.166	-0.568	-0.540
	(0.240)	(0.240)	(0.563)	(0.556)
De facto fin. openness	-0.133	-0.140	0.061	0.075
	(0.109)	(0.110)	(0.313)	(0.308)
GDP p.c.	0.083	0.096	0.582*	0.601**
	(0.090)	(0.091)	(0.304)	(0.306)
Contagion				
Trade channel	0.688***	0.691***	1.021***	1.041***
	(0.220)	(0.224)	(0.302)	(0.304)
Financial channel	-0.002	-0.001	-0.008*	-0.007
	(0.005)	(0.005)	(0.004)	(0.006)
Global				
VIX	0.013*	0.012	0.016**	0.015**
	(0.008)	(0.008)	(0.007)	(0.007)
Liquidity growth	-0.006	-0.006	-0.017	-0.017
	(0.014)	(0.014)	(0.014)	(0.014)
Interest rates	0.165***	0.165***	0.373***	0.377***
	(0.061)	(0.061)	(0.119)	(0.117)
Growth	-0.206***	-0.200***	-0.191***	-0.183***
	(0.064)	(0.066)	(0.065)	(0.067)
Observations	6,995	6,995	6,239	6,239
of which sudden stops	530	530	530	530
Time period		Exclude GFC (2008-2009)		
Sample	All	All	All	All
Country FE	no	no	yes	yes

Note: coefficient estimates of a complementary log-log estimation of equation (3) excluding the GFC. Sudden stop episodes, as well as global and contagion control variables are defined following Forbes and Warnock (2012). All explanatory variables are lagged by one quarter. Robust standard errors (clustered at the country-level) in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A8: Additional explanatory variables

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Sudden stop indicator (P(e_it = 1))							
Domestic								
Private sector credit	0.482	0.333	0.086	-0.034	0.459	0.238	0.388	0.186
	(0.514)	(0.495)	(0.303)	(0.306)	(0.441)	(0.438)	(0.456)	(0.457)
Growth shock	-0.083***	-0.033	-0.115***	-0.071**	-0.088***	-0.022	-0.089***	-0.027
	(0.025)	(0.035)	(0.022)	(0.029)	(0.026)	(0.037)	(0.025)	(0.040)
Private sector credit x Growth shock		-0.084**		-0.074**		-0.112**		-0.100**
		(0.043)		(0.034)		(0.046)		(0.047)
Government debt to GDP	-1.070	-1.074	-0.600	-0.651	-0.469	-0.451	-0.159	-0.140
	(0.728)	(0.730)	(0.389)	(0.407)	(0.677)	(0.673)	(0.678)	(0.675)
Fiscal balance	0.048*	0.047*	-0.034	-0.040	-0.032	-0.040	-0.066*	-0.071*
	(0.026)	(0.026)	(0.039)	(0.039)	(0.036)	(0.037)	(0.039)	(0.040)
De facto fin. openness	0.180	0.232	-0.082	-0.046	0.009	0.072	-0.094	-0.031
	(0.397)	(0.391)	(0.290)	(0.291)	(0.360)	(0.353)	(0.320)	(0.316)
De jure fin. openness	0.270	0.351	-0.096	-0.012	0.697	0.809	0.548	0.638
	(0.580)	(0.566)	(0.373)	(0.381)	(0.609)	(0.596)	(0.535)	(0.525)
GDP p.c.	0.562*	0.563*	0.764***	0.786***	0.465	0.465	1.109***	1.097***
	(0.314)	(0.317)	(0.240)	(0.241)	(0.339)	(0.342)	(0.349)	(0.355)
NFA/GDP	-0.029	-0.015	-0.027	-0.013	-0.024	-0.012	0.014	0.025
	(0.074)	(0.076)	(0.060)	(0.065)	(0.068)	(0.069)	(0.078)	(0.079)
Reserve assets/GDP	0.332	0.559	0.034	0.192	0.120	0.440	0.462	0.744
	(1.389)	(1.397)	(1.036)	(1.062)	(1.307)	(1.304)	(1.371)	(1.379)
Exchange rate regime	0.060	0.061	0.011	0.013	0.040	0.040	0.042	0.042
	(0.051)	(0.051)	(0.027)	(0.028)	(0.053)	(0.054)	(0.053)	(0.053)
Sovereign rating change	-0.535***	-0.521***	-0.550***	-0.544***	-0.495***	-0.474***	-0.510***	-0.491***
	(0.102)	(0.102)	(0.128)	(0.128)	(0.101)	(0.102)	(0.097)	(0.098)
Sudden stop t-1			3.640***	3.635***				
			(0.082)	(0.084)				
Surge t-8					0.653***	0.670***		
					(0.178)	(0.184)		
Contagion								
Trade channel	0.564**	0.581**	0.301*	0.314**	0.558**	0.575**	0.485**	0.502**
	(0.268)	(0.270)	(0.154)	(0.155)	(0.257)	(0.259)	(0.225)	(0.227)
Financial channel	0.073	0.065	0.013	0.009	0.072	0.065	0.071	0.067
	(0.050)	(0.048)	(0.024)	(0.024)	(0.051)	(0.048)	(0.052)	(0.049)
Global								
VIX	0.026***	0.025***	0.012*	0.011	0.024***	0.021***	0.035***	0.032***
	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
Liquidity growth	-0.038***	-0.036***	-0.058***	-0.055***	-0.043***	-0.039***	-0.063***	-0.058***
	(0.012)	(0.012)	(0.016)	(0.016)	(0.012)	(0.012)	(0.014)	(0.014)
Interest rates	0.398***	0.410***	0.273***	0.285***	0.303***	0.311***	0.398***	0.405***
	(0.108)	(0.106)	(0.078)	(0.076)	(0.104)	(0.102)	(0.101)	(0.101)
Growth	-0.132**	-0.121**	0.042	0.047	-0.138**	-0.121**	-0.266***	-0.255***
	(0.054)	(0.057)	(0.049)	(0.049)	(0.057)	(0.061)	(0.066)	(0.068)
GSMF							-0.475***	-0.464***
							(0.107)	(0.103)
Observations	5,342	5,342	5,342	5,342	5,071	5,071	5,342	5,342
Time period	1990q1-2018q4	1990q1-2018q4	1990q1-2018q4	1990q1-2018q4	1990q1-2018q4	1990q1-2018q4	1990q1-2018q4	1990q1-2018q4
Sample	All	All	All	All	All	All	All	All
Country FE	yes	yes	yes	yes	yes	yes	yes	yes
Nr of sudden stops	647	647	647	647	647	647	647	647

Note: coefficient estimates of a complementary log-log estimation of equation (3). Sudden stop episodes, as well as global and contagion control variables are defined following Forbes and Warnock (2012). All explanatory variables are lagged by one quarter unless otherwise indicated. Columns (3) and (4) control for a lagged dependent variable. Surge t-8 in columns (5) and (6) denotes indicator variable for a surge in capital inflows (defined symmetrically to a sudden stop) lagged by 8 quarters. Columns (7) and (8) include the Global Stock Market Factor (GSMF) by Habib and Vendetti (2019). Robust standard errors (clustered at the country-level) in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A9: Alternative definitions of sudden stops

	(1)	(2)	(3)	(4)	(5)	(6)
			Sudden stop in			
			Net *and* gross			
VARIABLES	Gross inflows		inflows		Flows > 5% of GDP	
Domestic						
Private sector credit	0.874**	0.743*	1.166*	1.201	1.030**	0.880*
	(0.378)	(0.393)	(0.687)	(0.761)	(0.490)	(0.458)
Growth shock	-0.085***	-0.032	-0.082***	-0.029	-0.111***	-0.036
	(0.024)	(0.033)	(0.031)	(0.042)	(0.036)	(0.052)
Private sector credit x Growth shock		-0.080**		-0.100*		-0.101**
		(0.040)		(0.054)		(0.048)
Government debt to GDP	-0.451	-0.436	0.064	0.170	0.150	0.310
	(0.502)	(0.503)	(0.794)	(0.834)	(0.581)	(0.570)
De facto fin. openness	0.062	0.054	0.272	0.219	0.358	0.310
	(0.252)	(0.254)	(0.444)	(0.654)	(0.378)	(0.376)
GDP p.c.	0.828***	0.839***	0.948**	0.904*	0.889***	0.907**
	(0.269)	(0.269)	(0.468)	(0.466)	(0.322)	(0.357)
Contagion						
Trade channel	0.590*	0.576*	0.013**	0.012**	0.674	0.988*
	(0.342)	(0.334)	(0.005)	(0.005)	(0.428)	(0.591)
Financial channel	0.439	0.748	-0.018*	0.012	0.347	1.487
	(0.972)	(1.230)	(0.010)	(0.104)	(0.936)	(1.769)
Global						
VIX	0.025***	0.023***	0.034***	0.037***	0.028***	0.025***
	(0.006)	(0.006)	(0.009)	(0.008)	(0.007)	(0.008)
Liquidity growth	-0.027**	-0.024**	-0.021	-0.013	-0.040***	-0.031**
	(0.012)	(0.012)	(0.015)	(0.017)	(0.013)	(0.014)
Interest rates	0.386***	0.386***	0.540***	0.573***	0.432***	0.439***
	(0.102)	(0.100)	(0.178)	(0.183)	(0.129)	(0.128)
Growth	-0.217***	-0.210***	-0.143**	-0.102	-0.215***	-0.168**
	(0.052)	(0.055)	(0.068)	(0.080)	(0.068)	(0.080)
Observations	6,727	6,727	5,088	5,088	5,330	5,330
Time period	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1
Sample	All	All	All	All	All	All
Country FE	yes	yes	yes	yes	yes	yes
Nr of Sudden Stops	726	726	395	395	515	515

Note: coefficient estimates of a complementary log-log estimation of equation (3). Sudden stop episodes defined following Forbes and Warnock in columns 1 and 2, restricted to sudden stop episodes in gross inflows which coincide with stops in net flows in columns 3 and 4, and restricted to episodes during which capital flows exceeded 5% of GDP on average in columns 5 and 6. Global and contagion control variables are defined following Forbes and Warnock (2012). Robust standard errors (clustered at the country-level) in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

Table A10: Episodes split by type and country group

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Sudden stop indicator (P(e_it = 1))							
VARIABLES	All inflows		Equity led	Debt led	Equity led	Debt led	Equity led	Debt led
Domestic								
Private sector credit	0.308	0.745***	0.442	0.301	0.094	0.352	1.215***	0.542
	(0.245)	(0.242)	(0.346)	(0.237)	(0.638)	(0.336)	(0.418)	(0.336)
Growth shock	-0.117*	-0.005	0.009	-0.059*	-0.016	-0.162**	-0.016	-0.012
	(0.066)	(0.034)	(0.033)	(0.033)	(0.088)	(0.065)	(0.035)	(0.040)
Private sector credit x Growth shock	-0.020	-0.144***	-0.117***	-0.030	-0.129*	0.046	-0.008	-0.140**
	(0.041)	(0.048)	(0.039)	(0.037)	(0.073)	(0.041)	(0.052)	(0.061)
Government debt to GDP	-0.219	0.073	-1.280**	0.082	-1.658**	0.244	-0.443	0.168
	(0.299)	(0.275)	(0.555)	(0.218)	(0.738)	(0.319)	(0.817)	(0.320)
De facto fin. openness	-0.053	-0.357**	-0.230	-0.179	-0.142	0.004	-0.372	-0.348**
	(0.142)	(0.142)	(0.179)	(0.139)	(0.250)	(0.198)	(0.318)	(0.168)
GDP p.c.	0.088	0.230**	-0.003	0.182	-0.220	0.266	0.114	0.250*
	(0.224)	(0.112)	(0.152)	(0.113)	(0.592)	(0.250)	(0.276)	(0.130)
Contagion								
Trade channel	0.357	0.409**	0.476***	0.421***	0.148	0.475**	0.569***	0.219
	(0.230)	(0.167)	(0.164)	(0.148)	(0.307)	(0.240)	(0.208)	(0.267)
Financial channel	0.663	-0.159	0.531	-0.845	2.490**	-1.440	-1.415	-0.042
	(0.967)	(0.463)	(0.444)	(0.960)	(1.003)	(1.459)	(1.978)	(0.471)
Global								
VIX	0.023***	0.024***	0.038***	0.012	0.013	0.026***	0.056***	0.008
	(0.009)	(0.008)	(0.011)	(0.008)	(0.020)	(0.010)	(0.012)	(0.011)
Global liquidity	-0.015	-0.024	0.007	-0.030***	0.021	-0.027*	-0.006	-0.029**
	(0.016)	(0.016)	(0.023)	(0.011)	(0.030)	(0.016)	(0.035)	(0.014)
Global interest rates	0.256***	0.091	0.048	0.182***	-0.063	0.363***	0.151	0.074
	(0.073)	(0.103)	(0.107)	(0.064)	(0.141)	(0.084)	(0.197)	(0.124)
Global growth	-0.239***	-0.178***	-0.055	-0.251***	-0.165	-0.247***	-0.014	-0.240***
	(0.080)	(0.055)	(0.074)	(0.051)	(0.102)	(0.086)	(0.107)	(0.065)
Observations	2,745	4,733	7,478	7,478	2,745	2,745	4,733	4,733
of which sudden stops	356	370	186	540	89	267	97	273
Time period	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1	1990q1-2018q1
Sample	AE	EMDE	All	All	AE	AE	EMDE	EMDE
Country FE	no	no	no	no	no	no	no	no

Note: coefficient estimates of a complementary log-log estimation of equation (3). Sudden stop episodes, as well as global and contagion control variables are defined following Forbes and Warnock (2012). A sudden stop is equity (debt) led when gross inflows were predominantely (i.e. > 50 percent) equity (debt) flows during the respective episode (Forbes and Warnock, 2012b). All explanatory variables are lagged by one quarter. Robust standard errors (clustered at the country-level) in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

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