Domestic Antidotes to Sudden Stops*

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Abstract

Sudden stops in net capital flows can be prevented when domestic investors repatriate foreign-held assets during an international credit crunch. This paper presents evidence that while borrowing countries may have no control over foreign credit supply, domestic factors such as low levels of liability dollarization, an inflation targeting regime with exchange rate flexibility, low inflation, and a solid institutional background are factors that explain why some countries are more successful than others in preventing that a cut-off in international credit turns into a costly sudden stop in net capital flows. It is only under specific favorable domestic conditions that domestic investors can feel confident repatriating assets at a time when foreigners are pulling out, thereby reducing the vulnerability of a country to an external financing shock.

JEL Codes: F30; F32; F40

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1 Introduction

The genesis of "sudden stops" in capital flows is an abrupt and unexpected cut-off in international credit, i.e., a sudden stop in *gross inflows*. When foreign creditors stop lending, debtor countries have to borrow less from the rest of the world. Yet, not everyone in a country that is borrowing from abroad is a debtor vis-à-vis the rest of the world. In open economies, a portion of national savings goes to purchasing foreign assets via *gross outflows*. Those foreign assets can eventually be repatriated, providing a source of external financing. If such repatriation happens when foreigners stop lending, then a sudden stop in net capital flows may be prevented. This paper studies under what conditions sudden stops in net capital flows can be prevented by locals.

The notion of "prevention" (or "antidotes to sudden stops") in this paper takes a specific meaning. It refers to conditions under which a sudden stop in gross inflows (henceforth "foreigners' sudden stop") does not become a full-fledged sudden stop in net flows (henceforth "prevented sudden stop"). It is not about removing the risk that foreign lenders may abruptly stop lending. This is usually outside the control of any given country. A "prevented sudden stop" is thus a situation in which, given a large reduction in gross inflows, gross outflows move in the opposite direction so that net capital flows remain relatively stable, meaning that net capital flows (i.e., gross inflows *minus* outflows) do not enter into sudden stop mode.

Prevented sudden stops are the sequence of two transitions: first, the transition from normal to crisis periods when foreigners stop lending. And second, the transition to a prevented sudden stop conditional on the cut-off in international credit when locals repatriate enough resources to offset the behavior of foreigners. We build a model in the spirit of global games, in which there is a "knowledge mechanism" such that domestic investors are better informed about their own economy. In the model prevention is not mechanical after a foreigners' sudden stop; instead prevention is ultimately associated with the soundness of domestic fundamentals.

In addition, we study the domestic and external determinants behind the two transitions through a unified empirical framework. We find that external factors - i.e., conditions that are outside the direct control of local policymakers - predominate in explaining why foreigners stop lending, while specific favorable domestic conditions are the antidotes that explain why some of those episodes become prevented sudden stops. This is to say that in periods when borrowing countries experience a cut-off in international credit, the ability to build resilience relies primarily on a particular set of sound domestic factors. We show that sudden stops in net capital flows are

more likely to be prevented in countries with strong institutional backgrounds, and solid macroeconomic frameworks. In contrast, prevented sudden stops are less likely in countries with underlying macroeconomic vulneraribilities such as high levels of foreign-currency liabilities in the financial system, and high rates of inflation.

Why should countries care about preventing a sudden stop? Because a foreigners' sudden stop that is not prevented imposes an adjustment in the outstanding current account deficit on the affected economy that is typically very costly to engineer. This adjustment typically entails large and long-lasting output loss. On the contrary, if the sudden stop in net capital flows is prevented, then the ensuing adjustment of the current account deficit is forgone and, therefore, associated output costs are lower.[1]

Prevented sudden stops are conceptually and empirically different from "retrenchments in capital outflows" which have been the focus of previous papers in the literature (see, for example Forbes and Warnock (2012)). This is so because prevented sudden stops originate in a crisis situation, i.e., in the context of a foreigners' sudden stop. Instead, a retrenchment in capital outflows - defined as a large repatriation of foreign-held assets, and initially conceived as a repatriation in times of distress - may also reflect economic strength rather than weakness. For example, it can be the result of domestic investors' willingness to rebalance their external portfolios in response to positive terms of trade shocks; or to recycle funds abroad following a surge in gross capital inflows. We show that prevented sudden stops happen with and without contemporaneous retrenchments in gross outflows. Moreover, we show that typical measures of retrenchment may not suffice to prevent a sudden stop in net capital flows.

Related Literature. From a theoretical point of view, this paper is closely related to Caballero and Simsek (2016) and Jeanne and Sandri (2017), who offer a framework where local investors provide a stabilizing counterforce to the "fickleness" of foreigners' capital inflows. In both models, liquidity shocks are the trigger of a fire-sale in local assets held by foreigners. The decision of domestic investors to benefit from these fire-sales is independent of the conditions in the domestic economy because there is no uncertainty about the final return of those assets. Thus, we build a framework that extends this analysis, and find that the offsetting behavior from domestic investors is not mechanic, but ultimately driven by the expected strength of domestic fundamentals.

Empirically, this paper belongs to a strand of the sudden stops literature that considers the

[1]The literature has identified a rank order of varieties of sudden stops in gross and net flows, in terms of the output losses imposed on the affected economies. Sudden stops in net capital flows are the costliest. See Cavallo et al. (2015) for further analysis on this point.

distinct roles of gross capital inflows and outflows in the dynamics of net capital flows. Until the 1990s, the relative size of gross outflows vis-à-vis gross inflows was negligible in emerging markets. Thus, discussions about sudden stops - a phenomena that was then prevalent in emerging markets - focused exclusively on "net flows," which were almost a synonym of "gross inflows." Since the global financial crisis of 2008/09, the scope of analysis has broadened. As local investors started playing more sizable roles in emerging markets, the discussion shifted towards differentiating foreigners (i.e., gross inflows) from resident investors (i.e., gross outflows); see Cavallo (2019). This distinction makes it possible to analyze sudden stops from different perspectives. On the one hand, sudden stops in net capital flows can be the consequence of a decline in inflows from foreigners; on the other hand, they can be driven by an increase in outflows from domestic agents (or "capital flight"). Moreover, the two types of investors can interact offsetting each other's actions, leading for example to "prevented sudden stops," which is the focus of this paper.

A stylized fact established in the literature is that gross inflows and outflows co-move along the economic cycle. Broner et al. (2013) find that gross inflows and outflows increase during economic expansions and decrease during downturns. The authors also find that in periods of global crisis, total gross flows collapse everywhere due to the retrenchment of investors from foreign markets. In fact, during the global financial crisis of 2008/09, significant retrenchments of resident investors compensated for the fall in gross inflows (IMF, 2013; Milesi-Ferretti and Tille, 2011). Our paper differs in that it focuses on crisis episodes along the economic cycle, thus providing a study of the empirical determinants of prevention during periods of distress in global capital markets.

Forbes and Warnock (2012) study the determinants of foreigners' sudden stops and retrenchments of capital outflows separately. They highlight that during the global financial crisis of 2008/09 there was an unprecedented number of countries experiencing sudden stops in inflows and retrenchment of outflows episodes. They find that global factors such as global risk; changes in risk aversion, and global growth, were key drivers of both types of events. Our paper emphasizes the interactions between the events instead of treating them as separate. More precisely, we define a different type of episode from the ones defined by Forbes and Warnock (2012). We show that the occurrence of a retrenchment of capital outflows is neither necessary nor sufficient condition to prevent a sudden stop in net flows. Moreover, we show that the economic consequences of prevented sudden stops are different from foreigners' sudden stops and from retrenchments, and therefore, they warrant a different analysis.

In a related paper, Adler et al. (2014) analyze the role of local investors in offsetting the

behavior of foreign investors. Using vector autoregressions and impulse response functions, they find that local investors can neutralize the decline in inflows from foreign investors when facing global uncertainty and shocks to long-term interest rates. Our paper focuses on crisis periods in which a foreigners' sudden stop has already materialized, i.e., times when countries have already been exposed to a reduction in external financing. This enables us to account for possibly different behaviors of resident investors during normal and crisis times. In addition, the methodology employed in this paper exploits the cross-sectional and time series variation in capital flows as opposed to time series variation only. Another paper related to ours is Cifuentes and Jara (2014). They stress the role played by foreign assets holdings and exchange rate flexibility in shaping the probability that a retrenchment of capital outflows can occur when the economy is facing what in our paper we define as a foreigners' sudden stop. Our paper uses different empirical methods, a larger set of explanatory variables, and a broader sample including emerging, frontier and advanced economies. Moreover, our paper is, to the best of our knowledge, the first one to provide a theoretical framework to guide the empirical exercise.

This paper is structured as follows. Section 2 introduces definitions and describes the sudden stop episodes considered in the paper. Section 3 discusses how important is the concept of prevention in terms of output losses. Section 4 provides theoretical and empirical evidence on the determinants of prevention. Section 5 concludes.

2 Defining Prevented Sudden Stops and Other Episodes

In Balance of Payments (BoP) accounting, gross inflows correspond to total liability transactions in the Financial Account (i.e., lending from non-residents). Gross inflows can be either positive (i.e., a capital inflow to the reporting economy) or negative (i.e., a flow of capital from the reporting country to the rest of the world). Gross outflows are the total asset transactions in the Financial Account (i.e., residents' purchases of foreign assets), excluding international reserves transactions.[2] A decrease in foreign asset holdings of residents leads to capital repatriation - which is an inflow to the reporting economy - and therefore it is recorded with a positive sign in the BoP (and vice-versa for an increase in foreign asset holdings of residents). As a result, *net flows* - which are the sum of inflows and outflows - can be either positive (i.e., net capital inflow to the reporting economy)

[2] Broner et al. (2013) include "changes in reserves" in their definition of "gross capital outflows." When a central bank accumulates international reserves, it is in essence accumulating foreign assets. However, in the BoP convention - which we maintain in this paper - changes in reserve assets holdings by the central bank are distinguished from gross outflows, which are the changes in foreign assets holding of other residents.

or negative (i.e., net capital outflow from the reporting economy).

Raw data on capital flows is available at a quarterly frequency in the IMF's BOPS dataset. The sample consists of 112 countries including advanced economies and emerging markets, between 1980q1 through 2017q4.[3]

To reduce the effects of seasonality and the incidence of random fluctuations in quarterly net and gross capital flows series, we smooth the series according to the procedure in Forbes and Warnock (2012). First, the series are aggregated based on the following formula:

$$C_{t,j} = \sum_{t=0}^{3} X_{t-1,j}, \qquad j = 1, 2, 3 \quad and \quad t = 1, \ldots, T \tag{1}$$

where $X_{t,1}$ = Inflows, $X_{t,2}$ = Outflows and $X_{t,3}$ = Net Flows.[4]

Next, the annual change in each of the series is defined as:

$$\Delta C_{t,j} = C_{t,j} - C_{t-4,j}, \qquad j = 1, 2, 3 \quad and \quad t = 5, \ldots, T. \tag{2}$$

Using the smooth capital flows series, a *foreigners' sudden stop* is defined following Calvo et al. (2004) as an event in which the annual change in gross inflows falls at least two standard deviations below the mean. In terms of measuring its duration, an episode starts from the quarter in which the series falls one standard deviation below the mean, but conditional on the fact that it will eventually cross the two-standard-deviations threshold. The episode ends when the series goes back to one standard deviation below the historical mean.

A *prevented sudden stop* is an event in which a foreigners' sudden stop does not co-exist with a sudden stop in net capital flows. A sudden stop in net capital flows is defined using the same algorithm as that of a foreigners' sudden stop but applied to net capital flows (instead of gross inflows). "Prevention" can happen if and only if changes in gross outflows offset the fall in gross inflows enough to avoid a large fall in net flows that would qualify as a sudden stop in net flows.

A *retrenchment of capital outflows* is defined, following Forbes and Warnock (2012), as the mirror image of a foreigners' sudden stop but applied to gross outflows: a large (more than two standard deviations) shift in the direction of gross outflows in which domestic investors repatriate foreign-held assets. However, prevented sudden stops are different from retrenchments in capital

[3] See Appendix A for a description of the capital flows data and the treatment given to the data.

[4] Normalizing the capital flows series in per capita terms as in Caballero (2016) is not required in this context because the level of flows in each country is used to identify county specific episodes.

flows. While retrenchments are defined using the same algorithm to gross outflows, they do not consider whether repatriation occurs in the context of a foreigners' sudden stop, or whether repatriation is large enough to offset the change in capital inflows. A retrenchment episode can therefore materialize with or without a contemporaneous foreigners' sudden stop; and with or without a sudden stop in net capital flows.

To get a better understanding of the dynamics behind prevention and the coincidence or not with retrenchments, consider Figure 1. It displays the dynamics of the smoothed series of gross inflows (solid green line) and outflows (dashed red line) changes for the cases of Germany and Turkey since the 1980s. When the solid line falls below the two standard deviations of the moving average (not shown), the algorithm identifies a foreigners' sudden stop. The blue-shaded (light-shaded) areas identify the foreigners' sudden stops episodes that were also "prevented sudden stops." They are all in Germany. The red-shaded (dark-shaded) areas identify the episodes of foreigners' sudden stops that were not prevented. They are all the episodes in Turkey, and one of the episodes in Germany.

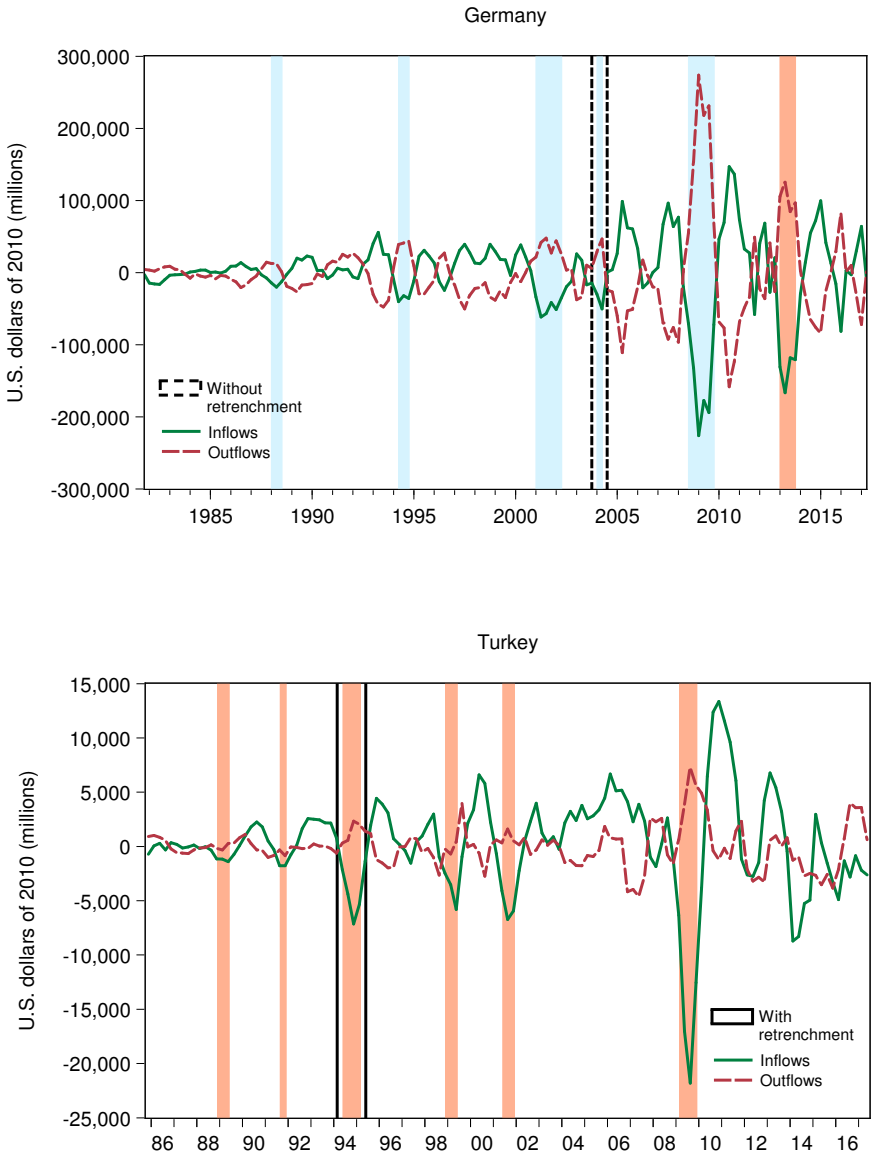
In the case of Germany, changes in gross flows exhibit a "diamond pattern." This implies that periods in which inflows declined almost always coincided with periods in which outflows moved in the opposite direction (and in similar magnitudes). These offsetting variations have allowed the country to prevent sudden stops in net flows, except for one episode in 2013. However, not all the offsetting variations in gross outflows have been large enough in magnitude to qualify as "retrenchments." There is one episode in 2003 in which there was prevention without a concurrent retrenchment.

The dynamics of capital flows in Turkey are different. They do not display the same "diamond pattern" as in Germany. None of the foreigners' sudden stops identified over the last 20 years in Turkey turned into prevented sudden stops in net flows. This was so because the offsetting variations in outflows were not large enough to compensate for the fall in inflows. However, the 1994 episode is worth highlighting because the change in gross capital outflows during that period qualifies as a retrenchment, yet it is not sufficient to offset the fall in gross capital inflows in order to prevent a sudden stop.

Moving beyond the examples of Germany and Turkey, Figure 2 provides a schematic representation of the prevalence of the different types of episodes in the sample, and the interrelationships between them.

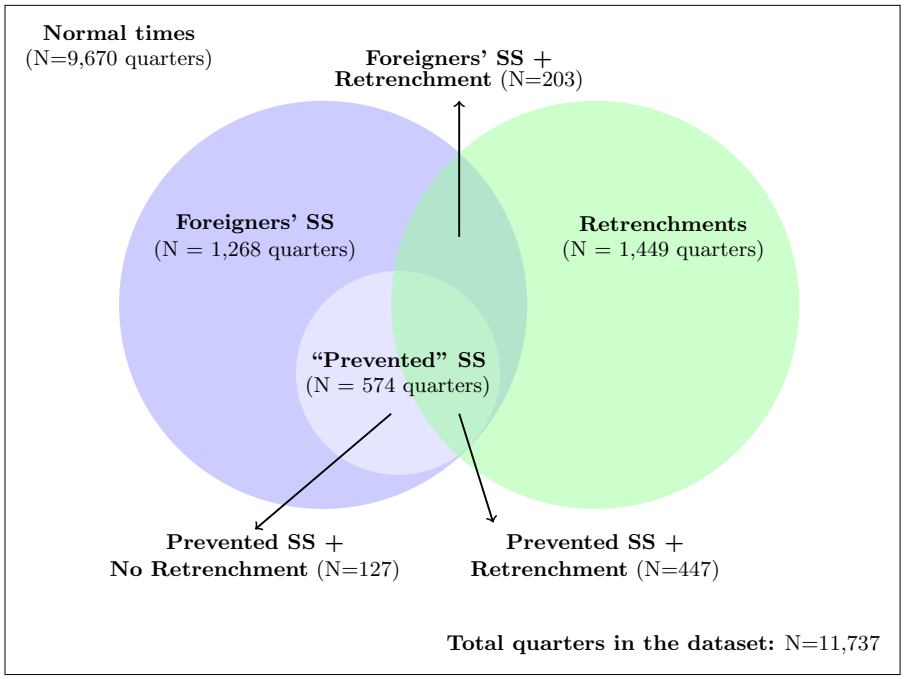
There is a total of 1,268 observations (quarters/country) that fall within foreigners' sudden stop

Figure 1: Inflows, Outflows, and Prevented Sudden Stops



Source. Author's own calculations based on data from IMF-BOPS. Blue-shaded (lighter) areas correspond to episodes catalogued as "prevented sudden stops". Red-shaded (darker) areas correspond to foreigner's sudden stop episodes that were not prevented. The graph also shows which of those episodes coincide with a retrenchment episode (or not).

Figure 2: A schematic representation of episodes in the sample



Source. Author's own calculations based on data from IMF-BOPS."SS"=Sudden Stop.

episodes out of a total of 11,737 available observations in the dataset. There are 371 foreigners' sudden stop episodes in the sample, with an average duration of 3.4 quarters per episode (= $1,268/371$).

Out of the 1,268 observations that fall within foreigners' sudden stop episodes, 574 of them also fall within "prevented" sudden stops (totaling 129 episodes), and 694 fall within not prevented episodes (totaling 242 episodes).

In the case of prevented sudden stops, 127 observations (or 29 episodes) out of 574 observations were not accompanied by contemporaneous retrenchments, showing that retrenchments are not a necessary condition for the prevention of a sudden stop.

When considering the case of foreigners' sudden stops that were not prevented, 203 observations (or 111 episodes) out of 694 observations coincide with retrenchments in gross outflows, showing that retrenchments are not always enough to prevent sudden stops.

Finally, 55 percent of the observations identified as retrenchments in the sample (=799/1,449 observations), did not materialize during a foreigners' sudden stops. This suggests that most of the retrenchments that are prevalent in the sample are unrelated to crisis episodes.

3 The Benefits of Sudden Stop Prevention

Why is it important to focus on prevention? One rationale for caring about the determinants of prevention is that sudden stops in net capital flows impose larger output losses on affected economies than prevented sudden stops. To see this, we study the response of output growth to a set of different scenarios. We build impulse response functions using the local projections method as in Jordà (2005).

First, we estimate model (3) to assess the dynamics of output growth after a foreigners' sudden stop and how these dynamics are affected when the episode is prevented.

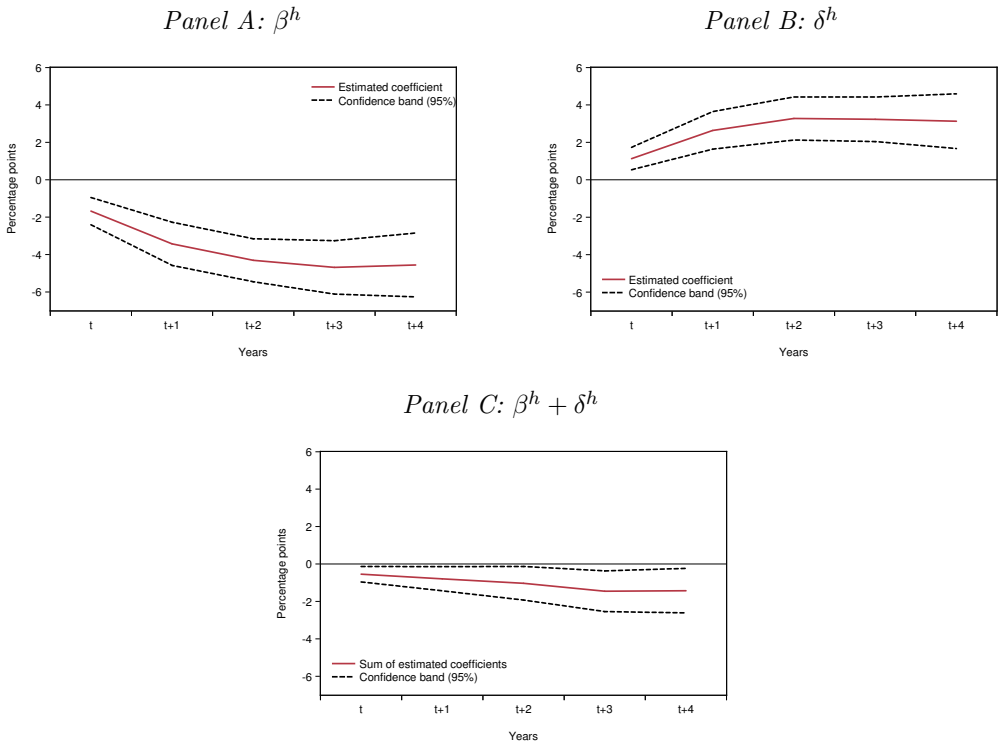
$$\Delta_h y_{i,t+h} = \alpha_{i,h} + \beta^h FSS_{i,t} + \delta^h Prev_{i,t} + \xi^h \mathbf{x}_{i,t} + \varepsilon_{i,t+h}, \tag{3}$$

for $h = 0, 1, ..., 5$. Here i and t index countries and years, respectively. $y_{i,t}$ is the log of real annual GDP. The variable $\Delta_h y_{i,t+h} \equiv y_{i,t+h} - y_{i,t-1}$ is the cumulative GDP growth between period $t-1$ and period $t+h$. $FSS_{i,t}$ is a dummy variable that takes a value of 1 if t coincided with a foreigners' sudden stop episode and zero otherwise. $Prev_{i,t}$ is a dummy variable that takes a value of 1 if t coincides with a prevented sudden stop episode, and zero otherwise. The vector of controls $\mathbf{x}_{i,t}$ includes lags of the growth rate.

Results for model (3) are depicted in Figure 3. The impact of a foreigners' sudden stop episode is captured by the coefficients β^h. In Panel A, we observe that foreigners' sudden stops are associated with below-average growth in the 5 years following the start of the episode. The estimated impact is statistically significant at the 95 percent confidence level. Instead, $\beta^h + \delta^h$ - depicted in Panel C - captures growth dynamics after a prevented sudden stop. Prevention effectively offsets the negative growth effect of a foreigners' sudden stop. The cumulative effect is such that the negative growth impact of foreigners' sudden stops that are prevented is quantitatively much smaller for every year after the episode, than a foreigners' sudden stop that is not prevented. Coefficient δ^h in Panel B shows that the difference in growth between a prevented sudden stop and one that is not prevented is statistically different from zero.

To sum up: "prevention" reduces the output costs of foreigners' sudden stop (i.e., dampens the estimated negative growth impacts of the crisis). It is thus important to assess how countries can increase resiliency to external shocks by enticing prevention. That is the task that we undertake in the next sections.

Figure 3: Impulse Responses of GDP growth to Sudden Stops - Model 1



Source. Author's calculations. The panels show selected coefficient estimates from Equation 3. The coefficient estimates represent the accumulated impact of the foreigners' sudden stop on real GDP growth, with and without prevention, up to five years following the shock. Standard errors to compute the 95 percent confidence bands are calculated using the methodology proposed by Driscoll and Kraay (1998), controlling for serial and spatial correlation.

4 What Determines Prevention?

4.1 Model

Environment. Consider an economy with two investors. There is a single "large" foreign investor (f-investor) and a continuum of "small" domestic investors (d-investors) as in Corsetti et al. (2004). Investors are risk averse and derive utility from consumption $u(c)$, which can be expressed in terms of their monetary wealth. The existence of a large foreign investor is a simplifying assumption to capture the potentially sizable effects on inflows of a foreigners' sudden stop.

Each investor holds an initial endowment of 2, which is split as follows: The f-investor holds $1-\beta$ in a domestic bond and $1+\beta$ in a safe foreign asset. The d-investors hold $1+\beta$ in a domestic bond and $1-\beta$ in a safe foreign asset.[5] The safe asset is denominated in foreign currency while the domestic bond is denominated in local currency. The initial local/foreign exchange rate is fixed at

[5] A similar distribution is considered in Goldstein and Pauzner (2004) to analyze contagion effects when investor's portfolio are diversified and they exhibit decreasing absolute risk aversion.

$e = 1$, but it can be subject to devaluation next period.

Investors' Problem and Sudden Stop Definitions. Agents can review their positions and decide whether to withdraw (attack) or roll over (stay) their investments in the domestic economy. The gross return on investment is $\kappa \in (0, 1]$ in case of withdrawal, and $R(\theta, \ell)$ at maturity. The return R is an increasing function of fundamental θ of the domestic economy, and decreasing in the proportion of agents ℓ who withdraw their investment. If the mass of withdrawals exceed economic fundamentals ($\ell \geq \theta$) the economy is insolvent and the return on investment collapses to zero.

When domestic fundamentals are sufficiently strong, the economy is solvent. There exists a θ^h, such that for any realization $\theta > \theta^h$, investors roll over their positions irrespective of the actions of the others. On the contrary, there exists a θ^l such that for any realization ($\theta < \theta^l$), the economy faces a sudden stop as investors withdraw their funds irrespective of the actions of the others.

We define a *foreigners' sudden stops* as a situation in which the f-investor withdraws all their investment from the domestic economy. A *sudden stop in net capital flows* is defined as a situation in which a country becomes insolvent (i.e., $\ell > \theta$). A *prevented sudden stop* is defined as a situation in which, given a foreigners' sudden stops, the behavior of domestic investors is such that the economy remains solvent and the return R on investment materializes.

Information. We introduce incomplete information to the model, in the spirit of global game models (Carlsson and van Damme, 1993; Morris and Shin, 1998). Investors do not observe the realization of θ, but they receive informative private signals about it. The large f-investor observes the realization of the following random variable:

$$y = \theta + \tau\eta \tag{4}$$

where $\tau > 0$ is a measure of how precise the signal for f-investor is and η is a standardized normal random variable. Small d-investors observe:

$$x_i = \theta + \sigma\epsilon_i \tag{5}$$

where $\sigma > 0$ is a measure of how precise the signal for d-investors is and the individual specific noise ϵ_i is distributed according to a normal standard distribution.

Assumption 1. *Domestic investors are relatively more informed about fundamentals of their own*

country than foreign investors, thus $\frac{\sigma}{\tau} \to 0$

This assumption follows Nieuwerburgh and Veldkamp (2009). The authors state that it is optimal for investors to specialize in information others do not know. In this case, d-investors know better their economy and have a more accurate assessment of the true underlying fundamentals of their economy than the f-investor.[6]

Timing. The f-investor moves first.[7] Based on her signal, the f-investor decides whether to withdraw her investment or roll over. In case of withdrawal, the investor recovers $\kappa(1-\beta)$, which is converted to foreign currency and invested in the safe asset with a return $1+r^f$. Following Guimaraes and Morris (2007), we assume that after a withdrawal from the f-investor, the exchange rate depreciates to $\tilde{e} > 1$.[8] When the f-investor decides to roll over her investment, the return R is determined by the solvency condition and the exchange rate remains unaltered.

Having observed the action of the f-investor, small d-investors must decide whether to withdraw their funds (i.e., capital flight) or roll over (i.e., stay) . In case of flight, they recover $\tilde{e}\kappa(1+\beta)$ from their domestic position and they invest it in the safe foreign asset. When d-investors decide to roll over, they can supplement their domestic positioning by withdrawing a units from their safe foreign asset position to invest in the domestic economy (i.e., repatriation). To simplify, we assume there is no partial repatriation, thus the decision of repatriation is binary ($a = \{0, (1-\beta)\}$).

Equilibrium. In this sequential-move game a unique trigger equilibrium is characterized by a 7-tuple $\left(y^*, \underline{x}^*, \underline{x}^{**}, \bar{x}^{**}, \bar{x}^*, \underline{\theta}^*, \bar{\theta}^*\right)$. Such that: (i) the large f-investor decides to roll over if her private signal y is greater than the threshold point y^*. (ii) After observing the f-investor to roll over her position, the small d-investors decide to roll over their domestic investment if $x_i > \underline{x}^*$. (iii) After observing the f-investor to roll over her position, the small d-investors decide to roll over their domestic investment and repatriate safe foreign assets if $x_i > \underline{x}^{**}$. (iv) After observing the f-investor to withdraw her position, the small d-investors decides to roll over their domestic investment if $x_i > \bar{x}^*$. (v) After observing the f-investor to withdraw her position, the small d-investors decides to roll over their domestic investment and repatriate safe foreign assets if $x_i > \bar{x}^{**}$.

[6] The underlying factors behind this knowledge mechanism have been extensively discussed in Caballero and Simsek (2016).

[7] As stated in Corsetti et al. (2004), small investors have incentives to postpone their actions. They believe that their actions are not capable of influencing the actions of the others, so there is no benefit in signalling.

[8] This assumption aims to capture that periods of distress are usually accompanied by sharp currency depreciations that improve the return of investments in local currency that resident investors may want to tap (as opposed to foreign investors that usually care about the foreign currency return of their investments). This idea is consistent with the literature that links currency depreciation and investment incentives, such as the theoretical work in Froot and Stein (1991), Blonigen (1997), and the empirical work of Klein and Rosengren (1994) and Goldberg and Klein (1997).

(vi) A threshold fundamental $\theta > \bar{\theta}$ such that the economy is solvent when f-investor withdraws her positions. And, (vii) a threshold fundamental $\theta > \underline{\theta}$ such that the economy is solvent when f-investor rolls over her position.

Solution. We focus in this section on the implications of foreigners' and prevented sudden stops derived from the model; that is to say, the trigger strategies derived after the withdrawal by the f-investor. All remaining equilibrium conditions and the proofs for all propositions here presented are derived in full detail in the online appendix.

Problem 1. *(Large f-investor) Having received the signal y, the critical signal y^* is defined by the following condition:*

$$\underbrace{Pr\left(\theta \geq \underline{\theta} | y = y^*\right) u\left(R(1-\beta) + (1+\beta)(1+r^f)\right)}_{Roll\ Over\ +\ Solvency} + \underbrace{Pr(\theta \leq \underline{\theta} | y = y^*) u\left((1+\beta)(1+r^f)\right)}_{Roll\ Over\ +\ Insolvency} = \underbrace{u\left((\kappa(1-\beta) + (1+\beta))(1+r^f)\right)}_{Withdraw} \quad (6)$$

The solution to equation (6) consists of finding a threshold $y = y^*$, at which the f-investor is indifferent between attacking or defending the domestic economy. When the f-investor rolls over her position and the economy remains solvent, she gets the returns R and r^f from her local and foreign investment, respectively. In the case when the economy becomes insolvent, the return on their domestic position is zero and her wealth is limited to the investment in the safe asset. Finally, when the f-investor attacks the domestic economy, the funds $\kappa(1-\beta)$ from early withdrawal are invested in the safe asset.

Proposition 1. *Define $\omega = \frac{u\left((1+r^f)(\kappa(1-\beta)+(1+\beta))\right) - u\left((1+r^f)(1+\beta)\right)}{u\left(R(1-\beta)+(1+r^f)(1+\beta)\right) - u\left((1+r^f)(1+\beta)\right)}$. (i) There exists a threshold $y^* = \underline{\theta}^* + \tau \mathbf{\Phi}^{-1}(\omega)$ such that for any realization $y < y^*$ there is a foreigner's sudden stop. (ii) The threshold y^* is decreasing in domestic interest rates (R) and exposure (β) and increasing in the risk free rate (r^f) and the face value of early withdrawals (κ).*

where Φ^{-1} is the inverse of the c.d.f of a standard Normal distribution. A low signal $y \leq y^*$ about fundamentals leads the large creditor to withdraw their funds, triggering a foreigners' sudden stop (as inflows become negative). Thus, given the compact support for y, the increase in y^* is associated with a higher probability of a foreigners' sudden stop.

What affects the incidence of a foreigners' sudden stop? According to proposition 1, an increase in interest rates r^f (which can be considered as a "external factor" from the standpoint of the

domestic economy) and an increase in the face value funds available after withdrawal κ rise the likelihood of a foreigners 'sudden stop. This is the case as both r^f and κ rise the value of funds available after withdrawal. In such scenario, investors require a higher realization of domestic fundamentals to roll over their positions on the domestic economy, making a foreigners' sudden stop more likely for a larger set of possible realizations of the domestic fundamentals.

Given the positive mapping between θ and R, stronger domestic fundamentals entice higher returns on domestic investments and thus, lower probabilities of a foreigners' sudden stops. According to proposition 1, a higher return increases the opportunity cost of withdrawing by making more attractive investments in the domestic economy. This reduces the realization of fundamentals required to make a f-investor to withdraw and thus, renders a lower probability of a foreigners' sudden stop. A key insight from this is that the probability of foreigners sudden stops depend on external and domestic factors. External factors encompassing higher risk and return of foreign assets are associated with higher probability of a foreigners sudden stop, while domestic factors summarized by the strength of domestic fundamentals θ are associated with lower probability of a foreigners sudden stop.

Problem 2. *(Small d-investors) After a foreigners' sudden stop with a exchange rate $\tilde{e} > 1$, a d-investor i (receiving a signal x_i) solves: (i) the critical signal $x_i = \bar{x}^*$ defined by the following equation:*

$$\underbrace{\bar{\pi}^* u\left(R\left((1+\beta)+\tilde{e}a\left(\bar{x}^{**}\right)\right)+\tilde{e}(1+r^f)\left((1+\beta)-a\left(\bar{x}^{**}\right)\right)\right)}_{\textit{Roll Over + Solvency}} + \tag{7}$$

$$\underbrace{(1-\bar{\pi}^*))u\left(\tilde{e}(1+r^f)\left((1+\beta)-a\left(\bar{x}^{**}\right)\right)\right)}_{\textit{Roll Over + Insolvency}} = \underbrace{u\left(\tilde{e}(1+r^f)\left(\kappa(1-\beta)+(1+\beta)\right)\right)}_{\textit{Withdraw}}$$

where $\bar{\pi}^* = Pr\left(\theta \geq \bar{\theta} | y \leq y^*; x_i = \bar{x}^*\right)$. And, (ii) the critical signal $x_i = \bar{x}^{**}$ defined by the following equation:

$$\underbrace{\bar{\pi}^{**} u\left(R\left((1+\beta)+\tilde{e}(1-\beta)\right)\right)}_{\textit{Roll over + Repatriation}} = \underbrace{\bar{\pi}^{**} u\left(R(1+\beta)+\tilde{e}(1+r^f)(1-\beta)\right)+(1-\bar{\pi}^{**})u\left(\tilde{e}(1-\beta)(1+r^f)\right)}_{\textit{Roll over + No Repatriation}} \tag{8}$$

where $\bar{\pi}^{**} = Pr\left(\theta \geq \bar{\theta} | y \leq y^*; x_i = \bar{x}^{**}\right)$.

There are two decisions made by d-investors. First, they choose between withdrawing their domes-

tic positions (i.e., capital flight) or rolling over (i.e., stay) . Equation (7) compares their expected wealth associated with rolling over the domestic investment (left hand side) with the returns from triggering capital flight and investing the proceeds in a safe asset (right hand side). This defines a threshold $x_i = \bar{x}^*(a)$, such that by the law of large numbers, the fraction of investors that receive a private signal smaller than $(x_i < \bar{x}^*(a))$ withdraw their domestic investment; while the fraction of investors who receive a private signal bigger than $(x_i > \bar{x}^*(a))$ roll over . Notice that this threshold is a function of the decision of repatriation $a = \{0, 1-\beta\}$, because it affects the portfolio balance and the expected returns on domestic and foreign investments.

Second, d-investors decide whether to repatriate their safe foreign assets or not. This decision takes place only if they have decided to roll over their domestic investment (i.e., $x_i > \bar{x}_i^*(a)$). In equation (8), d-investors compare the expected utility of withdrawing versus the alternative of rolling over the investment in the safe foreign asset. The solution to this problem entails the definition of a threshold $\bar{x}^{**}$ such that the fraction of d-investors that receive a private signal smaller than $(x_i < \bar{x}^{**})$ do not repatriate; while the fraction of agents that receive a private signal bigger than $(x_i > \bar{x}^{**})$ repatriate their foreign assets.

Proposition 2. *For $\frac{\sigma}{\tau} \to 0$: (i) There exists a threshold $\bar{x}^{**} = \bar{\theta} + \sigma\Phi^{-1}(\nu)$ such that d-investors with a signal $x_i > \bar{x}^{**}$ repatriate their foreign position. Thus, the decision to repatriate is given by:*

$$a^*(\bar{x}^{**}) = \begin{cases} a = 0 & \text{if} \quad x_i \leq \bar{x}^{**} \\ a = 1-\beta & \text{if} \quad x_i \geq \bar{x}^{**} \end{cases}$$

$$\text{with} \qquad \nu = \frac{u\left(\tilde{e}(1-\beta)(1+r^f)\right)}{u\left(\tilde{e}(1-\beta)(1+r^f)\right) + \tilde{u}(R, r^f, \beta, \tilde{e})},$$

,

$$\tilde{u}(R, r^f, \beta, \tilde{e}) = u\Big(R\big((1+\beta) + \tilde{e}(1-\beta)\big)\Big) - u\Big(R(1+\beta) + \tilde{e}(1+r^f)(1-\beta)\Big)$$

and (ii) There exists a threshold $\bar{x}^*(0) = \bar{\theta} + \sigma\Phi^{-1}(\varrho)$ such that d-investors with a signal $x_i > \bar{x}^*(0)$ roll over their domestic investment. With

$$\varrho = \frac{u\left(\tilde{e}(1+r^f)\left(\kappa(1-\beta) + (1+\beta)\right)\right) - u\left(\tilde{e}(1+r^f)(1+\beta)\right)}{u\left(R(1+\beta) + \tilde{e}(1+r^f)(1+\beta)\right) - u\left(\tilde{e}(1+r^f)(1+\beta)\right)}$$

(iii) The threshold $\bar{x}^*$ is decreasing in domestic interest rate R and increasing in the recovery value of investment κ, the risk free rate r^f and the exchange rate $\tilde{e}$.

where Φ^{-1} is the inverse of the c.d.f of a Standard Normal distribution. Based on proposition 2, we are able to divide the solution of a d-investors' problem in three regions. For realization $x_i \leq \bar{x}^*(0)$ the d-investors withdraw their investment. For realizations $\bar{x}^*(0) \leq x_i \leq \bar{x}^{**}$ the d-investors roll over their investment but do not repatriate. Finally, for realization $x_i \geq \bar{x}^{**}$ d-investors roll over their investment and repatriate their foreign investment.

Finally, to close the model we determine the critical value of the fundamental $\bar{\theta}$ at which the domestic economy is solvent after a foreigners' sudden stop. The solvency condition is granted if the mass of withdrawals does not exceed economic fundamentals (i.e., $\ell < \theta$). Thus, the threshold $\bar{\theta}$ is determined by the decision of the f-investor to withdraw, the mass of d-investors that receive a signal below the threshold $x_i < \bar{x}^*(0)$ and the weight that each investor has over the total portfolio in the domestic economy.

Proposition 3. *(Solvency). Define* $\pi\left(x^{**}\right) = (1+\beta)+(1-\beta)\left(1+\tilde{e}Pr\left(x_i \geq x^{**}|\theta=\bar{\theta}\right)\right)$, $\tilde{\lambda}_1 = \frac{1-\beta}{\pi}$ *and* $\tilde{\lambda}_2 = \frac{1+\beta}{\pi}$*: (i) There exists a threshold* $\bar{\theta}$ *determined by equation (9), such that for any realization of* $\theta < \bar{\theta}$ *there is a sudden stop as the economy becomes insolvent:*

$$\ell = \tilde{\lambda}_1 + \tilde{\lambda}_2 Pr\left(x_i \leq \bar{x}^*(0)\middle|\theta=\bar{\theta}\right) = \bar{\theta} \tag{9}$$

The probability of a sudden stop in net capital flows (insolvency) –which is the worst possible outcome for the economy– encompasses the withdrawal from the f-investor and capital flight from some d-investors. The weight of each investor in the total asset allocation is determined by the share of f-investor ($\tilde{\lambda}_1$) and the d-investors ($\tilde{\lambda}_2$) over the total amount invested in the domestic economy. Initially, the full amount invested in the domestic economy was equal to two: $1-\beta$ units from f-investor and $1+\beta$ units from d-investors. However, d-investors that repatriate their foreign investment enlarge their share by the factor $\tilde{e}(1-\beta)Pr\left(x_i \geq x^{**}|\theta=\bar{\theta}\right)$, at the expense of the share from the other investors.

What makes prevention more likely? A foreigners' sudden stop puts the economy at higher risk of insolvency (i.e., $\ell \leq \bar{\theta}$). To reduce that risk, the economy relies on two interrelated mechanisms: first, in the reduction in the mass of d-investors that trigger capital flight as the f-investor is withdrawing. And second, from the possible repatriation of safe foreign assets by some d-investors. Both of them are more likely to happen when domestic fundamentals (θ) are stronger. On the one hand, more roll over lowers the left hand side of equation (9). On the other hand, repatriation creates a reinforcing effect by diluting the weight of investors that are withdrawing from domestic

investment.

The bottom line is that stronger domestic fundamentals work in favor of reducing the probability of a foreigners' sudden stop (proposition 1) and, conditional on a foreigners' sudden stop having materialized anyway, stronger domestic fundamentals help to entice prevention thereby reducing the probability of insolvency (propositions 2 and 3) which is the worst possible outcome for the domestic economy.

4.2 Empirics

Our theoretical framework suggests that any mechanism through which prevention occurs must be tightly connected to domestic fundamentals. Thus, in this section we test this premise and ask what the empirical determinants of prevented sudden stops are. To answer this question, we use an estimation strategy consistent with the theoretical model that exploits the sequential nature of the problem.[9] The transition into a prevented sudden stop (second stage) can occur only after the economy is already in a foreigners' sudden stop (first stage). We employ a sequential logit model, which entails the estimation of separate logit regressions for each sample, restricting the sample in the second stage only to those countries that are already in a foreigner's sudden stop.[10]

The identification assumption is that, besides temporal precedence, the "decision" of foreigners in the first stage is independent from the decision of the locals in the second stage. This is the reason why it is valid to run separate regressions for each transition.

In the first stage of the sequential logit, we estimate the likelihood of a foreigners' sudden stop (FSS) using the full sample available as shown in Equation 10:

$$Prob(FSS_{it} = 1|\mathbf{w}, \mathbf{x}) = \Lambda\left(\mathbf{w}'\beta_1^G + \mathbf{x}'\beta_1^D\right) \tag{10}$$

where Λ indicates the logistic cumulative distribution, $\mathbf{w}$ a set of external conditions, $\mathbf{x}$ a set of domestic conditions and $\left\{\beta_1^G, \beta_1^D\right\}$ are vectors of parameters. In a second stage, we restrict the sample only to those countries that in the previous stage experienced a sudden stop in gross inflows to compute the likelihood that these episodes are prevented as presented in equation (11):

$$Prob(Prev_{it} = 1|\mathbf{w}, \mathbf{x}, FSS_{it} = 1) = \Lambda\left(\mathbf{w}'\beta_2^G + \mathbf{x}'\beta_2^D\right) \tag{11}$$

[9] Initially proposed by Mare (1981).

[10] In the first stage, we estimate a logit using the full sample to explore the determinants of foreigners' sudden stops across countries and over time. In the second stage, we restrict the sample only to those episodes that in the previous stage experienced a foreigners' sudden stop to analyze the determinants of prevention.

The set of determinants of sudden stops to be used in the econometric exercise encompasses most explanatory variables that have been considered in the literature analyzing a variety of crisis episodes, including sudden stops in net and gross capital flows, currency crises, current account reversals, among others.

We construct a comprehensive panel dataset at quarterly frequency, from 1980 through 2017, comprising 48 countries for which data is available. Given that some of the explanatory variables are not available for many countries at quarterly frequency, we leave variables that restrict the sample size for the sensitivity analyses introduced later. In all cases, we classify explanatory variables into external and domestic . A detailed description of the dependent and explanatory variables, definitions and data sources are presented in Table 6 in Appendix B.

Regarding external factors, following Forbes and Warnock (2012) we consider four explanatory variables: global risk, global liquidity growth, global interest rates and world growth.

Global risk. is proxied by stock market volatility in the US, measured as the VXO - the implied volatility index calculated by the Chicago Board Options Exchange - for the period 1986-2017, extended back to 1980 based on Bloom (2009).

Global liquidity growth is quantified using the yearly growth rate of money supply; this measure is computed as the average growth rate of M2 in the United States, Eurozone and Japan and the growth rate of M4 for the UK.

Global interest rates are calculated as the average interest rates on long-term government bonds in the United States, core Euro Area and Japan.

Finally, *global growth* corresponds to the year-on-year growth rate in world real GDP. The source of the last three variables is the International Financial Statistics (IFS) database from the IMF.

Regarding domestic variables, the set of explanatory variables included in the baseline regressions are:

GDP growth, defined as the year-on-year growth rate of quarterly real GDP.

Inflation, defined as the country's average CPI inflation rate.

Foreign Liabilities, proxied by "banks foreign borrowing as a share of GDP" from IFS and Bank of International Settlements (BIS).

Financial Openness is captured by the KAOPEN Index developed by Chinn and Ito (2006), which measures a country's degree of capital account openness, normalized values.

For *Institutions*, we use the composite risk rating index produced by the Political Risk Services

Group. This index has 12 components.[11]

Flexible Exchange Rate (Flex), is measured by the classification of exchange rate regimes constructed by Reinhart and Rogoff (2004) and updated by Iltzezky et al. (2009). Higher values of this indicator variable are associated with more flexible exchange rate regimes.

Inflation targeting (IT), is an indicator variable taking the value of 1 if the country has an inflation targeting regime and zero otherwise.

$IT \times Flex$ is an interaction term comprising the explanatory variables IT and Flex.

Contagion is captured by a dummy variable that takes the value of 1 if a country reports a foreigners' sudden stop in t and there is one large trading partner that suffered a foreigners' sudden stop in $t-1$.

4.2.1 Baseline Results

Results are presented in Table 1. In similar fashion to Forbes and Warnock (2012) all explanatory variables are lagged one quarter, except when stated otherwise.[12] Column (1), labeled "FSS," presents the results of the first stage logit regression. It shows that some of the external explanatory variables are significant determinants of foreigners' sudden stops. In particular, global risk is associated with a higher likelihood of foreigners' sudden stops, and global economic growth is associated with a reduced probability of a crisis. Results also reveal that some domestic explanatory variables affect the probability of foreigners' sudden stops. For instance, larger levels of foreign liabilities, a higher degree of financial openness, and stronger contagion, are associated with higher vulnerability to foreigners' sudden stops. Instead, higher domestic economic growth is associated with a lower vulnerability.

Once the economy has experienced a foreigners' sudden stop, then it can transition either into a sudden stop in net capital flows or into a prevented episode. Column (2) in Table 1, labeled "Prevented," shows that external factors do not influence the likelihood of prevention. Instead, domestic factors provide the antidotes for prevention. In particular, lower levels of foreign liabilities, lower inflation, higher economic growth, and a better institutional background are associated

[11] The components are: government stability, socio-economic conditions, investment-profile, internal conflict, external conflict, corruption, military and politics, religious tensions, law and order, ethnic tensions, democratic accountability and bureaucracy quality.

[12] Many of the explanatory variables are exposed to extreme outliers (observations which are 3 times higher (lower) than the interquartile range at the 75th (25th) percentile). To prevent atypical observations from distorting coefficient estimates, we include interaction terms with dummy variables in the baseline regressions that capture extremes values. This procedure avoids reducing the number of observations available for the estimation while controlling for outliers. Interactions are not shown in the tables below but are available upon request.

with a higher probability of preventing a sudden stop.[13]

In addition, results show that the degree of exchange rate flexibility (Flex) per se is not relevant in explaining either transitions into foreigners' sudden stops (column 1) or the subsequent likelihood of prevention (column 2).[14] The coefficient estimate on inflation targeting (IT) is negative and significant in both columns, suggesting that having an IT regime without a flexible exchange rate is associated with a lower probability of a foreigners' sudden stop; and, conditional on one having occurred, then the IT regime without a flexible exchange rate is associated with a lower probability of prevention. The positive and significant estimated coefficients of the interaction terms IT $\times$ Flex in columns 1 and 2 –which in the latter case, is twice as large in magnitude as the coefficient estimate on IT in that column – suggests that an IT regime combined with exchange rate flexibility does not affect the probability of a foreigners sudden stop, while it is associated with a higher likelihood of prevention.[15] We interpret this result as suggesting that having a "consistent" IT regime that involves a commitment to stabilize prices in the economy and allows for exchange rate flexibility is helpful for prevention.[16]

4.2.2 Robustness Checks

We conduct a battery of sensitivity tests including additional control variables, alternative measures of the variables presented in the baseline regression, and different definitions of sudden stops.[17]

Alternative definitions. Sudden stop episodes were identified using smooth capital flows series. A potential issue with the methodology is that, while it helps to avoid seasonality effects

[13] Adler et al. (2014) find that whether residents play a stabilizing role or not depends on the nature of the external shock. The seemingly different results that we get may be due to the nature of the problem analyzed in each case. In this paper results from the second stage regression capture the decisions of domestic investors conditional on a foreigners' sudden stop having already materialized. This approach is different from the one in Adler et al. (2014), who study the impact of global shocks on retrenchments by domestic investors without conditioning on a preceding foreigners' shock affecting inflows.

[14] This result is robust to the use of coarse classification in Iltzezky et al. (2009) and to differences with respect to mean as in Cifuentes and Jara (2014) (results are not shown here).

[15] When the interaction term is excluded form the regression (not reported) the coefficient estimates of IT and Flex are not statistically significantly different from zero in both columns. This suggests that, neither IT nor Flex per se are associated with changes in the probability of a foreigners' sudden stop (column 1) or prevented sudden stops (column 2).

[16] In an alternative specification (not reported), we relax the assumption of sequential order by estimating a multinomial logit between 3 categories: normal times, foreigners' sudden stops prevented and foreigners' sudden stops not prevented. The results are quantitatively similar to the ones discussed in this section. Moreover, we cannot reject the hypothesis that the likelihood ratios are statistically the same in the sequential and multinomial logit. However, we consider the sequential logit as a baseline since it is more aligned with the theoretical framework presented in the previous section.

[17] There are additional sensitivity tests reported in the working paper version of this paper (Cavallo et al., 2017).

or random fluctuations in the data, it may pose a challenge to the exogeneity assumption because the explanatory variables in the baseline regression are lagged only one quarter. Therefore, the dependent variable includes by construction information from $t-1$, which is the period concurrent with the explanatory variables included in the model.

The are two ways to deal with this issue. The first one is to lag the explanatory variables more than one quarter. The problem with this solution is that, to avoid any concurrent periods between left- and right-hand variables in the regression, it would require introducing the 9th lag of the explanatory variable (equivalent to two years of data) into the regression, thereby limiting sample size and leading to weak correlations. An alternative solution is to change the way the dependent variable was constructed. Instead of annualizing the raw capital flows data first (equation 1), and then computing the change of the annualized series (equation 2), an alternative is to compute equations 1 and 2 based on yearly changes of quarterly series. This introduces more volatility into the underlying capital flows series, and therefore results in a different set of episodes, but it has the advantage that it avoids concurrent periods between the dependent variables (which uses information from periods t and $t-4$ only) and the explanatory variables (which uses information from period $t-1$).

Columns (1) and (2) of Table 2 show the results based on the alternative definition of episodes. Reassuringly, the baseline results are unaffected by this change, suggesting that the results are robust to alternative definitions.

Including additional explanatory variables. We include additional explanatory variables to the set of domestic factors. The variables are:

- *Current account/Absorption of tradable goods (CA/TA)*, as a proxy of potential changes in the real exchange rate when a sudden stop materializes, following Calvo et al. (2008).[18]
- *Financial depth*, proxied by private credit by banks. This variable is measured using "deposit money banks and other financial institutions claims on the private sector as a percentage of GDP," obtained from IFS.
- *Trade openness*. Ratio of real exports plus real imports over GDP.

These variables have been shown to be associated with different types of crises in the literature. However, we do not include them in the baseline because doing so would restrict the sample due

[18]The absorption of tradable goods is computed as imports plus tradable output domestically consumed. The latter is calculated as the sum of agricultural and industrial output – obtained from the World Development Indicators (WDI) constructed by the World Bank – minus exports.

to limited data availability of these variables at the quarterly frequency. Notwithstanding the data limitations, the results in Table 3 show that the baseline results are robust to the inclusion of the additional explanatory variables. Among the new control variables included, the only one that shows up as statistically significant is private credit by banks. The coefficient estimate in column 1 suggests that when credit is growing fast, then the probability of a foreigners' sudden stop is higher. And, conditional on a foreigners' sudden stop having materialized, faster domestic credit growth is associated with a lower probability of prevention (column 2), although the statistical significance of the latter coefficient estimate is lower.

Prevention vs Retrenchment. While the focus of this paper is on the determinants of prevented sudden stops, a strand of the literature has focused on two sets of distinct events that are related to prevented sudden stops: "sudden stops in capital inflows" (which we define as foreigners' sudden stops) and "retrenchments of capital outflows" (see, for example, Forbes and Warnock (2012) and Cifuentes and Jara (2014)).

A shown in preceding sections, foreigners' sudden stops and retrenchments of capital outflows may or may not coincide in time, and the latter may or may not be large enough to offset a foreigners' sudden stop. In this section we probe deeper into the interrelationships between the different episodes in the sample by assessing whether prevented sudden stops that are accompanied by retrenchments of outflows have different determinants than prevented sudden stops without retrenchments.

We begin by splitting the 371 foreigners' sudden stops episodes in the sample (equivalent to $N = 1,268$ quarter/country observations) into four groups: (A) prevented sudden stops with concurrent retrenchment of outflows ($N = 447$); (B) prevented sudden stops with no concurrent retrenchment of outflows ($N = 127$); (C) foreigners' sudden stops (not prevented) with concurrent retrenchment of outflows ($N = 203$); and (D) foreigners' sudden stops (not prevented) with no concurrent retrenchment of outflows ($N = 491$).

Next, we use a multinomial logistic regression to explore the determinants of the episodes in each group. Considering that the dependent variable is split into four groups, the multinomial regression model estimates three logit equations using one of the groups as the reference category. The basic setup is the same as in the standard logit regression, the only difference being that the dependent variable is categorical (4 groups) rather than binary as we had in the second stage logit regressions reported in previous sections. Results must thus be interpreted as the determinants of each group in relation to the reference category (in this case, group D).

Interestingly, results reported in column (1) and (2) of Table 4 suggest that the determinants of groups A ("prevented with retrenchments") and group B ("prevented without retrenchment") are similar: lower levels of foreign liabilities, better institutional quality and the combination of an inflation targeting regime with flexible exchange rate are associated with higher probability of occurrence of both types of episodes relative to group D ("no prevention, no retrenchment"). There are, however, some differences. The coefficient estimates on domestic GDP growth, inflation and contagion are statistically significant in column (1) only. In contrast, the set of determinants of group C ("no prevention with retrenchment") that are statistically significant are different than the ones for groups A which encompass retrenchment episodes that were also prevented sudden stops. This suggests that the determinants of retrenchment that do not lead to prevention are different from the determinants of retrenchment that lead to prevented sudden stops (with the exception of institutions and contagion). These results confirm the results in (Cavallo et al., 2017) which show, using a different methodology, that the determinants of a set of episodes that combine foreigners' sudden stops with retrenchment are different from the determinants of a prevented sudden stop.

Preventing Sudden Flights. The final sensitivity test consists of switching the roles of inflows and outflows in the determination of prevented sudden stops to probe into the mechanisms that we claim are at work. An alternative explanation of the prevalence of domestic factors for prevention could be that external factors affect gross inflows in general, while domestic factors determine only gross outflows. The results in this section suggest that this is not the case.

To see why, note that a prevented sudden stop has a specific sequencing: it is a foreigners' sudden stop (originating from a reduction in gross inflows) that is offset by a movement in gross outflows in the opposite direction. However, a prevented sudden stop could also be identified by applying the same statistical algorithms to gross inflows and outflows in a different sequence. In particular: an increase in gross outflows (i.e., a sudden "capital flight" by resident investors) can turn into a prevented sudden stop if concurrently there is an offsetting effect coming from a "surge" in the inflows from foreigners. If there is no concurrent surge of inflows, then the capital flight can lead to a sudden stop in net capital flows similar to what would happen with a foreigners' sudden stop that is not offset by residents.[19]

Even though the prevented sudden stops generated by switching the roles of inflows and outflows may be observationally equivalent in the data (i.e., a placebo), the economic mechanisms

[19] Cowan et al. (2008) show that the sudden stop of Chile in the late 90s was driven by a capital flight, and not by a sudden stop in inflows.

underlying them are different. In the model of section 4.1, the initial trigger is external to the affected economy, and the response from resident investors is driven by country-idiosyncratic factors. In the placebo-like prevented sudden stops, the sequencing between domestic and external factors driving the dynamics is different. Therefore, when we apply the empirical model to the placebo-type prevented sudden stops we expect to find different results. That is indeed the case considering the results that are reported in Table 5.

Column (1) in Table 5 labeled "Locals" is the equivalent to the "FSS" columns in the baseline sequential logit regressions. It captures the probability of a sudden increase in gross outflows driven by resident investors (i.e., "locals"). The results suggest that external explanatory variables, in particular: global risk and global growth, are significant determinants of this type of episodes. Coefficient estimates imply that higher global risk is associated with a lower likelihood of a sudden increase in gross outflows, and that higher global economic growth is associated with a higher likelihood. Interestingly, this is the opposite to what we found in the baseline regressions, suggesting that the nature of the underlying shocks is quite different in the case of the placebo-like episodes. This, notwithstanding the fact that external factors are significant in this regression, suggests that external factors affect the dynamics of gross outflows. In terms of the domestic factors, only GDP growth appears to be a significant determinant. Column (2) in Table 5 labeled "Prevented," shows that domestic factors do not influence the likelihood of prevention. This is also different from the baseline regressions where domestic factors entered as the predominant determinants.

Columns (3) and (4) replicate the same exercise considering "bonanza-filtered episodes." Bonanza-filtered episodes capture the feature that favorable terms of trade shocks can add a source of external financing to the economy that is materializing through the current account of the balance of payment instead of the financial account. In such circumstances, gross outflows may suddenly increase as residents investors try to diversify investment portfolios internationally following the positive income shock. We evaluate the determinants of placebo-like prevented sudden stops by restricting the sample of episodes in the second stage, only considering those that occur when there is not a positive terms of trade shock.[20] This is interesting because when bonanza episodes are excluded, it is more likely that the set of remaining placebo-like prevented sudden stops are more similar to the prevented sudden stops that we identify using the original sequencing between

[20] We construct bonanza-filtered episodes similarly to episodes of extreme capital flows variations. First, a bonanza is defined as a terms of trade window in which the seasonally adjusted terms of trade rise above two standard deviations from the historical mean. A bonanza episode starts when the terms of trade increase one standard deviation above the historical mean, and it ends when the terms of trade fall below the one standard deviation threshold.

inflows and outflows. This is so because by excluding bonanza related episodes, we increase the probability that the remaining episodes are "crisis driven" as in the original setup.

Changes in the results in columns (3) and (4) in relation to columns (1) and (2) are revealing. There are no significant changes in column (3) compared to column (1), except for the coefficient estimate on domestic growth, which is not statistically significant in column (3), and the coefficient estimate on institutions which is positive and significant. However, the more striking differences arise when comparing columns (4) and (2). When bonanza episodes are excluded from the sample, domestic factors, i.e., foreign liabilities and inflation, re-emerge as significant determinants of prevention in column (4) with the same signs as in the baseline regressions. In other words, the results that emerge when restricting the sample to bonanza-filtered episodes are, as expected, more similar to the baseline results than those that emerge from the full sample of placebo-like prevented sudden stops.

5 Conclusion

The global financial crisis of 2008/09 revealed that all countries with open financial accounts are vulnerable to the risk of a cut-off in international credit. However, it also showed that some countries were successful in preventing the fall in gross inflows from turning into a sudden stop in net capital flows. This is important because countries that can avoid sudden stops in net capital flows can also avoid the large output contractions that are usually associated with them.

Why are some countries more resilient than others in the aftermath of the same underlying shocks? More specifically, what are the "antidotes" that enable some countries to prevent full-fledged sudden stops in net capital flows? The answer is that antidotes are mostly domestic factors. Keeping low levels of liability dollarization, having a strong institutional framework, keeping inflation in check, and having credible and consistent monetary regimes help to increase resilience to external financing shocks.

The methodology exploits the sequential nature of the episodes under study. First, countries may or may not experience a cut-off in international credit. Second, those countries that experience a foreigners' sudden stop can prevent it from becoming a sudden stop in net capital flows, or not, depending on the behavior of locals.

There is analytical value-added in focusing on "prevented sudden stops" because they are different from retrenchments in gross outflows which have been the focus of the previous literature.

While retrenchments in gross outflows can trigger a prevented sudden stop, they are neither necessary nor sufficient to cause prevention. Moreover, many retrenchments that are prevalent in the sample are related to positive, rather than negative external shocks, and may therefore have different consequences on the economy, and their determinants may differ.

Prevented sudden stops are a specific type of crisis-related episode that, to the best of our knowledge, had not been analyzed before. Results show that while it may not be possible for countries to insulate completely from the volatility of gross inflows, they still have control over the specific set of antidotes that will prevent that volatility from forcing potentially costly external adjustments. In doing so, the role of domestic factors is critical. It is only under favorable domestic conditions that local investors may want to repatriate foreign asset holdings at the time of a foreigners' sudden stop, thereby preventing a sudden stop in net capital flows.

Table 1: Determinants of Prevented Sudden Stops

	Baseline	
	FSS	Prevented
	(1)	(2)
External Factors		
Global Risk (lag 1)	0.036***	-0.017
	(0.008)	(0.014)
Global Liquidity Growth (lag 1)	0.001	0.008
	(0.002)	(0.006)
Global Growth (lag 1)	-0.248***	-0.195*
	(0.060)	(0.101)
Global Interest Rates (lag 1)	-0.037	-0.117
	(0.035)	(0.112)
Domestic Factors		
Foreign Liabilities (lag 1,% GDP)	0.028***	-0.077***
	(0.007)	(0.025)
GDP Growth (lag 1)	-0.136***	0.160***
	(0.024)	(0.044)
Inflation (lag 1)	-0.002	-0.128**
	(0.006)	(0.054)
Institutions	0.002	0.052**
	(0.010)	(0.023)
Contagion	0.506***	0.273
	(0.177)	(0.317)
Financial Openness	0.006**	0.007
	(0.003)	(0.007)
Flexible Exchange Rate (Flex)	-0.059	-0.888
	(0.184)	(0.675)
Inflation Targeting (IT)	-0.687**	-2.177**
	(0.335)	(1.011)
IT×Flex	0.658*	4.214***
	(0.354)	(1.235)
Observations	4,956	725

Notes: The dependent variable in column (1), denoted by "FSS", corresponds to a dummy that takes the value 1 if the country experienced a foreigners' sudden stop, and zero otherwise. The dependent variable in column (2), denoted by "Prevented", corresponds to a dummy that takes the value 1 if the country experienced a prevented sudden stop, and zero otherwise. For details on the definitions of the dependent and independent variables see Table 6 in Appendix B. Estimates are obtained using a logit model and robust standard errors clustered by country, unless otherwise stated. Interaction terms with dummies that capture extreme values for the regressors are included in the regression. An extreme value is defined as one that is three interquartile ranges above the 75th percentile or below the 25th percentile. Standard errors are reported in parenthesis. *** (**) [*] denotes significance at the 1 (5) [10] percent level.

Table 2: Determinants of Prevented Sudden Stops: Alternative Definition of Episodes

	Alternative Definition	
	FSS	Prevented
	(1)	(2)
External Factors		
Global Risk (lag 1)	0.037***	0.034
	(0.010)	(0.010)
Global Liquidity Growth (lag 1)	0.023	0.037
	(0.003)	(0.003)
Global Growth (lag 1)	-0.27***	-0.22***
	(0.075)	(0.066)
Global Interest Rates (lag 1)	-0.026	-0.095
	(0.042)	(0.068)
Domestic Factors		
Foreign Liabilities (lag 1,% GDP)	0.028***	-0.057**
	(0.010)	(0.017)
GDP Growth (lag 1)	-0.13***	0.017***
	(0.029)	(0.023)
Inflation (lag 1)	-0.001	-0.17***
	(0.005)	(0.032)
Institutions	-0.004	0.032
	(0.013)	(0.017)
Contagion	0.55***	-0.25
	(0.191)	(0.236)
Financial Openness	0.007*	-0.006
	(0.004)	(0.006)
Flexible Exchange Rate (Flex)	-0.074	-1.213
	(0.243)	(0.338)
Inflation Targeting (IT)	-0.683**	-1.21
	(0.338)	(0.804)
IT×Flex	0.51*	3.004**
	(0.420)	(0.888)
Observations	4,956	718

Notes: The dependent variable in column (1), denoted by "FSS", corresponds to a dummy that takes the value 1 if the country experienced a foreigners' sudden stop, and zero otherwise. The dependent variable in column (2), denoted by "Prevented", corresponds to a dummy that takes the value 1 if the country experienced a prevented sudden stop, and zero otherwise. For details on the definitions of the dependent and independent variables see Table 6 in Appendix B. Estimates are obtained using a logit model and robust standard errors clustered by country, unless otherwise stated. Interaction terms with dummies that capture extreme values for the regressors are included in the regression. An extreme value is defined as one that is three interquartile ranges above the 75th percentile or below the 25th percentile. Standard errors are reported in parenthesis. *** (**) [*] denotes significance at the 1 (5) [10] percent level.

Table 3: Determinants of Prevented Sudden Stops: Additional Regressors

	Additional Regressors	
	FSS	Prevented
	(1)	(2)
External Factors		
Global Risk (lag 1)	0.043***	-0.023
	(0.008)	(0.017)
Global Liquidity Growth (lag 1)	0.001	0.008
	(0.002)	(0.006)
Global Growth (lag 1)	-0.258***	-0.178
	(0.069)	(0.114)
Global Interest Rates (lag 1)	-0.031	-0.084
	(0.043)	(0.113)
Domestic Factors		
Foreign Liabilities (lag 1,% GDP)	0.027***	-0.079**
	(0.008)	(0.031)
CA/TA (lag 1)	-0.002	-0.002
	(0.004)	(0.010)
GDP Growth (lag 1)	-0.138***	0.150***
	(0.024)	(0.054)
Inflation (lag 1)	0.039*	-0.177**
	(0.022)	(0.074)
Trade Openness (lag 1)	-0.003	0.010
	(0.002)	(0.006)
Financial Depth (lag 4)	0.007***	-0.008*
	(0.002)	(0.005)
Institutions	-0.003	0.055**
	(0.011)	(0.022)
Contagion	0.451**	0.337
	(0.194)	(0.381)
Financial Openness	0.006**	0.006
	(0.003)	(0.007)
Flexible Exchange Rate (Flex)	-0.267*	-0.543
	(0.162)	(0.612)
Inflation Targeting (IT)	-0.657*	-2.231**
	(0.362)	(1.013)
IT×Flex	0.700**	4.232***
	(0.348)	(1.137)
Observations	4,310	646

Notes: The dependent variable in column (1), denoted by "FSS", corresponds to a dummy that takes the value 1 if the country experienced a foreigners' sudden stop, and zero otherwise. The dependent variable in column (2), denoted by "Prevented", corresponds to a dummy that takes the value 1 if the country experienced a prevented sudden stop, and zero otherwise. For details on the definitions of the dependent and independent variables see Table 6 in Appendix B. Estimates are obtained using a logit model and robust standard errors clustered by country, unless otherwise stated. Interaction terms with dummies that capture extreme values for the regressors are included in the regression. An extreme value is defined as one that is three interquartile ranges above the 75th percentile or below the 25th percentile. Standard errors are reported in parenthesis. *** (**) [*] denotes significance at the 1 (5) [10] percent level.

Table 4: Determinants of Prevented Sudden Stops: Prevention vs Retrenchment

	Prevention vs Retrenchment		
	Prev-Retren	Prev-No Retren	No Prev-Retren
	A	B	C
	(1)	(2)	(3)
External Factors			
Global Risk (lag 1)	0.013	-0.016	0.039**
	(0.022)	(0.039)	(0.019)
Global Liquidity Growth (lag 1)	0.013*	-0.006	0.003
	(0.008)	(0.009)	(0.006)
Global Growth (lag 1)	-0.136	-0.123	0.082
	(0.120)	(0.180)	(0.094)
Global Interest Rates (lag 1)	-0.174	-0.178	-0.082
	(0.117)	(0.172)	(0.103)
Domestic Factors			
Foreign Liabilities (lag 1,% GDP)	-0.045**	-0.100**	0.025*
	(0.022)	(0.040)	(0.014)
GDP Growth (lag 1)	0.116***	0.132	-0.048
	(0.043)	(0.081)	(0.039)
Inflation (lag 1)	-0.163***	-0.073	-0.002
	(0.058)	(0.079)	(0.025)
Institutions	0.104***	0.082*	0.076***
	(0.023)	(0.045)	(0.020)
Contagion	0.943**	0.284	1.067***
	(0.382)	(0.550)	(0.323)
Financial Openness	0.010	0.007	0.006
	(0.008)	(0.011)	(0.006)
Flexible Exchange Rate (Flex)	-0.844	0.041	0.298
	(0.616)	(1.026)	(0.406)
Inflation Targeting (IT)	-1.761	-3.642***	0.579
	(1.079)	(0.542)	(0.535)
IT×Flex	3.623***	4.165***	-0.442
	(1.300)	(1.043)	(0.739)
Observations	732	732	732

Notes: The dependent variable corresponds to a categorical variable that takes the value 1 if the country experienced a prevented sudden stop accompanied by a contemporaneous retrenchment (*Prev-Retren*). It takes the value 2 if the country experienced a prevented sudden stop that is not accompanied by a contemporaneous retrenchment (*Prev- No Retren*). It takes the value 3 if the country did not experience a prevented sudden stop, but it did experience a retrenchment (*No Prev-Retren*). Finally, it takes the value 4 if the country experienced neither a prevented sudden stop nor a retrenchment. For the estimation process we choose *No Prev-No Retren* as the base category. Column (1) reports the results for category 1, column (2) reports the results for category 2, and column (3) reports the results for category 3. For details on the definitions of the dependent and independent variables see Table 6 in Appendix B. Estimates are obtained using a multinomial logit model and robust standard errors clustered by country, unless otherwise stated. Interaction terms with dummies that capture extreme values for the regressors are included in the regression. An extreme value is defined as one that is three interquartile ranges above the 75th percentile or below the 25th percentile. Standard errors are reported in parenthesis. *** (**) [*] denotes significance at the 1 (5) [10] percent level.

Table 5: Prevention in an Scenario of Sudden Flights

			Bonanza	
	Locals	Prevented	Locals	Prevented
	(1)	(2)	(3)	(4)
External Factors				
Global Risk (lag 1)	-0.036***	-0.015	-0.053***	0.016
	(0.008)	(0.018)	(0.010)	(0.032)
Global Liquidity Growth (lag 1)	-0.002	0.006	-0.003	0.007
	(0.002)	(0.005)	(0.003)	(0.007)
Global Growth (lag 1)	0.181***	0.091	0.264***	0.197**
	(0.053)	(0.074)	(0.064)	(0.094)
Global Interest Rates (lag 1)	-0.023	0.357***	-0.053	0.326**
	(0.035)	(0.121)	(0.060)	(0.147)
Domestic Factors				
Foreign Liabilities (lag 1,% GDP)	0.015*	-0.023	0.008	-0.056***
	(0.008)	(0.015)	(0.011)	(0.022)
GDP Growth (lag 1)	0.067***	0.000	0.025	0.090
	(0.016)	(0.032)	(0.035)	(0.070)
Inflation (lag 1)	-0.011	-0.001	-0.006	-0.088**
	(0.008)	(0.023)	(0.019)	(0.040)
Institutions	0.010	-0.002	0.046**	0.011
	(0.008)	(0.021)	(0.021)	(0.043)
Contagion	-0.004	-0.007	0.121	-0.021
	(0.106)	(0.172)	(0.136)	(0.279)
Financial Openness	0.003	0.000	0.007	-0.018*
	(0.002)	(0.006)	(0.005)	(0.010)
Flexible Exchange Rate (Flex)	0.003	-0.403	0.176	-0.751
	(0.166)	(0.339)	(0.204)	(0.457)
Inflation Targeting (IT)	-0.089	0.275	-0.116	0.606
	(0.276)	(0.514)	(0.500)	(0.709)
IT×Flex	-0.021	0.177	-0.201	0.113
	(0.374)	(0.640)	(0.576)	(0.743)
Observations	4,956	1,056	4,956	491

Notes: The dependent variable in column (1), denoted by "Locals" corresponds to a dummy that takes the value 1 if the country experienced a sudden increase in gross outflows driven by resident investors (sudden flight), and zero otherwise. The dependent variable in column (2), denoted by "Prevented" corresponds to a dummy that takes the value 1 if the country experienced a prevented sudden stop, and zero otherwise. Columns (3) and (4) are equivalent to columns (1) and (2), but restricting the sample to bonanza-filtered episodes. For details on the definitions of the dependent and independent variables see Table 6 in Appendix B. Estimates are obtained using a logit model and robust standard errors clustered by country, unless otherwise stated. Interaction terms with dummies that capture extreme values for the regressors are included in the regression. An extreme value is defined as one that is three interquartile ranges above the 75th percentile or below the 25th percentile. Standard errors are reported in parenthesis. *** (**) [*] denotes significance at the 1 (5) [10] percent level.

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A Construction of Capital Flows Series

In 2009 there was a methodological change in the construction of the Balance of Payments (BOP) statistics, from BPM5 to BPM6. The calculation of the series of direct investment were the most affected by this change. While BPM5 distinguishes between "Direct Investment Abroad" and "Direct Investment in Reporting Economy," BPM6 computes direct investment distinguishing between assets and liabilities. The IMF reports the BPM5 series up to 2008 and the BPM6 series from 2005.

Due to this methodological change, the subcomponents of the financial account of the BOP (direct investment, portfolio investment and other investment) are not comparable between BPM5 and BPM6, since BPM5 does not follow the asset-liability criterion for the calculation of direct investment. Despite not being able to use the subcomponents of the financial account prior to 2005, the total flows of capital – both inflows and outflows – can still be computed because BPM5 reports the aggregate series of asset and liability transactions.

The series of inflows and outflows are computed using the following series from the BOP statistics reported by the IMF:

- $1980 - 2004$ (BPM5)
  - Assets: Total Asset Transactions
  - Assets excluding reserves: Total Asset Transactions - Reserve Assets
  - Liabilities: Total Liability Transactions
- $2005 - 2017$ (BPM6)
  - Assets: Direct Investment, Assets + Portfolio Investment, Assets + Financial Derivatives, Assets + Other Investment, Assets + Reserve Assets
  - Assets excluding reserves: Assets - Reserve Assets
  - Liabilities: Direct Investment, Liabilities + Portfolio Investment, Liabilities + Financial Derivatives, Liabilities + Other Investment, Liabilities

The series of BPM5 and BPM6 are combined to generate assets and liabilities series for the full period. Based on them, capital outflows are computed as the negative of the assets excluding reserves, while the inflows correspond to the liabilities.

B Additional Tables

Table 6: Description of Variables and Sources

Variable	*Definition*	*Source*
Sudden Stops		
Capital Flows	See Appendix A.	BOPS (BPM5 and BPM6), IMF.
Foreigners' Sudden Stops	Dummy that takes de value 1 if the year-on-year change in foreign capital *inflows* falls below two standard deviations from its historical mean. In terms of measuring its length in time, the sudden stop episode starts from the moment in which the series falls one standard deviation below its historical mean, but conditional on the fact that it will eventually cross the two-standard-deviations threshold. The episode ends when the series goes back to one standard deviation below the historical mean.	Constructed by authors.
Sudden Stop in Net Capital Flows	Dummy that takes de value 1 if the year-on-year change in foreign capital *net flows* falls below two standard deviations from its historical mean. In terms of measuring its length in time, the sudden stop episode starts from the moment in which the series falls one standard deviation below its historical mean, but conditional on the fact that it will eventually cross the two-standard-deviations threshold. The episode ends when the series goes back to one standard deviation below the historical mean.	Constructed by authors.
Terms of Trade	100*(Price of Exports / Price of Imports). **This variable is used to compute sudden stop episodes associated with bonanzas.**	
Domestic Factors		
Real GDP	Level of real GDP (annual, 2010 prices). **This variable is used to compute the impulse responses of Section 3.**	National Accounts Main Aggregate Database (U.N. Statistics Division).
GDP Growth	Year-on-year growth rate of real GDP (quarterly).	IFS.
Inflation	Year-on-year growth rate of CPI.	IFS. When note available, CPI inflation was obtained from local sources and from Datastream.
Current Account (CA)	Current account balance from the Balance of Payments (quarterly).	BOPS (both BPM5 and BPM6), IMF.

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Table 6 – continued from previous page

Variable	*Definition*	*Source*
Absorption of Tradable Goods (TA)	Imports plus tradable output domestically consumed minus exports. Tradable output domestically consumed is constructed as the share of tradable output multiplied by GDP. The share of tradable output is computed as the ratio of agriculture plus industrial output to total GDP. The obtained series are deflated using the implicit GDP deflator.	Imports, exports and GDP in local currency at current prices from IFS (National Accounts). Agriculture and industrial value added as percentage of GDP, at annual frequency, from WDI (World Bank). Implicit GDP deflator from IFS.
Trade Openness	Exports plus imports as percentage of GDP.	Exports, Imports and GDP in local currency at current prices from IFS (National Accounts).
Foreign Liabilities	*Emerging and Developing countries*: Bank foreign borrowing as a share of GDP. *Developed countries*: Banks' local asset positions in foreign currency (vis-a-vis the non-bank sector) as a share of GDP.	Bank foreign borrowing from IFS (line 26c). Banks' local asset positions in foreign currency from BIS. GDP in US dollars from WEO, IMF.
Financial Depth	Deposit money banks and other financial institutions claims on the private sector as a percentage of GDP.	Claims on the private sector from IFS (lines 22d and 42d). GDP in local currency at current prices from IFS.
Contagion	Dummy variable that takes the value of 1 if a country reports a sudden stop in t and there is at least one *top 10 trading partner* with a sudden stop in $t-1$.	Constructed by authors.
Institutions	Sum of the following components: rule of law, investment profile, government stability, bureaucracy quality, and corruption.	Political Risk Services Group.
Financial Openness	Index measuring a country's degree of capital account openness.	Chinn and Ito (2006)
Flex	Monthly fine classification (1-15) of countries according to their exchange rate regime. Flex is a dummy variable that takes the value 1 if the classification category corresponds to a flexible exchange rate regime, and zero otherwise.	Reinhart and Rogoff (2004), updated by Iltzezky et al. (2009).
IT	Dummy variable that takes the value 1 if the country adopted and Inflation Targeting regime, and zero otherwise.	Official country sources (central banks reports and statements).
External Factors		
Global Risk	US stock market volatility.	Bloom (2009). VXO index updated from CBOE website.
Global Liquidity Growth	Average of the year-on-year growth rate of M2 in the United States, M2 in the Eurozone, M2 in Japan and M4 in the UK.	IFS.
Global Interest Rates	Average rate on long-term government bonds in the United States, Euro area and Japan	IFS.
Global Growth	Year-on-year growth rate of World's real GDP.	IFS.

Table 7: "Prevented" Sudden Stop Episodes

Country	*Start*	*End*	*Country*	*Start*	*End*	*Country*	*Start*	*End*
Australia	1998q1	1998q1	Greece	2006q2	2006q3	New Zealand	2005q3	2005q3
Australia	2001q4	2002q1	Guatemala	2008q4	2009q4	New Zealand	2012q1	2012q3
Australia	2009q1	2009q3	Iceland	1989q2	1990q1	Norway	1983q4	1983q4
Australia	2012q2	2012q3	India	2001q4	2002q3	Norway	1991q3	1991q4
Austria	1993q3	1993q3	Indonesia	2006q4	2007q1	Panama	2002q1	2002q4
Austria	2001q1	2002q1	Ireland	1994q4	1994q4	Panama	2008q4	2009q4
Bangladesh	2009q2	2009q4	Israel	2007q4	2009q2	Paraguay	2009q4	2009q4
Belarus	2008q4	2009q1	Italy	1993q1	1993q3	Philippines	2008q2	2009q1
Belgium	2006q1	2006q3	Italy	1995q1	1995q1	Poland	1991q4	1992q2
Belgium	2008q4	2009q4	Italy	2000q4	2002q3	Portugal	1983q4	1984q2
Bolivia	2004q4	2005q1	Italy	2007q4	2009q3	Portugal	1996q2	1996q3
Brazil	1995q1	1995q2	Japan	2008q3	2009q4	Portugal	2004q4	2005q2
Brazil	2002q3	2003q2	Jordan	2011q4	2012q3	Portugal	2008q3	2009q3
Brazil	2012q1	2013q1	Latvia	1998q3	1999q2	Romania	2011q1	2011q1
Canada	2008q4	2009q2	Lesotho	1989q3	1989q4	Singapore	1998q4	1998q4
Canada	2013q3	2014q1	Lithuania	2000q4	2001q3	Singapore	2008q3	2009q3
Chile	2000q2	2001q1	Lithuania	2012q4	2013q1	Spain	1994q2	1995q1
Chile	2013q4	2014q2	Luxembourg	2008q2	2009q2	Spain	2001q3	2002q2
Cyprus	2013q1	2013q4	Macedonia	2002q1	2002q2	Sri Lanka	1994q2	1994q3
Czech Republic	2006q2	2006q4	Macedonia	2002q4	2002q4	Sri Lanka	1995q4	1996q1
Czech Republic	2008q4	2009q4	Macedonia	2012q2	2012q2	Sri Lanka	1998q3	1999q1
Denmark	1986q4	1987q2	Macedonia	2013q4	2014q2	Sri Lanka	2013q3	2014q1
Denmark	1994q3	1995q1	Malta	2000q1	2000q3	Sweden	1996q4	1997q3
Denmark	2001q2	2002q2	Mauritius	2008q3	2009q2	Sweden	2001q1	2002q3
Denmark	2008q4	2009q4	Mauritius	2012q2	2014q2	Switzerland	2008q1	2009q1
Finland	2001q1	2001q4	Mexico	2009q1	2009q3	Thailand	2008q2	2009q1
Finland	2003q1	2003q3	Namibia	2002q4	2003q2	United Kingdom	1994q2	1994q4
Finland	2005q3	2005q3	Namibia	2008q1	2008q1	United Kingdom	1998q1	1998q4
Finland	2009q2	2009q3	Namibia	2010q2	2010q4	United Kingdom	2001q3	2002q4
Finland	2011q2	2011q2	Nepal	1986q4	1987q1	United Kingdom	2008q2	2009q3
France	2002q1	2002q3	Nepal	1990q2	1991q1	Uruguay	2013q4	2013q4
France	2011q4	2012q3	Nepal	1995q4	1996q1			
Germany	1994q2	1994q4	Nepal	2009q4	2010q1			
Germany	2001q1	2002q2	Netherlands	1991q1	1991q4			
Germany	2004q1	2004q2	Netherlands	2002q1	2002q1			
Germany	2008q3	2009q4	Netherlands	2008q3	2009q3			

Note: A *"prevented"* sudden stop in economy j during period t is an event in which a foreigners' sudden stop does not co-exist with a sudden stop in net capital flows.