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International Capital Flow Reversals

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Abstract*

Sudden stops in capital flows are a form of financial whiplash that creates instability in the affected economies. The spark that ignites sudden stops originates in the supply of foreign financing that can halt for reasons that may be unrelated to the affected country's domestic conditions. Yet a spark cannot generate a fire unless combustible materials are available. Those materials are the domestic macroeconomic fundamentals that make some countries more vulnerable than others. Higher fiscal deficits, larger current account deficits, and higher levels of foreign currency debts in the domestic financial system are manifestations of weak fundamentals that increase vulnerability. On the flip side, international reserves provide buffers that can help countries offset the risks. While it may be impossible for countries to completely insulate themselves from the volatility of capital flows, the choice of antidotes to prevent that volatility from forcing potentially costly external adjustments is in their own hands.

JEL classifications: F30, F32, F40

Keywords: Sudden stops, Net capital flows, Gross capital flows, Financial crises, Current account reversals, Capital flow reversals

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1. The Perils of Sudden Stops

“Sudden Stops” in capital flows occur when foreign financing available to borrower countries unexpectedly dries up. Emerging market economies learned about the disruptive power of sudden stops in the aftermath of the crises of the 1990s. At that time, there took place a generalized retreat of foreign investors from emerging markets—particularly investors in short-term debt instruments; this occurred irrespective of countries’ underlying macroeconomic fundamentals. Calvo (1998) explained how sudden stops could entail major adjustments in domestic absorption, leading to current account reversals and real exchange rate depreciation.

What was yet not fully understood by the late 1990s is how troublesome the ensuing adjustment could be, particularly in countries with a large share of debt denominated in foreign currencies and with low trade-to-GDP ratios. This is so because the size of the real exchange rate depreciation that is required to engineer an increase in exports and/or a reduction of imports in the aftermath of a sudden stop is larger in countries where trade is a small share of output. In turn, real exchange rate depreciations may be contractionary through so-called “balance sheet effects,” i.e., if the country’s debts are denominated in foreign currency, the balance sheets of the indebted agents in the economy are hit in proportion to the real depreciation such that the output loss is bigger when the real exchange rate depreciation is larger.

The reason for the lack of understanding at the time was twofold: on the one hand, the idea that a balance of payment crisis could originate in shortcomings in international capital markets—i.e., shocks affecting the supply of loanable funds—rather than in domestic policy failings was something novel at the time. Policymakers were not ready to think through the consequences of a type of shock that they still did not fully understand. On the other hand, the aftermath of the 1995 banking crisis that originated in Mexico (“Tequila” crisis) was still a fresh memory when the Asian and Russian financial crises hit in 1997 and 1998. Although the Tequila crisis created financial turmoil in capital markets and financial contagion to other emerging markets, it proved to be short-lived and was contained with international assistance.¹ As capital inflows resumed, disruptive adjustments were avoided. The idea of a protracted external credit crunch that could last for years rather than weeks or months was inconceivable in the minds of many.

¹ For a review of the Tequila Crisis see Cavallo and Izquierdo (2009), and Musacchio (2012).

The Asian and Russian financial crises of 1997 and 1998 had repercussions that broke the status quo. Those events raised intellectual and policy interest in the genesis and consequences of sudden stops in capital flows.² Sudden stops became known as a form of financial crisis whose trigger is based on supply shocks stemming from world capital markets rather than on domestic policy failings, and where the external financing available to borrowing countries dries up.³ The determinants of sudden stops in cross-country settings have subsequently been widely studied.⁴ Additionally, other studies have focused on the consequences of sudden stops.⁵

The sudden stops literature was initially focused on emerging markets' economies, and it pertained to the analysis of *net* capital flows (i.e., the accounting counterpart of the current account balance in Balance of Payment statistics). The emphasis on "emerging market economies"⁶ was because those were the countries perceived to be more vulnerable at that time. This was so because some emerging market economies were using foreign financing to build up their relatively scarce capital stocks and, at the same time, they had limited tools to protect themselves from the volatility of capital flows.

The focus on *net* capital flows was determined by the fact that foreign investors dominated domestic investors in the external financing sphere of emerging market economies up to the beginning of the 2000s. Therefore *net* capital flows—the difference between the financing provided by foreign investors to a country (gross capital *inflows*) and net lending from resident investors of that country to the rest of the world (gross capital *outflows*)—were still a good proxy of the net borrowing of a country from the rest of the world.⁷

² There is a literature that explored sudden stops from a historical perspective. See Bordo, Cavallo and Meissner (2010).

³ To the best of my knowledge, the expression "Sudden Stops" was first used by Dornbusch, Goldfajn and Valdés (1995). The idea that capital flows may be driven by "push" (external) rather "pull" (domestic) factors has a long tradition in the literature (see, Calvo, Leiderman and Reinhart, 1996). The first analytic approach to the problem of sudden stops is Calvo (1998).

⁴ See for example, Hutchinson and Noy (2002), Calvo, Izquierdo and Mejía (2004), Edwards (2004a), Cavallo and Frankel (2008) and Calvo, Izquierdo and Mejía (2008).

⁵ For example, Guidotti, Sturzenegger and Villar (2004), Edwards (2004b), Calvo, Izquierdo and Talvi (2006), Cavallo and Velasco (2006) and Eichengreen and Gupta (2016)

⁶ There is no one single definition of what constitutes an "Emerging Market Economy." According to the MSCI Market Classification Framework, an emerging market is a country that is progressing towards a developed market but does not meet standards to be a developed market. Emerging markets must have both significant openness to foreign ownership and significant ease of capital inflow/outflows. One of the most widely used criteria to classify a country as an emerging market is whether the country is included in J.P Morgan's EM bond index.

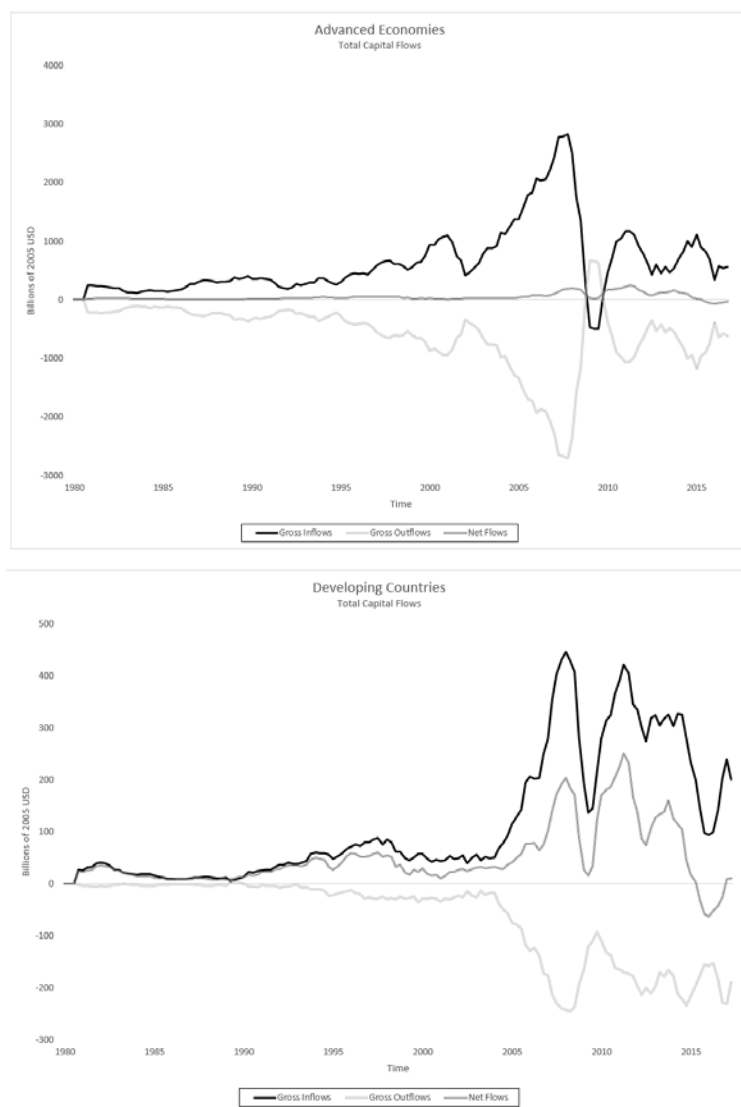
⁷ In fact, papers in the first wave of the sudden stop literature employ the terms "net capital flows," "net capital inflows" and "capital inflows" almost interchangeably.

The focus began to change in the run-up to the global financial crisis of 2008 and 2009. In particular, the crisis showed that sudden stops could also take place in advanced economies, because countries from North America to Europe experienced sudden stop-like episodes. Moreover, researchers began to pay attention to the possibly asymmetric response of foreign investors (i.e., gross capital inflows) vs. domestic investors (i.e., gross capital outflows) during the crisis. This, together with the increasing weight of domestic investors in financial markets that had been taking place since the early 2000s, led researchers to begin to unbundle *net* capital flows into its constituent parts: *gross capital inflows* (i.e., net lending from foreign investors) and *gross capital outflows* (i.e., net foreign assets purchase by resident investors).

Figure 1 provides an illustration of the evolution of capital flows in advanced and developing countries (including emerging market economies), respectively, since 1980. In advanced economies (panel a), gross capital flows have been larger than net flows since 1980. And there has been a significant amount of offsetting between gross capital inflows and outflows since the beginning of the sample. The offsetting implies relatively stable net capital flows.⁸ The situation began to change for advanced economies in the run-up to the global financial crisis. During the years preceding to the crisis, gross flows increased significantly, with inflows increasing by more than outflows, resulting in increased net capital flows. This was followed by a sudden stop during the crisis. In developing countries (panel b), the story was different. From 1980 to the early 2000s gross capital outflows were almost negligible in comparison to gross capital inflows. Therefore, gross capital inflows were almost equal to net capital flows. Beginning in the 2000s, there was an increase in gross inflows and an even more notable increase in gross outflows. In addition to the increase in size, there is also evidence of more offsetting between gross capital inflows and outflows, as in advanced economies; this notwithstanding, gyrations in net capital flows have remained prevalent in the sample of developing countries.

⁸ Borio and Disyatat (2011) provide a useful discussion about how a portion of what is recorded as gross inflows and outflows are simply a wash in the financial account of the balance of payments, and that therefore they do not affect the net capital flows balance at all.

Figure 1. Gross and Net Capital Flows in the World



Source: Authors' calculations using IMF Balance of Payments Dataset (BOP).

These developments have broadened the scope of the Sudden Stop literature from a focus on net capital flows and into the domain of the advanced economies.⁹ They also opened new research avenues, and a new body of work emphasizing different aspects, starting with a rethinking of basic definitions.¹⁰

This paper provides a survey of the empirical literature with an emphasis on definitions, turning points, and analysis of causes and consequences of sudden stops. The paper ends with a

⁹ See Milesi-Ferreti and Tille (2011) and Broner et al. (2013).

¹⁰ See Cavallo et al. (2015).

discussion of selected questions that remain unanswered. The hope is that this paper will serve as a useful reference for policymakers and academics in their quest for appropriate policy responses to sudden stops in capital flows.

2. A Taxonomy of Sudden Stops

In the balance of payments convention, *Gross Capital Inflows* are equal to the change in the stock of international liabilities owed by residents (foreign direct investment liabilities, portfolio investment liabilities and other investment liabilities). *Gross Capital Outflows* are equal to the change in the stock of foreign asset holdings of residents (foreign direct investment assets, portfolio investment assets, and other investment assets). It is common practice to separate changes in foreign reserve holdings of the Central Bank from the rest of gross capital outflows because the accumulation and de-accumulation of reserves are determined by the choice of the exchange rate regime. That is the convention that we apply henceforth.

Net Capital Flows are then gross capital inflows minus the gross capital outflows (excluding changes in foreign reserves holdings). Net capital flows are recorded in the Financial Account of the Balance of Payments (BoP). To a first degree of approximation, net capital flows are the flip side of the current account balance in the BoP. For example, countries that run a current account deficit (i.e., excess of domestic investment over national savings) can finance it through a surplus in the financial account (i.e., positive net capital flows), and vice versa in the case of countries running current account surpluses.

Because of the tight connection between the Current Account and the Financial Account balances in the BoP *sudden stops in capital flows* are intimately related to *current account reversals*.¹¹ But they are not equivalent. This is so for two reasons. First, there are other components in the Balance of Payments that can create a wedge between the current account and the financial account balances such that a current account reversal may not be associated to a sudden stop in net capital flows and vice versa. Those additional components are the following: changes in reserves holdings (reserves use); the capital account balance (i.e., international capital transfers pertaining to non-financial and non-produced assets); and net errors and omissions. The BoP identity is:

¹¹ See Milesi-Ferreti and Razin (2000), Chinn and Prasad (2003), Edwards (2005), Freund (2005), Adalet and Eichengreen (2007), and Freund and Warnock (2007).

$$\text{Current Account} + \text{Financial Account} + \text{Capital Account} + \text{Net Errors and Omissions} \\ + \text{Reserve Use} \equiv 0$$

Second, there is a conceptual difference that is related to the source of shocks triggering *current account reversals* and *sudden stops*. Papers analyzing *current account reversals* pre-date papers about sudden stops, and they were primarily concerned with shocks affecting the current account balance directly (i.e., shocks affecting national saving and/or domestic investment).¹² The models that underlie the analysis of current account reversals usually assume that there is an elastic supply of foreign financing that responds to the financing needs of the current account. Instead, papers analyzing sudden stops, such as Calvo (1998), flipped the argument around. They focus on shocks affecting the supply of foreign financing that *cause* an adjustment to the current account balance. The difference is not trivial, and it has implications for both analytical purposes and policy.

From an analytical standpoint, therefore, a relevant question is what is endogenous and what is exogenous in the BoP. In the financial crises literature pre-dating sudden stops, net capital flows in the financial account responded endogenously to events that affected the current account balance. For example, in the canonical model of currency crisis (Krugman, 1979), a persistent fiscal deficit lead to a deterioration of the current account and a loss of international reserves that ends in a currency crisis episode in which the exchange rate depreciates substantially during a short period of time. The so-called second and third generation models of currency crises emphasized other non-fiscal explanations, but they all highlighted inconsistencies in the domestic policy framework leading to an imbalance in external accounts that required adjustment.¹³ The novelty of the sudden stops literature was showing that there are situations when foreign financing may suddenly and unexpectedly dry up, *leading* rather than *lagging* an adjustment of the current account balance. This view finds support in the fact that sudden stops tend to occur around the same time and affect economies exhibiting a variety of domestic conditions.

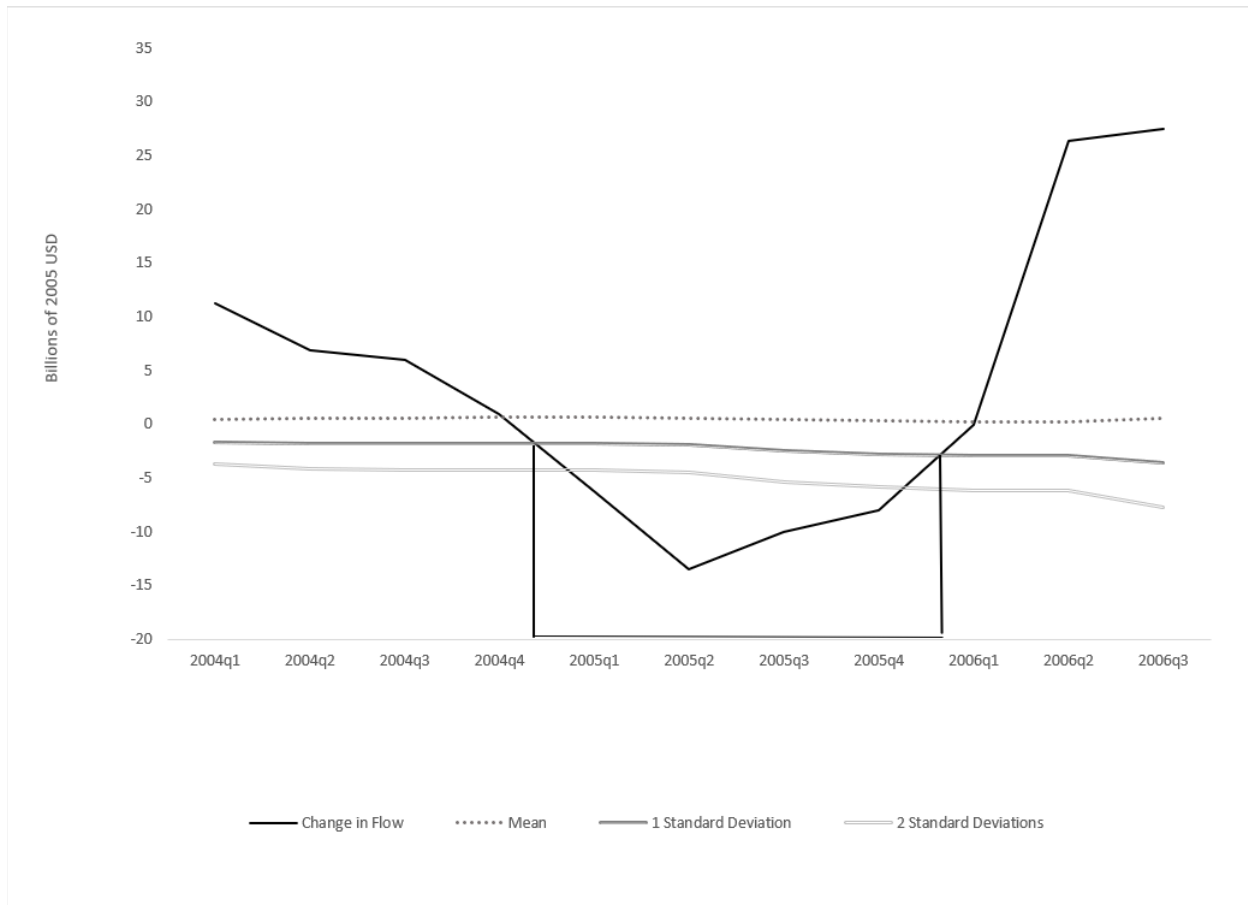
To identify sudden stops empirically, researchers have used Balance of Payments data which is readily available at a quarterly frequency for a large set of countries from the IMF's BOPS database. The algorithm of Calvo, Izquierdo and Mejía (2004) identifies a sudden stop as an event in which the year-on-year change in net capital flows falls at least two standard deviations below

¹² See Bergin (2006) for a review of the literature.

¹³ For a review, see Burnside, Eichenbaum and Rebelo (2007).

its sample mean.¹⁴ In terms of measuring its length in time, an episode starts in the quarter in which the series falls one standard deviation below its mean. The episode ends when the series goes back to one standard deviation below the mean (see Figure 2).¹⁵

Figure 2. Graphical Representation of a Sudden Stop



Source: Authors' calculations using IMF Balance of Payments Dataset (BOP).

Note: The figure depicts a Sudden Stop in Gross Inflows that occurred in Australia between 2004q4 and 2005q4.

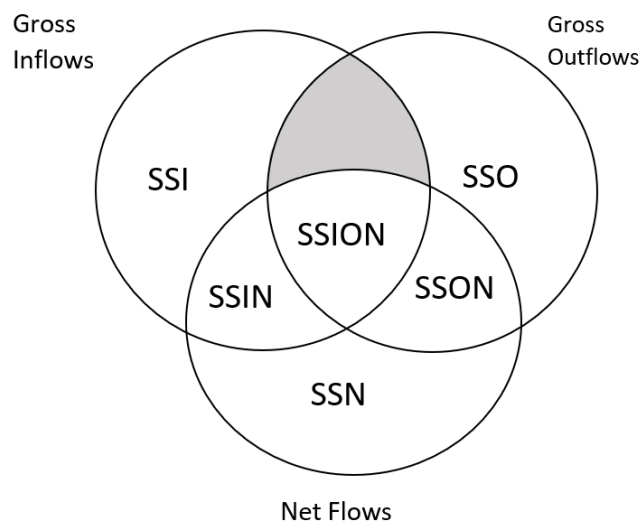
Sudden Stops can be defined based on net capital flows (as in Calvo, Izquierdo and Mejía, 2004) or based on gross flows (as in Forbes and Warnock, 2012). Considering all the varieties,

¹⁴ Some papers have broadened the original definition by adding criteria such as a concurrent fall in GDP and/or no contemporaneous increase in the terms of trade to exclude positive shocks (Calvo, Izquierdo and Mejía, 2004; Cavallo and Frankel, 2008). Calvo, Izquierdo and Mejía (2008) add that the sudden stop has to occur in conjunction with a sharp rise in EMBI spreads in order to capture a global component (they labeled those episodes “systemic sudden stops”).

¹⁵ Guidotti, Sturzenegger and Villar (2004) use a variant of this approach. They define a sudden stop as the reduction in the financial account that is at least one standard deviation below the mean and exceeds 5 percent of GDP. Calderón and Kubota (2013) applied the same approach to inflow- and outflow-driven sudden stops.

Cavallo et al. (2015) propose a taxonomy that is illustrated in the Venn diagram of Figure 3. There are six potential types of sudden stops. Considering the very center of this figure an SSION is then separately a sudden stop in gross inflows and a sudden start in gross outflows (i.e., “capital flight” from resident investors), which jointly determine a sudden stop in net capital flows. An SSIN is a sudden stop in gross inflows that is also a sudden stop in net capital flows, implying that resident investors (i.e., gross capital outflows) do not play a significant role. SSON is a sudden start in gross outflows (i.e., “capital flight” from resident investors) that is also a sudden stop in net capital flows, implying that foreign investors do not play a significant role.¹⁶ SSN is a sudden stop in net capital flows that is not concurrently a sudden stop in gross inflows or a sudden start in gross outflows; instead it is a combination of milder reductions in gross inflows and/or increases in gross outflows that add up to a two standard deviations fall in net capital flows, thus qualifying as a sudden stop. An SSI is a sudden stop in gross inflows that does not coexist with a sudden stop in net capital flows. This means it must be “financed” by a reduction in gross capital outflows (i.e., capital “repatriation” by resident investors). An SSO is a sudden start in gross outflows that does not co-exist with a sudden stop in net capital flows and hence, it must have been “financed” by an increase in gross inflows from foreign investors.

Figure 3. A Taxonomy of Sudden Stops

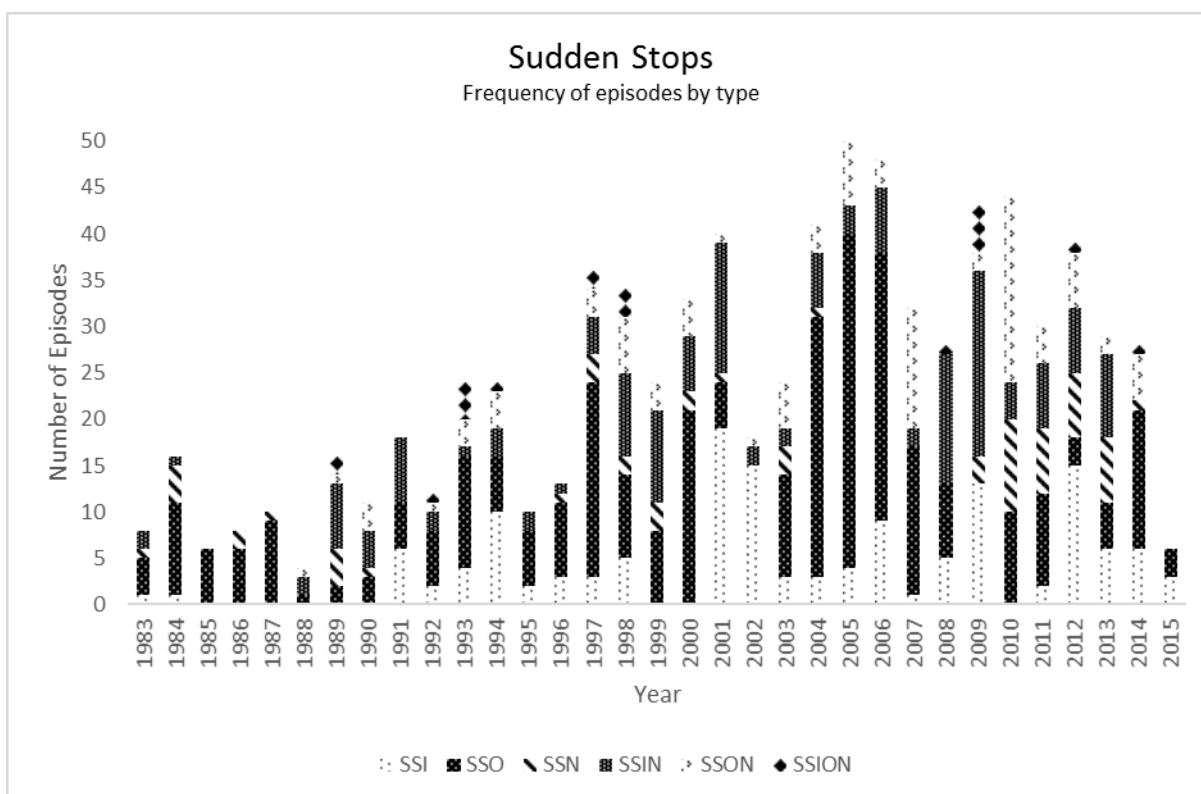


Source: Adapted from Cavallo et al (2015).

¹⁶ A seventh possibility exists. Logically, an SSIO is a sudden stop in gross inflows and a sudden start in gross outflows that is not a sudden stop in net capital flows. However, in practice it is unlikely to occur. Cavallo et al. (2015) find no such episodes in the data. Therefore, SSIO are not considered.

Going back to the origins of the term “sudden stop,” in the 1990s the focus of the literature was on sudden stops in net capital flows. The definitions adopted at that time usually did not distinguish between SSION, SSN, SSIN or SSON.¹⁷ In the post-global financial crisis period, the role of gross inflows and gross outflows has been considered, and thus the full taxonomy—with different names— started to gain traction.¹⁸ Figure 4 illustrates the incidence of the different types of sudden stops since 1980 in a sample of advanced and developing countries.

Figure 4. Frequency Distribution of Sudden Stops



Source: Authors’ calculations using IMF Balance of Payments Dataset (BOP).

Note: Each episode is identified applying the algorithm described in Figure 2 to the gross capital inflows, the gross capital outflows and the net capital flows series of each country. For details on the methodology, see Cavallo et al. (2015).

¹⁷ That said, additional filters were added that may have stressed more SSIN and SSION-type episodes. For example, Calvo et al. (2008) focused on “systemic sudden stops” where a Net Flow concept was employed but with an additional filter that the Sudden Stop was systemic. As we shall see below, that filter then tended to include more SSIN and SSION episodes and fewer SSON or SSN episodes.

¹⁸ For an alternative taxonomy, see Rothenberg and Warnock (2011). They extended the sudden stop definition including crisis episodes caused by the retreat of global investors, or by the sudden slight of local investors.

3. The Causes of Sudden Stops

Sudden stops are episodes with an external trigger. This implies that the spark that ignites the fire originates outside the affected country, more specifically, in the supply of foreign financing that unexpectedly and suddenly comes to a halt for reasons that may be unrelated to the affected countries' domestic conditions. Yet a spark cannot become a fire unless there are combustible materials. Those materials are the initial conditions in the affected economies that make some countries more vulnerable than others.

Sudden stops could be avoided if there was no initial spark. This could happen for example, if the global financial architecture was better prepared to prevent the risk that foreign lenders may abruptly and unexpectedly stop lending. For that, it would be useful to have a more powerful international lender of last resort (IOLR) that resembled on a global scale the roles of the Federal Reserve Bank (Fed) in promoting financial stability in the United States or the European Central Bank (ECB) in providing liquidity to Euro-zone countries.¹⁹ In fact, it has been argued that the existence of a lender of last resort that could back-stop capital flight from peripheral Euro-zone countries during the global financial crisis was a significant factor in preventing damaging sudden stops in those economies.²⁰ At the global level, the International Monetary Fund (IMF) could potentially play that role. That would require, however, a larger scale of operations and a greater variety of financing instruments to be effective.²¹

While there is space to improve the international financial architecture to build more resilience in capital markets, removing the risk that foreign lenders may abruptly and unexpectedly stop lending is outside the control of any single country. What then, can countries do to build resilience?

The literature has emphasized two different but not mutually exclusive options. The first is to build *self-insurance* through, for example, accumulating foreign exchange reserves that can be deployed when other sources of foreign financing dry up, contracting contingent credit lines with the IMF, or even swap lines with major Central Banks.²² International reserves may be a powerful tool to mitigate sudden stops because they provide buffers that allow countries to smooth

¹⁹ On the need for an international lender of last resort, see, for example, Fischer (1999) and Calvo (2005).

²⁰ See Cavallo, Fernández-Arias and Powell (2014).

²¹ See Truman (2010) for an analysis of the IMF as a Lender of Last Resort: <https://pie.com/blogs/realtime-economic-issues-watch/imf-international-lender-last-resort>.

²² See Jeanne and Rancière (2011), Calvo, Izquierdo and Loo-King (2013) and Jeanne and Sandri (2016).

the adjustment to a tighter financing constraint. Holding foreign currency reserves, for example, hedges the fiscal position of the government and enhances its credibility, thus improving financial stability and reducing the odds of a crisis (see Bocola and Lorenzoni, 2017)

A second option is improving the domestic factors that can provide combustible materials. Empirical estimations of the likelihood of sudden stops highlight three key variables that affect the probability of occurrence:²³ i) a proxy of potential changes in the real exchange rate were a sudden stop to materialize which depends on the pre-shock current account deficit and the elasticity of substitution between tradable and non-tradable goods; ii) the trade-to-GDP ratio;²⁴ iii) the share of foreign currency-denominated debts as a share of GDP;²⁵ and iv) the government's fiscal position.²⁶ While i) - iii) are directly related to the adjustment mechanism to sudden stops that is described in the introduction (more on this below), iv) is related to the ability of countries to respond to the shock. Lack of savings during periods of economic boom make it very difficult to follow expansionary fiscal policy once the crisis hits because expectations of an output fall are typically high at the time of the crisis, and credibility about future tax collection to compensate for expansionary policy may be low (see Ortiz et al., 2009).

Another strand of the literature has studied the determinants of sudden stops in gross inflows and retrenchments of capital outflows separately. Forbes and Warnock (2012) find that global factors, especially global risk through changes in economic uncertainty, as well as changes in risk aversion and global growth, were key drivers of those types of episodes. Their results, however, do not mean that domestic factors are unimportant. In fact, work by Calderón and Kubota (2012) and Adler, Djigbenou and Sosa (2014) show that foreign and local investors can react differently to external and domestic shocks, leading to asymmetric responses of gross capital inflows and outflows. Calderón and Kubota (2012), for example, show that foreign investors are more likely to pull out or stop bringing their funds to countries with poor economic performance

²³ See, for example, Calvo et al. (2008).

²⁴ See Cavallo and Frankel (2008).

²⁵ Calvo, Izquierdo and Mejía (2008) focus on a specific proxy labeled “Domestic Liability Dollarization” (DLD) that is calculated as foreign currency deposits plus foreign liabilities of banks as share of GDP. This is a good proxy of liability dollarization in the economy under the assumption that there is matching in the asset and liability composition of banks' balance sheets. The latter in turn is usually the case as a consequence of the existence of financial regulation requiring matching of assets and liabilities by currency in order to avoid bank exposure to exchange rate risk.

²⁶ See Ortiz et al. (2009).

(i.e., slow domestic growth), while local investors tend to either halt their investments abroad or repatriate their capital when risk aversion heightens in world capital markets.²⁷

Cavallo, Izquierdo and Leon (2017) study how the actions of foreign and domestic investors may combine to determine different outcomes in terms of sudden stops. In particular, they study the conditions under which a sudden stop in gross capital inflows does not turn into a full-fledged sudden stop in net capital flows. A “prevented sudden stop” is a situation in which, given sudden stop in gross capital inflows, gross capital outflows compensate so that net capital flows remain relatively stable, meaning that net capital flows do not enter into sudden stop mode. The results are that, while external conditions (i.e., global risk, global liquidity growth, international interest rates, and world GDP growth) are important in explaining the incidence of sudden stops in gross inflows, favorable *domestic conditions* are the antidotes that explain why in some of these episodes net sudden stops are prevented. This is to say that, in periods of global distress in capital markets, a country’s ability to build resilience against sudden stops in net capital flows relies heavily on the soundness of domestic conditions. They show that net sudden stops are more likely to be prevented in countries with a strong institutional background and a flexible exchange rate regime that is accompanied by inflation targeting (which they interpret as having a consistent inflation targeting regime that allows for exchange rate flexibility). In contrast, prevented sudden stops are less likely in countries with high levels of foreign-currency liabilities and high inflation.

4. The Consequences of Sudden Stops

Sudden stops, when they materialize, can be very costly to the affected economies. Sudden stops are associated and tend to precede currency and banking crises.²⁸ A key concern is that the size of GDP fall under a sudden stop can be quite large—more than 7 percent on average according to Calvo, Izquierdo and Talvi (2006) in emerging markets affected by sudden stops in net capital flows, and approximately 4 percent on average in a broader sample comprising advanced and developing countries according to Cavallo et al (2015).

²⁷ The idea that resident investors can neutralize the actions of foreigners has been explored in other contexts, particularly in the aftermath of the global financial crisis. See for example, Schmidt and Zwick (2015), Ghosh et al. (2014) and Fratzscher (2011).

²⁸ See, for example, Joyce and Nabar (2009), Furceri, Guichard and Rusticelli (2012), and Zhao et al. (2014).

A strand of the literature has emphasized that sudden stops can lead to output losses through the adjustment mechanism (see Cavallo, 2006). That is, when foreign financing available to countries abruptly disappears, debtor countries are forced to go through a resource transfer to creditor countries. Because of this, any outstanding current account deficit must be financed using international reserves or eliminated outright. Either option amounts to a resource transfer from debtor to creditor countries. The size of the transfer is an increasing function of the current account deficit that was being financed prior to the shock. Less obviously, the cost in terms of output loss of generating the transfer is a decreasing function of trade-to-GDP ratio. This is so because any resource transfer operating through a current account adjustment requires a change the relative price of traded to non-traded goods (i.e., the real exchange rate). A real exchange rate depreciation will induce a substitution in domestic consumption away from traded and into non-traded goods. Similarly, it will induce a substitution in production in the opposite direction. The magnitude of the required real exchange rate depreciation for a given current account deficit is a decreasing function of the country's trade-to-GDP ratio: i.e., relative prices must adjust more when quantities traded are smaller. Moreover, real depreciations can be recessionary because of the adverse effects of weaker exchange rates on the balance sheets of indebted agents in the economy. Thus, a small share of tradables in total output, and high shares of foreign currency liabilities compound to increase the ensuing output contraction after the shock.

Another strand of literature has emphasized the potential disruptive nature of sudden reversals in capital flows without net resource transfer from debtor to creditor countries (see Bruno and Shin, 2012a and 2012b, and Shin, 2012). According to this view, gross flow reversals may be disruptive, even with stable net capital flows. This view is summarized in Brunnermeier et al. (2012), which underscored the potentially destabilizing role of cross-border capital flows on financial stability. Along the same lines, Obstfeld (2012) argues that gross capital flows furnish the key conduit through which financial meltdown is transmitted and amplified across countries. According to Obstfeld, at least as important as net capital flows are the gross two-way flows that underlie them because they can wreak havoc on financial stability. The European crisis provides a clear example of the mechanisms that can be in play. Calvo (2013) conjectures that, just as the creation of the Eurozone deepened financial integration and gave rise to financial instruments that traveled in both directions (i.e., increased gross flows across countries), the crisis seriously interfered with financial integration as bank deposits at financial institutions in peripheral

European countries stopped being perfect substitutes for deposits at German banks. In Calvo's view, the cycle of *liquidity creation* during the financial integration phase and *liquidity destruction* during the retrenchment was the driving force of the financial fragilities revealed during the crisis.

5. Policy Responses to Sudden Stops

Should a country facing a sudden stop tighten its fiscal and monetary policies? Or conversely, should it relax those policies to attenuate the output contraction that typically occurs during these events? Two main arguments characterize this debate. On the one hand, the view that macroeconomic policies in the aftermath of sudden stops should become tighter is grounded in the need to reestablish the pre-crisis flow of financing as quickly as possible. The idea is to restore credibility and avoid potentially destabilizing adjustment dynamics.²⁹ On the other hand, others have argued that a sudden stop is precisely the time in which macroeconomic policies should be expansionary.³⁰ To shed light on this debate, Ortiz et al. (2009) studied fiscal and monetary policy responses and their effects on output in a set of 22 “systemic sudden stop”³¹ episodes in emerging markets during the period 1990-2006. They find that, other things being equal, countries that were able or willing to loosen monetary and fiscal policy during the crisis fared better than those that did not. This does not mean, however, that countries that followed tighter policies would have done better had they followed a looser path. For example, there is evidence that countries with high shares of foreign currency liabilities experience greater “fear of floating”³² and are thus more reluctant to let the exchange rate depreciate during a crisis due to adverse balance sheet effects. Those countries might resist depreciation through higher domestic interest rates. This could precipitate a more severe contraction in GDP relative to a country with no liability dollarization that could allow the exchange rate to depreciate. However, it is unclear that a country in such a situation would have done better by loosening monetary policy and letting the exchange rate depreciate. With a large degree of liability dollarization, it could conceivably have done worse.

A similar argument can be made about fiscal policy. Countries that pursued expansionary policies during a cyclical upturn would be forced into highly pro-cyclical adjustments (i.e.,

²⁹ See for example, Fischer (1998)

³⁰ See for example, Stiglitz (2003).

³¹ Systemic sudden stops are periods of skyrocketing interest rate spreads for emerging markets and capital inflows collapse that affected a large set of emerging countries at approximately the same time, and thus have a systemic component (see Calvo, Izquierdo and Talvi, 2006).

³² See Calvo and Reinhart (2002).

reductions in government spending or increases in tax rates) during the crisis. Such a pro-cyclical response would trigger a larger contraction relative to a country that saved during the expansionary phase and, as a result, it is able to adopt countercyclical fiscal policy during the downturn. However, it is unclear whether a country in this situation would have done better by pursuing more expansionary fiscal policies during the crisis. Those policies could have conceivably cast doubts about the country's solvency, precipitating an even larger contraction.

In summary, the evidence presented by Ortiz et al. (2009) suggests that having the flexibility to loosen monetary and fiscal policies during an external financial crisis may be beneficial. But flexibility, in fiscal or exchange rate policy, cannot be used under any circumstances. On the contrary, stringent preconditions need to be met to allow the use of policy flexibility. For fiscal policy, this means sound inter-temporal fiscal behavior and low debt levels. For monetary policy, it means high levels of credibility that keep inflation expectations low in the face of an expansionary move. And for exchange rate policy, it means low levels of liability dollarization that reduce the fear of floating. The efforts of policymakers should aim toward removing the fundamental obstacles that preclude the use of countercyclical monetary and fiscal policy in times of external financial crisis.

What about the policy responses to sudden stops in gross capital flows? How can countries prepare for and deal with those types of events that do not entail a net resource transfer from debtor to creditor countries? Brunnermeier et al. (2012) provide guiding principles. Given that most of capital flows between countries are intermediated through banks, effective regulation of cross-border banking is essential for local and global financial stability. To limit the risks of cross-border banking in turn, regulators should limit the ability of banks to rely on short-term wholesale funding (as opposed to deposits) to fund their operations. Brunnermeier et al. (2012: 30), on the other hand, are skeptical about the role of capital controls in limiting the quantity of flows. They state: *"While some impediments to capital flows may have sound economic justification, in practice others may result of political economic pressures that seek to preserve vested interests and resist much needed domestic policy adjustments. To maximize the former and minimize the latter, the introduction of capital-flow-related restrictions should be clearly and explicitly grounded in comprehensive analysis and careful reading of the evidence."*

In short, just as much as two-way capital flows across countries that do not entail a net resource transfer can be a positive development for the world economy because they enable

portfolio diversification and risk mitigation, such flows can also sow the seeds of trouble in the financial system, leading to boom and bust cycles of liquidity with deleterious consequences for financial stability. It is thus necessary to monitor and circumvent the risks through regulation to avoid costly crises.

6. The Future: What Significant Questions Remain?

The sudden stops literature has transitioned over the years from an emphasis on *net flows* with a focus on the potentially destabilizing role of abrupt contraction in net capital flows, frequently associated with real exchange rate depreciations and current account reversals, to the *gross flow view* that emphasizes the role of gross capital flows—in particular, debt-creating flows such as cross-border bank flows—as a potential source of financial instability. Since the global financial crisis of 2008/09, the two views have converged. This is so because in the post-crisis global environment the differences between emerging markets (which was the primary focus of the *net flows* view) and advanced economies (where the *gross flows* view was more relevant because gross capital flows were much larger in magnitude and more volatile than net flows) have effectively narrowed. In conjunction with this development net capital flows have become more volatile in advanced economies, and gross capital flows have grown in magnitude and in economic significance in emerging markets. It would appear that all countries may now wish to consider how to protect themselves against the potentially deleterious effects of net and gross flow-type sudden stops.

The quest for appropriate policy responses has led researchers to explore a rich set of questions. However, there are still many open avenues for research. For example, the literature has noted that inflow-driven sudden stops in net capital flows (i.e., SSIN in the taxonomy presented in Section 2) are costlier in terms of output loss than outflow-driven sudden stops in net capital flows (i.e., SSON). And moreover, it has been established that sudden stops in net capital flows driven by milder swings in underlying gross capital flows (i.e., SSN in the taxonomy) are less damaging to output than sudden stops in net capital flows that are driven by wilder swings in underlying gross capital flows (i.e., SSIONs). However, it is still not clear what are the mechanisms driving the differentiated response, especially considering that the main channel that has been explored in the literature, which is the adjustment mechanism through real exchange rate depreciations and the

balance sheet effects, is in principle not different across the different subtypes of sudden stops in net capital flows.

There is also a need to deepen the analysis of optimal policies under sudden stops. Many countries have responded to the heightened risks of sudden stops by accumulating international reserves as a form of self-insurance. Bocola and Lorenzoni (2017) show that foreign currency reserves help financial stability because they have good hedging properties. A desirable feature of foreign currency reserves is that if private sector confidence deteriorates, pushing the economy towards a crisis, the value of reserves increases, giving the government more resources to intervene. However, it remains unclear how those reserves can be used most effectively to reduce economic disruption during sudden stops. Should reserves be used to intervene in the foreign exchange market reducing the volatility of the exchange rate? Should reserves be used to provide credit to exporters to facilitate the recovery of output and the external adjustment? Or should they be preserved to avoid financing capital flight during the crisis?

Apart from having a large buffer of reserves, many countries have also attempted to improve their external balance sheets by lengthening sovereign debt maturities, issuing more debt locally and in local currency and, in general, reducing currency or maturity mismatches. An interesting topic for future research is how such advances might reduce the costs of different types of sudden stops.

Another question that deserves scrutiny is why sudden stops in inflows are more disruptive than sudden starts in outflows. This is true for gross flows episodes (i.e., SSI versus SSO in the taxonomy of Section 2) and for net episodes (SSIN versus SSON). Can it be rationalized by considering the transactions underlying the different types of sudden stops? A sudden stop in gross inflows implies the sudden sale of domestic assets on the part of foreign investors which might imply deleveraging or negative liquidity effects in domestic markets with impacts on real activity. On the other hand, a sudden start in outflows implies a sudden purchase of foreign assets on the part of domestic residents that might be the by-product of positive income shock affecting the economy. Indeed, if such sudden foreign asset purchases are driven more by international opportunities than domestic problems it might constitute a net positive for the domestic economy. Also, it may be the case that countries have found more effective ways to backstop abrupt changes in the stock of foreign asset holdings of residents than to have access to external liquidity sources to finance an abrupt reduction in gross capital inflows. Yet irrespective of the reasons why sudden

stops in inflows may be more disruptive than sudden starts in outflows, the distinction underscores the importance of international liquidity assistance via an international lender of last resort during sudden stops, something that is still missing from the global financial architecture.

Sudden stops in capital flows have reshaped the economics profession's views on financial crises. They have become part of the family of financial whiplashes that have attracted the attention of academics and practitioners alike. A variety of countries, from developing to advanced have had to deal with their consequences. As the world teeters with seemingly never-ending episodes of financial instability, the issues addressed in this paper may be useful references to those thinking about appropriate policy responses.

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Appendix

Figures 1 – 4 are based on balance of payments data from IMF BOPS dataset available for the following countries.

Country List				
Advanced Economies		Developing Countries		
Australia	Albania	Czech Republic	Malaysia	Serbia, Republic of
Belgium	Argentina	Ecuador	Malta	Seychelles
Canada	Armenia, Republic of	El Salvador	Mauritius	Slovak Republic
China, P.R.: Hong Kong	Aruba	Estonia	Mexico	Slovenia
Denmark	Austria	Ethiopia	Moldova	Solomon Islands
Finland	Azerbaijan, Republic of	Fiji	Mongolia	South Africa
France	Bahamas, The	Gambia, The	Montenegro	Sri Lanka
Germany	Bangladesh	Georgia	Morocco	Sudan
Iceland	Belarus	Greece	Mozambique	Suriname
Ireland	Belize	Guatemala	Myanmar	Tajikistan
Israel	Bermuda	Haiti	Namibia	Thailand
Italy	Bhutan	Honduras	Nepal	Tonga
Japan	Bolivia	Hungary	Netherlands Antilles	Turkey
Korea, Republic of	Bosnia and Herzegovina	India	Nicaragua	Uganda
Luxembourg	Brazil	Indonesia	Pakistan	Ukraine
Netherlands	Brunei Darussalam	Jordan	Panama	Uruguay
New Zealand	Bulgaria	Kazakhstan	Papua New Guinea	Vanuatu
Norway	Cabo Verde	Kyrgyz Republic	Paraguay	Venezuela, Republica Bolivariana de
Portugal	Cambodia	Lao People's Democratic Republic	Peru	Vietnam
Singapore	Chile	Latvia	Philippines	Yemen, Republic of
Spain	China, P.R.: Mainland	Lebanon	Poland	Zambia
Sweden	Colombia	Lesotho	Romania	
Switzerland	Costa Rica	Lithuania	Russian Federation	
United Kingdom	Croatia	Macedonia, FYR	Samoa	
United States	Cyprus	Madagascar	Saudi Arabia	

Notes: Classification done following IMF World Economic Outlook.