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**Working Paper**

## Sudden stops in Latin America and the Caribbean during COVID-19

IDB Working Paper Series, No. IDB-WP-1313

**Provided in Cooperation with:**

Inter-American Development Bank (IDB), Washington, DC

*Suggested Citation:* Cavallo, Eduardo A.; González, María José; Hernández, Juan; Powell, Andrew (2022) : Sudden stops in Latin America and the Caribbean during COVID-19, IDB Working Paper Series, No. IDB-WP-1313, Inter-American Development Bank (IDB), Washington, DC, <https://doi.org/10.18235/0003999>

This Version is available at:

<https://hdl.handle.net/10419/290072>

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February 2022

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Cataloging-in-Publication data provided by the  
Inter-American Development Bank  
Felipe Herrera Library

Sudden stops in Latin America and the Caribbean during COVID-19 / Eduardo A. Cavallo, María José González Jaramillo, Juan M. Hernández, Andrew Powell.

p. cm. — (IDB Working Paper Series; 1313)

Includes bibliographic references.

1. Capital movements-Latin America. 2. Capital movements-Caribbean Area. 3. Capital investments-Latin America. 4. Capital investments-Caribbean Area. 5. Coronavirus-Economic aspects-Latin America. 6. Coronavirus-Economic aspects-Caribbean Area. I. Cavallo, Eduardo A. II. González Jaramillo, María José. III. Hernández, Juan. IV. Powell, Andrew. V. Inter-American Development Bank. Department of Research and Chief Economist. VI. Series. IDB-WP-1313

<http://www.iadb.org>

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## **Abstract**

External capital accounts suffered during the COVID-19 crisis in Latin America and the Caribbean, but perhaps surprisingly the impacts were less severe than in previous crises. Gross capital inflows offset the outflows of residents, in sharp contrast to the global financial crisis of 2008/09 when residents' repatriation of capital countered withdrawals from non-residents. In general, the result was relatively stable net capital inflows and modest current account adjustments. Still, some countries that had seen inflows fall prior to the crisis, reflecting weaker fundamentals, suffered Sudden Stops in net capital flows. Given accommodating global monetary policy, sound fundamentals ensured access to liquid international capital markets, reducing the impacts of Sudden Stops during the pandemic.

**JEL classifications:** F30, F32, F40

**Keywords:** Sudden stops, Gross and net capital flows, External accounts, COVID-19, Latin America and the Caribbean

## 1. Introduction

The spread of COVID-19 across the world was accompanied by considerable economic uncertainty. In the first quarter of 2020, the depth and persistence of the shock to demand and to supply chains were unknown. As in previous crises, net capital flows to emerging markets, including those in Latin America and the Caribbean, were heavily impacted. March 2020 saw large withdrawals of portfolio capital by non-residents, but there was a strong recovery through the rest of the year. By the end of 2020, just six countries in Latin America and the Caribbean, of 26 analyzed, had suffered a Sudden Stop in net capital flows. Given the events of March, this was a welcome and positive outcome.

Still, digging deeper in the data, three further countries experienced a Sudden Stop in outflows (flows of residents), but they were spared from a full-blown Sudden Stop in net capital flows. This type of event was denominated as an SSO in the taxonomy introduced by Cavallo et al. (2015). A country that suffers an SSO but no concurrent Sudden Stop in net capital flows must have found alternative financing sources from non-residents: i.e., public (official or multilateral lending) or private capital inflows to avoid the reversal in net capital flows. On the flip side, two countries experienced Sudden Stops in capital *inflows* during 2020 (SSI in the abovementioned taxonomy) but no Sudden Stop in net flows. That is possible if resident investors (public or private) repatriate foreign held assets while foreign investors sell domestic assets or otherwise increase their holdings. This paper explores the dynamics that were in play during the COVID-19 period. We find some similarities and notable differences vis-à-vis previous crises that affected the region. In the 1990s, episodes of instability in international financial markets, such as the Asian financial crisis of 1997 and the Russian default of 1998, resulted in Sudden Stops in inflows (the flows of non-residents) prompting net flow Sudden Stops, with resulting forced current account adjustments, that were only possible with a contraction in demand and a real exchange rate depreciation; see Calvo et al. (2008). During the Global Financial Crisis (GFC), while there was market instability and Sudden Stops in inflows (non-resident flows), in many cases these were offset by the repatriation of capital from residents and therefore, few Sudden Stops in net flows; see Cavallo et al. (2015).

As discussed further below, in the COVID-19 period Brazil and Chile followed the same pattern as during the GFC, but more countries experienced a Sudden Stop in outflows (the flows of non-residents), which was then offset by larger inflows from non-residents. So, while the result

was similar to the GFC, in that net capital flows were stabilized due to the offsetting nature of the flows of residents and non-residents, the “offsetting behavior” was in the opposite direction.

While offsetting between resident and non-resident capital flows has been common in advanced economies since at least the 1990s, it is a relatively new occurrence among emerging markets. One theme that has emerged in the literature is that stronger domestic fundamentals may entice resident investors to take advantage of investment opportunities left by foreign investors when they leave. That may in part explain the experiences of Brazil and Chile and of several countries during the Global Financial crisis.<sup>1</sup> But the offsetting witnessed in many countries through the COVID-19 crisis appears to be of a different nature.

The results in this paper suggest that, during the COVID-19 episode, many countries avoided Sudden Stops in net capital flows because they maintained access to external credit. Some of this took the form of official lending (mainly through multilateral sources); however, countries’ ability to keep issuing foreign debt in the international financial markets, despite the initial volatility, was also instrumental. We show that four countries avoided a net flow Sudden Stop, *ceteris paribus*, because of their issuance in external debt markets. In addition, two other countries avoided a Sudden Stop in net flows (*ceteris paribus*) given either their access to official multilateral flows or due to their issuance in commercial debt markets.

The importance of maintaining access to international capital flows to avoid disruptive external current account adjustments in turn brings to the fore the role of sound macroeconomic fundamentals. During the global financial crisis, the region had improved macroeconomic fundamentals, and residents repatriated foreign-held assets, while foreign investors retrenched from emerging markets.<sup>2</sup> During COVID-19, while external financing was available for some countries, still about one third of countries experienced Sudden Stops in net flows. Interestingly, most of the Sudden Stops that materialized could have been successfully predicted with a model that considers the state of key macroeconomic factors before the pandemic begun. Thus, while the COVID-19 shock affected all countries in the region, those that were able to access external foreign credit from either public or private sources were able to fend off Sudden Stops. But those countries

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<sup>1</sup> The precise reasons why the offsetting behavior might occur remain debated; see Cavallo (2019) for a recent survey of the literature.

<sup>2</sup> In the preceding years to the global financial crisis, the region had gone through a period of economic bonanza facilitated in part by good external conditions.

with weaker pre-existing conditions, including higher fiscal and current account deficits, higher levels of liability dollarization, and low international reserve buffers, were more vulnerable.

Going forward, countries will need to roll over external debt and finance fiscal deficits that may require additional external financing. As economic recovery gathers steam, investment is likely to increase, leading to greater external financing needs. Countries that lacked buffers before the pandemic, and those that depleted those buffers during COVID-19, will need to rebuild them to prevent painful capital flow volatility in the future, as well as to finance the recovery.

## **2. Defining Sudden Stops**

A Sudden Stop occurs when foreign financing available to borrower countries unexpectedly dries up, forcing an abrupt current account reversal. Given the difficulty in boosting exports quickly, such a reversal is normally accompanied by a sharp curtailment in imports, which in turn is only possible with a sharp recession and real exchange depreciation. Sudden Stops in net capital flows can then be very costly indeed. Countries may be more vulnerable to such events if macroeconomic fundamentals are weak, if debt levels and fiscal deficits are high, reserve levels are low, domestic dollarization is significant and current accounts are in deficit. By year-end 2019, 21 out of the 26 countries in Latin America and the Caribbean were running current account deficits, some of them substantial, making them more vulnerable to Sudden Stops.

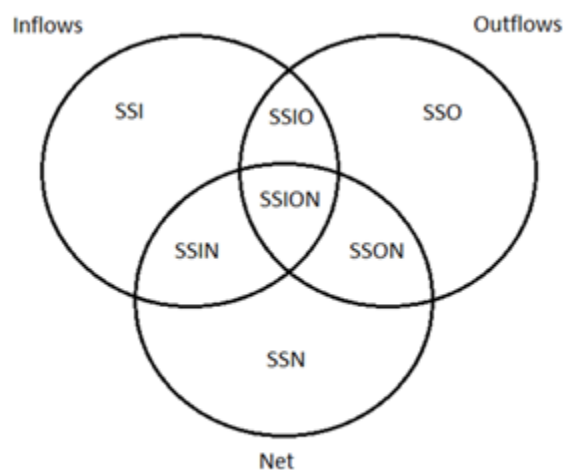
To identify Sudden Stops empirically, researchers implement a variety of statistical algorithms applied to the capital flows series. The algorithm of Calvo, Izquierdo and Mejía (2004) identifies a Sudden Stop as an event in which the year-on-year change in net capital flows falls at least two standard deviations below its sample mean. 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. 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, Cavallo et al. (2015) propose a taxonomy that is illustrated in the Venn diagram of Figure 1.

There are six potential types of Sudden Stops. Considering the very center of the 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. 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 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 1. A Taxonomy of Sudden Stops**



*Source:* Cavallo et al. (2015).

In this paper we focus on a subset of episodes that encompass the full taxonomy. We focus on “net flows Sudden Stops” (encompassing SSION, SSIN, SSON and SSN)—or SS Net in short—without distinguishing among the subtypes, and on gross flows sudden stops, i.e., SSI and SSO.

### **3. Sudden Stops during the COVID-19 Crisis**

We use the Financial Account flows data from the Balance of Payments Statistics (BOPS) database compiled by the IMF to assess the incidence of Sudden Stop episodes among the IDB borrowing member countries during the COVID-19 crisis. As is standard in the literature, we exclude reserve accumulation and depletion from the capital flows. We estimate the rolling mean and standard deviation for gross outflows, inflows, and net flows to determine if there was a Sudden Stop according to the algorithm of Calvo, Izquierdo and Mejía (2004).

Table 1 shows the SS episodes during the COVID-19 period (from 2020 2Q2 until 2021 Q1) for 22 out of 26 Latin American and the Caribbean economies for which data are available. There were six Sudden Stops in net flows events, six SSO, and three SSI events. Notice that some countries experienced more than one type of event, while others faced none.

Among the six countries with SS Net events, Argentina was already in a Sudden Stop in net flows and in inflows before the COVID-19 crisis. The cases of Costa Rica, Dominican Republic, and Ecuador were driven by the asset side, as they also had an SSO. In the cases of Guatemala and Suriname, they did not experience a concurrent SSI nor SSO, suggesting that in these cases, the conjunction of relatively mild swings in inflows and outflows reinforced each other, producing the Sudden Stops in net flows.

For countries facing an SSI or SSO but not an SS Net, there was an “offsetting behavior,” that prevented the gross flow Sudden Stop from becoming an SS Net. In countries facing of SSO’s but not SS Net: Colombia, EL Salvador, and Paraguay residents’ capital flight was compensated by a rise in foreign capital inflows, resulting in no net Sudden Stop. On the other side, Brazil and Chile experienced an SSI due to falling foreign capital inflows, but that decline was offset by residents’ asset repatriation, which helped keep Sudden Stops in net flows at bay.

**Table 1. Sudden Stops in LAC during COVID**

<i>Country</i>	<i>Net Flows</i>	<i>Outflows</i>	<i>Inflows</i>
ARG	Yes		Yes
BLZ			
BOL			
BRA			Yes
CHL			Yes
COL		Yes	
CRI	Yes	Yes	
DOM	Yes	Yes	
ECU	Yes	Yes	
SLV		Yes	
GTM	Yes		
GUY			
HND			
JAM			
MEX			
NIC			
PAN			
PRY		Yes	
PER			
SUR	Yes		
TTO			
URY			
Total SS	6	6	3
Total Sample	22	22	22
SS out of Total (%)	27.3%	27.3%	13.6%

*Source:* Authors' calculations based on the Financial Account from the Balance of Payments database (IMF).

*Note:* Table shows if there was a Sudden Stop from 2020 Q2 until 2021 Q1. We calculate the year-on-year change in financial flows, the rolling mean and standard deviation, and see if the change in yearly flows falls at least two standard deviations below its sample mean.

## 4. Capital Flows by Type during Selected Crisis Episodes

### 4.1 Sudden Stops in Other Crises

Using the same data and methodology, we explore the behavior of capital flows during previous crises to assess the differences with the COVID-19 crisis. We explore three previous crises: the Tequila Crisis of 1995, the Emerging Market Crises of the late 1990s and the Great Financial Crisis of 2009. To keep the focus on the Financial Account flows and for comparability purposes, we

date crisis-windows using the 4-quarter window in which more countries had their net flows grow 2 standard deviations below the mean. Table 2 shows the resulting crisis-windows:

**Table 2. Crisis Dates**

Crisis	Periods	
	Start	End
Tequila Crisis	1995 Q1	1995 Q4
EM Crisis	1999 Q1	1999 Q4
Great Financial Crisis	2009 Q1	2009 Q4
COVID-19 Crisis	2020 Q2	2021 Q1

*Note:* For each crisis we define a four-quarter window. We define each window by selecting the quarters where there is the higher percentage of countries that had the growth of their net flows below two standard deviations of the mean.

Table 3 shows the Sudden Stop events that materialized during those periods. While data is more limited for past crises, in the 1990s there was a higher prevalence of Sudden Stops in net flows among the countries with available data. For example, 50 percent of the countries with available data experienced a Sudden Stop in net flows during the Tequila and the Emerging Market crises. During the Global Financial Crisis, the ratio of countries experiencing sudden stops in net flows declined to 40 percent, and the incidence of SSI and SSOs increased suggesting that there were more offsetting flows than during preceding crises.<sup>3</sup> While there was a significant amount of offsetting flows during this period, the size of the external shock did not preclude Sudden Stops in net flows from materializing in many countries. While the counterfactual is not observable, it is possible that if it had not been for the degree of offsetting, the incidence of Sudden Stops in net capital flows would have been even worse among the affected countries during the global financial crisis.

<sup>3</sup> Mexico appears as experiencing an SSI and an SSO but not a Sudden Stop in net capital flows. This would be rare if they had happened concurrently, but they did not. The global financial crisis window extended for a year, and during that period, Mexico experienced an SSI first (with offsetting from outflows)—between 2009 Q1 and 2009 Q3—and then a SSO (with offsetting from inflows)—between 2009 Q4 and 2010 Q3—but not concurrently, and that is why it did not register a Sudden Stop in net flows during the window.

**Table 3. Sudden Stops in LAC across Different Crises**

Country	Tequila Crisis			EM Crisis			Great Financial Crisis			COVID-19 Crisis		
	Net Flows	Outflows	Inflows	Net Flows	Outflows	Inflows	Net Flows	Outflows	Inflows	Net Flows	Outflows	Inflows
ARG	Yes					Yes				Yes		Yes
BLZ		-			-							
BOL				Yes		Yes		Yes				
BRA		Yes		Yes	Yes	Yes	Yes		Yes			Yes
CHL	Yes			Yes	Yes		Yes	Yes	Yes			Yes
COL		-									Yes	
CRI		-			-		Yes		Yes	Yes	Yes	
DOM		-			-			-		Yes	Yes	
ECU		-		Yes	Yes					Yes	Yes	
SLV		-			-		Yes		Yes		Yes	
GTM	Yes		Yes			Yes	Yes		Yes	Yes		
HND		-			-							
JAM		-			-			-				
MEX	Yes		Yes					Yes	Yes			
NIC												
PAN		-			-				Yes			
PRY		-			-		Yes	Yes	Yes		Yes	
PER				Yes		Yes	Yes	Yes	Yes			
SUR		-			-			Yes		Yes		
TTO		-			-			-				
URY		-			-		Yes					
Total SS	4	1	2	5	3	5	8	6	9	6	6	3
Total Sample	8	8	8	10	10	10	18	18	18	21	21	21
SS out of Total (%)	50.0%	12.5%	25.0%	50.0%	30.0%	50.0%	44.4%	33.3%	50.0%	28.6%	28.6%	14.3%

*Source:* Authors' calculations based on the Financial Account from the Balance of Payments database (IMF).

*Note:* "-" indicates that there is no data for all flows in the country. Countries with data are the countries that had information for all the periods of the crisis. Table shows if countries had an SS during the period of the crisis. Tequila Crisis shows the SS between 1995 Q1 and 1995 Q4, EM Crisis shows the SS between 1999 Q1 and 1999 Q4, Great Financial Crisis shows the SS between 2009 Q1 and 2009 Q4, and COVID-19 Crisis shows the SS between in 2020 Q2 and 2021 Q1.

The table also shows that during the COVID-19 crisis, the incidence of all types of Sudden Stops was less than during the global financial crisis. To probe deeper into flows dynamics during COVID-19 vis-à-vis during the global financial crisis, in the next subsection we plot the actual flows during the quarters around the crises.

## 4.2 Capital Flows Offsetting

For each of the crises, we divide the sample into three groups: countries that experienced a net Sudden stop (Net SS), countries that faced a gross Sudden Stop but NO net SS (Gross SS), and countries that did not experience a Sudden Stop (No SS) (see Appendix A.1. for a list of the countries included in each group in each crisis).<sup>4</sup>

We define the *statistic* for each flow type (net flows, gross outflows, and gross inflows) as the yearly change in the annualized flow in a quarter minus its rolling mean until that quarter, everything divided by the rolling standard deviation of the *net* flows until that quarter. Formally, this is:

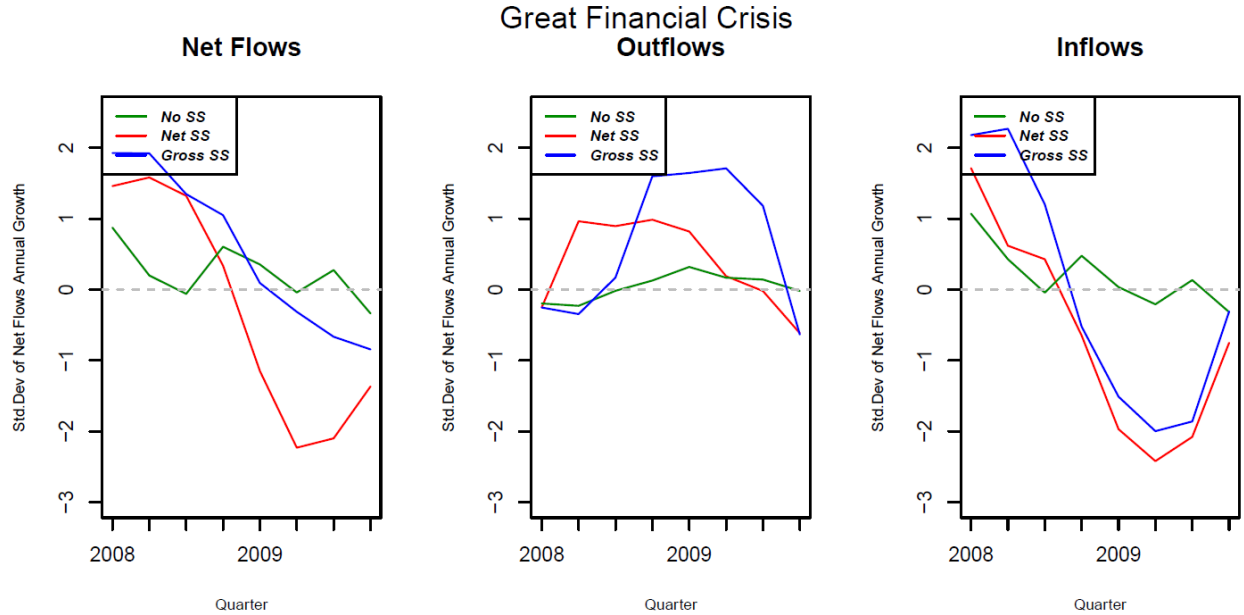
$$\frac{ChangeYearlyFlow_{i,t} - mean_{i,t}}{StandardDeviation_{net,t}},$$

where  $i$  is the type of flow, i.e., net, outflow, or inflow, and  $t$  the quarter. In terms of the SS event dating methodology, a SS in net becomes *effective* when the *net* statistic falls below -2 and is said to have started when the net statistic fell below -1 and finishes when it rises above -1. To define the statistics for all other flows we use the standard deviation of *net* inflows, which allows keeping the additivity of statistics, and weight deviations from the mean according to their contribution to deviations of net flows. See Appendix A.2. for the evolution of statistics for each country during each of the revised crises.

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<sup>4</sup> The differences between the net SS group and the gross SS group highlight the importance of offsetting flows across episodes.

**Figure 2. Average Flows to LAC Economies during GFC**



*Note:* Figure shows the statistic for each flow type, which is defined as the yearly change in the annualized flow in a quarter minus its rolling mean until that quarter, everything divided by the rolling standard deviation of the net flows until that quarter. We divide the sample into three groups: Net SS: countries that experienced a net Sudden Stop, Gross SS: countries that faced a gross sudden stop but no net SS and, No SS: countries that did not experience a Sudden Stop. Net SS Sample: Brazil, Chile, Costa Rica, Guatemala, Peru, Paraguay, El Salvador, and Uruguay. Gross SS Sample: Bolivia, Mexico, Panama, and Suriname. No SS Sample: Argentina, Belize, Colombia, Ecuador, Honduras, and Nicaragua.

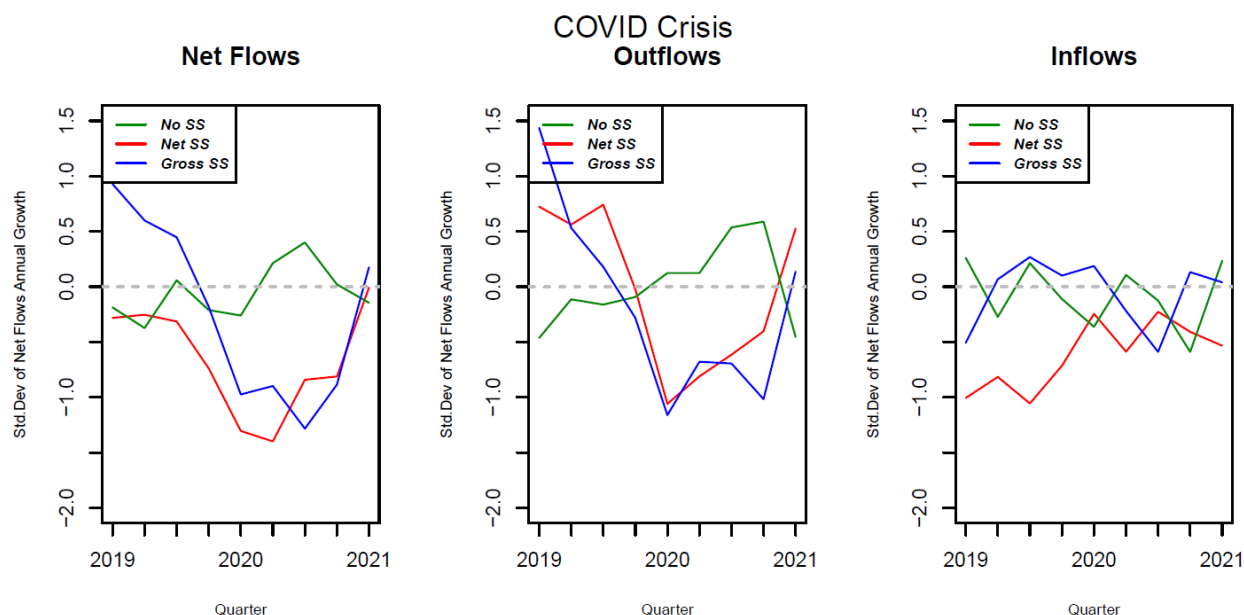
Figures 2 and 3 show the quarterly *average* of the net, gross outflows, and gross inflows statistics within each group before and during the GFC and the COVID-19 crises. While countries both in the net SS and gross SS groups faced a decline in gross inflows during the GFC, the gross outflows offset that reversal for the gross SS group.<sup>5</sup>

During COVID, the offsetting behavior was in the opposite direction. Residents in both the net and gross SS groups increased capital flight, as can be seen in the gross outflows' statistics in Figure 3. However, the difference in gross inflows among groups highlights two things: first, it was access to external credit what determined the fate of countries during the COVID-19 crisis. Second, the countries that faced an SS in net flows entered the COVID-19 episode with negative

<sup>5</sup> For the Tequila Crisis, and the Emerging Market Crisis we have a limitation in the construction of the Gross SS groups. In Tequila Crisis there is only Brazil in this group, while in the Emerging Market Crisis the group is composed of Argentina and Guatemala. Taking this into account, these crises have little offsetting, as their respective asset statistic was very small, while their liabilities statistic fell substantially. Figures for these crises can be found in Appendix A.2.

gross inflows’ statistics on average, which implies that they were receiving less external credit flows than usual before the COVID-19 shock hit. This in turn signals that the countries in this group had pre-existing vulnerabilities that did not produce offsetting flows. The next two sections will probe these facts deeper.

**Figure 3. Average Flows to LAC Economies during the COVID-19 Crisis**



*Note:* Figure shows the statistic for each flow type, which is defined as the yearly change in the annualized flow in a quarter minus its rolling mean until that quarter, everything divided by the rolling standard deviation of the net flows until that quarter. We divide the sample into three groups: Net SS: countries that experienced a net Sudden Stop, Gross SS: countries that faced a gross Sudden Stop but no net SS and, No SS: countries that did not experience a Sudden Stop. Net SS Sample: Argentina, Costa Rica, Dominican Republic, Ecuador, Guatemala, and Suriname. Gross SS Sample: Brazil, Chile, Colombia, El Salvador, and Paraguay. No SS Sample: Belize, Bolivia, Honduras, Jamaica, Mexico, Nicaragua, Panama, Peru, Trinidad and Tobago, and Uruguay.

## 5. The Role of Sovereign External Borrowing in Preventing Sudden Stops

Access to external credit was crucial for countries to avoid Sudden Stops during the COVID-19 crisis. To probe this fact further, we look at the Financial Account flows for LAC economies excluding two types of external sovereign lending in 2020: first we take out external sovereign bond issuances, and second, we exclude multilateral lending.

For the first exercise we used data for external debt issuance by country. Specifically, we used data of sovereign bonds issued outside the country’s jurisdiction during 2020 for each country



in LAC.<sup>6</sup> For each quarter we aggregate the debt issued at face value during that period. Table 4 shows the amount issued as a percentage of the 2019 GDP for LAC countries. For each quarter in 2020, we subtract the sovereign issuance from the Financial Account Liability Inflows from the government portfolio investment liabilities line. Then we recalculate the Sudden Stop statistics for net flows and gross flows with the counterfactual series.

**Table 4. Actual and Counterfactual 2020 Sudden Stops**

Country	External Issuance (2020, % GDP)	Type of Sudden Stop	
		Actual	Counterfactual
DOM	9.28	Net SS, SSO	Net SS, SSO, <b>SSI</b>
PAN	7.49	No SS	<b>Net SS, SSI</b>
SLV	3.70	SSO	<b>Net SS, SSO</b>
PRY	2.62	SSO	SSO
URY	2.62	No SS	No SS
HND	2.41	No SS	No SS
TTO	2.15	No SS	No SS
PER	2.06	No SS	<b>Net SS, SSI</b>
COL	1.73	SSO	<b>Net SS, SSO</b>
CHL	1.61	SSI	<b>Net SS, SSI</b>
MEX	1.43	No SS	<b>Net SS</b>
GTM	0.65	Net SS	Net SS, <b>SSI</b>
BRA	0.28	SSI	SSI

*Source:* Thomson Reuters Datastream. Data for the GDP for each country for 2019 from the WEO.

*Note:* We omit debt restructuring issuance from Argentina, and Ecuador. Belize, Bolivia, Jamaica, Nicaragua, and Suriname did not issue in 2020. Costa Rica only issued domestically in 2020. We omit Guyana because of lack of data. A bold Net SS, and SSI, indicates that the country did not have that type of SS in the actual data, but had a SS without sovereign external debt issuance in the net flows or inflows, respectively.

Table 5 presents the summary of SS events identified with the observed and with the counterfactual series. Since we do not modify any asset flows, SSOs stay the same and are only reported for the observed series. SSIs and SS Nets highlighted in bold are those that materialize under the counterfactual series but not with the observed—that is, the contraction of net flows that were prevented by either sovereign debt issuance or multilateral lending.

<sup>6</sup> We omit debt restructuring issuance from Argentina, and Ecuador. Some countries did not issue in the period, such as Bolivia, Belize, Jamaica, Nicaragua, and Suriname.

Without sovereign issuance, 12 countries would have experienced an SS in Net flows, twice as many as what was observed. The countries with counterfactual SS in this case are Chile, Colombia, El Salvador, from the Offset group, and Mexico, Panama, and Peru from the No SS group.

Chile had an SSI offset by gross outflows that prevented an SS Net, but if the country had not been able to issue debt, the SSI would have been sharper, requiring more offsetting from residents to prevent the SS Net. Colombia, and El Salvador, experienced an SSO (residents saving money abroad), and the offsetting was on the liabilities side, so if that offsetting had not occurred, these countries would have experienced an SS Net.

Mexico, Panama, and Peru are countries for which the ability to issue debt permitted avoiding the SS net. Panama and Peru would have experienced an SSI and an SS Net without the sovereign issuance. We do not claim that these countries would have necessarily experienced Sudden Stops had they not been able to issue debt, because residents could have repatriated assets; however, the results indicate that what prevented the Sudden Stops was precisely that these countries were able to maintain access to external credit.

For the second exercise we exclude multilateral lending following the same procedure. We define multilateral *net* lending as the quarterly change in a country's outstanding obligations with multilateral institutions. Then, for each quarter of 2020 we subtract the multilateral net lending from the Other Investment Liability flows to the government line of the financial account and recalculate the SS statistics for net and gross flows. Table 6 shows the net multilateral lending flows to LAC economies during 2020. Net lending from the IMF was approximately 60 percent of the total flows.

Only Colombia, and El Salvador would have had an SS Net without multilateral lending. Removing these flows increases the number of counterfactual SS Nets by one third, which is less than the effect of removing sovereign external issuance but is still significant. The smaller quantitative offsetting effect of multilateral flows reflects the smaller size of multilateral *net* lending compared with *gross* issuance for some countries.<sup>7</sup>

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<sup>7</sup> Among countries that issued sovereign external debt, the average ratio of multilateral net lending to external issuance in 2020 was 50 percent.

**Table 5. Sudden Stops in LAC during COVID-19 under Alternative Scenarios**

Country	Type of Sudden Stop		
	Actual	Scenario 1	Scenario 2
	Net SS, SSI		
ARG	SSI	Net SS, SSI	Net SS, SSI
BLZ	No SS	No SS	No SS
BOL	No SS	No SS	No SS
BRA	SSI	SSI	SSI
CHL	SSI	<b>Net SS, SSI</b>	SSI
COL	SSO	<b>Net SS, SSO</b>	<b>Net SS, SSO</b>
	Net SS, SSO		
CRI	SSO	Net SS, SSO	Net SS, SSO
	Net SS, SSO		
DOM	SSO	Net SS, SSO, <b>SSI</b>	Net SS, SSO
	Net SS, SSO		
ECU	SSO	Net SS, SSO	Net SS, SSO, <b>SSI</b>
SLV	SSO	<b>Net SS, SSO</b>	<b>Net SS, SSO</b>
GTM	Net SS	Net SS, <b>SSI</b>	Net SS
GUY	No SS	No SS	No SS
HND	No SS	No SS	No SS
JAM	No SS	No SS	No SS
MEX	No SS	<b>Net SS</b>	No SS
NIC	No SS	No SS	No SS
PAN	No SS	<b>Net SS, SSI</b>	No SS
PRY	SSO	SSO	SSO
PER	No SS	<b>Net SS, SSI</b>	No SS
SUR	Net SS	Net SS	Net SS, <b>SSI</b>
TTO	No SS	No SS	No SS
URY	No SS	No SS	No SS

*Source:* Authors' calculations based on the Financial Account from the Balance of Payments database (IMF), data from sovereign issuance from Thomson Reuters Datastream, and data for multilateral lending from World Bank's Joint External Debt Hub.

*Note:* Table shows the type of Sudden Stop during 2020 for each country. Scenario 1 is the exercise without sovereign external debt Issuance, where we subtract the sovereign issuance from the Financial Account Liability Inflows. We omit debt restructuring issuance from Argentina, and Ecuador. Belize, Bolivia, Jamaica, Nicaragua, and Suriname did not issue in 2020. Costa Rica only issued domestically in 2020. We omit Guyana because of lack of data.

Scenario 2 is the exercise without multilateral lending where we subtract the flow from the Liabilities inflows.

A bold Net SS, and SSI, indicates that the country did not experience that type of SS in the actual data, but had a SS without sovereign external debt issuance in the net flows or inflows, respectively.

**Table 6. Net Multilateral Lending to LAC Economies (% of GDP)**

ISO3	Type of SS	Total Multilateral Lending	IMF Lending	Other Multilateral Lending
ECU	Net SS, SSO	7.66%	5.77%	1.89%
HND	No SS	3.46%	1.88%	1.58%
JAM	No SS	3.03%	2.56%	0.46%
BOL	No SS	2.80%	0.79%	2.01%
NIC	No SS	2.70%	1.44%	1.26%
PRY	SSO	2.32%	0.00%	2.32%
COL	SSO	2.28%	1.67%	0.61%
PAN	No SS	2.01%	0.77%	1.25%
URY	No SS	1.82%	0.00%	1.82%
BLZ	No SS	1.79%	0.00%	1.79%
DOM	Net SS, SSO	1.70%	0.75%	0.95%
SLV	SSO	1.70%	1.45%	0.25%
SUR	Net SS	1.53%	1.46%	0.07%
PER	No SS	1.04%	0.00%	1.04%
CRI	Net SS, SSO	0.96%	0.82%	0.14%
GTM	Net SS	0.33%	0.00%	0.33%
ARG	Net SS, SSI	0.27%	0.00%	0.27%
TTO	No SS	0.20%	0.00%	0.20%

*Source:* Authors' calculations based on the World Bank's Joint External Debt Hub. For the GDP for each country for 2019 data are from the WEO.

*Note:* We do not show data for Chile, Mexico, Guyana, and Brazil, as their multilateral lending is below 0.2 percent of GDP.

The bottom line is that access to credit was crucial for LAC countries during the COVID-19 crisis, preventing external crises like those seen during the Great Financial Crisis of 2008. Still, a few countries did experience Sudden Stops in net flows, as shown in Table 1. The next section assesses the role of the pre-existing fundamental vulnerabilities for those cases through the lens of a Sudden Stop model.

## **6. A Model to Explain the Incidence of Sudden Stops in Net Flows**

Given that countries that suffered a Sudden Stop in net flows in 2020 were already facing reduced net flows in 2019, we seek to identify and summarize the role of pre-existing conditions. We

employ the model from Calvo, Izquierdo, and Loo-Kung (2012) and rank LAC economies according to the probability of having a net SS in 2020, derived from 2019 data. The model incorporates domestic factors such as: fiscal balance, reserves, current account balance, and liability dollarization, and produces the likelihood of a Sudden Stop in net flows in the following year. See Appendix A.3 for a detailed description of the model. Table 7 shows probabilities for LAC economies with available data, only two of which had a Sudden Stop in net capital flows during 2020: Costa Rica and the Dominican Republic.<sup>8</sup>

**Table 7. Model Likelihood of Net SS in 2020 for Selected LAC Economies**

Country	Data from 2019					Observed Net SS in 2020
	Gross Dollarization	General Govt. Balance	Reserves	Current Account Balance	P(SS=1)	
CRI	19.8%	-6.8%	13.9%	-2.1%	38.5%	Yes
URY	43.3%	-2.8%	23.4%	1.3%	37.3%	No
CHL	16.4%	-2.7%	14.6%	-3.7%	36.5%	No
DOM	11.0%	-2.2%	9.9%	-1.3%	32.0%	Yes
BRA	9.3%	-5.9%	19.0%	-3.5%	31.7%	No
BOL	9.4%	-7.2%	15.7%	-3.4%	30.2%	No
PRY	18.1%	-3.8%	20.3%	-1.1%	29.8%	No
COL	4.6%	-3.5%	16.4%	-4.5%	29.2%	No
HND	20.0%	0.1%	23.3%	-1.4%	29.1%	No
JAM	14.6%	0.9%	23.0%	-2.3%	27.8%	No
PER	23.0%	-1.4%	29.6%	-0.9%	27.4%	No
MEX	8.4%	-2.3%	14.4%	-0.3%	26.8%	No

*Source:* Authors' calculation using data from the WEO from October 2021 for net lending/borrowing, observed reserves, and current account balance as a percentage of GDP. Data from each country's central bank for gross liabilities dollarization.

*Note:* We exclude countries that faced a net SS in 2019: Argentina, Guatemala, and Nicaragua.

Costa Rica and The Dominican Republic are among the countries identified by the model as being more vulnerable due to their initial conditions. According to these metrics, Uruguay and Chile were also vulnerable to a Sudden Stop; however, they were both spared that outcome. As discussed previously, there was significant repatriation of capital by Chilean residents, which is necessarily captured well by the model. In the case of Uruguay, the model includes a relatively

<sup>8</sup> We exclude countries that faced a net SS in 2019: Argentina, Guatemala, and Nicaragua, as that implies their external deficit, and possibly also the fiscal one, were already forcefully corrected.

elevated level of liability dollarization, but liability dollarization levels have been declining. Moreover, the macroeconomic policy framework has been strengthened, and this is not fully reflected in the parameters of the model. Additionally, we use machine learning techniques to evaluate the ability of the model to identify the most vulnerable economies. The exercise, described in Appendix A.4, indicates the model is significantly apt for the task.

The model has at least two shortcomings. First, the model is not well suited for fully dollarized economies: El Salvador, Ecuador, and Panama are thus excluded from the analysis. Second, it relies on data about domestic liability dollarization which is not available for many countries. Still, the bottom line is that the results from the calibration of the model suggest that a key difference between the countries that experienced an SS Net and those that did not during the COVID-19 crisis were the macroeconomic conditions prior to the pandemic.

## **7. Conclusions**

The impact of the COVID-19 crisis on the external accounts in Latin America and the Caribbean was significant but weaker than previous crises. Since the crises of the 1990s, gross capital flows have become more relevant in the region. During the global financial crisis of 2008/09, many countries suffered Sudden Stops in gross capital inflows as foreign investors withdrew investments, but the impacts on net flows, and consequently on current accounts, were attenuated by offsetting gross capital outflows in the form of capital repatriation from resident investors.

During the COVID-19 episode, there was also a significant degree of offsetting gross flows, but mostly in the opposite direction. Many countries in the region saw capital outflows from residents that were offset by gross inflows, which implies that those countries were able to avoid current account adjustments because they maintained access to external finance; some of them borrowed from the official sector (mostly multilateral institutions) and others issued debt in commercial markets. In fact, sovereign issuances were large and prevented many Sudden Stops in net capital flows from materializing. Multilateral lending, albeit smaller, also contributed to stabilize external accounts.

Both in the Global Financial of 2008 and in the COVID-19 crises several countries benefited from gross flows offsetting. In the former, asset inflows compensated liability outflows, while in the latter, liability inflows compensated asset outflows. Further work can exploit this difference to understand the underlying crises transmission and offsetting mechanisms.

The countries that did not experience similar levels of offsetting gross flows during the COVID-19 episode, and thus, that suffered Sudden Stops in net capital flows, had seen inflows deteriorate before 2020. The pre-existing vulnerabilities were found to be captured relatively well by a model that considers the probability of Sudden Stops given the state of key macroeconomic fundamentals before the crisis.

In particular, the COVID-19 shock pushed all governments in the region to tap all financing sources available. From an external finance perspective this was a huge demand shock, while the supply side impact seems to have been more nuanced, as weak growth prospects all around the world and lower global interest rates left investors without highly attractive alternatives. Further work can exploit this episode to identify the external financing supply curve determinants, overcoming the simultaneity bias arising from data reflecting market equilibrium outcomes.

A key policy question is whether, going forward, countries will continue to benefit from the strengths that allowed them to avoid significant external crises, or whether there is higher risk that countries could face Sudden Stops in capital flows? The answer lies in the strength of macroeconomic fundamentals. During the Global Financial Crisis of 2008, and more recently during the COVID-19 crisis, Latin America and the Caribbean countries were able to avoid Sudden Stops. In both cases, sound economic fundamentals were key, by enticing retrenchment of private capital flows from resident investors during the global financial crisis of 2008/09, and by enabling continuous access to external financing during the COVID-19 period. But those buffers, especially the fiscal ones, have been depleted. A key goal for Latin American and Caribbean economies should thus be to rebuild those buffers to reduce vulnerability.

## References

- Calvo, G.A., A. Izquierdo and L.F. Mejía. 2004. “On the Empirics of Sudden Stops: The Relevance of Balance-Sheet Effects.” NBER Working Paper 10520. Cambridge, United States: National Bureau of Economic Research.
- Calvo, G.A., A. Izquierdo and L.F. Mejía. 2008. “Systemic Sudden Stops: The Relevance of Balance-Sheet Effects and Financial Integration.” NBER Working Paper 14026. Cambridge, United States: National Bureau of Economic Research.
- Calvo, G.A., A. Izquierdo and R. Loo-Kung. 2012. “Optimal Holdings of International Reserves: Self-Insurance against Sudden Stop.” NBER Working Paper 18219. Cambridge, United States: National Bureau of Economic Research.
- Cavallo, E.A. 2019. “International Capital Flow Reversals (Sudden Stops).” In: *Oxford Research Encyclopedia of Economics and Finance*. Oxford, United Kingdom: Oxford University Press. Doi: <http://dx.doi.org/10.1093/acrefore/9780190625979.013.303>
- Cavallo, E.A. et al. 2015. “A New Taxonomy of Sudden Stops: Which Sudden Stops Should Countries Be Most Concerned About?” *Journal of International Money and Finance* 51: 47-70.
- Forbes, K.J., and F.E. Warnock. 2012. “Capital Flow Waves: Surges, Stops, Flight and Retrenchment.” *Journal of International Economics* 88(2): 235-251.



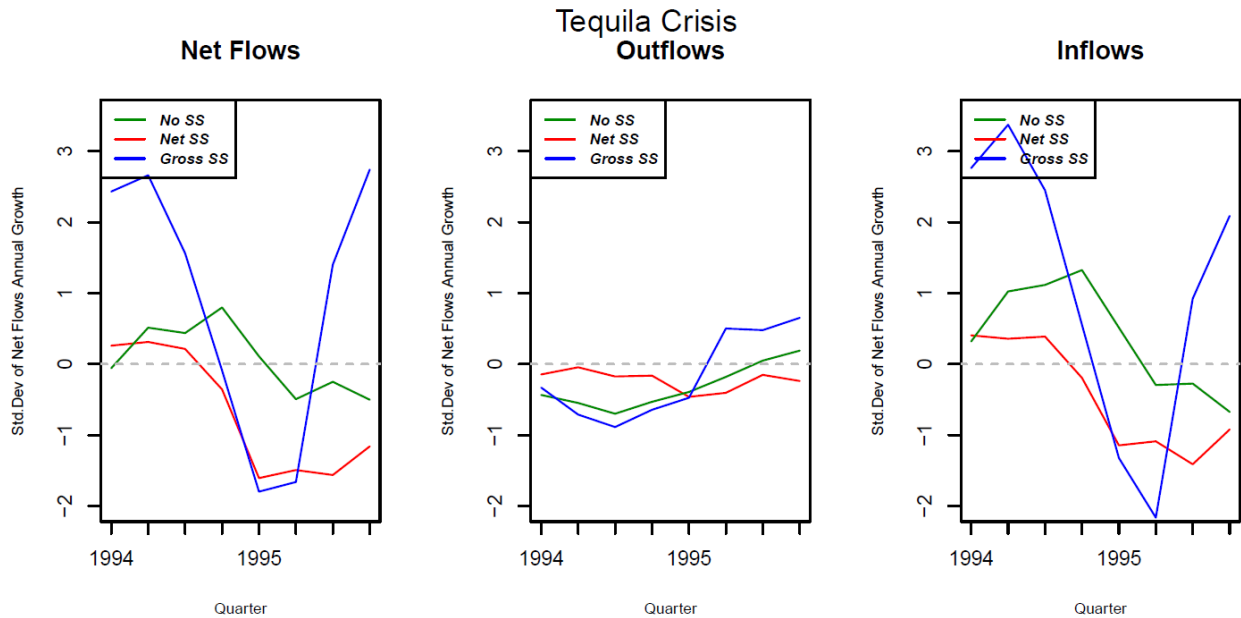
## Appendix

### *A.1. List of Countries Included in Each Group in Each Crisis*

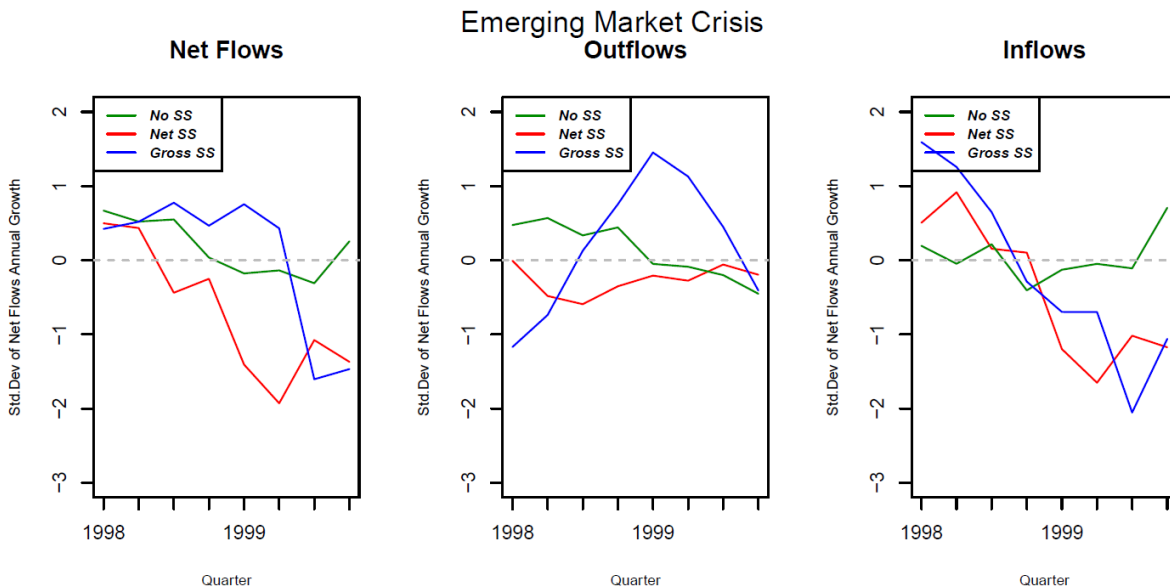
Tequila Crisis					
Net SS Sample		Gross SS Sample		No SS Sample	
Number of Countries	Countries	Number of Countries	Countries	Number of Countries	Countries
4	Argentina Chile Guatemala Mexico	1	Brazil	2	Bolivia Nicaragua Peru
Emerging Market Crisis					
Net SS Sample		Gross SS Sample		No SS Sample	
Number of Countries	Countries	Number of Countries	Countries	Number of Countries	Countries
5	Bolivia Brazil Chile Ecuador Peru	2	Argentina Guatemala	3	Colombia Mexico Nicaragua
Lehman Debacle					
Net SS Sample		Gross SS Sample		No SS Sample	
Number of Countries	Countries	Number of Countries	Countries	Number of Countries	Countries
8	Brazil Chile Costa Rica Guatemala Peru Paraguay El Salvador Uruguay	4	Bolivia Mexico Panama Suriname	6	Argentina Belize Colombia Ecuador Honduras Nicaragua

COVID-19 Crisis					
Net SS Sample		Gross SS Sample		No SS Sample	
Number of Countries	Countries	Number of Countries	Countries	Number of Countries	Countries
6	Argentina Costa Rica Dominican Republic Ecuador Guatemala Suriname	5	Brazil Chile Colombia El Salvador Paraguay	10	Belize Bolivia Honduras Jamaica Mexico Nicaragua Panama Peru Trinidad and Tobago Uruguay

## A.2. Capital Flows Offsetting During the Tequila Crisis and the Emerging Market Crisis



*Note:* Figure shows the statistic for each flow type, which is defined as the yearly change in the annualized flow in a quarter minus its rolling mean until that quarter, everything divided by the rolling standard deviation of the net flows until that quarter. We divide the sample into three groups: Net SS: countries that experienced a net sudden stop, Gross SS: countries that faced a gross sudden stop but no net SS and, No SS: countries that did not experience a sudden stop. Net SS Sample: Argentina, Chile, Guatemala, and Mexico. Gross SS Sample: Brazil. No SS Sample: Bolivia, Nicaragua, and Peru.



*Note:* Figure shows the statistic for each flow type, which is defined as the yearly change in the annualized flow in a quarter minus its rolling mean until that quarter, everything divided by the rolling standard deviation of the net flows until that quarter. We divide the sample into three groups: Net SS: countries that experienced a net Sudden Stop, Gross SS: countries that faced a gross Sudden Stop but no net SS and, No SS: countries that did not experience a Sudden Stop. Net SS Sample: Bolivia, Brazil, Chile, Ecuador, and Peru. Gross SS Sample: Argentina, and Guatemala. No SS Sample: Colombia, Mexico, and Nicaragua.

### ***A.3. Description of the Model by Calvo, Izquierdo, and Loo-Kung (2012)***

The estimate of the probability of having a Sudden Stop in 2020 follows Calvo, Izquierdo, and Loo-Kung (2012) for 15 Latin American countries: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Peru, Paraguay, and Uruguay. The model is not suited for dollarized economies, which are omitted (these countries are Ecuador, El Salvador, and Panama). Also excluded are the economies for which dollarization data are not available: The Bahamas, Barbados, Belize, Guyana, Haiti, and Suriname. Also, Venezuela is omitted because of data availability. Annual information for 2019 come from general government balance, reserves, current account balance, and data from each country's central bank for gross liabilities dollarization. Data for general government net lending/borrowing, observed reserves, and current account balance as a percentage of GDP come from WEO. For gross domestic liabilities dollarization (GDLD), GDP data in current local currency from World Development Indicators (WDI) are used; deposits included in broad money, transferable deposits included in broad money, and liabilities to non-residents are from IFS of IMF. GDLD is calculated as a sum of foreign liabilities and the deposits in foreign currency to total deposits ratio, weighted by the nominal GDP. The deposits in foreign currency to total deposits ratio is calculated using data from each central bank.

To obtain the probability of having an SS in 2020, the authors follow the estimated form in Calvo, Izquierdo, and Loo-kung (2012) and replace the 2019 values for each of the 15 countries mentioned above. The functional form is:

$$P(SS_t = 1) = \Phi(\alpha_0 + \alpha_1 NetDLD_{t-1} + \alpha_2 FiscalBal_{t-1} + \alpha_3(1 - \omega_{t-1}(CA)) + \alpha_t),$$

where  $\Phi(.)$  is the standard normal cumulative distribution,  $NetDLD_{t-1}$  is the Net Liabilities Dollarization, which is the Liabilities Dollarization net of international reserves,  $FiscalBal_{t-1}$  is the fiscal balance  $(1 - \omega_{t-1}(CA))$  represents the change in the real exchange rate that results from a stop in financing, note that  $\omega_{t-1}(CA)$  depends on the Current Account Balance,<sup>9</sup> and  $\alpha_t$  is a time dummy found with a restricted ML.

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<sup>9</sup> For a detailed explanation of the construction of  $\omega_{t-1}(CA)$  refer to Calvo, Izquierdo, and Loo-Kung (2012).

#### A.4. Assessing the Model's Performance

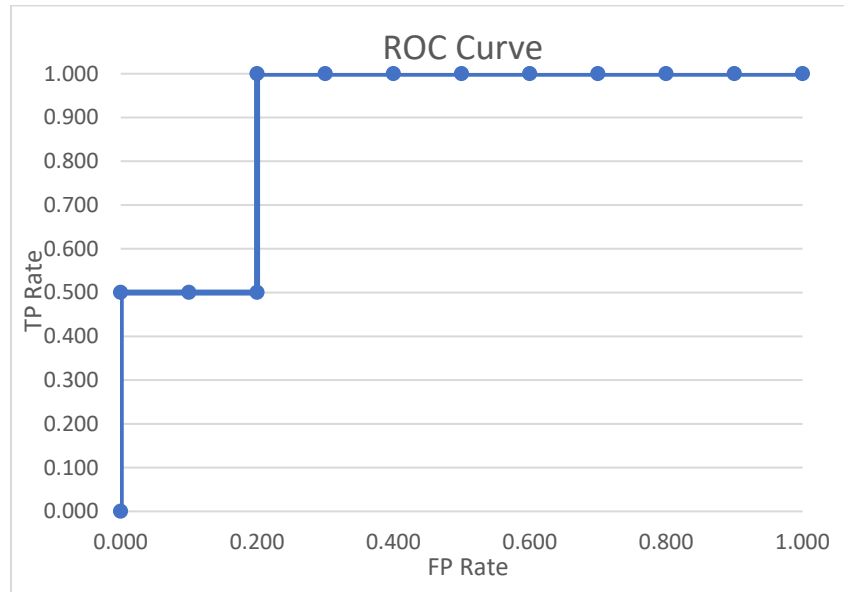
To evaluate the ability to identify the most vulnerable economies of the model by Calvo, Izquierdo, and Loo-Kung (2012), we use machine learning techniques. We generate a signaling model that gives a positive SS signal whenever the estimated probability is above a given threshold and calculate the true positive and false positive rates given the observed data. Formally, these rates are:

$$TPR = \frac{TP}{TP+FN}, \text{ and } FPR = \frac{FP}{FP+TN},$$

where  $TPR$  is the true positive rate,  $TP$  are the true positive values,  $FN$  are the false negative values,  $FPR$  is the false positive rate,  $FP$  are the false positive values, and  $TN$  are the true negative values.

Then we repeat the process for all possible thresholds and plot the relationship between the true positive and false positive rates, in the signaling machine learning literature this is called the Receiver Operating Characteristic (ROC) curve, shown in Figure A.4.1.

**Figure A.4.1. ROC Curve for Model's Predictions**



When the threshold is very high, all signals are negative, that is the (0,0) as the threshold falls positive signals appear, some true other false. When the threshold is sufficiently low all signals are positive, all positives are true positives, all negatives are false positives, hence the (1,1)

point. At the middle part of the curve, the critical points happen when the threshold reaches one of the model's predicted values, turning that signal into a positive. If it is a true positive the curve will jump up; otherwise, it will jump to the right.

The area under this curve (AUROC) is generally used as a measure of signal strength. When all positives are ranked above all negatives, hence the model perfectly discriminates, the AUROC is 1.0 as all jumps up come before all jumps to the right. A random signal should generate an AUROC of 0.5, as false positives and negatives appear randomly as the threshold decreases. Values below the 0.5 suggest the signal is better at predicting the opposite behavior, that is the signal predicts negatives, not positives. On the machine learning literature, an AUROC over 0.7 is understood as a good performance. In our case, the AUROC has a value of 0.9, suggesting that the model ranking is informative, and it fits very well. This is because the two observed SSNs are among the top four of most vulnerable economies according to the model.