















































































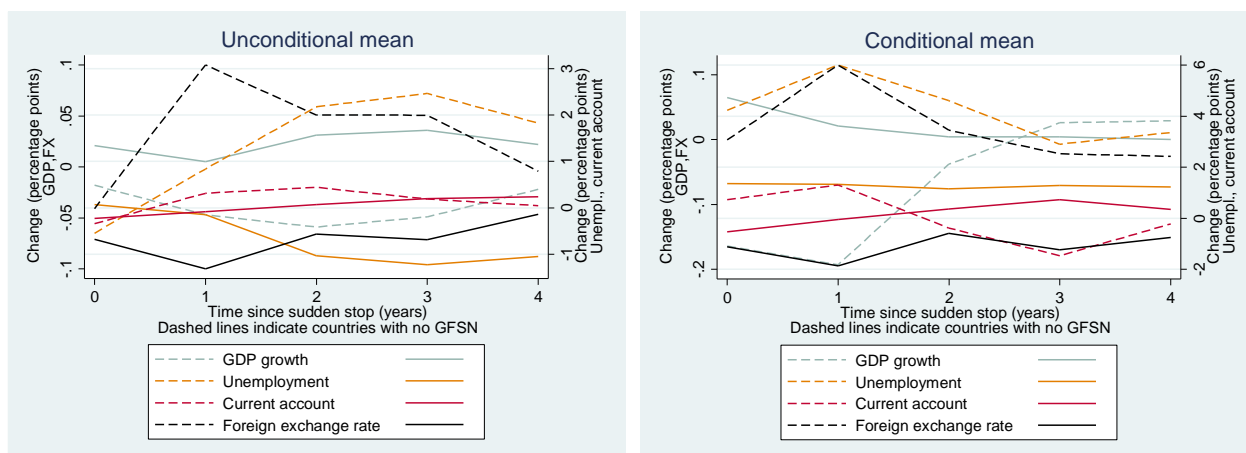




GFSN availability in  $t - 1$  measured by one of the aggregate GFSN measures and  $ss_{i,t}^{GFSN_{t-1}} = ss_{i,t} * GFSN_{i,t-1}$ . In other words,  $ss_{i,t}^{GFSN_{t-1}}$  indicates a sudden stop in year  $t$  interacted with one of the aggregate measures of GFSN coverage in  $t - 1$ .  $y_{i,t+h-1}$  denotes the lagged value of the dependent variable prior to the sudden stop and  $z_{i,t+h}$  denotes a vector of control variables.

### Chart 7

#### Developments in key macroeconomic variables around sudden stops



Source: Authors' calculation. Positive changes in FX denote devaluation of currency.

**Chart 7** shows the developments in four key macroeconomic indicators as an unconditional mean in the left panel (i.e. the coefficients  $\beta_h$  and  $\beta_h + \theta_h$  of equation (2)) and as a conditional mean (i.e. the coefficients  $\beta_h$  and  $\beta_h + \theta_h$  of equation (1)) in the right panel. The dashed line shows developments after a sudden stop for countries with no GFSN availability, i.e.  $\beta_h$ .

$$y_{i,t+h} = \alpha_i + \lambda_t + \beta_h ss_{i,t} + \zeta_h GFSN_{i,t-1} + \theta_h ss_{i,t}^{GFSN_{t-1}} + \epsilon_{i,t+h} \quad (2)$$

While it is obvious from the unconditional mean that developments in countries with at least some GFSN availability were more favourable after a sudden stop than developments in countries with no GFSN availability, the conditional mean in addition highlights that countries with GFSN availability seem to experience less volatility in key macroeconomic indicators and return more quickly to pre-crisis levels.

**Table 7** shows the detailed local projections for four macroeconomic variables which are provided in the database. The top half of the table shows the coefficient  $\beta_h$  of a conditional mean, using the ordinal measure of GFSN access GFSN\_COUNT, for a local projection for the variables GDP, foreign exchange rate, current account balance and unemployment rate. The bottom half of the table shows the coefficient  $\theta_h$ .

**Table 7** illustrates that – conditional on the level of the current account, GDP growth, in the preceding year, as well as on the foreign exchange rate, the unemployment rate, exports and debt as a share of GDP, the Chinn-Ito measure of capital account openness, the overall restrictions index by Fernández et al. (2015), a country's share

in world GDP and the VIX index – economies which experience a sudden stop tend to also experience a significant drop in GDP during the year of the sudden stop and the year following the sudden stop. The foreign exchange rate significantly depreciates during the year of the sudden stop and the year after the sudden stop, but shows an (albeit insignificant) upward adjustment from year  $t+2$ . The current account balance increases during the year of the sudden stop and the following year. The unemployment rate is up to one percentage point higher for at least two years after the sudden stop.

**Table 7**  
Local projections on sudden stops – ordinal GFSN measure

	(1) T	(2) T+1	(3) T+2	(4) T+3	(5) T+4
<b>Coefficient of the sudden stop in <math>t</math> (<math>\beta_n</math>)</b>					
<b>GDP (log)</b>	-0.146* (0.066)	-0.146** (0.016)	0.021 (0.049)	0.075 (0.073)	0.051 (0.062)
<b>FX (log)</b>	0.110** (0.047)	0.117** (0.046)	-0.001 (0.036)	-0.079 (0.076)	-0.032 (0.066)
<b>Current account balance</b>	3.086* (1.527)	2.926** (1.335)	1.687 (1.883)	0.527 (1.375)	1.638 (1.192)
<b>Unemployment rate</b>	1.063* (0.698)	0.989 (0.668)	-0.827* (0.427)	-1.660** (0.720)	-0.270 (0.410)
<b>Coefficient of the interaction term between the sudden stop in <math>t</math> and GFSN coverage in <math>t-1</math> (<math>\theta_h</math>)</b>					
<b>GDP (log)</b>	0.044* (0.025)	0.016 (0.026)	-0.027 (0.023)	-0.032 (0.033)	-0.022 (0.026)
<b>FX (log)</b>	-0.031* (0.015)	-0.021 (0.020)	0.011 (0.016)	0.025 (0.030)	0.015 (0.027)
<b>Current account balance</b>	-0.440 (0.618)	-0.561 (0.644)	-0.025 (0.750)	-0.554 (0.399)	-0.622 (0.524)
<b>Unemployment rate</b>	-0.307 (0.257)	0.026 (0.227)	0.293* (0.175)	0.530** (0.235)	0.097 (0.164)

Notes: Estimation with FE OLS, including a time trend; standard errors adjusted for clustering. Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Estimation based on GFSN measure GFSN\_COUNT. Vector of control variables  $z_{t+h-1}$  includes GDP, FX, CA, unemployment rate, imports, exports and debt as a share of GDP, the Chinn-Ito measure of capital account openness and the overall restrictions index by Fernández et al. (2015), a country's share in world GDP and the VIX index. Respective dependent variables included as first lag.

The bottom half of **Table 7**, illustrating effects of past GFSN availability based on an ordinal measure, suggests that effects of the sudden stop are mitigated particularly during the year of the sudden stop. GDP growth is higher and the exchange rate does not depreciate as much in countries with GFSN access. Interestingly, **Table 7** also suggests that countries with GFSN access prior to a sudden stop experience a higher unemployment rate than countries without past GFSN access in years  $t + 2$  and  $t + 3$ .

**Table 8** shows the same analysis as in **Table 7**, albeit based on the measure GFSN\_CARD. When defining the sample using the non-binary measures of past GFSN availability of which GFSN\_CARD is composed, the local projections shown in the top half of the table suggest similar negative effects of a sudden stop on key macroeconomic variables as the local projections based on the ordinal GFSN measure in **Table 7**. However, the mitigating effect of GFSN access, as illustrated by the bottom half of **Table 8**, is less pronounced than when using the ordinal GFSN measure. There is no significant difference in GDP growth between countries without and with GFSN access. The depreciation of the currency is significantly less strong

in countries with GFSN access, but of limited economic significance. However, the local projections based on the cardinal measure of past GFSN access do not indicate a significantly higher unemployment rate among those countries with GFSN access. It seems that a higher GFSN coverage in the sense of a larger assistance package is mainly visible in differences in current account developments during  $t + 3$  and  $t + 4$ .

**Table 8**  
Local projections on sudden stops – cardinal GFSN measure

	(1) T	(2) T+1	(3) T+2	(4) T+3	(5) T+4
<b>Coefficient of the sudden stop in <math>t</math> (<math>\beta_{it}</math>)</b>					
<b>GDP (log)</b>	-0.107* (0.056)	-0.091* (0.052)	0.023 (0.041)	0.039 (0.062)	0.023 (0.058)
<b>FX (log)</b>	0.087** (0.039)	0.089* (0.045)	0.001 (0.037)	-0.042 (0.065)	0.005 (0.053)
<b>Current account balance</b>	1.637 (1.371)	1.169 (1.257)	1.722 (1.552)	0.242 (1.164)	1.862** (0.740)
<b>Unemployment rate</b>	0.700 (0.607)	1.128* (0.653)	-0.464 (0.342)	-1.048* (0.555)	-0.366 (0.273)
<b>Coefficient of the interaction term between the sudden stop in <math>t</math> and GFSN coverage in <math>t-1</math> (<math>\theta_{it}</math>)</b>					
<b>GDP (log)</b>	0.002 (0.001)	-0.001 (0.002)	-0.002 (0.001)*	-0.001 (0.002)	-0.001 (0.001)
<b>FX (log)</b>	-0.002** (0.001)	-0.001 (0.001)	0.001 (0.001)	0.001 (0.002)	0.000 (0.001)
<b>Current account balance</b>	0.007 (0.035)	0.019 (0.048)	-0.004 (0.047)	-0.031 (0.029)	-0.061** (0.029)
<b>Unemployment rate</b>	-0.011 (0.016)	-0.006 (0.016)	0.006 (0.009)	0.156 (0.014)	0.013 (0.009)

Notes: Estimation with FE OLS, including a time trend; standard errors adjusted for clustering. Significance level: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Estimation based on GFSN measure GFSN\_CARD. Vector of control variables  $z_{i,t+h-1}$  includes GDP, FX, CA, unemployment rate, imports, exports and debt as a share of GDP, the Chinn-Ito measure of capital account openness and the overall restrictions index by Fernández et al. (2015), a country's share in world GDP and the VIX index. Respective dependent variables included as first lag.

**Table 9** complements this picture with the same analysis, now based on GFSN\_OVERALL, the measure of *potential* GFSN coverage. The picture for the sample with low potential GFSN coverage is similar to the picture based on ordinal actual GFSN coverage: GDP first drops significantly during  $t$  and  $t + 1$  before rebounding again from  $t + 3$ , while the foreign exchange rate first depreciates and then appreciates. Similarly, the unemployment rate rises first and then decreases from  $t + 3$ . A significant difference for those countries with very high potential GFSN coverage appears only for the year of the sudden stop. GDP is significantly higher during the year of the sudden stop, while the foreign exchange rate depreciates significantly less. However, there is no significant difference in the unemployment rate.



**Table 9**

## Local projections on sudden stops – potential GFSN measure

	(1) T	(2) T+1	(3) T+2	(4) T+3	(5) T+4
<b>Coefficient of the sudden stop in t (<math>\beta_n</math>)</b>					
<b>GDP (log)</b>	-0.117** (0.054)	-0.136*** (0.048)	-0.002 (0.042)	0.049 (0.056)	0.046 (0.046)
<b>FX (log)</b>	0.098** (0.038)	0.112*** (0.035)	0.015 (0.033)	-0.047 (0.057)	-0.027 (0.049)
<b>Current account balance</b>	2.794* (1.516)	2.236* (1.124)	1.491 (1.349)	0.197 (1.199)	0.942 (0.801)
<b>Unemployment rate</b>	0.941* (0.550)	1.178* (0.610)	-0.366 (0.319)	-1.083 (0.551)*	-0.233 (0.284)
<b>Coefficient of the interaction term between the sudden stop in t and GFSN coverage in t-1 (<math>\theta_n</math>)</b>					
<b>GDP (log)</b>	0.037* (0.021)	0.015 (0.027)	-0.034 (0.021)	-0.035 (0.035)	-0.040 (0.026)
<b>FX (log)</b>	-0.035** (0.014)	-0.026 (0.019)	0.007 (0.016)	0.021 (0.029)	0.034 (0.026)
<b>Current account balance</b>	-0.260 (0.531)	-0.220 (0.686)	0.078 (0.665)	-0.588 (0.378)	-0.286 (0.398)
<b>Unemployment rate</b>	-0.336 (0.228)	-0.125 (0.262)	0.087 (0.143)	0.266 (0.228)	0.020 (0.143)

Notes: Estimation with FE OLS, including a time trend; standard errors adjusted for clustering. Significance level: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Estimation based on GFSN measure GFSN\_OVERALL. Vector of control variables  $z_{i,t+h-1}$  includes GDP, FX, CA, unemployment rate, imports, exports and debt as a share of GDP, the Chinn-Ito measure of capital account openness and the overall restrictions index by Fernández et al. (2015), a country's share in world GDP and the VIX index. Respective dependent variables included as first lag.







Macedonia (SBA, approved 30 April 2003), Peru (SBA, approved 1 February 2002), Turkey (SBA, approved 4 February 2002) and all arrangements for Samoa. The programmes for the Republic of Yugoslavia and for Serbia and Montenegro are also excluded from the database as they cannot be clearly attributed to one specific country at this stage. The SBA (2009) for Dominica is not included either.

## Details on the compilation of the indicators of IMF support

Annualised data drawn from the MONA database is the basis for the indicators *IMFAgreedTotaltoGDP* and *IMFDrawtoGDP*. Inter alia, MONA contains information on the amount agreed for each programme and on funding disbursed to a country (its “purchases” of SDRs). To measure access to Fund support, this paper focuses on the total programme envelope, the funding which has originally been planned to be disbursed and on the funding which has actually been disbursed. MONA data as provided by the Fund are not organised by year, but by programme and by review. The information on agreed and drawn amounts is compiled from the information on the programme envelope and from the information on planned and actual disbursements during each review. This includes revisions of the total programme envelope during the course of a programme. Annualising the data implies that some disbursements may be listed for years without a corresponding IMF arrangement. Such disbursements are related to revised disbursement schedules of previously agreed programmes. Moreover, if more than one programme took place during a year aggregated amounts may cover more than one programme. A variable (*IMFNrofProgrammes*) indicates the number of on-going programmes during a year.

For years 1992-2014 MONA data on the programme envelope is only supplemented for 24 country-year observations and for 591 country-year observations on drawn amounts and data on where information on a programme envelope was not provided in MONA. The additional information on the programme envelope only relates to years 1992 and 1993 for which the coverage in MONA is less comprehensive than for following years.<sup>30</sup> Drawn amounts are supplemented for more years, but mostly for years prior to 2002 for which MONA data is provided in a different format.<sup>31</sup>

The information on IMF support in the IFS is provided for programme envelope and undrawn amount, for SBAs, EFFs, ESAFs and SAFs for years 1980-2009. The drawn amount is calculated as the difference between agreed and undrawn amount. It should be noted that the agreed amount provided in the IFS refers to the total programme envelope, but that this information in the IFS is not provided for every year of the programme if no amount was drawn after the year of programme approval. Moreover, while the total programme envelope in IFS data largely

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<sup>30</sup> These observations include inter alia programmes which have been agreed early in 1992, such as Guatemala's precautionary SBA which had been agreed in 1992 and expired in 1994, Panama's SBA which had been agreed in 1992 and expired in 1993 and which was not fully drawn, and Jordan's SBA which had been agreed in 1992 and which expired in 1994.

<sup>31</sup> The IMF provides MONA data for years 1992-2002 as so-called "Archived MONA" which on some occasions has different labels from the data from 2002 and a slightly different recording of reviews, which is the information on which the calculation of the drawn amount is based.

corresponds to the total programme envelope provided in the MONA data base for years 1992-2009, the figures are not identical for all years. It may be possible that these (rather small) divergences are related to the fact that IFS data on a country's transactions with the IMF stem from its b.o.p. reporting.

The information from the World Bank International Debt statistics provided for drawings from the IMF's GRA can complement the information from MONA and IFS further. World Bank data on IMF support contains longer time series than the IFS. However, since the World Bank data refers to drawings from the GRA, it includes non-concessional financing, and therefore does not report all drawings which are listed on the IMF's website. Hence, the additional information provided by the World Bank data should be considered complementary, but not fully comprehensive information, particularly for years 1966-1980 for which the World Bank is the only source for the variable *IMFDrawtoGDP*.

Information on the agreed amounts between 1960 and 1980 is added from the IMF website using its Financial Data Query tool. This tool allows listing all programme agreement dates and types, including the agreed amount. For adding this information to the variable *IMFAgreedTotaltoGDP*, the date of the arrangement is considered the starting year while the expiration date is considered the final year. The amount agreed, i.e. the total programme envelope, is transformed from SDR into USD using year end exchange rates, and then divided by GDP in current USD. Similar to the approach for MONA data, the programme envelope is summed if there was more than one programme per year. While the IMF website also provides information on two subsequent programmes, it does not provide the corresponding arrangement numbers. Hence, for years 1960-1980, arrangement numbers are not included in the data base. However, it is possible to detect a second programme (which in these times were mostly SBAs) if the total programme envelope changes significantly (i.e. not just driven by marginal changes in GDP) from one year to the next.

## B – Details on measuring private capital flows

There are two main concepts for recording international capital flows which have been used for the analysis of financial flows and positions. The standard balance of payments (b.o.p.) provides information on capital flows between residents and non-residents, whereas the recording of the international investment position (i.i.p.) provides information on stocks of financial assets and liabilities. This implies that the researcher interested in (sudden) capital movements, particularly at shorter frequencies, should prefer to look at the flows recorded in the b.o.p.

### Private versus public flows

Both public and private capital flows, which are also the basis for the financial position recorded in the i.i.p., are accounted for in the financial account of the b.o.p.

For the context of this paper, it is useful to consider the financial account as being composed of public and private flows (see also Bayoumi et al., 2015):

$$\text{Financial account} = \text{public flows} + \text{private flows}$$

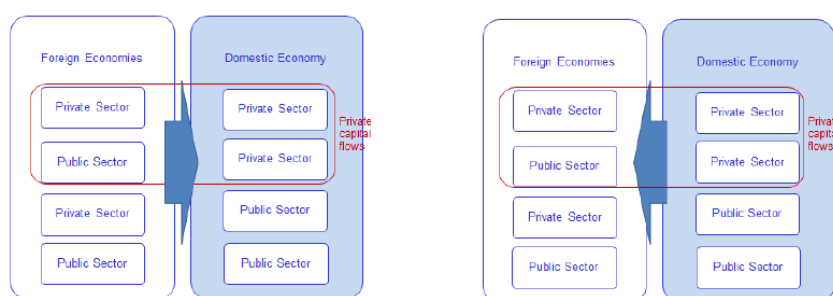
However, both the i.i.p. and the financial account recording of the b.o.p. list assets and liabilities by functional category, which include (i) direct investment, (ii) portfolio investment, (iii) financial derivatives (other than reserves and employee stock options), (iv) other investment, and only for assets (v) reserve assets. Consequently, public flows have to be separated from private flows for these functional categories. For example, according to BPM 6, IMF loans and SDR allocations are recorded under “other investment”, while SDR holdings are recorded as “reserve assets”.

Consequently, private flows can either be derived separately from these b.o.p. items or calculated as the financial account net of public flows, and the approach in the few papers which have attempted to do so depends on the research question. To show an inverse relationship between public and private capital flows, Dasgupta and Ratha (2000) define FDI flows and all portfolio flows as private, and official flows as all bilateral governmental and multilateral flows other than those related to the IMF. Milesi-Ferretti and Tille (2011) select those items of the b.o.p. where a bank is involved in the transaction to measure financial integration. By contrast, Bayoumi et al. (2015) aim to single out public capital flows. They sum reserves and net portfolio investment and other investment for central bank and general government, making adjustments for countries with e.g. large pension funds or sovereign wealth funds. Alfaro et al. (2014) focus on private flows, acknowledging the difficulty of differentiating between public and private issuers and holders of debt securities. Particularly for “debt securities” which are recorded under “portfolio investment” (b.o.p. item 3.2), it is difficult to distinguish between public and private issuers and holders of debt securities. For this reason, Alfaro et al. (2014) combine IMF b.o.p. data with the World Bank’s Global Development Finance database, which contains this information for developing countries, and consequently focus their analysis on developing countries. The approach to approximating private sector capital flows based on b.o.p. statistics is similar to Alfaro et al. (2014) and Lane and Milesi-Ferretti (2001). In particular, this paper also counts errors and omissions, which denote the accounting difference between inflows and outflows, as unrecorded capital outflows such that they are added as part of private debt assets. However, the approach differs in a main respect in that this paper looks at gross instead of net flows.

In addition, some assumptions are needed as b.o.p. statistics are not bilateral. Consider the depiction of capital inflows and capital outflows in Figure 1. A proper identification of private capital inflows and outflows requires data from both the creditor and the debtor side. From the b.o.p. statistics it can be inferred whether the flow to or from the domestic economy is to or from the public or the private sector, but not the source or destination sector of the foreign economy. The source or destination sector in the foreign economy can be private or public. This leads to the four types of bilateral flows depicted in Figure 1. Consider inflows to the domestic economy first. As the source sector is not known, all flows which are recorded in the domestic private sector are treated as private and all flows which are recorded in the domestic public sector are treated as public. As long as it can be assumed that

foreign public capital flows which are eventually targeted at the private sector, such as foreign aid, are first channelled via the public sector in the domestic economy, the measure of private flows largely excludes those flows which should be considered public. A similar logic can be applied to outflows by considering all outflows from the private sector as private and all outflows from the public sector as public.

**Figure 1**  
Identification of private capital inflows and outflows



Notes: Inflows are defined as (private and public) flows from foreign investors to the domestic private sector. Outflows are defined as flows from private agents resident in the domestic country, investing in (public or private) assets abroad.

## Inflows versus outflows

While most earlier studies have focused on net capital inflows, more recent studies have looked at gross outflows and gross inflows separately to better gauge foreign and domestic triggers of capital flows. It is important to stress, as already noted by Forbes and Warnock (2012), that “gross inflows is the net of foreign purchases and foreign sales of domestic assets, while gross outflows is the net of domestic residents’ purchases of foreign assets and domestic residents’ sales of foreign assets”. In other words, gross inflows effectively measure net financial transactions by non-residents and gross outflows measure net financial transactions by residents. Consequently, net inflows/outflows denote the difference between domestic and foreign net flows. Looking at net flows would not allow a distinction to be made between changes in foreign and domestic flows.

As the new edition of the IMF’s Balance of Payments Manual (BPM6) was introduced in 2012, with effect on data series from 2005, differences between BPM5 and BPM6 are also reflected in the data. Specifically, b.o.p. data from 2005 onwards are accounted for according to BPM6. For the financial account, which is the source of the data on capital flows, changes are minor. First, “reverse investment” in “direct investment” was reclassified, which does not affect the composition of private capital flows since this paper assumes that all direct investment is by definition private. In addition to some changes in the accounting of portfolio investment, BPM6 switched the sign for gross outflows. While the database contains the data accounted for under BPM6 for years after 2005, the data are included according to the BPM5 signing convention, i.e. similar to earlier research outflows are denoted with a negative sign.



In contrast to Forbes and Warnock (2012), this approach cannot distinguish between foreign and domestic investors. However, this paper does not focus on the behaviour of investors. To gauge the adequacy of the GFSN during past capital flow episodes, it is important to adequately capture private flows, but not the type of investor. Moreover, residency-based capital flow data can be heavily distorted by the use of tax havens or low-tax areas.

While the capital flow data in the database are annualised, they are available quarterly. When only focusing on the behaviour of capital flows, data at a higher frequency than annual is useful owing to the high volatility of capital flows particularly around crises. Moreover, capital flow episodes may not span more than one year. Consequently, particularly for analysing capital flow episodes, using at least quarterly data should be preferable. However, data for two of the four elements of the GFSN (harmonised reserves data by country and RFA access) are not available quarterly. Therefore, the database includes annual data also for capital flows, but note that the methodology could in principle also be applied to quarterly data.

In addition, a concern should be noted which led Alfaro et al. (2014) to focus their paper on developing economies only. The distinction between private and public entities in “portfolio investment” and “other investment” is not available for all IMF-reporting countries for longer time series. Particularly during the 1970s and 1980s, separate data for public and private entities are not available for many countries. Moreover, the fact that information is missing for those years for some countries may not be random and could be related to the degree of financial integration of a country or to its exchange rate regime. Despite these data issues, the consistency of accounting of b.o.p. data and availability for most countries makes it a valuable source at least for analysing episodes since the mid-1990s and the interaction between the GFSN and private capital flows.

Data coverage for b.o.p. capital flows is limited particularly for years earlier than the 1990s and for many developing economies. Corresponding to the size of the economies, the size of capital flows differs across countries. This implies that for some emerging and developing economies in the sample, hardly any capital flows are recorded. Moreover, as capital flows were generally smaller during the 1970s and 1980s, there are fewer non-missing observations for those years. In addition, since b.o.p. reporting is voluntary for some items, non-random non-reporting by some countries cannot be ruled out.

To deal with large numbers of missing data and zeros particularly for developing countries and for years prior to 1990, the sample is restricted for the analysis of sudden stops to the 80% largest economies or 72 countries in total. Although this is a reduced and possibly non-randomly restricted sample, it contains the non-negligible capital flows. Moreover, since this paper treats errors and omissions as unrecorded capital outflows, this may help to address at least part of the bias resulting from “non-zero zeros” in the data.

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