Taming the Global Financial Cycle:
What Role for the Global Financial Safety Net?

Beatrice Scheubel
Livio Stracca
Cédric Tille

ECB and CESifo
ECB
Graduate Inst. and CEPR

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The views in this paper are those of the authors and do not reflect the views of the European Central Bank.
How can countries handle capital flows?

- Capital flows are highly volatile.
  - Retrenchment in the global financial crisis (Bussiere, Schmidt, and Valla 2016, McQuade and Schmitz 2016, Milesi-Ferretti and Tille 2011).
  - Sudden stops a long standing issue in emerging markets (Cavallo, Powell, Pedemonte, and Tavella 2015).
- Recent emphasis on global nature of capital flows cycle (Forbes and Warnock 2012; Ghosh et al. 2012, Rey 2016).
- What can policy makers do to shield their economies?
  - Do some work better than others?
Our contribution: heterogeneous GFSN

- Construct a measure of the Global Financial Cycle (GFC) from a factor analysis with sign restrictions.
  - Not correlated with a country’s openness or GFSN coverage.
  - Our GFC correlates well with episodes of large capital flows.
  - Sensitivity to the indicators included (capital flows, price vs. quantities), period covered, and types of episodes.
- Assess macroeconomic impact of episodes of large capital flows, and usefulness of GFSN.
  - Sudden stops and episodes lower growth and depreciate the currency.
  - Heterogeneous impact of GFSN.
  - Limited support that GFSN availability helps, no evidence that actual use does much.
Related literature (1)

- Literature on episodes of large capital flows.
  - Initial focus on sudden stops (Cavallo, Powell, Pedemonte, and Tavella 2015, Levchenko and Mauro 2006).
  - Other types of episodes: surges, flights, retrenchments (Forbes and Warnock 2012; Ghosh et al. 2012).
- Sizable role of global “push” factors (Vix, US interest rate).
  - Role of push factors may be time-varying (Comelly 2015, Fratzscher 2011).
Related literature (2)

- Recent emphasis on the Global Financial Cycle, with possible dilemma (Passari and Rey 2015, Rey 2016).
  - Debate on trilemma vs dilemma ongoing (Aizenman, Chinn and Ito 2015, Choi, Kang, Kim and Lee 2017; Cerutti, Claessens and Rose 2017).
  - Global Cycle may matter more in periods when financial constraints bind.
- Role of macroprudential policy (Mendoza (2010), Bianchi et al. 2013, Korinek and Mendoza 2013).
  - Recent compilation of data on tools focused on international capital flows (Scheubel and Stracca 2016).
  - Distinguish between potential access (parallel with deposit insurance) and actual use.
A new measure of the global cycle

- Principal component with sign restrictions. Similar to Eickmeier et al. (2014), where $F_t$ is a set of $N_F$ factors:

$$x_t = \alpha + \beta F_t + \varepsilon_t$$

- Median from all rotations that satisfy the restrictions.
- We make no assumption on the fundamental driver of the GFC (say US monetary policy, or global risk aversion)
- The baseline measure includes restrictions of portfolio flows, which may give rise to concerns of circularity.
  - We consider a variant without restrictions on capital flows,
  - We consider a “price only” measure with no restrictions on quantities.
- Correlation is good, but not perfect, with other measures (Vix, Miranda-Agrippino and Rey 2015).
### Restrictions

Table 2: Sign restrictions imposed for the computation of the Global Financial Cycle

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Transformation</th>
<th>Sign of the correlation with GFC</th>
<th>Main reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMP of EME, EMBI spread, VIX</td>
<td>Level, standardised</td>
<td>-</td>
<td>Banerjee et al. (2016); Miranda Agrippino and Rey (2015)</td>
</tr>
<tr>
<td>Credit to GDP, G7 Real house price, G7 World equity price Relative world equity price of banks Leverage of broker/dealers</td>
<td>Detrended level, standardised</td>
<td>+</td>
<td>Miranda Agrippino and Rey (2015); Bruno and Shin (2015)</td>
</tr>
<tr>
<td>Portfolio flows to EME</td>
<td>Level, standardised</td>
<td>+</td>
<td>Bruno and Shin (2015); Banerjee et al. (2016)</td>
</tr>
</tbody>
</table>

*Notes:* All restrictions are imposed on the loading of each variable on the first factor. Notes: See Eickmeier et al. (2014) for details on the methodology.
Estimates of the GFC

Figure 3: Measures of the Global Financial Cycle.

Notes: The blue line indicates the median baseline measure of the GFC, the green line the variant without restrictions on capital flow measures, and the purple one is the price-only variant.
GFC and capital flows

- We focus on episodes of large capital flows (following Forbes and Warnock 2012), and currency crises (Laeven et Valencia 2012).
  - Focus on private flows.
- We assess the global nature of flows by regressing (logit):
  \[ \Pr(Episode_{i,t} = 1) = \alpha_i + \beta GFC_t + \gamma X_t + \epsilon_{i,t} \]
- The GFC matter for the various types of episodes.
  - Sensitivity to type of flows and exact sample.
- We also interact the GFC with a country index of financial vulnerability.
  - Indicators of vulnerability play little role, showing the global nature of episodes.
Macroeconomic impact of episodes

- Impact on a macroeconomic variable $x_{i,t}$ (growth, inflation, exchange rate, ...).
  \[ x_{i,t+h} = \alpha_i + \lambda_t + \beta \text{Episode}_{i,t} + \rho x_{i,t-1} + \varepsilon_{i,t+h} \]
- OLS estimates, local projection (Jorda 2005) estimate of impact of episode at $t$ on variable at $t+h$.
- For brevity focus on sudden stops and currency crises (in appendix slides).
- Impact as expected.
  - Lower GDP.
  - Weaker currency.
  - Higher inflation.
  - Lower private inflows.
Impact of a sudden stop

- Real GDP growth
- Log bilateral FX vs. USD
- Inflation
- Current account/GDP
- Log capital inflows/GDP
- Log capital outflows/GDP
- Domestic credit/GDP
- Net trade/GDP
Does the GFSN help?

- Focus on two main instruments: foreign reserves and IMF program.
- Distinguish access from actual use.
  - IMF: access proxied by quota, use by disbursed program.
  - Reserves: access as reserves/GDP, use by deviation from trend.

\[
\text{ResUse}(2)_t = |\text{ResFlow}_t - \overline{\text{ResFlow}_{t-1,t-5}}| \\
\text{if } \text{ResFlow}_t < \overline{\text{ResFlow}_{t-1,t-5}} - \text{Stdev(ResFlow}_{t-1,t-5})
\]

- Assess how IMF and reserves impact the path of a variable during a capital flow episode: 
  \[
z_{i,t}^h = (x_{i,t+h} - x_{i,t}) \times \text{Episode}_{i,t}.
\]
  \[
z_{i,t}^h = \alpha_i + \beta_{IMFA}^h \text{IMFAccess}_{i,t-1} + \beta_{RESA}^h \text{ResAccess}_{i,t-1} + \varepsilon_{i,t}^h
\]
- Similarly for \text{IMFUse}_{i,t} and \text{ResUse}_{i,t}.
- OLS estimates. As use can be endogeneous, instrument with reserve/GDP, IMF quota, and past IMF programs.
Evidence for GFSN usefulness

- Some evidence that access helps.
  - In a sudden stops reserves lower inflation, IMF sustains capital inflows.
  - In a currency crisis reserves support growth and limit the exchange rate depreciation, IMF supports growth.

- No evidence that actual use of GFSN helps.
  - Regardless of use of IV or not.
Reserves access in a sudden stop

<table>
<thead>
<tr>
<th>Diff. in real GDP growth * episode</th>
<th>Diff. in log FX vs. USD * episode</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Graph showing differences over years]</td>
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</tbody>
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<tr>
<th>Diff. in inflation * episode</th>
<th>Diff. in CA/GDP * episode</th>
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<td>[Graph showing differences over years]</td>
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<tr>
<th>Diff. in log capital inflows/GDP * episode</th>
<th>Diff. in log capital outflows/GDP * episode</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Graph showing differences over years]</td>
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<table>
<thead>
<tr>
<th>Diff. in domestic credit/GDP * episode</th>
<th>Diff. in net trade/GDP * episode</th>
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<td>[Graph showing differences over years]</td>
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</tr>
</tbody>
</table>

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IMF access in a sudden stop

- **Diff. in real GDP growth**
- **Diff. in log FX vs. USD**
- **Diff. in inflation**
- **Diff. in CA/GDP**
- **Diff. in log capital inflows/GDP**
- **Diff. in log capital outflows/GDP**
- **Diff. in domestic credit/GDP**
- **Diff. in net trade/GDP**
Reserves access in a currency crisis

- Diff. in real GDP growth * episode
- Diff. in log FX vs. USD * episode
- Diff. in inflation * episode
- Diff. in CA/GDP * episode
- Diff. in log capital inflows/GDP * episode
- Diff. in log capital outflows/GDP * episode
- Diff. in domestic credit/GDP * episode
- Diff. in net trade/GDP * episode
IMF access in a currency crisis

- Diff. in real GDP growth * episode
- Diff. in inflation * episode
- Diff. in log FX vs. USD * episode
- Diff. in CA/GDP * episode
- Diff. in log capital inflows/GDP * episode
- Diff. in log capital outflows/GDP * episode
- Diff. in domestic credit/GDP * episode
- Diff. in net trade/GDP * episode
Reserves use in a sudden stop (IV)
IMF use in a sudden stop (IV)
Conclusion and further steps

- New measure of GFC, linked to episodes of large capital flows.
- Macroeconomic effects of sudden stops and currency crises are as expected.
- The GFSN can help absorb them to some extent.
  - Effectiveness of GFSN access, but contrasted across reserves and IMF support, and across types of episodes (stops vs. crises).
  - Actual GFSN use does not appear to help with episodes.
- Areas for future work.
  - Broaden range of instruments for GFSN use.
  - Impact of surges.
  - Consider magnitude of capital flows (instead of dummy).
APPENDIX
Components of the global cycle

Figure 1: Underlying components of the global financial cycle.

Notes: Underlying components of the global financial cycle. The data are detrended where appropriate and standardised for all variables.
# Contrast with other measures

**Table 3: Correlations of GFC measures**

<table>
<thead>
<tr>
<th></th>
<th>GFC: baseline</th>
<th>GFC: no-flows</th>
<th>GFC: price-based</th>
<th>MA-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>GFC: baseline</td>
<td>1</td>
<td>0.59 (0.66)</td>
<td>0.61 (0.61)</td>
<td></td>
</tr>
<tr>
<td>GFC: no-flows</td>
<td></td>
<td>1</td>
<td>0.73 (0.41)</td>
<td></td>
</tr>
<tr>
<td>GFC: price-based</td>
<td></td>
<td></td>
<td>0.59 (0.42)</td>
<td>1</td>
</tr>
<tr>
<td>MA-R</td>
<td>0.83 (0.74)</td>
<td>0.38 (0.52)</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>VIX</td>
<td>0.13 (-0.28)</td>
<td>-0.28 (-0.49)</td>
<td>-0.52 (-0.64)</td>
<td>-0.01 (-0.20)</td>
</tr>
</tbody>
</table>

*Notes:* The three GFC measures are our baseline, the variant with no restrictions on capital flows (no-flows), and the price-based variant. The MA-R measure is the global factor of Miranda-Agrippino and Rey (2015), and VIX is the VIX index. The correlations are computed on annual data, 1990 to 2014 or longest available sample. We end the sample in 2014 because this is the end year of the GFSN database in Scheubel and Stracca (2016).
### Definition of capital flows episodes

<table>
<thead>
<tr>
<th>Type</th>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surge</td>
<td>$\Delta c_t^i &gt; (m_4^{\Delta c_t^i} + 2sd_4^{\Delta c_t^i})$</td>
<td>Sharp increase in gross inflows</td>
</tr>
<tr>
<td></td>
<td>for at least 1 year; lasts as long as $\Delta c_t^i &gt; (m_4^{\Delta c_t^i} + sd_4^{\Delta c_t^i})$</td>
<td></td>
</tr>
<tr>
<td>Stop</td>
<td>$\Delta c_t^i &lt; (m_4^{\Delta c_t^i} - 2sd_4^{\Delta c_t^i})$</td>
<td>Sharp decrease in gross inflows</td>
</tr>
<tr>
<td></td>
<td>for at least 1 year; lasts as long as $\Delta c_t^i &lt; (m_4^{\Delta c_t^i} - sd_4^{\Delta c_t^i})$</td>
<td></td>
</tr>
<tr>
<td>Flight</td>
<td>$\Delta c_t^o &gt; (m_4^{\Delta c_t^o} + 2sd_4^{\Delta c_t^o})$</td>
<td>Sharp increase in gross outflows</td>
</tr>
<tr>
<td></td>
<td>for at least 1 year; lasts as long as $\Delta c_t^o &gt; (m_4^{\Delta c_t^o} + sd_4^{\Delta c_t^o})$</td>
<td></td>
</tr>
<tr>
<td>Retrenchment</td>
<td>$\Delta c_t^o &lt; (m_4^{\Delta c_t^o} - 2sd_4^{\Delta c_t^o})$</td>
<td>Sharp decrease in gross outflows</td>
</tr>
<tr>
<td></td>
<td>for at least 1 year; lasts as long as $\Delta c_t^o &lt; (m_4^{\Delta c_t^o} - sd_4^{\Delta c_t^o})$</td>
<td></td>
</tr>
</tbody>
</table>
Impact of a currency crisis
Reserves and IMF use in a sudden stop (OLS)
Reserves and IMF use in a currency crisis (OLS)
Reserves use in a currency crisis (IV)

- Diff. in real GDP growth * episode
- Diff. in log FX vs. USD * episode
- Diff. in inflation * episode
- Diff. in CA/GDP * episode
- Diff. in log capital inflows/GDP * episode
- Diff. in log capital outflows/GDP * episode
- Diff. in domestic credit/GDP * episode
- Diff. in net trade/GDP * episode
IMF use in a currency crisis (IV)

- Diff. in real GDP growth * episode
- Diff. in log FX vs. USD * episode
- Diff. in inflation * episode
- Diff. in CA/GDP * episode
- Diff. in log capital inflows/GDP * episode
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- Diff. in domestic credit/GDP * episode
- Diff. in net trade/GDP * episode