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Macro-Financial Linkages & Current Account Imbalances
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Disclaimer: The views on this presentation are the authors and should not be reported as those of The European Stability Mechanism
Official lending in exchange for conditionality is at the basis of the current crisis resolution framework → IMF as a Lender of Last Resort

(+) By providing financial resources and facilitating policy adjustment, official assistance programs reduce the potential for sharp investors’ reactions (Cottarelli and Giannini, 2002)

This is the (so-called) **catalytic effect of official assistance**

(-) If official lending bails-out private creditors, how can it catalyse private inflows? (IMF, 2013)
Catalysis is theoretically an option but has proved empirically elusive

In theory, catalysis can work


Still, empirical evidence of catalysis is at best mixed

Gosh et al. (2002), Edwards (2003), Saravia (2013)

Catalysis has been found on some circumstances

Eichengreen et al (2005), Broto et al. (2012), Erce (2012)

- **Empirical work has focused on net flows or specific market segments**

- **Theory work has focused on catalysis vis-a-vis foreign creditors**
Our approach: Focus on the Gross Flows composing the Net Flow

The literature on capital flows has recently started to focus on the heterogeneous dynamics of the (gross) components of the current account

- Cowan et al. (2007) or Broner et al. (2013)

Improved understanding of the driving forces behind net inflows

We bridge these two literature strands by asking ourselves the following:

**What is the effect of IMF lending on gross capital flows?**

(At least) Three ways of looking at this:

- **Capital entering vs. exiting the country** (Janus and Riera-Crichton, 2015)
- **Resident vis-a-vis foreign investors** (Broner et al., 2013)
- A combination of the above
Our story in a nutshell

- Catalysis is not to be found on foreign creditors. IMF loans do not ease the foreign flow.

- Catalysis is very significant vis-à-vis residents
  - Reduces fresh outflows
  - Induces retrenchment

- While IMF catalysis is found on portfolio flows, the domestic banks story seems to be the “big story”

- Domestic catalysis is stronger during debt crises and foreign catalysis weaker during banking and currency crises
Data

- 50+ countries, quarterly data 1990Q1-2009Q4
- IMF programs: IMF website. Only SBA & EFF. A wealth of information
- Capital flows: IMF’s Balance of Payments data
- Other controls: HY & FFR (DataStream), Capital mobility (Chinn-Ito), Real GDP (WEO)
A very quick look at the data

Table 1: IMF Program Summary Stats

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMF Ongoing Dummy</td>
<td>4332</td>
<td>0.231</td>
<td>0.421</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>IMF Program Size (SDR Mill)</td>
<td>147</td>
<td>1318.1</td>
<td>3229.9</td>
<td>11.6</td>
<td>22821.1</td>
</tr>
<tr>
<td>IMF Program Size (Rel Quota)</td>
<td>147</td>
<td>121.7</td>
<td>223.8</td>
<td>15</td>
<td>1938.5</td>
</tr>
<tr>
<td>IMF Amount Drawn (SDR Mill)</td>
<td>105</td>
<td>1459.3</td>
<td>3266.4</td>
<td>4</td>
<td>17199.6</td>
</tr>
<tr>
<td>IMF Amount Drawn (Rel to Total)</td>
<td>105</td>
<td>0.74</td>
<td>0.55</td>
<td>0.06</td>
<td>4.05</td>
</tr>
<tr>
<td>IMF Original Program Duration (Months)</td>
<td>147</td>
<td>20.1</td>
<td>9.4</td>
<td>5</td>
<td>36</td>
</tr>
<tr>
<td>IMF Actual Program Duration (Months)</td>
<td>147</td>
<td>20.6</td>
<td>10.2</td>
<td>5</td>
<td>49</td>
</tr>
<tr>
<td>Final - Original Duration (Months)</td>
<td>147</td>
<td>0.48</td>
<td>5.6</td>
<td>-26</td>
<td>17</td>
</tr>
<tr>
<td>Paris Club Program Size ($US Mill)</td>
<td>51</td>
<td>4382</td>
<td>7651.2</td>
<td>58</td>
<td>40160</td>
</tr>
</tbody>
</table>

Table 3: IMF programs and economic crises

<table>
<thead>
<tr>
<th></th>
<th>Total Onsets</th>
<th>Onsets per Country</th>
<th>Countries with Onsets</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMF Onset_Total</td>
<td>147</td>
<td>3.77</td>
<td>39</td>
</tr>
<tr>
<td>Paris Club Programs_Total</td>
<td>52</td>
<td>2.17</td>
<td>24</td>
</tr>
<tr>
<td>IMF_Onset during All Crisis</td>
<td>83</td>
<td>2.59</td>
<td>32</td>
</tr>
<tr>
<td>IMF_Onset during Currency Crisis</td>
<td>51</td>
<td>1.89</td>
<td>27</td>
</tr>
<tr>
<td>IMF_Onset during Banking Crisis</td>
<td>41</td>
<td>1.78</td>
<td>23</td>
</tr>
<tr>
<td>IMF_Onset during Sovereign Dom. Crisis</td>
<td>15</td>
<td>1.67</td>
<td>9</td>
</tr>
<tr>
<td>IMF_Onset during Sovereign Ext. Crisis</td>
<td>36</td>
<td>2.25</td>
<td>16</td>
</tr>
</tbody>
</table>
Building gross flows measures

**By residence:**

\[
Net\ Inflow_{it} = \Delta\Liabilities_{it} - \Delta\Assets_{it} = Gross\ Foreign\ Inflows - Gross\ Domestic\ Outflows
\]

Liabilities driven by the behaviour of foreign creditors vis-à-vis the economy

Assets driven by the actions of resident investors vis-à-vis the ROW

**By direction:**

\[
Net\ Inflow_{it} = (\Delta\Liabilities_{it}^+ + \Delta\Assets_{it}^-) - (\Delta\Assets_{it}^+ + \Delta\Liabilities_{it}^-)
\]

Residents shed external asset
Residents accumulate external asset
Foreigners accumulate domestic asset
Foreigners shed domestic asset
Econometric approach

- One-year cumulative effect of IMF program on capital flows

\[ Y_{it} = \alpha_i + \delta_t + \sum_{n=1}^{4} \theta_n IMF_{it-n} + \beta X_{it-1} + \mu_{it} \]

- Non-random selection complicates the interpretation of OLS results

- Use instrumental variables

\[ IMF_{it} = \alpha_i + \delta_t + \gamma Z_{it-1} + \phi X_{it-1} + \varepsilon_{it} \]

\[ Y_{it} = \alpha_i + \delta_t + \sum_{n=1}^{4} \theta_n IMF_{it-n} + \beta X_{it-1} + \mu_{it} \]

- Benchmark is normal times (standard though controversial)

- Interpretation of instrumented IMF_{it} not straight-forward
Econometric Approach. Instrumenting IMF lending

• Follow Barro and Lee (2005) and use International Political Economy-based instruments

• Various IPE theories deliver a wealth of instruments:
  » Borrowing country politics (Edwards and Santaella (2013) or Dreher (2002))
  » Geo-politics (Tacker (2000) or Barro and Lee (2005))
  » Official sector politics (Papi et al, 2014)
  » IMF internal politics (Barro and Lee (2005) or Saravia (2013))
Results IV. First step

<table>
<thead>
<tr>
<th></th>
<th>IMF presence</th>
<th>IMF presence</th>
<th>IMF presence</th>
<th>IMF presence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domestic politics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dictatorship dummy</td>
<td>-0.1216</td>
<td>-0.1162</td>
<td>-0.1071</td>
<td>-0.1082</td>
</tr>
<tr>
<td></td>
<td>[0.025]**</td>
<td>[0.026]**</td>
<td>[0.026]**</td>
<td>[0.026]**</td>
</tr>
<tr>
<td>Elections dummy</td>
<td>-0.0118</td>
<td>-0.0121</td>
<td>-0.0112</td>
<td>-0.0115</td>
</tr>
<tr>
<td></td>
<td>[0.006]**</td>
<td>[0.006]**</td>
<td>[0.006]**</td>
<td>[0.006]**</td>
</tr>
<tr>
<td><strong>Geo-politics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presence in UN Security Council</td>
<td>0.0185</td>
<td>0.0205</td>
<td>0.0199</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.011]*</td>
<td>[0.011]*</td>
<td>[0.011]*</td>
<td></td>
</tr>
<tr>
<td>Alignment with the US at UN voting</td>
<td>0.5029</td>
<td>0.5351</td>
<td>0.539</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.266]*</td>
<td>[0.260]**</td>
<td>[0.268]**</td>
<td></td>
</tr>
<tr>
<td><strong>Official sector politics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paris Club deal dummy</td>
<td></td>
<td>0.3092</td>
<td>0.3108</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>[0.053]**</td>
<td>[0.053]**</td>
<td></td>
</tr>
<tr>
<td>ODA provided by the US</td>
<td>14,348</td>
<td>16,639</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>[0.427]**</td>
<td>[0.368]**</td>
<td>[0.368]**</td>
<td></td>
</tr>
<tr>
<td><strong>IMF internal politics</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quota at the IMF</td>
<td></td>
<td></td>
<td>0.0096</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>[0.033]</td>
<td></td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td>3,849</td>
<td>3,777</td>
<td>3,767</td>
<td>3,767</td>
</tr>
<tr>
<td><strong>Number of countries</strong></td>
<td>57</td>
<td>56</td>
<td>56</td>
<td>56</td>
</tr>
</tbody>
</table>

Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1. All regressions also include also four lags of real GDP growth, the high yield index, Federal funds rate, Chinn-Ito Index and a crisis dummy.
### Results IV. Second Step

#### Table 6: IV Estimation (second stage): Impact of AP on Aggregate Gross Flows

<table>
<thead>
<tr>
<th></th>
<th>Total Gross Flows</th>
<th>Private Gross Flows</th>
<th>Private Gross Inflows</th>
<th>Private Gross Outflows</th>
<th>CIF</th>
<th>COD</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMF Onset</td>
<td>-0.356</td>
<td>-1.072</td>
<td>-1.673</td>
<td>-0.565</td>
<td>-2.469</td>
<td>-1.357</td>
</tr>
<tr>
<td>P-Value of Joint Significance</td>
<td>0.636</td>
<td>0.146</td>
<td>0.041**</td>
<td>0.511</td>
<td>0.004***</td>
<td>0.008***</td>
</tr>
</tbody>
</table>

Regressions include also four lags of real GDP growth, the high yield index, Federal funds rate, Chinn-Ito Index and a crisis dummy.

#### Table 7: IV Estimation (second stage): Impact of AP - Four-way Gross Flows

<table>
<thead>
<tr>
<th></th>
<th>Private inflow from Liabilities</th>
<th>Private inflow from Assets</th>
<th>Private outflow from Assets</th>
<th>Private outflow from Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMF Onset</td>
<td>-2.526</td>
<td>1.64</td>
<td>-0.468</td>
<td>-0.389</td>
</tr>
<tr>
<td>P-Value of Joint Significance</td>
<td>0.002***</td>
<td>0.022**</td>
<td>0.527</td>
<td>0.602</td>
</tr>
</tbody>
</table>

Regressions include also four lags of real GDP growth, the high yield index, Federal funds rate, Chinn-Ito Index and a crisis dummy.
Table 8: IV Estimation (second stage): Impact of AP on Gross Flows by type

<table>
<thead>
<tr>
<th></th>
<th>FDI inflows</th>
<th>FDI outflows</th>
<th>Portfolio investment inflows</th>
<th>Portfolio investment outflows</th>
<th>Other investment inflows</th>
<th>Other investment outflows</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMF Onset</td>
<td>-1.1776</td>
<td>0.654</td>
<td>-0.64</td>
<td>-0.676</td>
<td>-1.632</td>
<td>-1.68</td>
</tr>
<tr>
<td>P-Value of Joint Significance</td>
<td>0.024**</td>
<td>0.9239</td>
<td>0.417</td>
<td>0.413</td>
<td>0.034**</td>
<td>0.041**</td>
</tr>
</tbody>
</table>

Regressions include also four lags of real GDP growth, the high yield index, Federal funds rate, Chinn-Ito Index and a crisis dummy.
Econometric approach. Dynamic response

- Dynamic response of gross flows to the signing of a program
  - IV - Linear Projection Methods (Jorda et al., 2014)
    - h-step ahead cumulative treatment effect (h=0,1,…,12)
    - First step as previously
    - Robust single-equation IRF
      \[
      \Delta Y_{i,t+h} = \alpha_{i,h} + \beta_{E,h} \text{IMF}_{it} + \chi_{E,h}(L) \Delta Y_{i,t-1} + \Psi_{E,h}(L) \Delta X_{i,t-1} + t_h + \sigma_{th} + \mu_{i,t,h}
      \]
    - Flexible (effect depending on crisis type)
      \[
      \Delta Y_{i,t+h} = \alpha_{i,h} + \beta_{1,h} \text{IMF}_{it} + \beta_{2,h} \text{IMF}_{it} * CD_{i,t} + ... + \mu_{i,t,h}
      \]
Results LP: Foreign versus resident flows
Results LP. Direction & residence

Panel A

Private Inflows from Liabilities

% Change in Cap Flows over GDP

Quarters

Panel B

Private Inflows From Assets

% Change in Cap Flows over GDP

Quarters

Panel C

Private Outflows From Assets

% Change in Cap Flows over GDP

Quarters

Panel D

Private Outflows from Liabilities

% Change in Cap Flows over GDP

Quarters
Results LP. No Catalysis on relatively stable FDI Flows
Results LP. Catalysis is found on Portfolio flows although...
Results LP. … the “big” story seems to be a domestic banks’ story.
Results LP. Domestic catalysis (COD) works best in debt crises
Results LP. Foreign catalysis (CIF) works worst in Currency and Banking crises
Concluding

- Catalysis is
  - Residence dependent
  - Shock dependent

- Forthcoming work:
  - Show that it is also program type dependent:
    - Size
    - Duration
    - Successful adoption of conditionality
Thank you!