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   - Benefits of Foreign Exchange Intervention

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Extent of Foreign Exchange Intervention

- Central Banks intervene regularly on the foreign exchange market, typically through sterilized sale and purchase of international reserves.
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This accumulation has also further increased due to increased liberalization of the capital account around the world.

**Figure: Evolution of Capital Account Openness**

*Source: Own Calculations based on Chinn-Ito (2006)*
Figure: Reserves as a Share of GDP (%)

Source: Author’s Calculations based data from World Bank World Development Indicators
Figure: Reserves in Months of Import

Source: Author’s Calculations based data from World Bank World Development Indicators
Benefits of Foreign Exchange Intervention

- Reserve holdings allow central banks to lean against the trilemma or widen the policy space constrained by the trilemma.

- A rise in reserve holdings often lowers the cost of private debt and equity capital (Feldstein, 1999).

- To some extent, reserve holdings have substituted for capital controls (Ilzetzki et al., 2017).

- Holding of international reserves equal to at least the value of short term external debt reduces the annual probability of a country experiencing a share reversal in capital flows, which can precipitate and external debt and/or currency crisis, by 10 percentage points (Rodrik, 2006).

- Reserves of foreign exchange are built to provide insurance against speculative currency attacks.
But what is the Cost of this Self-Insurance?
Costs of Foreign Exchange Intervention

- Foreign Exchange Intervention is considered the purchase (sale) of a foreign exchange reserve asset and the attendant sale (purchase) of the local currency asset.

\[
MC_{k,t+1} = 1 + i_k,t + 1 - i^*,t + 1 (1)
\]

The total cost of foreign exchange intervention is thus

\[
TC_{k,t+1} = MC_{k,t+1} \times NFA_{k,t} (2)
\]

Since most central banks are quasi-government bodies that typically transfer their surpluses to the government, this total costs is the quasi-fiscal cost of foreign exchange intervention.
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- Therefore, the cost of Foreign Exchange is the cost of carrying that position. Following Adler and Mano (2017), this is measured as the deviations from uncovered interest parity

\[ MC_{k,t+1} = \frac{1 + i_{k,t}}{1 + i^*_t} \frac{S_{k,t+1}}{S_{k,t}} - 1 \]  

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Calculating Costs

- The spread considered is that between sovereign debt of the country in question over US Treasury Bills.
- In 2014, this cost was about 1.16% and 1.12% of the GDP for emerging market economies.

Source: Author’s Calculations based data from World Bank World Development Indicators and IMF International Financial Statistics.
Cross Country Distribution of Cost

Quasi-fiscal cost in 2014 (% of GDP)

Source: Author's Calculations based data from World Bank World Development Indicators and IMF International Financial Statistics

Devika Dutt (UMass Amherst)
### Table: Summary Statistics: Quasi Fiscal Cost

<table>
<thead>
<tr>
<th>Year</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Maximum</th>
<th>Country incurring Maximum cost</th>
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<td>1996</td>
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<td>1.433</td>
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<td>1997</td>
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<td>0.779</td>
<td>Lesotho</td>
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<td>1.993</td>
<td>Lao</td>
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<td>1999</td>
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<td>2007</td>
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<td>2.215</td>
<td>2.894</td>
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Decomposition of Costs for Emerging Countries

Source: Author’s Calculations based data from World Bank World Development Indicators
Following Obstfeld et al. (2010), the following simple Random Effects Model is estimated

\[ Y_{it} = \alpha + \beta \times X_{it} + u_{it} \]

\[ u_{it} = \mu_i + v_{it} \]
Determinants of these Costs

The dependent variables are the logarithm of the reserves to GDP ratio and the total cost of foreign exchange intervention. Following, Obstfeld et al. (2010), the explanatory variables include:

- Advanced country dummy variable *advanced*.
- Normalized Chinn-Ito index of capital account openness, *ka_open*.
- Exchange Rate Peg dummy variable, *peg*, where 1 is a pegged exchange rate and 0 indicates a non-pegged exchange rate.
- Logarithm of the ratio of total trade (exports to imports) to GDP, *logtrade*.
- Exchange Rate Volatility calculated as the standard deviation of the monthly percentage change in exchange rate against the dollar over the current year, *evol*.
- Logarithm of the share of M2 in GDP, *logm2*.
- Year Specific dummies
Determinants of these Costs

The model in Obstfeld et al. (2010) is supplemented with the following explanatory variables:

- **Historical currency crisis dummy, histcc**, where the variable takes the value 1 if the country has experienced a currency crisis in the past.

- **RFA** is a binary variable that takes the value 1 if the country is a member of a Regional Financial Arrangement and 0 otherwise.

- **Swap** is a binary variable that takes the value 1 if the country’s central bank has historically had a swap line with another central bank and 0 otherwise.

- **Fedswap** is a binary variable that takes the value 1 if the country’s central bank has historically had a swap line with the Federal Reserve and 0 otherwise.

- **ECBswap** is a binary variable that takes the value 1 if the country’s central bank has historically had a swap line with the European Central Bank and 0 otherwise.

- **BOEswap** is a binary variable that takes the value 1 if the country’s central bank has historically had a swap line with the Bank of England and 0 otherwise.
Gold reserves as a share of Total Reserves (%)

Source: Author’s Calculations based data from World Bank World Development Indicators and IMF International Financial Statistics
## Results

<table>
<thead>
<tr>
<th></th>
<th>(1) Reserves</th>
<th>(2) Cost</th>
<th>(3) Reserves</th>
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<td>(0.140)</td>
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<td>(0.000)</td>
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<td>(0.303)</td>
<td>(0.941)</td>
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<tr>
<td>Constant</td>
<td>-5.826***</td>
<td>0.257</td>
<td>-5.790***</td>
<td>0.264</td>
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<tr>
<td></td>
<td>(0.000)</td>
<td>(0.619)</td>
<td>(0.000)</td>
<td>(0.636)</td>
</tr>
</tbody>
</table>

| N           | 5114         | 2398     | 5114         | 2398     |
| R²          | 0.2967       | 0.2534   | 0.2805       | 0.2353   |
Preliminary Observations

- There is substantial cost associated with intervention in the foreign exchange market by the Central Bank.
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- RFA membership and having access to most swap lines is not associated with statistically significant lower accumulation of reserves or lower costs.
- Access to a Federal Reserve Swap line reduces reserve accumulation and the associated costs. The cost coefficient is statistically significant at the ten percent level.