Financial Exchange Rates and International Currency Exposures

Philip Lane
Trinity College, Dublin

Jay C. Shambaugh
Dartmouth College
Financial Exchange Rates and International Currency Exposures

Philip R. Lane – IIIS, Trinity College Dublin and CEPR
Jay C. Shambaugh – Dartmouth College and NBER

IMF 8th Annual Research Conference
November 2007
Overview

- Valuation channel of external adjustment: importance growing in line with financial globalization
- Exchange rates and valuation channel: currency composition of international balance sheets
- Empirical evidence on topic still in its infancy
- This paper tries to fill a gap – provide broad based evidence on the international financial impact of exchange rate changes
Valuation Effects

• Change in NFA comes from both flows and changes in the value of the stock

\[ \Delta NFA = CA + VAL \]

• In principle, valuation effects can be split into changes in the prices (\( VAL^{MV} \)) of assets and changes in the exchange rate (\( VAL^{XR} \)) [also measurement error]
Valuation Channel and Exchange Rates

• Two strands in research on valuation channel

• Adverse balance sheet impact of depreciation in emerging market economies
  – Eichengreen and Hausmann (2005), Goldstein and Turner (2005)

• Gains to United States from dollar depreciation
  – Lane and Milesi-Ferretti (2001, 2003, 2005, 2007a, 2007b); Tille (2003, 2005); Gourinchas and Rey (2007);

• Full profile of currency exposures lacking for a large number of countries
Contribution

• Calculate currency exposures in international balance sheet by country over time
  – Compare trade and finance weighted exchange rates
  – Consider countries’ aggregate currency exposures
    • And changes over the last decade
  – Consider size and importance of valuation shocks
    • Persistence, correlation of VAL\textsuperscript{MV} and VAL\textsuperscript{XR}, magnitudes
Previous Empirical Work

- Lane and Milesi-Ferretti (2001, 2007a, 2007b) highlighted aggregate role of valuation channel in driving net foreign asset positions
- Lane and Milesi-Ferretti (2003, 2005, 2007c): exchange rate and valuation channel
- Tille (2003): valuation impact of dollar movements on the US external position
- Gourinchas and Rey (2007): valuation channel a stabilizing force for US external position; external imbalance a predictor for the dollar.
Data Constraint

- IIP data typically do not contain information on currency composition of foreign assets and liabilities
- United States an exception but also atypical: sui generis position in issuing debt in its own currency and the international standard role of the dollar
- Dollar exposures for selected other countries: Warnock (2006), Lane and Milesi-Ferretti (2007c)
- Full list of currency exposures desirable
- We tackle this data gap over 1990-2004 for 117 countries
Method

• The currency exposures are generated by both combining numerous sources and filling in data with a variety of models and assumptions where necessary.

• Generate currency exposure by asset class and then combine

• Caveats:
  – Hedging
    • Intra country hedging is moot, may also only hedge L making A&L even more unmatched
  – Offsets of VAL$^{XR}$ and VAL$^{MV}$
    • Partial
Method: ASSETS – portfolio equity

- **Portfolio Equity Assets:**
  - Assume destination equals currency
  - CPIS data on a limited number of reporters
  - Exclude Offshores
  - Use LMF- IIP model of equity holdings (distance, size, etc) to predict positions of missing countries
Method: ASSETS - FDI

• FDI:
  – Again, assume destination equals currency
  – Use UNCTAD data on FDI outward and inward stocks.
  – Missing data: inferences based on inward reporting by other countries
    • For a limited number of countries more ad hoc process relying on flows data
Method: ASSETS – portfolio debt

- **Portfolio Debt Assets:**
  - Destination does **not** equal currency
  - Use gravity augmented CPIS data to generate geographical holdings.
  - Then use BIS issuance data, national sources, and World Bank external debt data to calculate currency by geographical location.
  - Use national sources (US, ECB, BoJ) to remove major currency investor holdings, then use residuals for rest of world
    - That is, subtract US holdings by country by currency from the issuance of each country before calculating the average currency profile by destination.
Method: Assets – Other Debt

• **Other Debt Assets:**
  
  – use BIS data on bank assets and liabilities. Gives us geographical distribution as well as home vs. foreign breakdown.
  
  – Using both A & L, we can triangulate towards currency.
Method: Assets - reserves

• Reserves:
  – Begin with COFER database on world currency breakdown by year.
  – Use regression results from Eichengreen and Mathieson on confidential individual country data to back out currency composition of reserves.
    • Using time varying constants to match COFER annual world totals
  – Use evidence from Truman and Wong to fill in some actual data for ~20 countries for 2000-2004
  – Output is matched to a variety of sources and individual country reports.
    • Country announcements
    • Lim (2006)
Method: Liabilities

• Equity and FDI liabilities are considered to be in the local (ie home) currency.

• World Bank data gives a combined breakdown for external debt that pools portfolio debt, bank debt, and official lending.

• For industrial countries BIS issuance data and BIS banking data are combined to generate the equivalent series.
Method: weights

- A, L, Gross, and Net weights are created using these currency weights across the asset classes.

\[
\omega^A_{ijt} = \sum_{k=1}^{k=N} \lambda^Ak \ast \omega^{Ak}_{ijt}
\]

- where \( \omega^{Ak} \) is the currency weight for a given asset class and \( \lambda^Ak \) is the asset class weight within assets.
- EWN data is used to create the \( \lambda^Ak \)
- Same construction is done for liabilities
Weights: cont

- NET financial weights show the overall exposure of a country to a particular currency:

\[
\omega_{ijt}^F = \omega_{ijt}^A \frac{A}{A+L} - \omega_{ijt}^L \frac{L}{A+L}
\]

\[
\frac{\partial VAL_{it}}{\partial E_{ijt}} = \omega_{ijt}^F \ast (A_{it-1} + L_{it-1})
\]
Index Construction

• We create exchange rate indices based on these weights.
  – They are approximations of geometric indices based on summing the percentage changes across partner countries
    • In this manner changing weights do not change index on their own
    • Negative is an appreciation
  – Under our construction, if a country hyperinflates, the value for that country in all other countries will head towards zero, rather than take an outsized role.

\[ I_{it}^A = I_{it-1}^A \times \left( 1 + \sum \omega_{ij}^A \times \%\Delta E_{ij} \right) \]
Index Construction (continued)

• This allows us to write:

\[
VAL_{it}^{XR} = \% \Delta I_{it}^A \times A_{t-1} - \% \Delta I_{it}^L \times L_{t-1}
\]

− Where A and L are as % of GDP

• As well as create a NET index

\[
I_{it}^F = I_{it-1}^F \times \left( \frac{\% \Delta I_{it}^A \times A_{t-1}}{A_{t-1} - L_{t-1}} - \% \Delta I_{it}^L \times \frac{L_{t-1}}{A_{t-1} - L_{t-1}} \right)
\]

\[
VAL_{it}^{XR} = \% \Delta I_{it}^F \times (A_{t-1} + L_{t-1})
\]
Quick comment on NET

- The NET weights and index are a bit different than normal indices
- NET weights can be negative
- NET weights do NOT necessarily sum to 1
  - A country can have perfect balance (they sum to zero), or be long or short
- The NET index can be stable if you are balanced even if E is moving.
Aggregate Foreign Currency Exposures

- Optimal portfolios in DSGE open-economy models: new wave in the literature
  - Key issue: optimal pattern in foreign currency exposure (long or short rest of world)

- Define foreign currency exposure by:

\[
FX_{it}^{AGG} = \omega_{it}^A s_{it}^A - \omega_{it}^L s_{it}^L
\]

- Where \( \omega^A \) is the share of foreign assets in foreign currencies and \( s^A \) is the share of assets in A+L

- In turn, the impact can be summarized by:

\[
NETFX_{it}^{AGG} = FX_{it}^{AGG} \times IFI_{it-1}
\]
RESULTS

• We will examine:
  – Do “financial” exchange rates look different
    • Correlation with trade indices
  – Are countries positions mismatched?
    • Correlation of A & L indices
  – Aggregate foreign currency exposures
    • Net weight vs. rest of the world
    • How has it changed?
  – What are the general properties of VALXR
Correlation of Indices

Table 1: Correlations between Financial and Trade-Weighted Exchange Rate Indices

<table>
<thead>
<tr>
<th>Group</th>
<th>Statistic</th>
<th>Assets Liabilities</th>
<th>Assets Trade</th>
<th>Liabilities Trade</th>
<th>Net Finance Trade</th>
<th>Exports Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>mean</td>
<td>0.96</td>
<td>0.90</td>
<td>0.86</td>
<td>-0.30</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td>median</td>
<td>0.98</td>
<td>0.95</td>
<td>0.92</td>
<td>-0.72</td>
<td>0.98</td>
</tr>
<tr>
<td>Advanced</td>
<td>mean</td>
<td>0.97</td>
<td>0.92</td>
<td>0.88</td>
<td>0.41</td>
<td>0.97</td>
</tr>
<tr>
<td></td>
<td>median</td>
<td>0.98</td>
<td>0.93</td>
<td>0.89</td>
<td>0.70</td>
<td>0.98</td>
</tr>
<tr>
<td>Dev. &amp; Emging</td>
<td>mean</td>
<td>0.96</td>
<td>0.90</td>
<td>0.86</td>
<td>-0.47</td>
<td>0.95</td>
</tr>
<tr>
<td></td>
<td>median</td>
<td>0.99</td>
<td>0.96</td>
<td>0.95</td>
<td>-0.82</td>
<td>0.98</td>
</tr>
<tr>
<td>Developing</td>
<td>mean</td>
<td>0.96</td>
<td>0.88</td>
<td>0.84</td>
<td>-0.61</td>
<td>0.94</td>
</tr>
<tr>
<td></td>
<td>median</td>
<td>0.99</td>
<td>0.95</td>
<td>0.94</td>
<td>-0.89</td>
<td>0.97</td>
</tr>
<tr>
<td>Emerging</td>
<td>mean</td>
<td>0.94</td>
<td>0.93</td>
<td>0.88</td>
<td>-0.13</td>
<td>0.98</td>
</tr>
<tr>
<td></td>
<td>median</td>
<td>0.97</td>
<td>0.97</td>
<td>0.95</td>
<td>-0.37</td>
<td>0.99</td>
</tr>
</tbody>
</table>


*Mean and median across countries where correlation is done within country*

- TRADE and NET are negatively correlated, (other indices highly correlated)
  - TRADE may miss important information for many countries
- A & L are highly correlated. Currency “mismatch” not strong in the indices
Stability of the indices

Table 2

<table>
<thead>
<tr>
<th>Group</th>
<th>Statistic</th>
<th>Trade</th>
<th>Net</th>
<th>Assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>Mean</td>
<td>0.123</td>
<td>0.050</td>
<td>0.140</td>
<td>0.105</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>0.066</td>
<td>0.023</td>
<td>0.067</td>
<td>0.055</td>
</tr>
<tr>
<td>Advanced</td>
<td>Mean</td>
<td>0.050</td>
<td>0.013</td>
<td>0.058</td>
<td>0.035</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>0.046</td>
<td>0.010</td>
<td>0.053</td>
<td>0.034</td>
</tr>
<tr>
<td>Dev. &amp; Emging</td>
<td>Mean</td>
<td>0.140</td>
<td>0.058</td>
<td>0.159</td>
<td>0.122</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>0.081</td>
<td>0.028</td>
<td>0.071</td>
<td>0.068</td>
</tr>
<tr>
<td>Developing</td>
<td>Mean</td>
<td>0.133</td>
<td>0.069</td>
<td>0.153</td>
<td>0.121</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>0.071</td>
<td>0.035</td>
<td>0.064</td>
<td>0.068</td>
</tr>
<tr>
<td>Emerging</td>
<td>Mean</td>
<td>0.158</td>
<td>0.036</td>
<td>0.173</td>
<td>0.123</td>
</tr>
<tr>
<td></td>
<td>Median</td>
<td>0.090</td>
<td>0.021</td>
<td>0.101</td>
<td>0.071</td>
</tr>
</tbody>
</table>

Sudden Stops   mean % Δ 44%  -8%  54%  41%
Big Change     mean % Δ 88%  -30% 107% 88%

Std deviation of the percentage change by country

- Net indices are much more stable than the others.
- Liability indices are more stable than Asset
  - despite their high correlation, they are not moving one for one with one another
Some examples

- US liabilities index is stable.
- France A&L indices move together, but post-euro, all are stable
Examples

- Brazil: A, L, Trade indices all depreciate while net falls (net debtor: capital losses).
- China: dollar peg stabilized all financial indices
Examples

- Benin: trade and finance moving differently ($ vs euro).
- Bangladesh: L starting to flatten
- IN GENERAL: Trade weighted index is not a good summary of what is going on financially
FX$_{AGG}$ in 1994 and 2004

- The number of countries with negative positions has gone down from 71% to 54%.
- The number of countries below -.5 has gone down from 30% to <10%
Aggregate Foreign Currency Exposure

Table 4

<table>
<thead>
<tr>
<th></th>
<th>1994 mean</th>
<th>1994 median</th>
<th>2004 mean</th>
<th>2004 median</th>
</tr>
</thead>
<tbody>
<tr>
<td>FX^a99</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>-0.24</td>
<td>-0.26</td>
<td>-0.04</td>
<td>-0.03</td>
</tr>
<tr>
<td>Advanced</td>
<td>0.04</td>
<td>0.08</td>
<td>0.11</td>
<td>0.09</td>
</tr>
<tr>
<td>Dev. &amp; Emgng</td>
<td>-0.31</td>
<td>0.43</td>
<td>0.08</td>
<td>-0.10</td>
</tr>
<tr>
<td>Developing</td>
<td>-0.42</td>
<td>-0.47</td>
<td>-0.15</td>
<td>-0.18</td>
</tr>
<tr>
<td>Emerging</td>
<td>-0.11</td>
<td>-0.07</td>
<td>0.04</td>
<td>0.06</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1994</th>
<th>2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>NETFX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>-0.31</td>
<td>-0.22</td>
</tr>
<tr>
<td>Advanced</td>
<td>0.17</td>
<td>0.11</td>
</tr>
<tr>
<td>Dev. &amp; Emgng</td>
<td>-0.45</td>
<td>0.36</td>
</tr>
<tr>
<td>Developing</td>
<td>-0.73</td>
<td>-0.21</td>
</tr>
<tr>
<td>Emerging</td>
<td>0.06</td>
<td>0.38</td>
</tr>
</tbody>
</table>

- Bulk of developing countries are not hedged against depreciation. Shift towards positive position over time.
- SIZE of exposure growing in industrial countries
Quick note

- Recall: \[
\frac{\partial VAL_{it}}{\partial E_{ijt}} = \omega_{ijt}^F \ast (A_{it-1} + L_{it-1})
\]

- So, a net weight of -.50 on the rest of the world implies that a 10% depreciation against the rest of the world will generate a loss of 5% times (A+L)

- A country with mean A+L (=200% of GDP) will therefore suffer a 10% of GDP wealth loss from a 10% depreciation if it has a -.5 weight.
What shifted as FX$^{AGG}$ moved?

- Change in NFA position (change in $s^A$) is crucial for improvement
- Change in share of liabilities that are foreign is also important
- Drop in A and L foreign currency shares comes from EMU
What shifted as $\text{FX}^{\text{AGG}}$ moved?

<table>
<thead>
<tr>
<th>quartile</th>
<th>$\Delta \text{Res}/\Delta A$</th>
<th>$\Delta \text{NFA}^{\text{priv}}$</th>
<th>$\Delta (\lambda_{\text{Lit}}^{\text{PEQ}} + \lambda_{\text{Lit}}^{\text{FDI}})$</th>
<th>$\Delta \text{Debt}_{\text{FC}}$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>obs</td>
<td>Mean</td>
<td>Median</td>
<td>Mean</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
<td>0.21</td>
<td>0.05</td>
<td>-0.18</td>
</tr>
<tr>
<td>2</td>
<td>25</td>
<td>0.30</td>
<td>0.36</td>
<td>0.08</td>
</tr>
<tr>
<td>3</td>
<td>26</td>
<td>0.42</td>
<td>0.46</td>
<td>0.14</td>
</tr>
<tr>
<td>4</td>
<td>26</td>
<td>0.50</td>
<td>0.58</td>
<td>0.43</td>
</tr>
<tr>
<td>All</td>
<td>102</td>
<td>0.37</td>
<td>0.41</td>
<td>0.12</td>
</tr>
<tr>
<td>Advanced</td>
<td>22</td>
<td>0.02</td>
<td>0.00</td>
<td>0.03</td>
</tr>
<tr>
<td>EMU</td>
<td>11</td>
<td>-0.02</td>
<td>-0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td>non-EMU</td>
<td>11</td>
<td>0.07</td>
<td>0.03</td>
<td>0.08</td>
</tr>
<tr>
<td>Dev. &amp; Emging</td>
<td>80</td>
<td>0.47</td>
<td>0.52</td>
<td>0.15</td>
</tr>
<tr>
<td>Developing</td>
<td>52</td>
<td>0.51</td>
<td>0.54</td>
<td>0.28</td>
</tr>
<tr>
<td>Emerging</td>
<td>28</td>
<td>0.40</td>
<td>0.46</td>
<td>-0.07</td>
</tr>
</tbody>
</table>

- Reserves went up, Private NFA improved in developing countries, FDI & Equity grew, but not "sin" going away.
### Changes in NETFX

<table>
<thead>
<tr>
<th></th>
<th>obs</th>
<th>mean</th>
<th>min</th>
<th>max</th>
<th>ΔFX_{it}^{AGG}</th>
<th>ΔIFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>96</td>
<td>0.41</td>
<td>-0.52</td>
<td>3.11</td>
<td>0.20</td>
<td>0.57</td>
</tr>
<tr>
<td>Advanced</td>
<td>22</td>
<td>0.30</td>
<td>-0.52</td>
<td>1.40</td>
<td>0.07</td>
<td>2.18</td>
</tr>
<tr>
<td>EMU</td>
<td>11</td>
<td>0.14</td>
<td>-0.52</td>
<td>0.91</td>
<td>0.00</td>
<td>2.89</td>
</tr>
<tr>
<td>Non-EMU</td>
<td>11</td>
<td>0.46</td>
<td>0.11</td>
<td>1.40</td>
<td>0.15</td>
<td>1.47</td>
</tr>
<tr>
<td>Dev. &amp; Emging</td>
<td>74</td>
<td>0.45</td>
<td>-0.25</td>
<td>3.11</td>
<td>0.23</td>
<td>0.09</td>
</tr>
<tr>
<td>Developing</td>
<td>48</td>
<td>0.52</td>
<td>-0.14</td>
<td>3.11</td>
<td>0.27</td>
<td>-0.21</td>
</tr>
<tr>
<td>Emerging</td>
<td>26</td>
<td>0.32</td>
<td>-0.25</td>
<td>2.53</td>
<td>0.15</td>
<td>0.64</td>
</tr>
</tbody>
</table>

- Developing countries are both increasing $FX^{AGG}$ and reducing scale.
- Advanced are rapidly increasing scale (especially EMU)
Characteristics of $\text{VAL}^{\text{XR}}$

- $\text{VAL}^{\text{XR}}$ is sizable:
  - $75^{\text{th}}$ percentile abs value is 4.3% of GDP, $90^{\text{th}}$ is 11.2%
- $\text{VAL}^{\text{XR}}$ moves with VAL (not fully offset)
- $\text{VAL}^{\text{XR}}$ effects do not reverse
  - slight positive autocorrelation
  - Only a handful of countries show reversals in individual country regressions
## Size of $\text{VAL}^{\text{XR}}$

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean</th>
<th>Median</th>
<th>75%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>5.0</td>
<td>1.7</td>
<td>4.3</td>
<td>11.2</td>
</tr>
<tr>
<td>Advanced</td>
<td>2.4</td>
<td>1.2</td>
<td>2.8</td>
<td>5.0</td>
</tr>
<tr>
<td>Dev. &amp; Emging</td>
<td>5.7</td>
<td>1.8</td>
<td>4.7</td>
<td>12.6</td>
</tr>
<tr>
<td>Developing</td>
<td>6.8</td>
<td>2.3</td>
<td>5.3</td>
<td>15.8</td>
</tr>
<tr>
<td>Emerging</td>
<td>3.4</td>
<td>1.2</td>
<td>3.8</td>
<td>10.0</td>
</tr>
</tbody>
</table>

- $\text{VAL}^{\text{XR}}$ as a share of GDP (in percentage points)
VAL and VAL$^{XR}$

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Adv.</td>
<td>Dev.</td>
<td>Eme.</td>
</tr>
<tr>
<td>VAL$x$r</td>
<td>1.071 (0.05)**</td>
<td>0.574 (0.14)**</td>
<td>1.095 (0.05)**</td>
<td>0.982 (0.12)**</td>
</tr>
<tr>
<td>Constant</td>
<td>0.724 (0.15)**</td>
<td>-0.969 (0.07)**</td>
<td>2.529 (0.25)**</td>
<td>-1.745 (0.18)**</td>
</tr>
<tr>
<td>N</td>
<td>1496</td>
<td>304</td>
<td>802</td>
<td>390</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.65</td>
<td>0.09</td>
<td>0.72</td>
<td>0.51</td>
</tr>
<tr>
<td>$R^2$ (no FE)</td>
<td>0.54</td>
<td>0.06</td>
<td>0.61</td>
<td>0.42</td>
</tr>
</tbody>
</table>

- VAL and VAL$^{XR}$ are positively correlated. VAL$^{XR}$ is not entirely offset by price movements
VAL, VAL$^{XR}$ over time

<table>
<thead>
<tr>
<th></th>
<th>$\rho(VAL)$</th>
<th></th>
<th>$\rho(VAL^{\text{ar}})$</th>
<th></th>
<th>$\rho(VAL^{mp})$</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>Mean</td>
<td>Median</td>
<td>Mean</td>
<td>Median</td>
</tr>
<tr>
<td>All</td>
<td>0.02</td>
<td>-0.01</td>
<td>0.12</td>
<td>0.09</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Advanced</td>
<td>-0.01</td>
<td>-0.06</td>
<td>0.15</td>
<td>0.15</td>
<td>-0.05</td>
<td>-0.04</td>
</tr>
<tr>
<td>EMU</td>
<td>-0.02</td>
<td>-0.04</td>
<td>0.20</td>
<td>0.16</td>
<td>-0.01</td>
<td>-0.04</td>
</tr>
<tr>
<td>Non-EMU</td>
<td>0.01</td>
<td>-0.08</td>
<td>0.10</td>
<td>0.14</td>
<td>-0.09</td>
<td>-0.03</td>
</tr>
<tr>
<td>Developing</td>
<td>0.02</td>
<td>-0.001</td>
<td>0.11</td>
<td>0.06</td>
<td>0.02</td>
<td>0.03</td>
</tr>
</tbody>
</table>

- Crucial point is that the exchange rate effects do not disappear a year later
Summary

• We have the first cross-country cross-time currency exposure by country.

• We are able to show:
  – Trade and Finance weights look different
    • Trade weighted index not a good summary of valuation impact of currency movements
  – Some (especially especially developing countries) have reduced exposure by:
    • Increasing reserves and changing composition of liabilities
  – Valuation shocks are substantial as a share of GDP, and the exchange rate channel is important
Next Steps

- Examine role of $\text{VAL}^\text{XR}$ in international adjustment mechanism
- Monetary Policy and $\text{VAL}^\text{XR}$
- Financial Properties of Exchange Rate Regimes
- Explore weights across asset classes
- Explore bilateral weights in more detail