Currency-Induced External Balance Sheet Effects at the Onset of the COVID-19 Crisis

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Motivations: Crises, Currency Movements, and Valuation Effects

- At the onset of the COVID-19 crisis flight to safety was accompanied by
  - Rapid appreciation of safe heaven currencies
  - Large depreciation of EMDEs currencies

Since the 1990s EMDEs have shifted towards long positions — what are the valuation effects now?
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- Valuation effects

In a nutshell

We assess the size of the aggregate currency-induced valuation effects from January 1 to March 31, 2020 (early phase of the COVID-19 crisis) using a new dataset on the currency composition of the IIP published by the IMF (Benetrix, Gautam, Juvenal and Schmitz, 2019). Sample of 48 countries, separate analysis for two asset classes: Portfolio Debt (PD) and Other Investment (OI). We propose a new measure of currency-induced valuation effects: elasticity of net external liabilities (over assets) with respect to changes in exchange rates.
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Results

- Currency-induced external balance sheet losses during the early stage of the COVID-19 economic crisis were modest
  - This is due to the fact that the majority of EMDEs were long on FC
  - Caveat: aggregate positions may mask substantial currency mismatches
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  - Caveat: aggregate positions may mask substantial currency mismatches

- Mismatches can be due to borrowing abroad in foreign currency but investing domestically in local currency
  - Compute an upper bound for losses if all net external liabilities are invested domestically in local currency
  - Upper bound of currency induced valuation losses is high

→ Important to account for domestic investments when evaluating currency-induced valuation effects
Stock of external portfolio debt and other investment assets and liabilities
  - External Wealth of Nations (EWN) data set by Lane and Milesi-Ferretti (2007)
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- Exchange rates
  - EWN and Datastream
Data on Currency Composition (BGJS)

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  - PDL: International Debt Issuance from BIS
  - OIA and OIL: Currency of denomination of banks’ cross-border positions from BIS

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Focus on four global currencies: USD, GBP, EUR and JPY, in addition to domestic currency (DC)
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Our Measure of Currency-Induced Valuation Effects

- Elasticity of net liabilities / assets with respect to exchange rate changes
- Assets (A) and liabilities (L) of an asset class denominated in three currencies, x (USD), y (any other foreign), and z (domestic currency - DC): A_x, A_y, A_z and L_x, L_y, L_z
  - A^x_z: amount of assets that are denominated in z but evaluated in x
  - A^x_z = E_{xz} A_z, where E_{xz} is the exchange rate expressed as amount of currency x needed to buy one unit of currency z
- Express all assets A and all liabilities L in terms of x

\[
A^x_{all} = A_x + E_{xy} A_y + E_{xz} A_z, \]
\[
L^x_{all} = L_x + E_{xy} L_y + E_{xz} L_z
\]
Our Measure of Currency-Induced Valuation Effects

- Our measure of the total currency-induced valuation effect on net liabilities:

\[
V \equiv \frac{dnl}{|nl|} = \sum_{k=1, k\neq x}^{K} \left( \frac{A_{all}^x L_k^x - L_{all}^x A_k^x}{A_{all}^x |L_{all}^x - A_{all}^x|} \times \frac{dE_{xk}}{E_{xk}} \right) 
\]  

- \( K \) is the number of currencies, \( D_x^k \) is the percent depreciation of currency \( x \) wrt currency \( k \) and \( \varepsilon_{x,k} \) is the first term of the elasticity

- A dollar appreciation (negative \( dE_{xk} \)) will lead to increase in net liabilities (\( V > 0 \)) if the share of non-dollar A is higher than the share of non-dollar L (negative numerator)
Currency-Induced Valuation Effects in Early 2020

- We use our measure to compute changes in net liabilities that are due to the appreciation of major currencies between January 1 and March 31, 2020.

- For each of the 48 countries in our sample, we calculate the effect for $K = 4$ separately for portfolio debt and other investment net liabilities.

- For country $i$ the valuation effect is

$$V_i = D^i_{USD} \times \varepsilon_{USD,i} + D^E_{USD} \times \varepsilon_{USD,EUR} + D^G_{USD} \times \varepsilon_{USD,GBP} + D^J_{USD} \times \varepsilon_{USD,JPY}$$
Results in Terms of Elasticities: Portfolio Debt

Negative numbers are gains (reduction in net liabilities, percent)
Results in Terms of Elasticities: Other Investment

Negative numbers are gains (reduction in net liabilities, percent)
Results in Terms of USD (million USD)

Negative numbers are gains (reduction in net liabilities)

GBR USA CAN RUS MEX IDN ZAF KOR IRL NOR COL DEU IND ITA NLD CZE THA BRA MYS TUR POL ARG DNK HUN URY ESP FIN AUT ITA CHN SGP CHE JPN
Role of Domestic Assets

- **External assets**
  - Domestic currency
  - USD
  - Other global currencies

- **External liabilities**
  - Domestic currency
  - USD
  - Other global currencies

*Domestic net assets (assume all in domestic currency)*
Results in Terms of USD with Domestic Assets (million USD)
Positive numbers are gains (reduction in net liabilities)
Conclusion

- The magnitudes of the currency-induced valuation effects on *external* aggregate balance sheets for most countries are modest.
- The upper bound on potential losses when accounting for domestic assets financed by external net liabilities is large for some countries.
- Domestic assets cannot be ignored in calculation of currency-induced valuation effects.
EXTRA SLIDES
Foreign Currency Exposures (FXAGG) became longer

\[ FXAGG = \frac{A_{FC} - L_{FC}}{A + L} \]
External Balance Sheet (for a given asset class or overall)

**External assets**
- Domestic currency
- USD
- Other global currencies

**External liabilities**
- Domestic currency
- USD
- Other global currencies
External Balance Sheet (for a given asset class or overall)

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- USD
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External liabilities

- Domestic currency
- USD
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External Balance Sheet (for a given asset class or overall)
Our Measure of Currency-Induced Valuation Effects

- What is the exposure to movements in $E_{xz}$?
- What matters is the change in net liabilities that results from a change in the exchange rate and the currency composition of gross assets and liabilities.
- We scale net liabilities by total assets of that asset class, assuming that any shortfall needs to be covered by a sale of an asset in the same class.
- The exposure of total net liabilities of a given asset class, expressed in $x$ as a share of the total amount of this asset is

$$\frac{\partial}{\partial E_{xz}} \frac{L_{all}^x - A_{all}^x}{A_{all}^x} = \frac{L_z}{A_{all}^x} - \frac{A_z L_{all}^x}{A_{all}^x} = \frac{L_z^x}{E_{xz} A_{all}^x} - \frac{A_z^x L_{all}^x}{E_{xz} A_{all}^x}$$

Equation (1) gives the effect of a unit change in the exchange rate.
Our Measure of Currency-Induced Valuation Effects

- Net liabilities of a given asset class as a share of total assets of that class as
  \[ nl = \left( L^x_{all} - A^x_{all} \right) / A^x_{all} \]

- From (1), we established that
  \[ \left. d\frac{nl}{E_{xz}} \right|_{E_{xz}} = \left[ \frac{L^x_z}{E_{xz} A^x_{all}} - \frac{A^x_z L^x_{all}}{E_{xz} A^x_{all}^2} \right] \, dE_{xz} \]

- Dividing both sides by \( |nl| \), we get a unit-free elasticity of net liabilities in all currencies wrt a change in \( E_{xz} \):
  \[ \left. \frac{dnl}{|nl|} \right|_{E_{xz}} = \frac{A^x_{all} L^x_z - L^x_{all} A^x_z}{A^x_{all} |L^x_{all} - A^x_{all}|} \times \frac{dE_{xz}}{E_{xz}} \]

- Similarly for \( E_{xy} \)
  \[ \left. \frac{dnl}{|nl|} \right|_{E_{xy}} = \frac{A^x_{all} L^x_y - L^x_{all} A^x_y}{A^x_{all} |L^x_{all} - A^x_{all}|} \times \frac{dE_{xy}}{E_{xy}} \]