Interpreting Turbulent Episodes in International Finance

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Motivation

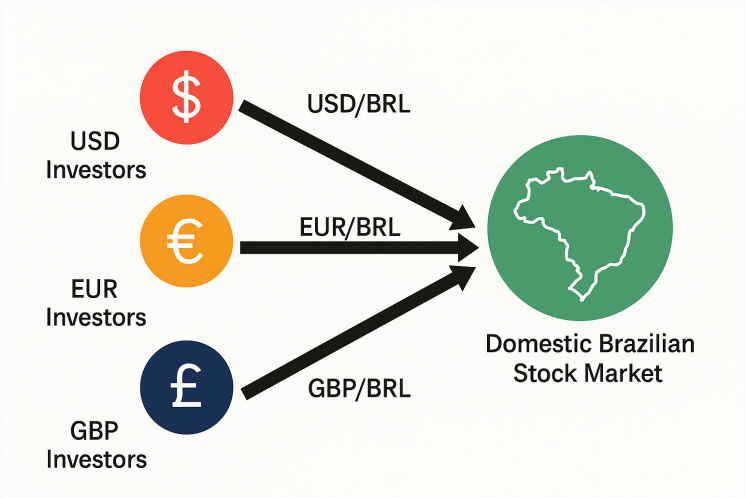
- Exchange rate and asset price fluctuations shape monetary, fiscal, and financial stability policies.
- Links between cross-border portfolio flows and stocks and bond prices are not well understood.
- Recent shocks (e.g. Covid, Trump's tariffs) revealed potential important changes in the international financial architecture.
- We lack unifying frameworks to discuss those issues. Build on Currency Centrality and Global Financial Cycle (Stavrakeva and Rey (2024))

Our Approach and Findings

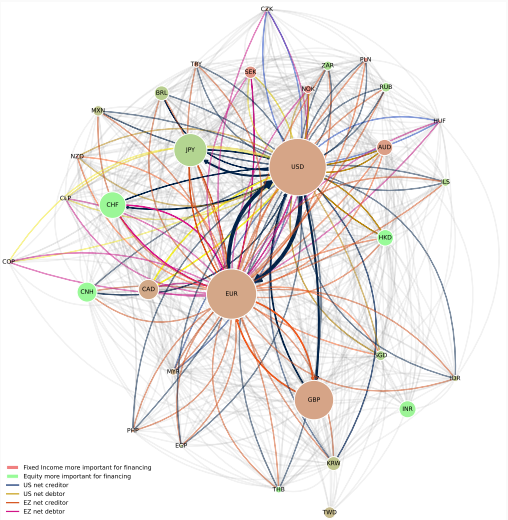
- Architecture of the network (comparing 2008 and 2023). *Risk sharing implications.*
- Use market clearing conditions and IV to link global network of portfolio flows and FX and asset prices. *Exchange rate management implications.*
- Construct a high-frequency proxy of portfolio flows and use it to interpret recent turbulent episodes (Covid, GFC, Tariffs).

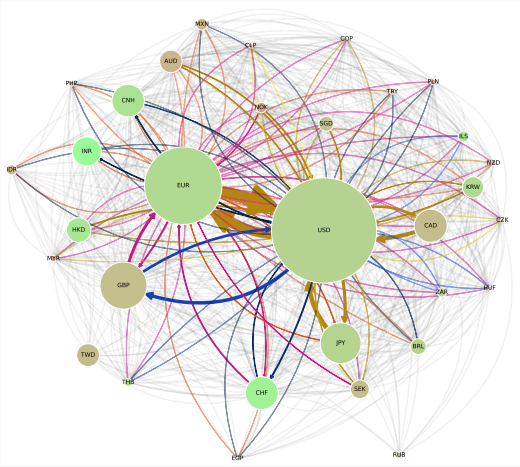
  Useful tool to understand changes in international financial architecture (USD status).

Cross-Border Equity Portfolio Investment: Example



The Global Portfolio Equity Network 2008-2023

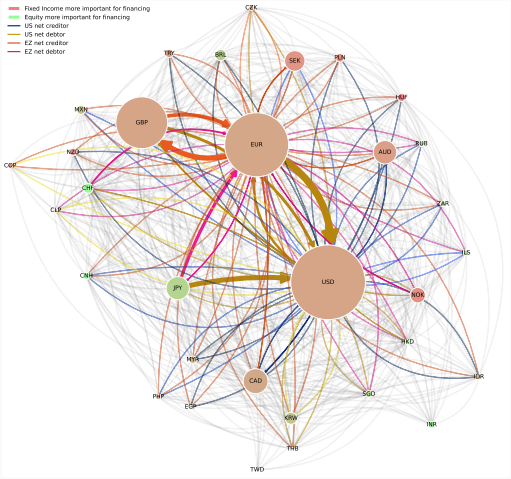


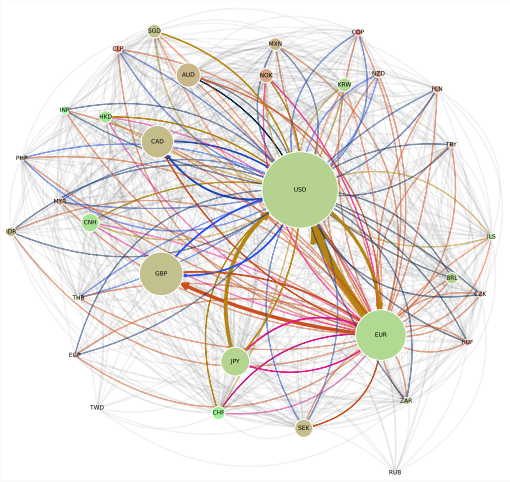


The Global Portfolio Equity Network 2008-2023

- From a tripolar to multipolar world: rise of EM currencies and non-G7 investors.
- Deeper cross-border capital markets.
- Growing importance of equity financing vs. debt in international capital flows.
- US and Euro area from net long equity to net short in 2023.

The Global Portfolio Debt Network 2008-2023

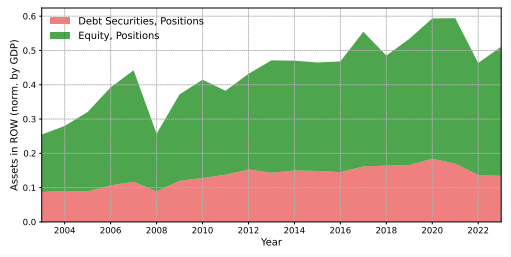




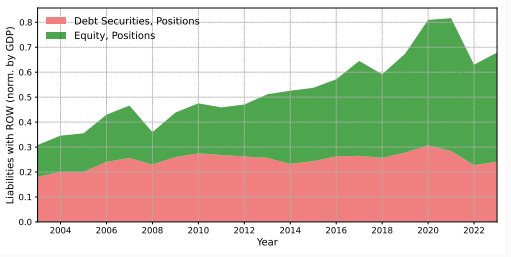
The Global Portfolio Debt Network 2008-2023

- Debt liabilities remain relatively concentrated.
- Structural shift in how countries are financed internationally towards more equity.
- Implications for risk-sharing in the global economy.

Portfolio Assets and Liabilities: United States (incl. CYM, BHS, BMU)

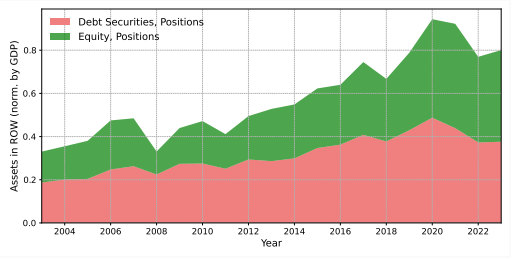


Assets in ROW, USD norm. by GDP

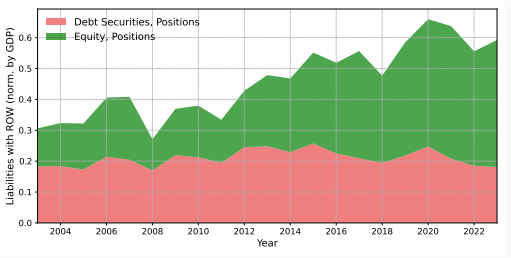


Liabilities from ROW, USD norm. by GDP

Portfolio Assets and Liabilities: Euro Area

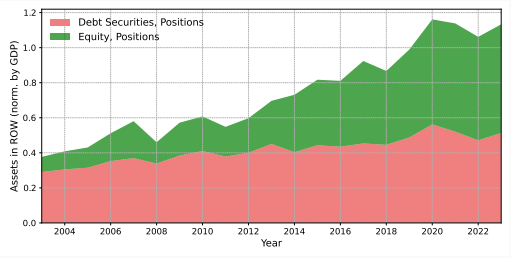


Assets in ROW, USD norm. by GDP

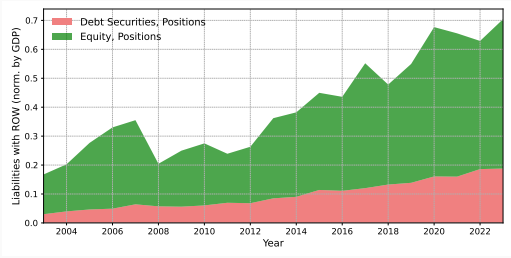


Liabilities from ROW, USD norm. by GDP

Portfolio Assets and Liabilities: JPN, KOR, SGP, HKG,TWN

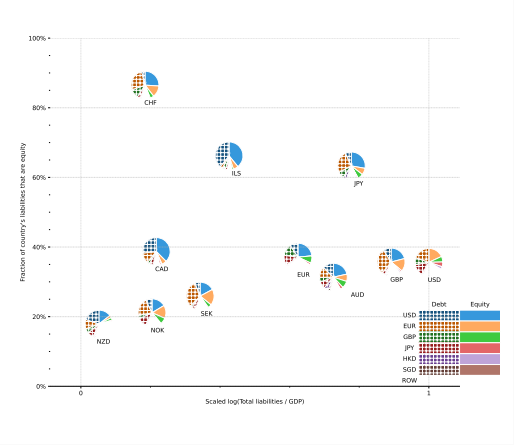


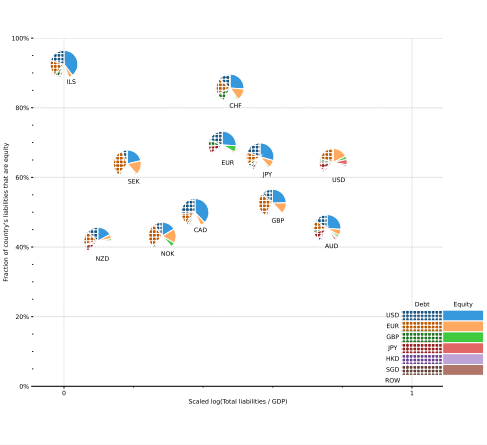
Assets in ROW, USD norm. by GDP



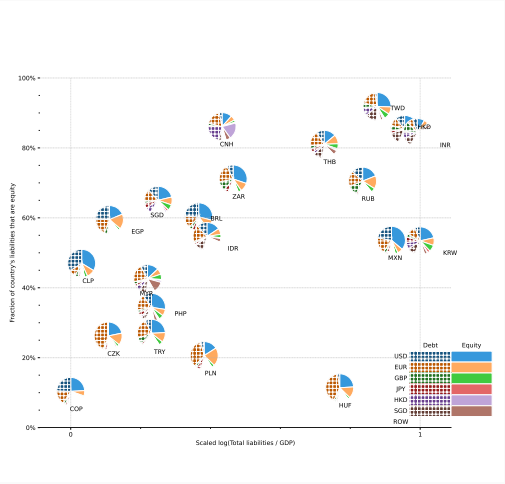
Liabilities from ROW, USD norm. by GDP

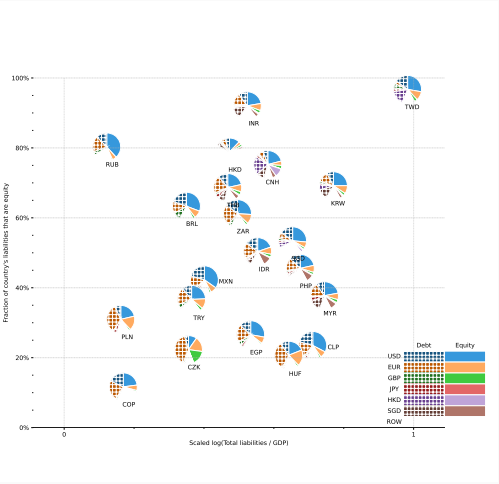
Advanced Economies external liabilities 2008-2023





Emerging Economies external liabilities. 2008-2023





Theoretical Framework: Market-Clearing Identity

$$P_t^{I,E} Q_t^{I,E} = \sum_j S_t^{I/j} D_t^{I,j,E}$$

- Left-hand side: capitalisation of stock market I,; $P_t^{I,E}$: price of stock market I in local currency; $Q_t^{I,E}$: number of shares issued in stock market I.
- Right-hand side: $D_t^{I,j,E}$ are the holdings of stock market I by investors located in country j, denominated in the currency of country j. $S_t^{I/j}$: exchange rate.

Theoretical Framework: Market-Clearing Identity

$$P_t^{I,E} Q_t^{I,E} = \sum_j S_t^{I/j} D_t^{I,j,E}$$

$$\begin{aligned} p_t^{I,E} + q_t^{I,E} &= \sum_j \left(\nu^{I,j,E} \left(s_t^{I/j} + d_t^{I,j,E} \right) \right) \\ \nu^{I,j,E} &= \frac{\overline{S^{I/j} D^{I,j,E}}}{\overline{P^{I,E} Q^{I,E}}}, \end{aligned}$$

where small caps denote the natural logarithms of the variables. In changes we obtain:

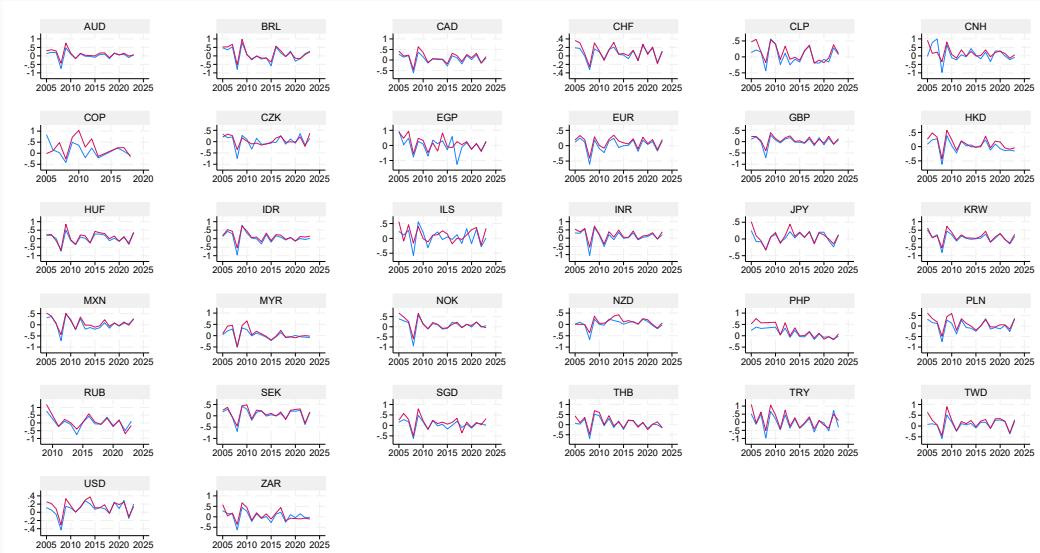
$$\triangle p_t^{I,E} - \sum_{j \neq I} \nu^{I,j,E} \triangle s_t^{I/j} = \sum_j \nu^{I,j,E} \triangle d_t^{I,j,E} - \triangle q_t^{I,E}.$$

Theoretical Framework: Market-Clearing Identity

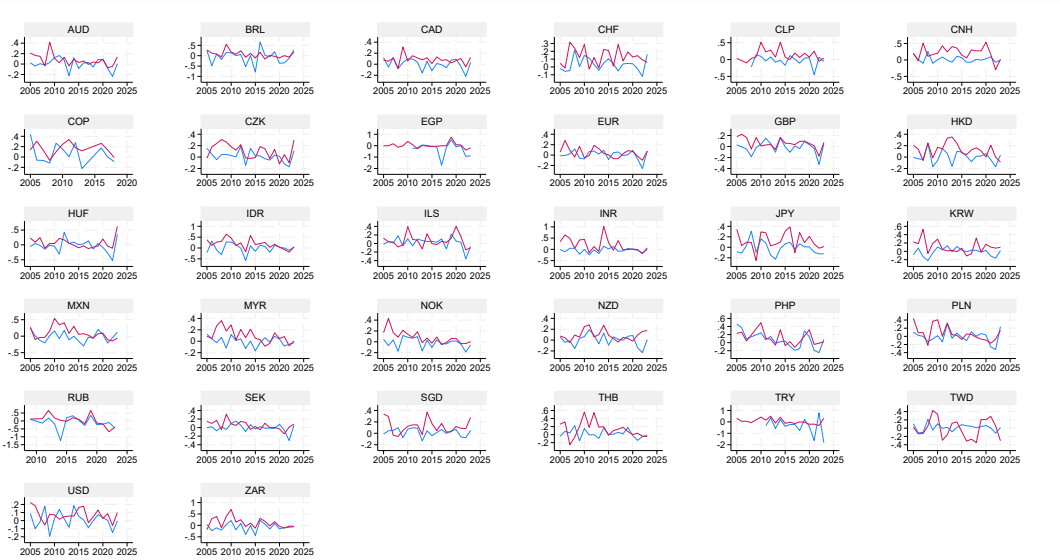
$$\underbrace{\triangle \widetilde{H}_t^{I,E}}_{Prices} = \underbrace{\triangle H_t^{I,E}}_{CPIS} + resid_t^{I,E}$$

- $\triangle H_t^{I,E}$: annual growth rate of stock of cross country equity positions (CPIS).
- $\triangle \widetilde{H}_t^{I,E}$: implicit foreign equity holdings backed from prices (local stock market price growth and exchange rate growth rates).
- Similar set up for long term debt.

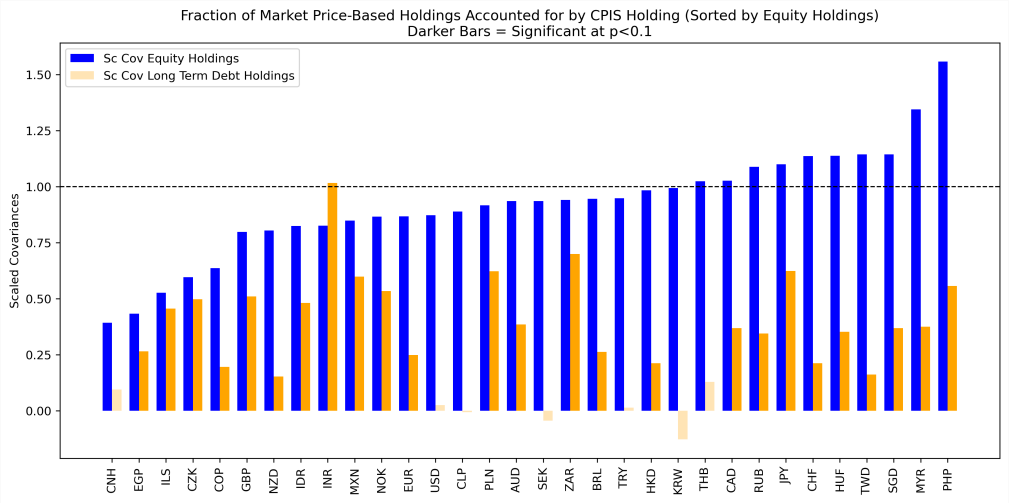
Red: CPIS Equity Holdings. Blue: Price implied equity holdings



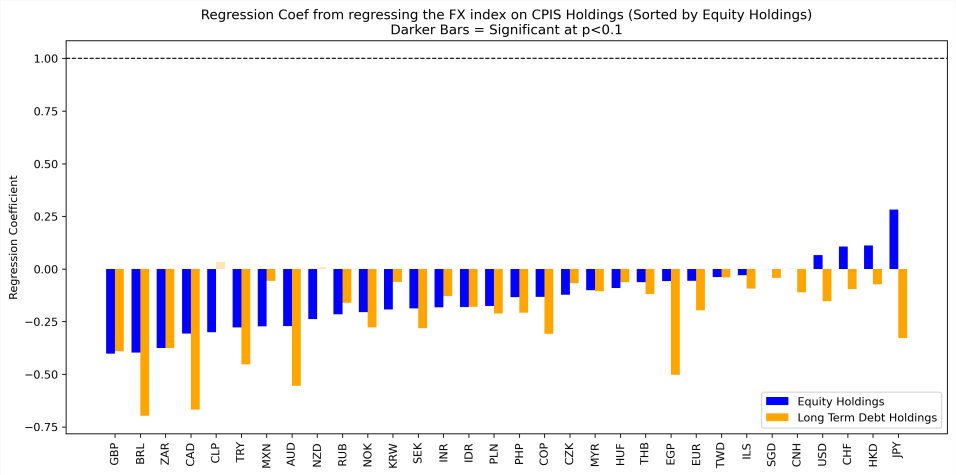
Red: CPIS LT Debt Holdings. Blue: Price implied LT Debt holdings



How good is the fit? Broad Set of Investor Countries

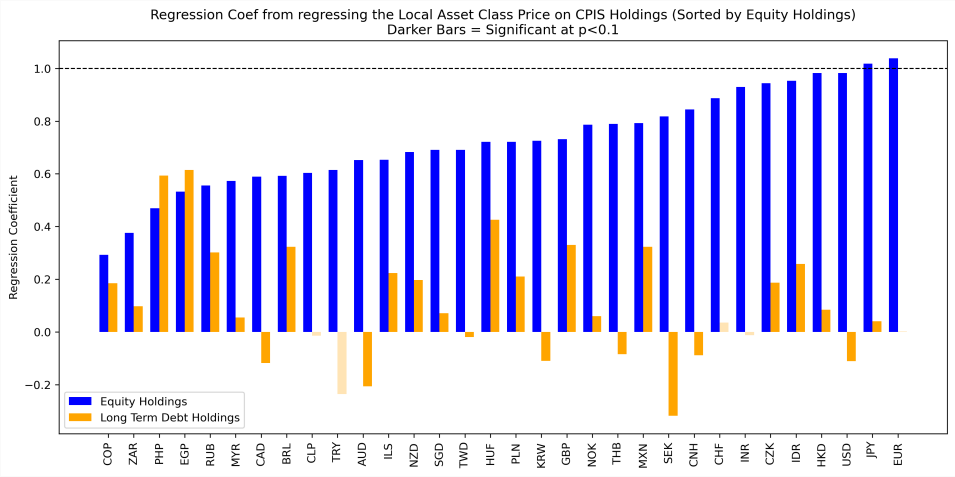


Comovement of equity (blue) or debt (orange) holdings and exchange rates



FX: Negative means appreciation of local currency

Comovement of equity (blue) or LT debt (orange) holdings and stock price or LT debt price

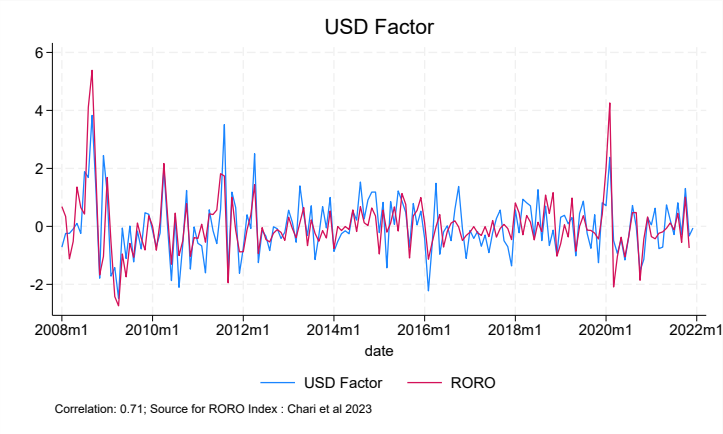


Asset Prices

Taking stock and Policy Implications

- Fit much better for equity than LT debt (issuance, data gaps -maturity, prices-).
- Asset prices and exchange rate help clear the market to a different degree in different countries.
- Holdings tend to comove positively with prices. Holdings associated with local currency appreciation *except* for USD, JPY, CHF and HKD.
- For recipient countries: Exchange rate movements dampen equity price fluctuations. Managing exchange rate associated with higher stock price volatility.
- For investor countries: hedging via comovements of exchange rate and stock price. Increased equity holdings in US from ROW associated with USD depreciation (hedge); increased holdings of US debt with a USD appreciation (same as JPY).

Global Financial Cycle and the Dollar: ups, USD depreciates

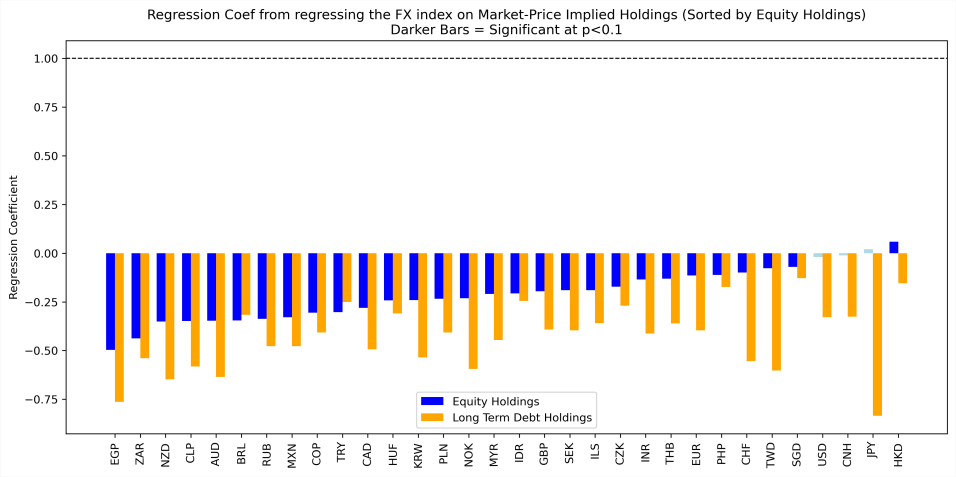


Stavrakeva Rey (2024): Currency Centrality in Equity Markets, Exchange Rates, and the Global Financial Cycle

High-Frequency changes in holdings

- Good fit in the data of $\triangle H_t^{I,E} = \triangle \widetilde{H}_t^{I,E}$. We can approximate growth rate of stock of international equity positions using high-frequency (daily) price data (local stock market price growth and network weighted exchange rate growth rates): $\triangle \widetilde{H}_t^{I,E}$
- We confirm validity of the proxy by regressing 30 day overlapping overlapping changes of $\triangle \widetilde{H}_t^{I,E}$ (proxied) on assset prices and exchange rates.
- Results: similar as before with annual CPIS data (better for equity).

Comovement of equity (blue) or debt (orange) holdings demand (proxy) and exchange rates



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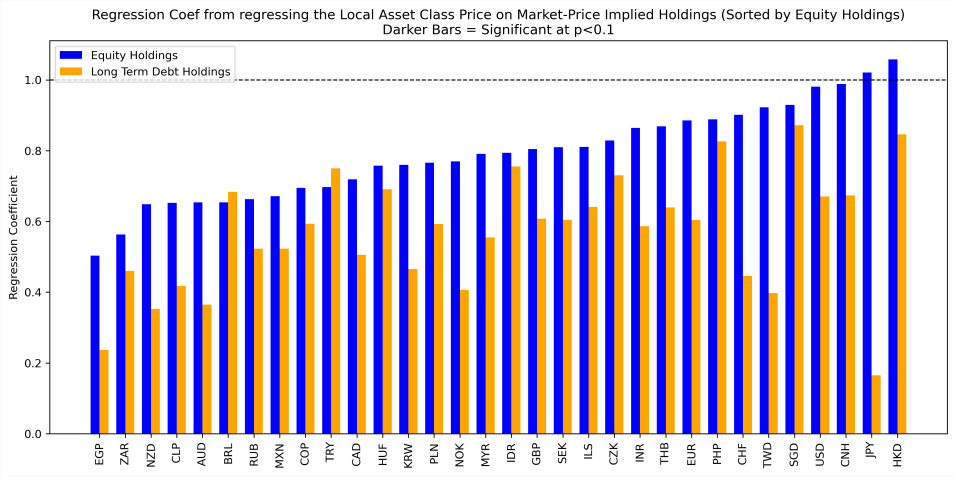


Asset Prices

Instrumenting daily changes in holdings using ETFs

- IV: 30-day growth rate of the BlackRock MSCI iShare ETFs' shares. ETF is country specific. ETFs are issued and traded primarily in the US.
- For the US stock market: ETF is iShares-Core-SP-500-UCITS-ETF-USD-Acc (traded in the UK and Eurozone).
- The iShare ETFs, associated with the MSCI index of each individual stock market, are some of the most liquid and frequently trades ETFs. They report daily data on the shares outstanding and the net asset value of the fund.

Instrumenting daily changes in holdings using ETFs

$$\frac{\Delta \text{SharesOutstanding}^i_{t,t-30}}{\text{SharesOutstanding}^i_{t-30}} = \alpha^i + \sum_{j=1}^{4} \beta_j^{i,\text{NAV}} \frac{\Delta \text{NAV}_{t-30j,t-30(j+1)}}{\text{NAV}_{t-30(j+1)}} + \sum_{j=0}^{4} \beta_j^{i,\text{VIX}} \frac{\Delta \text{VIX}_{t-30j,t-30(j+1)}}{\text{VIX}_{t-30(j+1)}} + \epsilon^{ShOut,i}_{t,t-30}$$

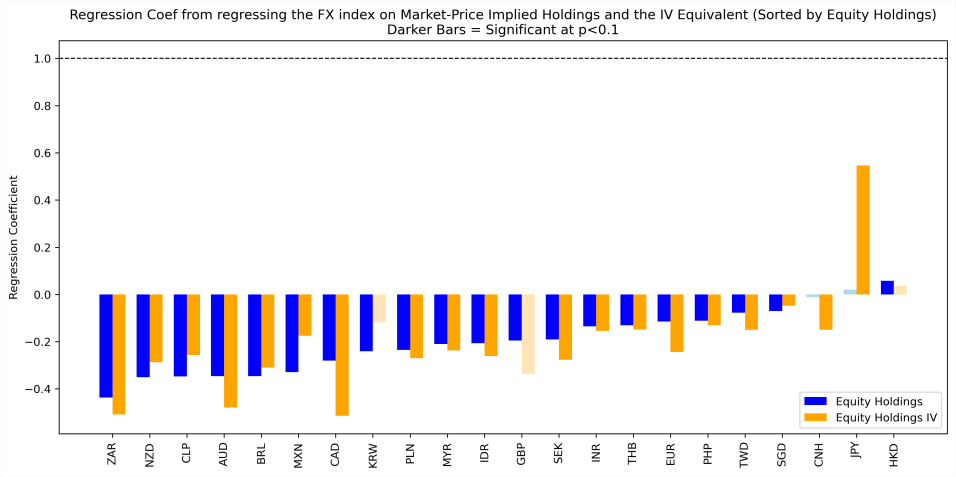
we use the **residual**, $\epsilon^{ShOut,i}_{t,t-30}$, to instrument $\triangle \widetilde{H}^{I,E}_{t,t-30}$.

IV regression:

$$\triangle p^{I,E}_{t,t-30} = \gamma^{P,I} + \zeta^{P,I} \triangle \widetilde{H}^{I,E}_{t,t-30} + \epsilon^{P,I}_{t,t-30}$$

$$\sum_{j \neq I} \nu^{I,j,E} \triangle s^{I/j}_{t,t-30} = \gamma^{s,I} + \zeta^{s,I} \triangle \widetilde{H}^{I,E}_{t,t-30} + \epsilon^{s,I}_{t,t-30}$$

Causal Effect of equity (blue) or debt (orange) holdings (IV) and exchange rates



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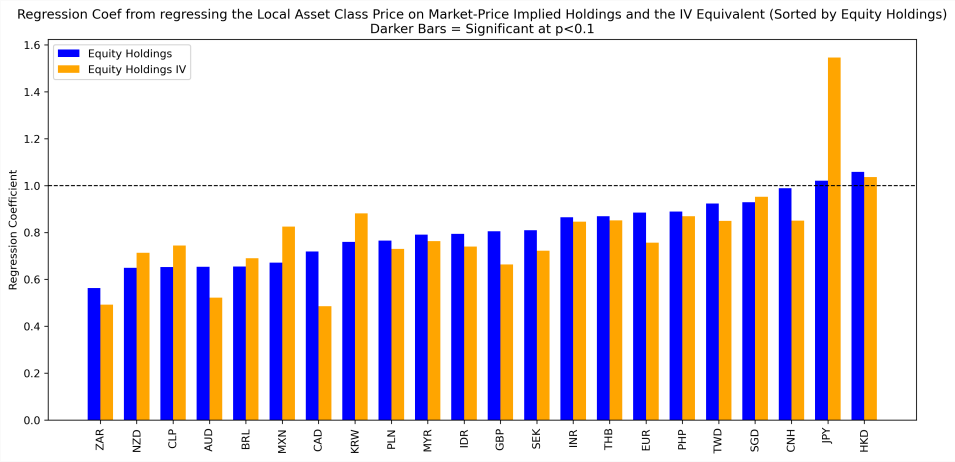
Causal Effect of equity (blue) or LT debt (orange) holdings (IV) on stock price or LT debt price



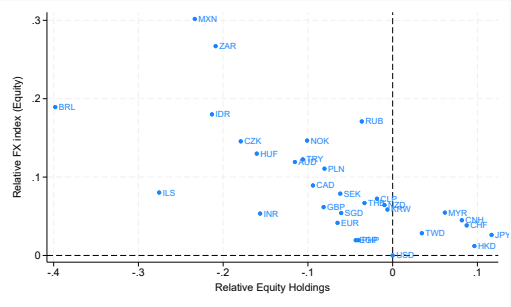
Asset Prices

Trump's shocks in historical perspective

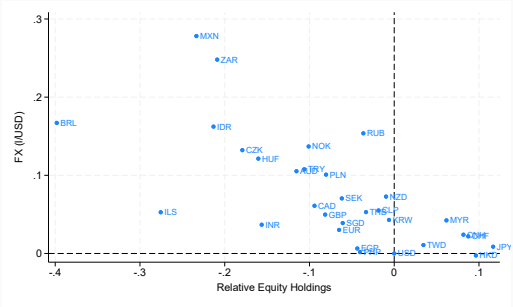
- Response of exchange rates and local stock market prices to foreign equity holdings is very similar to the response to the ETF-based demand measure.

- Use our market based proxy of holdings to understand what happened around Covid, Global Financial crisis and Trump's tariffs.

Trump's shocks in historical perspective: COVID. Equity and exchange rates



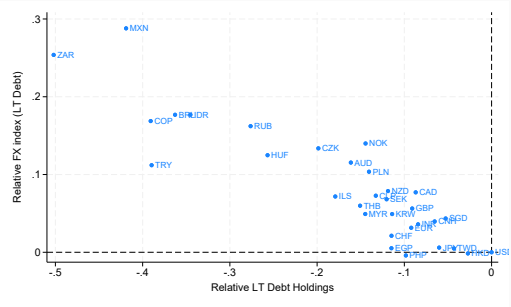
Equities; FX index



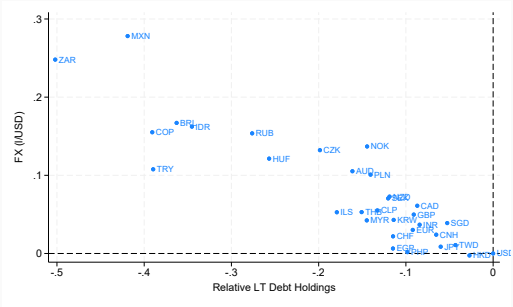
Equities; FX (l/USD)

Covid Effect on FX; 30 day window post US closure; 5 March 2020

Trump's shocks in historical perspective: COVID. LT debt and exchange rates



LT Government Debt; FX index



LT Government Debt; FX (l/USD)

Covid Effect on FX; 30 day window post US closure; 5 March 2020

Trump's liberation day shocks. Equity and exchange rates

Equities; FX index

Equities; FX (l/USD)

Trump Tariffs Effect on FX; 30 day window post announcement; 2 April 2025.[1]

Trump's liberation day shocks. LT debt and exchange rates

LT Government Debt; FX index

LT Government Debt; FX (l/USD)

Trump Tariffs Effect on FX; 30 day window post announcement; 2 April 2025

Trump's shocks in historical perspective: Lehman. Equity and exchange rates

Equities; FX index

Equities; FX (l/USD)

Lehman on FX; 30 day window post Lehman Failure; 15 Sept 2008

Trump's shocks in historical perspective: Lehman. LT Debt and exchange rates

LT Government Debt; FX index

LT Government Debt; FX (l/USD)

Lehman on FX; 30 day window post Lehman Failure; 15 Sept 2008

Conclusions

- Evolving nature of the international finance network. Important for risk sharing.
  - Growing multipolarity
  - Deepening of equity portfolio linkages
  - US and Europe switch from net long equity to net short
- Markets clear by adjusting both the prices of the portfolio securities and the value of currencies in a differentiated manner across countries.
- Policy Implications: Volatility of asset prices versus exchange rates.
- USD, JPY and CHF: different hedging properties
- IV: changes in holdings impacts equity and bond prices as well as exchange rates.
- High-frequency proxy of holdings. Market turbulences:
  - The 2020 COVID shock: USD reserve currency textbook.
  - The Liberation day shock: shift in financial structure