The International Monetary Transmission Mechanism

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Background

- Previously well-established consensus in International Macroeconomics: Mundell-Fleming
  - Expenditure switching at the center: When US raises R^*, USD appreciates
    - Foreign exports & US imports go up
    - Foreign economies expand
- In recent decades the consensus has begun to shift.
  - Some events Asian Crisis, Taper Tantrum (2013)
  - Recent literature (Financial linkages + muted expenditure switching channel)

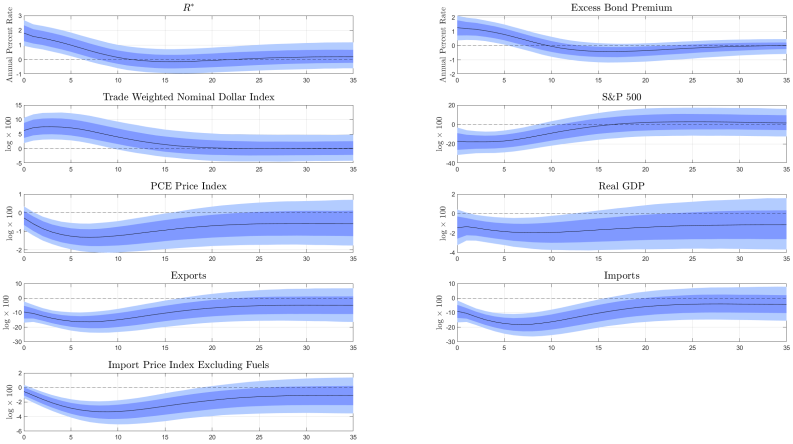
International consequences of a US monetary policy tightening?

- First, look at impact on the US
  - Generally looks like responses reported elsewhere.
  - Show, in addition, that US imports contract fairly sharply after a monetary tightening.
- Then, look at impact on rest of the world.
  - A US contraction appears to lead to a contraction in the rest of the world, especially emerging markets.
- Investigate various frictions that have been proposed to address the above observations.

VAR Analysis

- Monthly data, 2006-2019
  - Data availability & 2000s different regime for EMEs
  - US Monetary policy shocks: Bauer & Swanson (2023) Details
  - Bayesian estimation: Minnesota priors.
- 8 variables in Y_t:
  - GDP, PCE, Exports, Imports, trade-weighted nominal exchange rate, $S\&P$ 500,
  - Excess Bond Premium (EBP), from Gilchrist-Zakrajsek
    - Excess of what businesses pay to borrow (adjusted for default risk) over US government.
  - R^* (sum of 2-year US Treasury bond rate and EBP), default-free short term rate for business
    - Shortest maturity subject to being away from 0 during ZLB periods (13-20 basis points in Covid, a bit higher post-GFC).
    - EBP spread as marginal value of liquidity of Treasury securities (Devereux-Engle-Wu 2023)
- Quantity and Price Variables are in Log-Levels.

Response to Contractionary US Shock



Key US Results

- Generally, results in line with what others get.
  - R^* rises,
  - US currency appreciates,
  - $S\&P$ 500 goes down,
  - Price level goes down.
- Imports go down a lot more than GDP in percent terms.
  - M-F expenditure switching???

International Impact of US Monetary Tightening

- Our VAR for the i^{th} non-US economy is

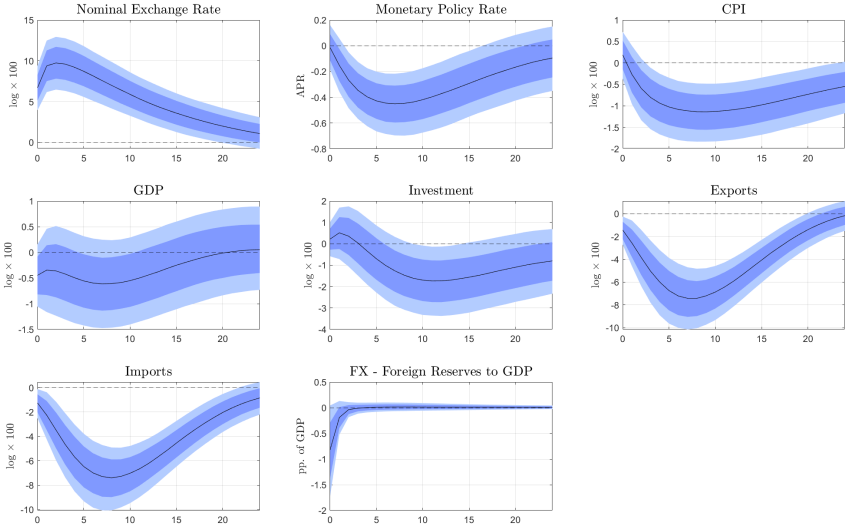
$$Y_{i,t} = A_1 Y_{i,t-1} + A_2 Y_{i,t-2} + C\varepsilon_t^{mp} + \varepsilon_{i,t}, \tag{1}$$

$$Y_{i,t} = \begin{bmatrix} \tilde{Y}_t \\ Y_t^i \end{bmatrix},$$

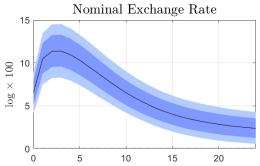
  and $\tilde{Y}_t$ are US variables that affect other economies: $\tilde{Y}_t \sim 3 \times 1$ vector of log GDP^{US}, R^*, PCE^{US}

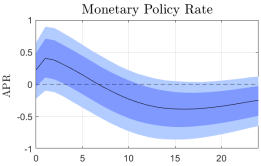
- Impose that coefficients for each country are the same and no interaction between countries.
  - *AE* (advanced economies): $N = 8$ - Australia, Canada, UK, Germany, Japan, Korea, Switzerland, and Sweden
  - *EME* (emerging market economies): $N = 15$ - Brazil, Chile, Colombia, Dominican Republic, Hungary, Indonesia, Mexico, Peru, Philippines, Poland, Russia, Serbia, South Africa, Turkey.

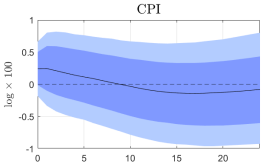
Advanced Economies

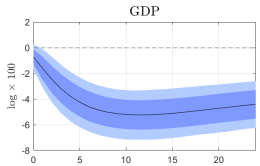


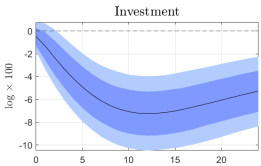
Emerging Market Economies

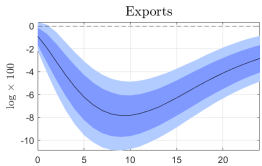


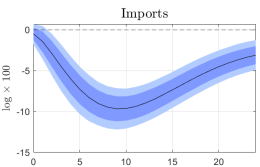


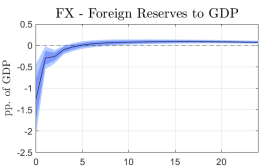












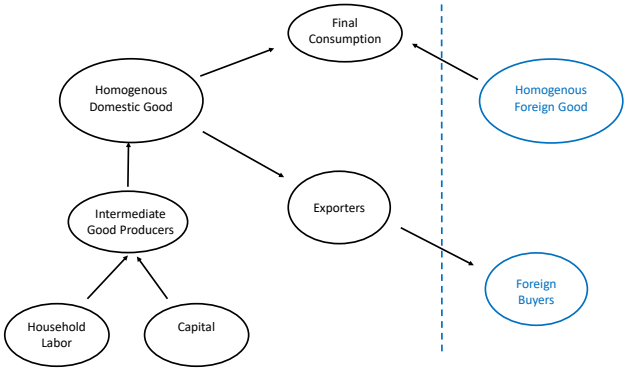
Facts

- When US raises rates:
  - US import demand declines
  - Rest of world contracts
- Substantial ER depreciations followed by reversion
- Larger output fall in EMEs relative to AEs
  - Large drop in exports
- EMEs seem to resort to FX intervention more, in response to US tightening

Small Open Economy Model

- We build a small open economy model
  - US is exogenous, source of 'shocks'
- Estimate the model: Match the facts
- Results suggest import demand channel is the main channel through which US MP shocks transmit to RoW
- Financial Frictions matter: Amplifies import demand shock

Small Open Economy Model



1. Interest Rate Parity Friction

- Households not inclined to shift their portfolios
  - Non-pecuniary reasons, habits
  - Regulation, capital controls
- Gabaix-Maggiori, Itskhoki-Mukhin, Eichenbaum-Johannsen-Rebelo and others.
  - Accounts for the interest rate premium in countries.
  - Allows FX Interventions to influence the ER

2. Portfolio Effect

- When R^* rises, households in the SOE reallocate their portfolios towards the US.
  - People pull back on investment inside the SOE.
  - This portfolio effect, in a 'reasonably parameterized' version of the model, overwhelms the expenditure switching force in the M-F model and produces a recession in the SOE.
- We amplify this portfolio effect:
  - Introduce "flight to safety" "low risk appetite": Target portfolio moves with R^*(non-pecuniary motive)

3. Balance Sheet Channel

- Drop in EMEs (esp investment) seems quite substantial.
- Introduce a balance sheet channel following costly state verification model, BGG.
  - Funding for investment requires dollars and local currency.
- When EME currency depreciates, then entrepreneurs suffer capital losses and they borrow less.
  - This effect can be very large.

4. Dominant Currency Paradigm

- Export prices sticky in dollars (Gopinath, et al).
- Muted expenditure switching: Exports respond sluggishly to depreciation

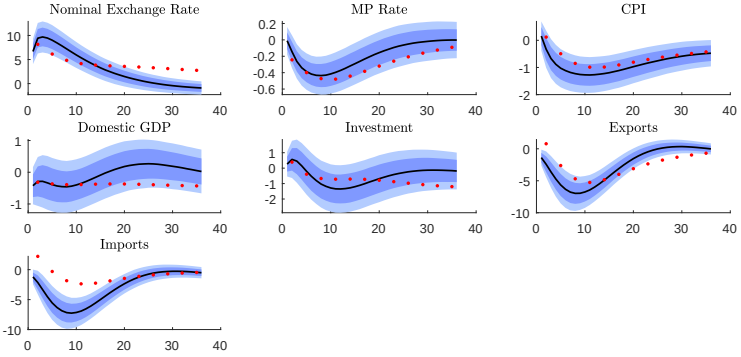
Model Estimation

- Match IRFs for AEs & EMEs (Christiano et al 2011, 2016)

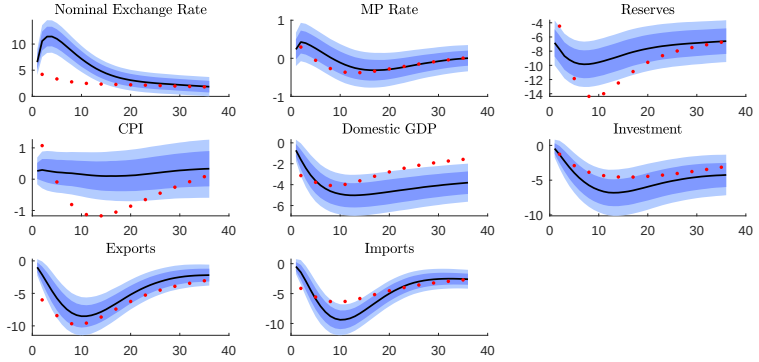
Table 1: Estimated Model Parameters

Variable	Description	Peru	EME	AE
γ	Portfolio Adjustment	2.70	1.84	4.68
γ_R	Portfolio Demand Shifter	0.91	28.42	27.90
κ	Investment Adjustment	3.14	6.92	3.03
θ_{R*}	FX Intervention Coefficient	0.36	0.34	0.00
ρ^{FX}	FX Intervention Persistence	0.71	0.89	0.00
η_c	Consumption Elasticity of Substitution	1.43	1.16	0.78
η_x	Export elasticity of Substitution	1.49	1.82	1.40
ν_i	Investment Elasticity of Substitution	1.20	0.81	0.25
η^f	Price Elasticity of Exports	2.04	5.17	2.62
γ_f	Export Demand Shifter	2.67	5.71	4.50
θ^x	Export Calvo Stickiness	0.79	0.89	0.82
$1-\omega_c$	Home Bias, Consumption	0.53	0.54	0.93
γ_I	Home Bias, Investment	0.29	0.29	0.49
γ_x	Home Bias, Exports	0.42	0.41	0.61
γ_f	Export Demand Shifter	2.67	5.71	4.50
ρ_R	MP Persistence	0.86	0.95	0.89
$1-\phi$	Credit Dollarization	0.50	0.56	0.01
$\widehat{\Upsilon}$	Steady State Deposit Dollarization	0.40	0.40	0.05
$\frac{F^*}{4\times GDP}$	Steady State Reserves/GDP	0.30	0.15	0.05

Advanced Economy Fit



EME Fit


Nominal Exchange Rate
MP Rate
Reserves
CPI
Domestic GDP
Investment
Exports
Imports

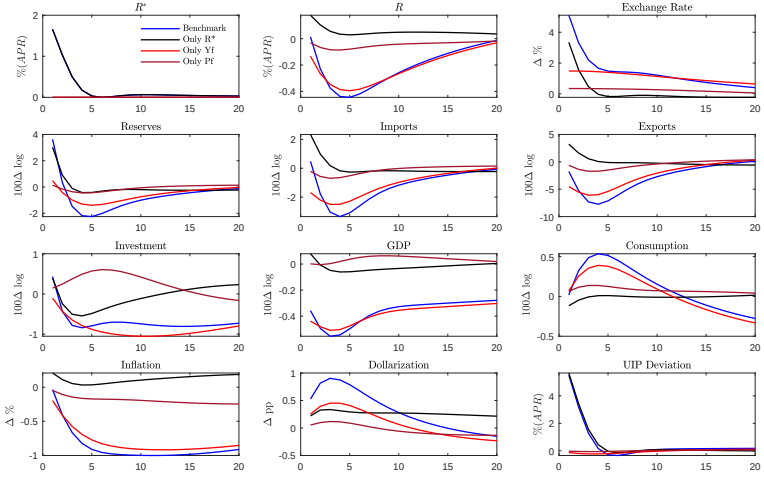
Results

- Large ER depreciation
  - 'So' large that expected appreciation makes dollar asset returns lower in LCU
  - High $R^* \longrightarrow$ High $R_t - R_t^* \frac{S_{t+1}}{S_t}$ ▸ UIP Spreads
  - Flight to safety key
- AE output decline modest: High home bias
  - AE with low home bias: larger decline ▸ Detail
- EME: FX Interventions not effective against US MP Shocks ▸ Detail
  - The reduction in US imports that goes with the tightening acts as real shock on the SOE.
  - Effective against pure R^* shocks ▸ Detail and UIP Shocks ▸ Detail
  - Role of Dollar debt & sticky export prices ▸ Detail
- Peru: FX Intervention official policy (Castillo and Medina 2021), large reserves, large interventions
  - ▸ Fit ▸ Invervention Effectiveness ▸ Invervention Effectiveness: Pure R* Shock

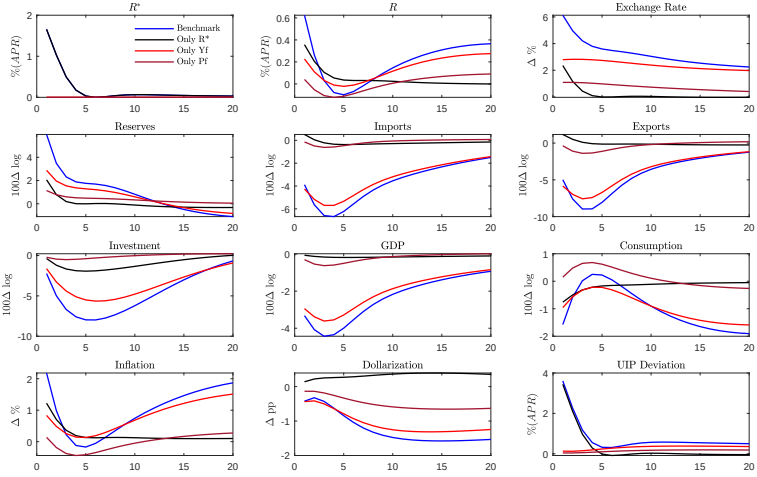
Decomposition

- US Monetary shock has 3 effects
  - Pure interest rate (R^*)
  - GDP & Import demand decline (Y^f)
  - Inflation & expenditure switching (P^f)
- GDP decline (both EME & AE) is mostly due to Y^f
- Trade and financial frictions
  - Trade shock is more severe with financial frictions (through investment)

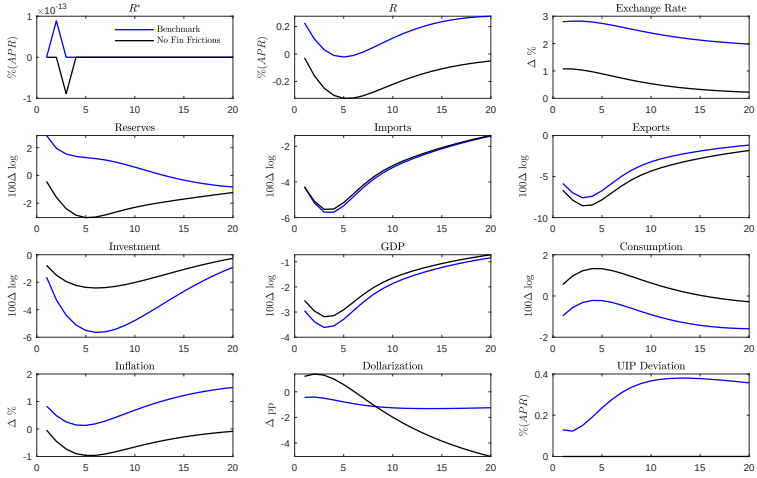
Advanced Economies - Decomposition



EME - Decomposition



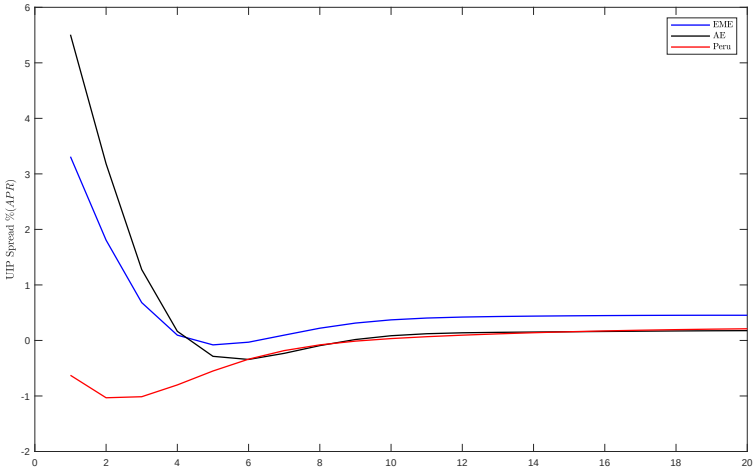
EME - Role of Financial Frictions



Conclusion

- US MP Shocks $\longrightarrow$ US Slowdown $\longrightarrow$US Import demand declines
- Results suggest US demand decline could be the main transmission mechanism
  - The impact of the decline in imports shaped by financial frictions.
- Results may shed light on the puzzle, "Why has the recent US monetary tightening not launched a big recession in the EMEs, like it normally does?"
  - Answer: this time is unusual, US economy and US imports didn't contract like they normally do.

UIP Spread



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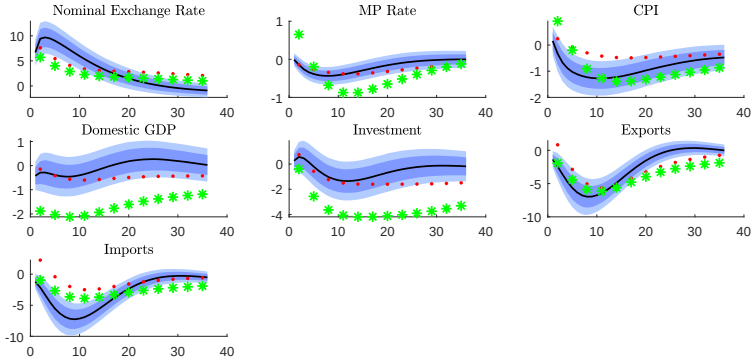
Advanced Economy with Low Home Bias



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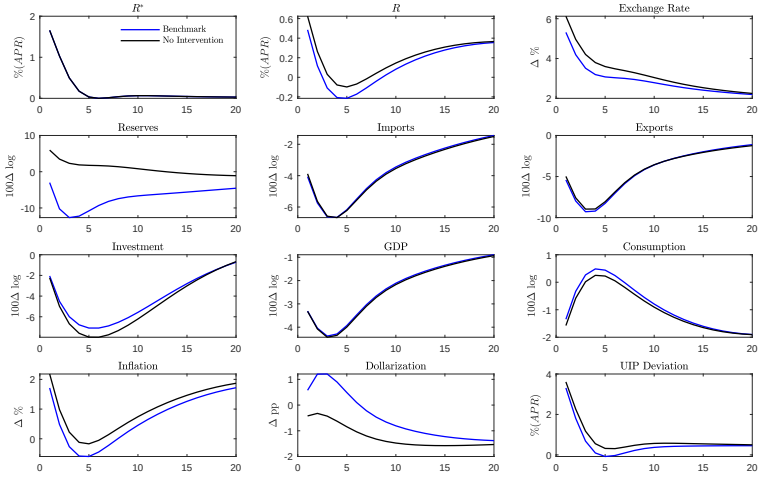
EME Effectiveness of Interventions



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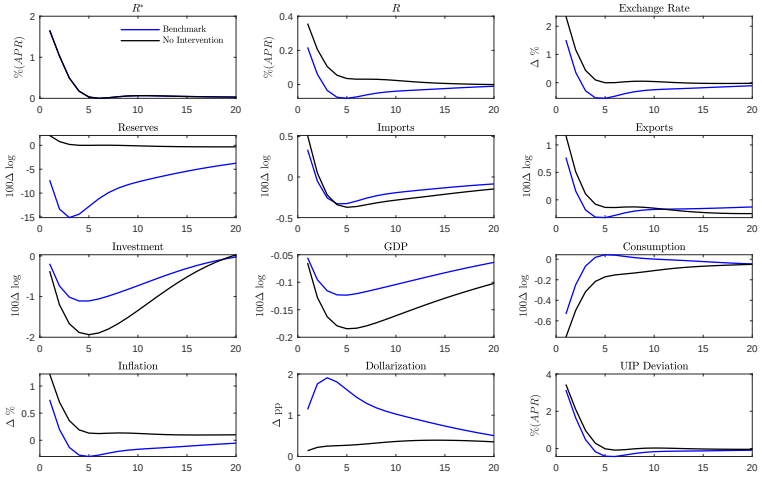
EME Effectiveness of Interventions: Pure R^* Shock



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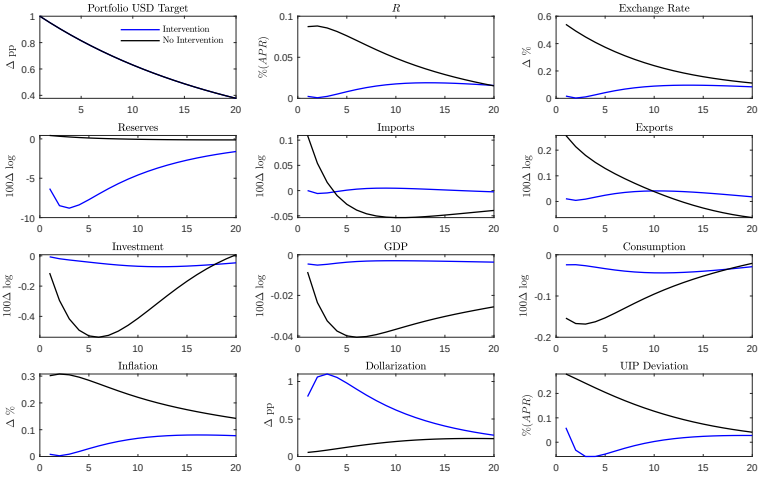
EME Effectiveness of Interventions: UIP Shock



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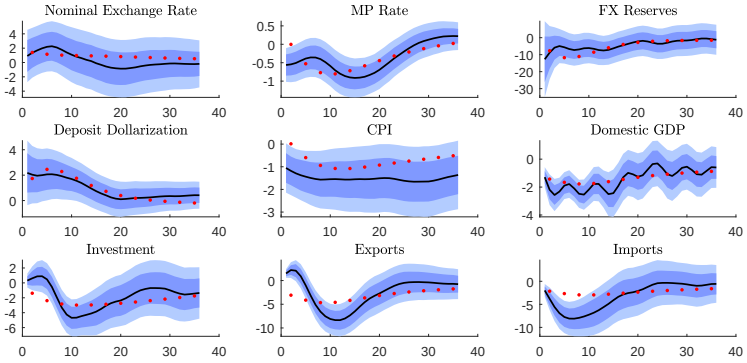
Peru Fit



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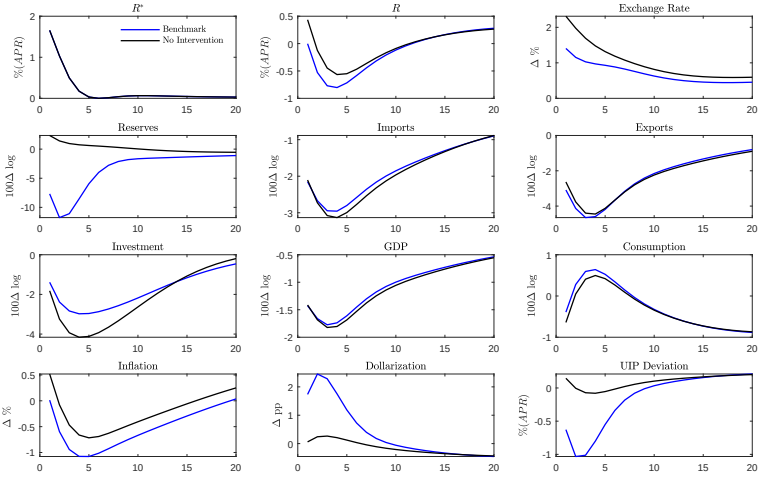
Peru: Effectiveness of FX Interventions



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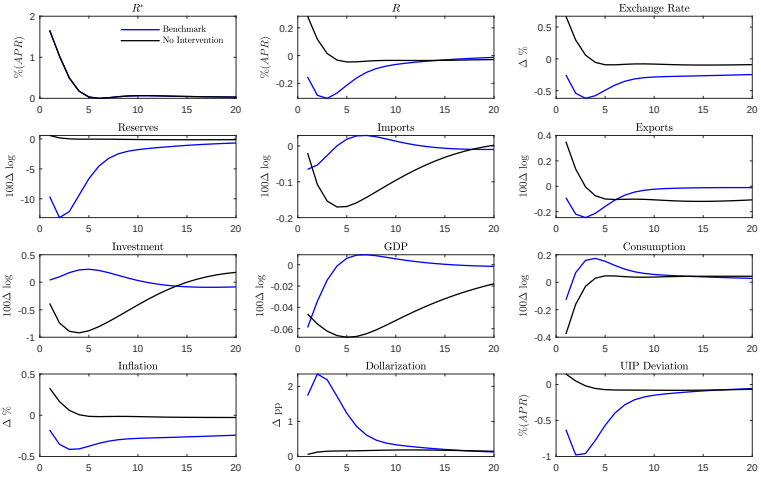
Peru: Effectiveness of FX Interventions: Pure R^* Shock



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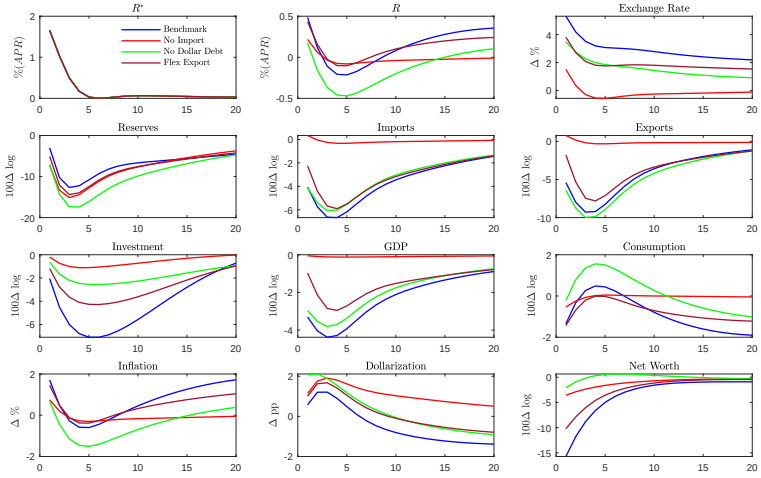
EME: Role of Dollar Debt & Dollar Invoicing



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Bauer and Swanson (2023) Index of Monetary Policy Shocks

- High frequency identification:
  - Based on FOMC meetings that occur 8 times a year (on average in the middle of the month).
  - Compute changes (10 minutes before FOMC announcement to 20 minutes after) on four Eurodollar futures rates, $ED1, ..., ED4$.
  - Compute first principle component, $\tilde{x}$, of $ED1, ..., ED4$.
    - Loosely, $\tilde{x}$ is the time series that best captures the variation in $ED1, ..., ED4$.
- Regress $\tilde{x}_t$ on data *publicly known* at t:
  - surprise in most recent release of nonfarm payrolls prior to FOMC meeting, relative to median expectation for that release.
  - employment growth, commodity price...
  - Residual is ε_t^m, the estimate of *pure* monetary policy shock (higher ε_t^m means tighter policy).
- Interpret correlation of $\tilde{x}_t$ with information at time t as reflecting error in private sector's expectation of how the Fed reacts to publicly available news.
  - They want to remove the latter, so ε_t^m is a 'pure' monetary policy shock. back