# Discussion of "Sovereign Debt Portfolios, Bond Risks and the Credibility of Monetary Policy" by Wenxin Du, Carolin Pflueger and Jesse Schreger

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# What this paper does

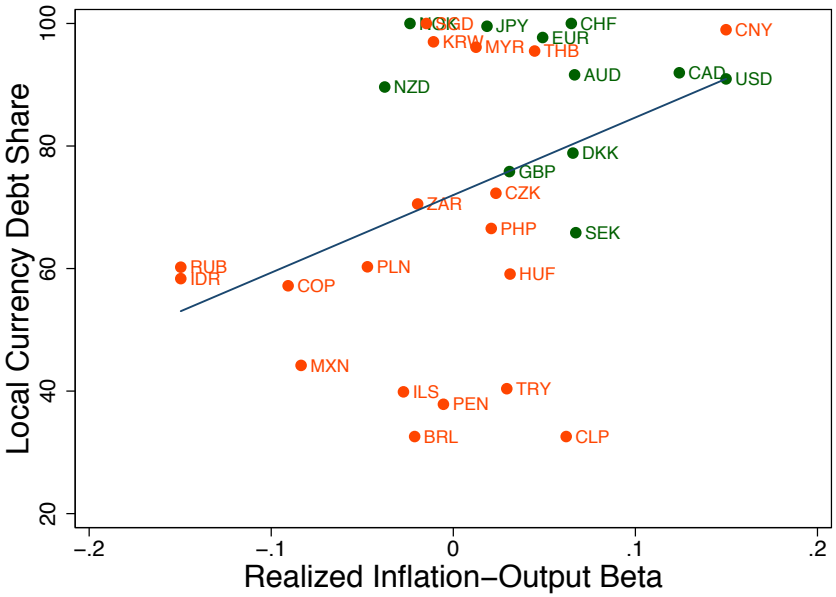
**This paper:**

1. Provides empirical evidence that countries with more countercyclical inflation issue *less* local-currency debt $s^L$
   - $\text{Corr}\left(\beta_{\pi,Y}, s^L\right) > 0$
2. Presents a model offering a causal interpretation of this correlation relying on inflation credibility $p$
   - $p \uparrow \Rightarrow \beta_{\pi,Y} \uparrow$ *and* $s^L \uparrow$
3. Calibrates the model to show that it can be quantitatively consistent with the empirical evidence
4. Provides supportive evidence in favor of the causal mechanism

**This discussion:**

- Reviews the argument in some detail
- Offers comments and suggestions along the way

# Key empirical fact




- Clever use of financial market data to show this evidence in multiple ways
- Surprisingly robust across measures:
  a) Beta of LC bonds on stocks
  b) Revisions of 2-year fcasts
  c) Realized $\pi$ vs realized $Y$
- Which one is the better one theoretically?

# Risks in government borrowing

- Consider stylized 2-period model to get intuitions
- $t = 0$: govtt needs to raise real amount $V > 0$ with local currency debt $D^L$, foreign currency debt $D^F$, and inflation-linked debt $D^R$

$$P_0 V = D^L + \mathcal{E}_0 D^F + P_0 D^R$$

  - $P_t$ is domestic price level, $\mathcal{E}_t$ nominal exchange rate

- $t = 1$: govtt receives income $Y_1$, consumes $C_1$, repays debt

$$P_1 C_1 = P_1 Y_1 - (1 + i) D^L - \mathcal{E}_1 (1 + i^*) D^F - P_1 (1 + r) D^R$$

  - $i$ home nominal, $i^*$ foreign nominal, $r$ home real risk-free

- For now, risk-neutral lenders. No arbitrage $\Rightarrow$ Fisher equation & UIP

$$(1 + r) \frac{\mathbb{E}[P_1]}{P_0} = 1 + i = (1 + i^*) \frac{\mathbb{E}[\mathcal{E}_1]}{\mathcal{E}_0}$$

# Risks in government borrowing

- At $t = 0$, form portfolio shares

$$1 = \underbrace{\frac{1}{V}\frac{D^L}{P_0}}_{s^L} + \underbrace{\frac{1}{V}\frac{\mathcal{E}_0 D^F}{P_0}}_{s^F} + \underbrace{\frac{D^R}{V}}_{s^R}$$

- At $t = 1$, using Fisher equation & UIP

$$C_1 = Y_1 - (1+r)\left(s^L \frac{\mathbb{E}[P_1]}{P_1} + s^F \frac{\mathcal{E}_1 \mathbb{E}[P_1]}{P_1 \mathbb{E}[\mathcal{E}_1]} + s^R\right) V$$

1. Unexpected inflation ($\frac{P_1}{\mathbb{E}[P_1]} \uparrow$) lowers real burden of LC debt
   - Fisher effect
2. Unexpected deprec. of RER ($\frac{\mathcal{E}_1}{P_1} \uparrow$) raises real burden of FC debt
   - Foreign-currency debt-deflation effect

# Naive intuition

- Suppose FC borrowing unavailable ($s^F = 0$). Normalize $r = 0$.
- Government

$$\max_{s^L} \mathbb{E}\left[\frac{C_1^{1-\gamma}}{1-\gamma}\right]$$

$$\text{s.t.} \quad C_1 = Y_1 - \left(s^L \frac{\mathbb{E}[P_1]}{P_1} + (1 - s^L)\right) V$$

- If $(Y_1, P_1)$ stochastic and *exogenous*:
  - $s^L \uparrow$ when $\mathrm{Cov}(Y_1, P_1) \downarrow$, since LC debt better hedge
  - cf lit. on pf choice with background risks (Campbell-Viceira etc)
- Key point of DPS: in data, correlation is the opposite!
- Their key observation: $P_1$ is not exogenous

# Refined intuition: no commitment

- *No commitment govtt* plays game with future self
- Self 1 takes $s^L$ as given and

$$\max \frac{C_1^{1-\gamma}}{1-\gamma} - \alpha \left( \frac{1}{P_1} - 1 \right)^2$$

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- Solution ('no-commitment inflation rule')

$$P_1 = \frac{1}{1 - \frac{s^L V}{2\alpha} \mathbb{E}[P_1] C_1^{-\gamma}} \simeq 1 + \mathbb{E}[P_1] \frac{s^L V}{2\alpha} Y_1^{-\gamma}$$

  - Endogenously, $\text{Cov}(Y_1, P_1) < 0$
  - Self-0 likes this... but also internalizes effect on $\mathbb{E}[P_1]$, so reduces $s^L$
  - **Commitment/flexibility tradeoff** (Amador-Werning-Angeletos 06)
  - Low commitment govtts have $\text{Cov}(Y_1, P_1) < 0$ and low $s^L$

# Refined intuition, full commitment

- Under full commitment, time-0 govt has plan for $P_1(z)$

$$\max_{P_1(z), s^L} \mathbb{E}\left[\frac{C_1^{1-\gamma}}{1-\gamma} - \alpha\left(\frac{1}{P_1} - 1\right)^2\right]$$
$$\text{s.t.} \quad C_1(z) = Y_1(z) - \left(s^L \frac{\mathbb{E}[P_1]}{P_1(z)} + (1 - s^L)\right) V$$

- Force for high $s^L$ and complete hedging $\mathrm{Cov}(Y_1, P_1) < 0$
  - Intuition: decentralizes the risk-sharing problem with RN investors

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- Force for high $s^L$ and complete hedging $\mathrm{Cov}(Y_1, P_1) < 0$
  - Intuition: decentralizes the risk-sharing problem with RN investors
- To increase $\mathrm{Cov}(Y_1, P_1)$, introduce investors with risk aversion $\phi$
  - Intuition: risk-sharing rule $\Rightarrow$ country bears own output fluctuations
  - But how can we flip the sign? Seems to defeat risk-sharing!
  - Explain $\phi$ vs $\gamma$ better.

# Comments on model

- Overall: nice work given not-so-tractable model!
- You may be asking too much from it:
  - Endogenous $\mathrm{Cov}\left(Y_1, P_1\right) > 0$? Many reasons why this is true in devpd economies (cf Phillips curve)
  - Model highly stylized, so calibrating to data is very difficult
- Instead of calibration, would favor clear discussion of what empirical objects are relevant for the theory
  - Realized inflation vs actual inflation vs beta of stocks and bonds

# Long maturities

- Inflating away public debt with long maturities?
  - In practice, mp can only affect nominal prices with a lag
  - So, only long maturity LC debt is affected
  - Quantitatively challenging to get much reduction in real debt from such policy in US (eg Hilscher-Raviv-Reis 2013)
  - May be even harder in EMs (more FC debt, shorter maturities)
- Yet, paper provides clear evidence of countercyclical inflation in emerging markets
  - Direct evidence that this is due to attempts to inflate the public LC debt?
- Could also explore and test relationship between monetary credibility and LC debt *maturity*

# Conclusion

- New, robust and interesting set of stylized facts
- Intuitive rationalization, nice work on model
- Thought provoking on the role monetary-fiscal interactions in determining inflation cyclicality and macro outcomes