Dominant Currency Debt

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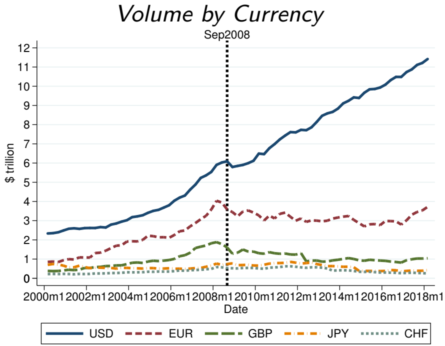
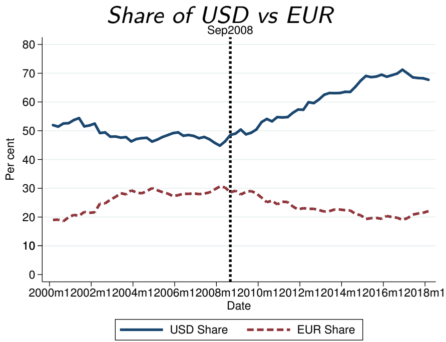
Disclaimer: The views are those of the authors and do not necessarily represent those of the BIS.

The Dollar is the Dominant Currency for Debt





Notes: Currency Denomination of Cross-Border Loans and International Debt Securities (Non-banks, amounts outstanding).
Source: Bank for International Settlements

1. Of all the **major** currencies, why do firms borrow in dollars?
   - This paper is **not** about "why EME firms issue FC, not LC debt."
2. What explains the fall and the rise of the dollar in the last 20 years?

The Conventional View: Investor-driven

The Conventional View

- Investors hold dollars because they are safe (\$ $\uparrow$ in downturns).
- Firms have to issue in dollars.

Dollar debt is **bad** for borrowers in downturns.

- Three challenges:
  - Dollar is not the "safest haven." e.g. JPY, CHF, (also EUR) are safer.
  - Nominal dollar rates are higher.
  - After the Bretton Woods, the dollar depreciated a lot, yet increased its dominant role (Gourinchas, 2019).

The Debt View: Borrower-driven

Theory:

- Among major currencies, borrowers with nominal debt prefer the "riskiest:"
  - the one that co-moves with their stock value the most: $Cov(Stock, FX)$
  - independent of lenders' discount factor.

Empirics:

- It is the dollar! Not the euro, the yen, nor the CHF...
  - Especially (≥2Y), which accords with typical debt maturity.
- Forward-looking expectations and historical covariances, debt issuance patterns, predictability of the dollar exchange rate...

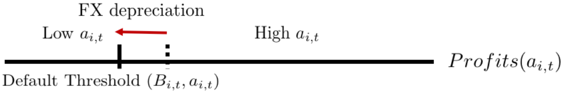
The Debt View

- Dollar debt can be **good** for borrowers in downturns.
- It is certainly **better** compared to EUR, JPY or CHF.

The Debt View: What Do Firms Really Want?

A very simple model with nominal debt and default (also works in GE)

- Global firms: exporters, prices are flexible, CFs diversified.
- Choose capital structure (trade-off): equity or debt in any currency.
- **Ex-post,** if c depreciates, the probability of default is lower.



- **Ex-ante,** choose c that depreciates the most in a downturn.

Theorem

Absent heterogeneity in issuing costs, issuing only in dollars is optimal for firm i if and only if for all currencies $CUR(j)$, $j = 1, \cdots, N$.:

$$\mathrm{Cov}_t^{\$}\left((Stock_{i,t,t+1})^{-\ell}, \frac{CUR(j)}{USD}_{t,t+1} \right) \geq 0. \quad (1)$$

Empirical evidence: Quanto-Implied Risk Premium

Ideally, forward looking covariance at long horizons.

- Forward looking expectations can be inferred from asset prices!
- Kremens and Martin (2019):
  - Quanto contracts on S&P 500 of 2-year maturity.
  - Forwards on S&P 500, but in EUR, JPY etc... not USD!
  - Contract value depends on S&P 500, but also on FX risk.

$$QRP_t = \mathrm{Cov}_t^{\$}\left(Stock_{i,t,t+1}, \frac{CUR(j)}{USD}_{t,t+1}\right) = \frac{R_{f,t}^{\$}}{R_{f,t}^{i} P_t}(Q_{i,t} - F_t)$$

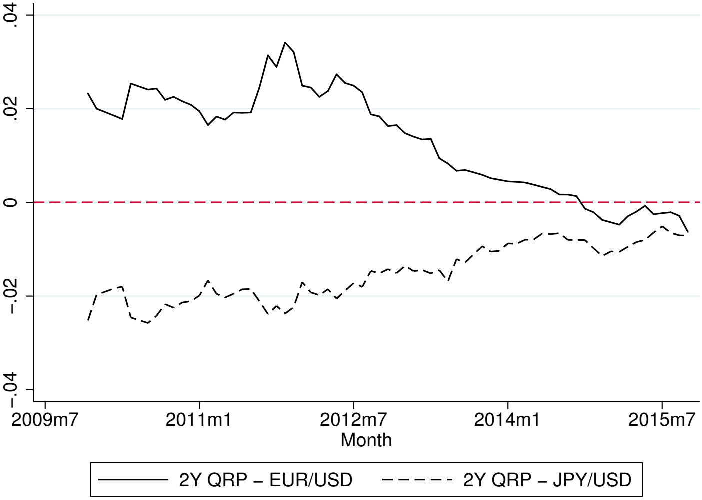
where $Q_{i,t}$ and F_t are quanto and vanilla forward prices, respectively.

- **Note:** Negative QRP means $CUR(j)$ appreciates (Dollar depreciates) when S&P 500 falls!

$$\mathrm{Cov}_t^{\$}\left((Stock_{i,t,t+1})^{-\ell}, \frac{CUR(j)}{USD}_{t,t+1}\right) \approx -\ell\, \mathrm{Cov}_t^{\$}\left(Stock_{i,t,t+1}, \frac{CUR(j)}{USD}_{t,t+1}\right) \geq 0$$

Quanto Risk Premium - EUR/USD, JPY/USD

$QRP_{2Y} < 0 \Rightarrow$ **Market expectations: dollar depreciates when the S&P 500 falls!**



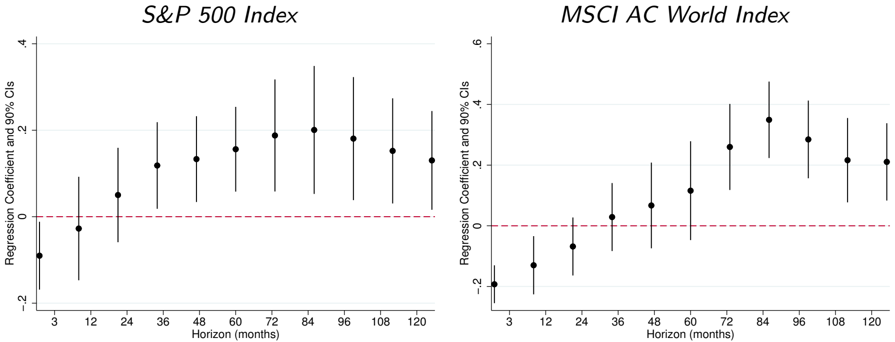
Empirical Evidence: Realized covariances

FRED USD Index, but same pattern for bilateral exchange rates

For each $h \in \{3, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120\}$ months:

$$Return\_USD_t^h = \alpha^h + \beta_h Return\_SP500_t^h + \epsilon_t^h \,. \quad (2)$$

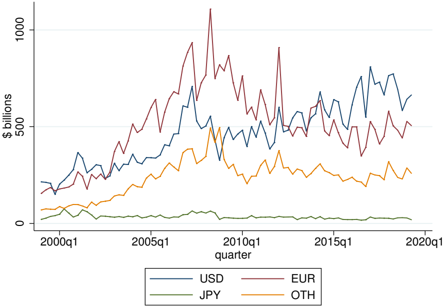
$$Return\_USD_t^h = \alpha^h + \beta_h Return\_MSCIACWorld_t^h + \epsilon_t^h \,. \quad (3)$$



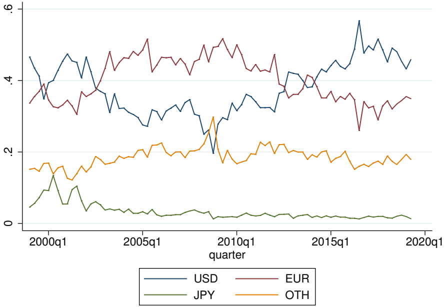
Notes: The graph reports the regression coefficients β_h from the first regression on the left hand panel and the second regression on the right hand panel using the USD index. The dots are the corresponding β_h and the lines are the 90% confidence intervals. Standard errors are corrected using the Newey-West procedure, with h lags in each regression.

Gross International Debt Issuance Patterns

Gross Issuance Volumes



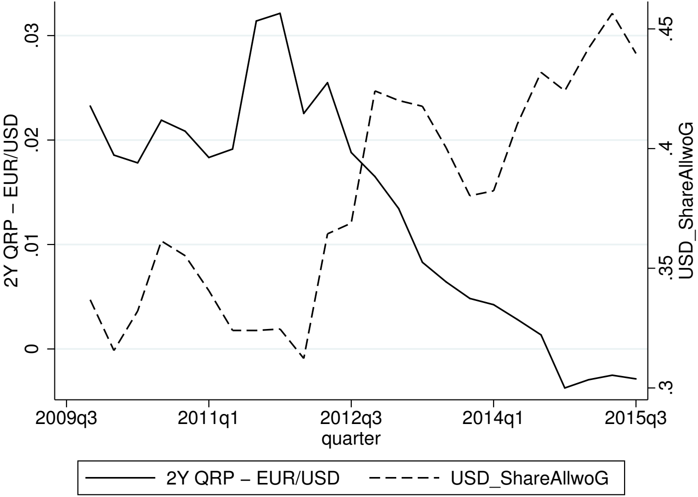
Shares of Currencies



Source: BIS International Debt Securities (excludes government)

QRP and international debt issuance

Our prediction: QRP and debt issuance are negatively related.



What Role for Monetary Policy?

Suppose that there exists a global business cycle shock a_t such that:

(A1) Inflation is counter-cyclical (Campbell, Pflueger and Viciera, 2019)

$$\log \mathcal{P}_{i,t,t+1} \;=\; -\phi_i a_{t+1} \;+\; \varepsilon_{i,t+1},$$

(A2) Relative inflation rates are an important driver of exchange rates (weak form of relative PPP)

(A3) Stock prices are pro-cyclical

(A4) Stochastic discount factor is counter-cyclical

Theorem: DC = highest *expected* ϕ_i (most effective CB).

- Those expectations can be inferred from asset prices as well!
- **Inflation Risk Premium:** Covariance of inflation with investors' SDF.

The fall and the rise of the dollar:

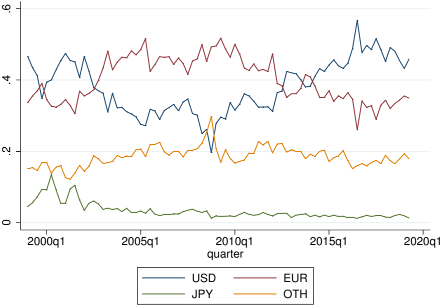
- Markets have updated $\phi_\$ \uparrow$ or $\phi_€ \downarrow$ after 2008.

Inflation Risk Premia and Dollar Dominance

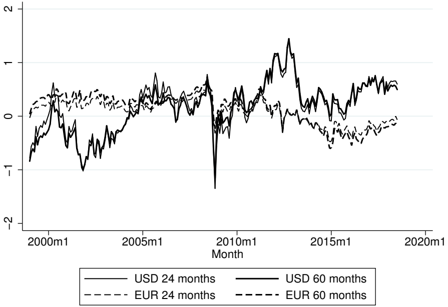
Et voila!

$IRP_{\$}$ is lower before the crisis, higher after the crisis.

Share of USD vs EUR



2- & 5-year Inflation Risk Premium



Source: BIS, Hordahl and Tristani (2014).

Note also, in 2018, as IRPs converge, dollar share is lower.

Putting them into a regression

(P1) USD_t^{shr} co-moves negatively with $QRP_{€/\$,t}^{2Y}$.

(P2) USD_t^{shr} co-moves positively with $IRP_{\$,t}$ and negatively with $IRP_{€,t}$

(P3) Quarterly reg: changes depend on expectations can happen quickly.

	(1) USD_t^{shr}	(2) USD_t^{shr}	(3) USD_t^{shr}	(4) USD_t^{shr}	(5) USD_t^{shr}	(6) USD_t^{shr}
$QRP_{€/\$,t}^{2Y}$	-3.481***	-1.597**	-3.503***			
	(0.332)	(0.643)	(0.311)			
$IRP_{\$,t}^{2Y}$				-0.0168	-0.0197	0.0229
				(0.0190)	(0.0237)	(0.0231)
$IRP_{€,t}^{2Y}$				-0.181***	-0.174***	-0.182***
				(0.0320)	(0.0428)	(0.0285)
Trend		X			X	
Control			X			X
Period	09q4-15q3	09q4-15q3	09q4-15q3	99q1-18q3	99q1-18q3	99q1-18q3
Observations	24	24	24	79	79	79
R^2	0.705	0.781	0.763	0.286	0.287	0.412

Notes: Robust standard errors are shown in parentheses. *, **, *** denote significance at the 10, 5, and 1% levels respectively. Debt issuance data includes all sectors except the government. Latest observed values of $QRP_{€/\$,t}^{2Y}$, $IRP_{\$,t}^{2Y}$ and $IRP_{€,t}^{2Y}$ in a given quarter are used. $QRP_{€/\$,t}^{2Y}$ data come from Kremens and Martin (2019), and $IRP_{\$,t}^{2Y}$ and $IRP_{€,t}^{2Y}$ come from Hoerdahl and Tristani (2014). Trend refers to a linear time trend and control refers to the inclusion of total issuance as a control variable.

Exchange rate expectations or convenience yield?

- $Corp.Basis_t$: FX-hedged corp. borrowing cost differential (Liao, 2019).
- Higher $Corp.Basis_t$ $\rightarrow$ cheaper to borrow in USD than EUR.
- QRP and IRP signs, stat. significance remain unchanged.
- Corp. basis has **the wrong sign.**

	(1) USD^{shr}_t	(2) USD^{shr}_t	(3) USD^{shr}_t	(4) USD^{shr}_t	(5) USD^{shr}_t	(6) USD^{shr}_t	(7) USD^{shr}_t
$QRP^{2Y}_{€/\$,t}$	-3.448***			-1.612**			
	(0.312)			(0.713)			
$Corp.Basis_t$		-0.00112	-0.00292***	-0.00176**			-0.000782
		(0.000784)	(0.000445)	(0.000758)			(0.000475)
$IRP^{2Y}_{\$,t}$					-0.0168	0.0364	0.0416
					(0.0190)	(0.0259)	(0.0255)
$IRP^{2Y}_{€,t}$					-0.181***	-0.187***	-0.181***
					(0.0320)	(0.0243)	(0.0242)
Period	09q4-15q3	03q4-16q2	09q4-15q3	09q4-15q3	99q1-18q3	03q4-16q2	03q4-16q2
Observations	24	51	24	24	79	51	51
R-squared	0.716	0.052	0.744	0.782	0.286	0.514	0.538

Notes: Robust standard errors are shown in parentheses. *, **, *** denote significance at the 10, 5, and 1% levels respectively. Debt issuance data includes all sectors except the government. Latest observed values of $QRP^{2Y}_{€/\$,t}$, $IRP^{2Y}_{\$,t}$ and $IRP^{2Y}_{€,t}$ in a given quarter are used. $QRP^{2Y}_{€/\$,t}$ data come from Kremens and Martin (2019), and $IRP^{2Y}_{\$,t}$ and $IRP^{2Y}_{€,t}$ come from Hoerdahl and Tristani (2014).

Additional results

1. Micro data: Firm*Month FE, multiple currency issuance:
    - Firms tend to issue their longer maturity bond in dollars.
2. Local currency vs dominant currency debt mix:
    - EMEs whose inflation co-moves with US inflation have more LC debt.
    - Evidence in the data for a cross-section of 17 EME countries.
3. $\mathrm{Cov}(Ret\_SP500_{t-h,t-h_1},\ Ret\_USD_{t-h_1,t}) > 0$ for even short horizons:
    - i.e. S&P 500 predicts the dollar (Eren, Malamud and Schrimpf, 2019).
4. GBP provides a better hedge to firms than JPY:
    - Despite similar share in the world GDP, much more GBP issuance.
5. Historical evidence: GBP and USD in interwar years

The Debt View: A Piece in the Puzzle

- **Dollar's special role in the global financial system:**

  Goldberg and Tille (2008), Gourinchas, Rey, Govillot (2017), Gourinchas, Rey, Sauzet (2019), Gopinath (2016), Boz et al (2017), Gopinath et al (2019), Shin (2012), Ivashina, Scharfstein and Stein (2015), Casas, Diez, Gopinath and Gourinchas (2017), Bruno and Shin (2017), Bräuning and Ivashina (2017), Maggiori, Neiman and Schreger (2018, 2019), Aldasoro, Ehlers and Eren (2019), Avdjiev, Bruno, Koch and Shin (2018)...

  - **vehicle currency, unit of account, anchoring:** Matsuyama, Kiyotaki and Matsui (1993), Rey (2001), Devereux and Shi (2013), Chahrour and Valchev (2017), Doepke and Schneider (2017), Drenik, Kirpalani and Perez (2018), Ilzetzki, Reinhart, Rogoff (2019)...
  - **trade view (invoicing):** Gopinath and Stein (2018), Mukhin (2017), Gopinath et al (2019)...
  - **safe asset view:** Farhi and Maggiori (2017), He, Krishnamurthy and Milbradt (2017), Caballero, Farhi, Gourinchas (2017), Bocola and Lorenzoni (2018), Jiang, Krishnamurthy and Lustig (2018, 2019)...
  - **debt view: Does not rely on network effects, price stickiness, complementarities in pricing, safety demand. Role of expectations and risk properties of currencies. Role for monetary policy. Changes can be fast.**

Conclusion and policy implications

Disclaimer: All reflect only the authors' views!

- The debt view:
  - Borrowers prefer the "riskiest" among the safe haven currencies.
  - The dollar is dominant because it depreciates in downturns over long horizons.
  - It can account for:
    - why JPY, CHF or EUR are not dominant despite being safer,
    - why dollar nominal rates are higher,
    - why the dollar cemented its dominance after the Bretton Woods.
- If EU wants euro as a dominant currency $\rightarrow \uparrow \pi$ countercyclicality.
- Dollar might lose dominance faster than we think. Expectations.
- Exchange rates affect profits not only through exports, but also through long-term nominal debt:
  - Dollar depreciation might help firms with dollar debt worldwide.
  - Renminbi depreciation might incentivize firms to borrow in RMB.
- More work on this agenda: "Risk properties of currencies"

APPENDIX

Dominant Currency Debt: Theory

Theorem

Issuing only in dollars is optimal for firm i if and only if

$$\frac{Cost_i(issue\ in\ j)}{Cost_i(issue\ in\ \$)} - 1 \ \leq\ e^{r_{j,t}} \frac{\mathrm{Cov}_t^{\$}\left(\left(Stock_{i,t+1}\right)^{-\ell}, \frac{CUR(j)}{USD}\right)}{E_t^{\$}\left[\left(Stock_{i,t+1}\right)^{-\ell}\right]} \tag{4}$$

for all currencies $CUR(j)$, $j = 1, \cdots, N$. Absent heterogeneity of issuance costs:

$$\mathrm{Cov}_t^{\$}\left(\left(Stock_{i,t+1}\right)^{-\ell}, \frac{CUR(j)}{USD}\right) \ \geq\ 0\,. \tag{5}$$

- Issue in \$ if it co-moves positively with the stock returns (in USD).
- A period $[t, t+1]$ is the horizon of the debt maturity of firms ($\sim$ 5y).

Why not Argentine peso? Cost of issuance

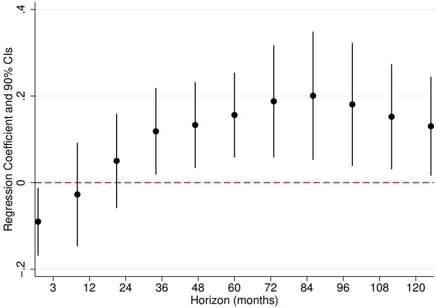
Empirical Evidence: Realized covariances

For each $h \in \{3, 12, 24, 36, 48, 60, 72, 84, 96, 108, 120\}$ months:

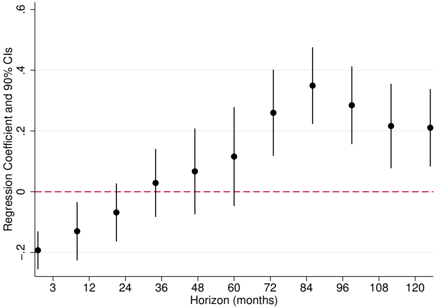
$$Return\_USD_t^h = \alpha^h + \beta_h Return\_SP500_t^h + \epsilon_t^h . \quad (6)$$

$$Return\_USD_t^h = \alpha^h + \beta_h Return\_MSCIACWorld_t^h + \epsilon_t^h . \quad (7)$$

S&P 500 Index



MSCI AC World Index



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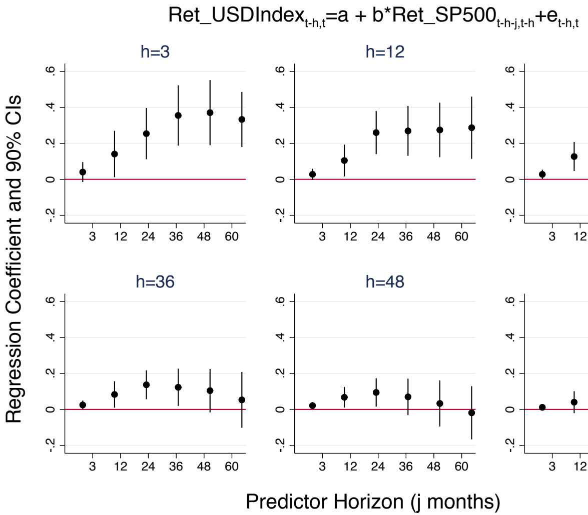
Covariance decomposition

We decompose the covariance between the dollar and the stock market based on the additivity of log-returns: $Ret_{t-h,t} = R_{t-h,t-h_1} + R^{t}_{t-h_1}$ for any $h_1 < h$. Using this decomposition, we get that

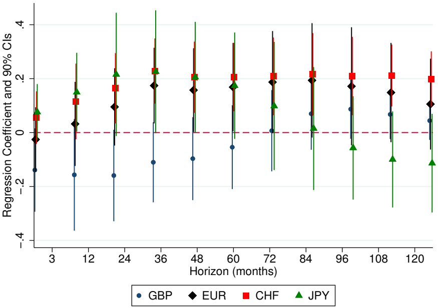
$$
\begin{aligned}
&\mathrm{Cov}(Ret\_USD_{t-h,t},\ Ret\_SP500_{t-h,t}) \\
&= \underbrace{\mathrm{Cov}(Ret\_USD_{t-h,t-h_1},\ Ret\_SP500_{t-h,t-h_1}) + \mathrm{Cov}(Ret\_USD_{t-h_1,t},\ Ret\_SP500_{t-h_1,t})}_{co-movement} \\
&+ \underbrace{\mathrm{Cov}(Ret\_USD_{t-h,t-h_1},\ Ret\_SP500_{t-h_1,t})}_{USD\ leading\ SP500} + \underbrace{\mathrm{Cov}(Ret\_SP500_{t-h,t-h_1},\ Ret\_USD_{t-h_1,t})}_{SP500\ leading\ USD}.
\end{aligned}
$$

S&P 500 predicts the dollar

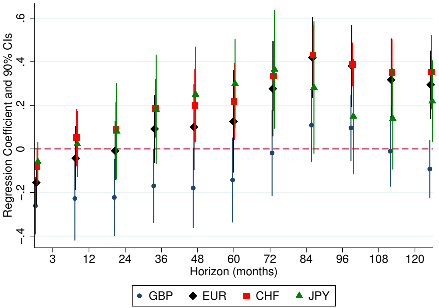


Bilateral exchange rates

S&P 500 Index



MSCI AC World Index



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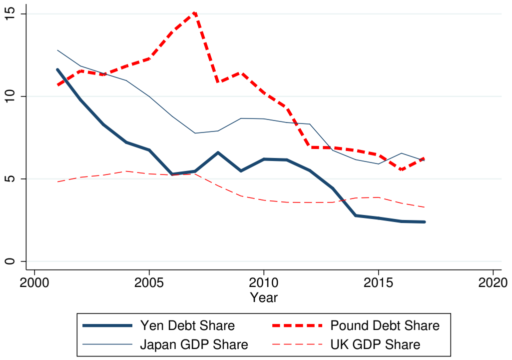
Yen vs Pound

- Challenge for some theories: Why is JPY not dominant ?
- GDP: Japan > UK but Debt: Yen < Pound.
- Japan teaches us that it is not low inflation, rates or safety.
  - Nominal debt related risk properties favor pound over yen.
- Even Japanese firms are reducing yen issuance (Source: Nikkei)



Debt Maturity and Currency Choice

Hypothesis: A longer debt maturity is associated with a higher propensity to issue dollar-denominated debt.

	(1)	(2)	(3)	(4)	(5)
Sample:	Full	Full & $< 10y$	Partial & FC	Full†	Partial & FC†
	$\mathbb{1}(USD)$	$\mathbb{1}(USD)$	$\mathbb{1}(USD)$	$\mathbb{1}(USD)$	$\mathbb{1}(USD)$
$Maturity_w$	0.0180***		0.0220***	0.0389***	0.0850***
	(0.00291)		(0.00558)	(0.0124)	(0.0270)
$\mathbb{1}(Maturity > 1y)$		0.0278***			
		(0.00718)			
Controls	X	X	X	X	X
Industry FE	X	X	X		
Country*Month FE	X	X	X		
Firm*Month FE				X	X
Observations	103,534	75,465	7,210	4,311	757
R-squared	0.743	0.714	0.616	0.392	0.542
Mean of Dep. Var	0.328	0.247	0.843	0.341	0.621

Notes: Standard errors clustered by $Country * Year$ in parantheses. *, **, *** denote significance at the 10, 5 ,and 1% levels, respectively. $\mathbb{1}(USD)$ is a dummy variable that takes the value 1 if the currency of the issued bond is the dollar. $Maturity_w$ is the standardized value of maturity winsorized at 5% and 95% levels. $\mathbb{1}(Maturity > 1y)$ is a dummy variable that is 1 if maturity is greater than 1 year. Controls include the size of the issuance and a dummy variable for the status of investment-grade status of the bond. The full sample includes all observations. Partial & FC refers to observations where the nationality of the company is not the United States, a country in Eurozone, Japan, Great Britain or Switzerland, but the currency is either USD, EUR, JPY, GBP or CHF. † means that the sample is further restricted only to those firms that issued debt in multiple currencies in a given month.

Maturity by Currency

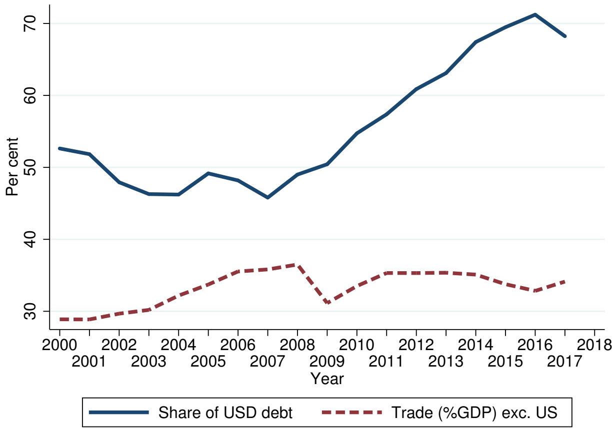
Local Currency versus Dominant Currency

- If σ^2 of idio. TFP shocks large enough: a mix of LC and DC debt.
- DC debt $\rightarrow$ DC CB reacts to only their output gap.
- LC debt $\rightarrow$ Local CB reacts to your output gap.
- **Theoretical predictions** *for the cross-section* (test for 17 EMs):
  1. If domestic inflation co-moves with US inflation $\rightarrow$ more LC debt.
  2. More idiosyncratic volatility of LC inflation $\rightarrow$ less LC debt.

	(1) $\frac{L\bar{C}U}{USD}_i$	(2) $\frac{L\bar{C}U}{USD}_i$	(3) $\frac{L\bar{C}U}{USD}_i$	(4) $\frac{L\bar{C}U}{USD}_i$
$\hat{\beta}_i^{\pi_t^{res,i},\pi_t^{res,US}}$	3.951***	3.930***	3.713***	
	(0.680)	(0.640)	(0.775)	
$ka\bar{o}pen_i$		-0.0108	0.102	-0.334
		(0.327)	(0.413)	(0.349)
$\sigma_i^{\pi_t^{res,i}}$				-2.218
				(1.306)
Observations	17	17	15	17
R-squared	0.537	0.537	0.409	0.217

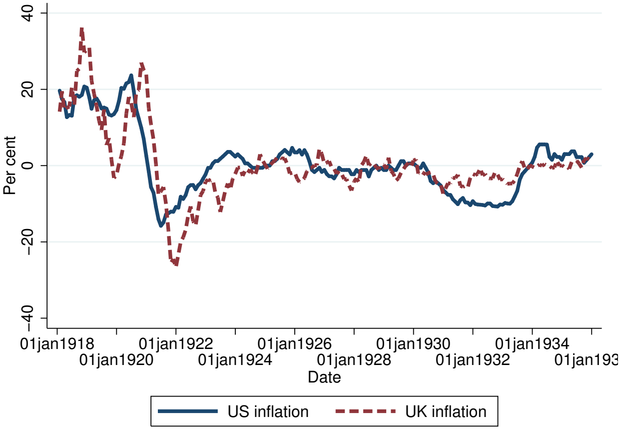
DC Debt and Trade

Theorem Shocks to expected $\phi_\$$ push dollar debt and expected trade in opposite directions.



Switches Can Occur Fast: Historical Evidence

- Our model predicts switches can be fast, all depends on expectations.
- Interwar years, multiple switches between the pound and the dollar (Mehl et al (2014)). Inflation?



Optimal Monetary Policy in GE

- Tax shields: Leverage privately optimal, but reduces social welfare.
- DC CB provides insurance to the world, ex-ante does not want to, ex-post has to.
- Optimal monetary policy: Reduces the welfare costs of providing this insurance.

Theorem

The welfare maximizing policy is to only react to output gap in countries with:

- *low TFP variance,* $\sigma(a_{i,t})$
- *low restructuring cost*
- *low importance in global trade*

Cost of issuance

Velandia and Cabral (2017):

"... in the case of Mexico, the average bid- ask spread of the yield to maturity on outstanding USD-denominated international bonds is 7 basis points, compared to 10 basis points for outstanding EUR-denominated bonds; and Mexico is an example with very liquid benchmarks on both currencies."

- So, realistically, a negative but small enough covariance would also be fine.

Back

The Dollar Versus Argentinian Peso

- Issuing in pesos is not optimal because variance of $\varepsilon_{i,t+1}$ is high:

$$\mathcal{P}_{i,t,t+1} = (OUT\_GAP_{t+1}(i))^{\phi_i} e^{\varepsilon_{i,t+1}}. \quad (8)$$

1. FX rate is too volatile for idiosyncratic reasons. Firms dislike that.
   - ★ 1995-2018: σ of ARS/USD: 7.1%, σ of USD index: 1.9%
   - ★ R^2 of the regression of ARS/USD on USD index: 0.33%.
2. Issuance costs are high: dollar markets are deeper and more liquid.

Back