Dominant Currency Debt

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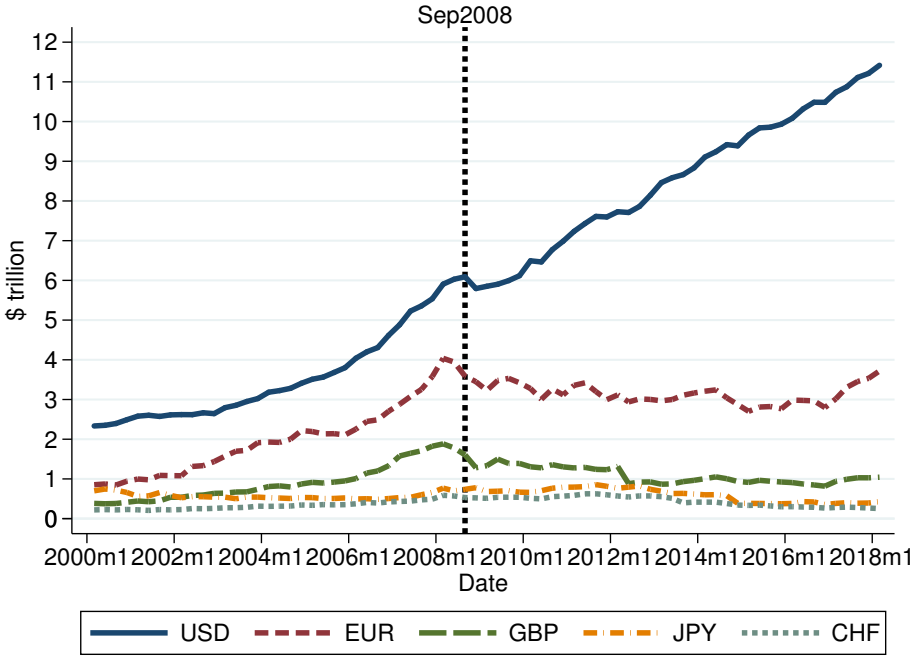
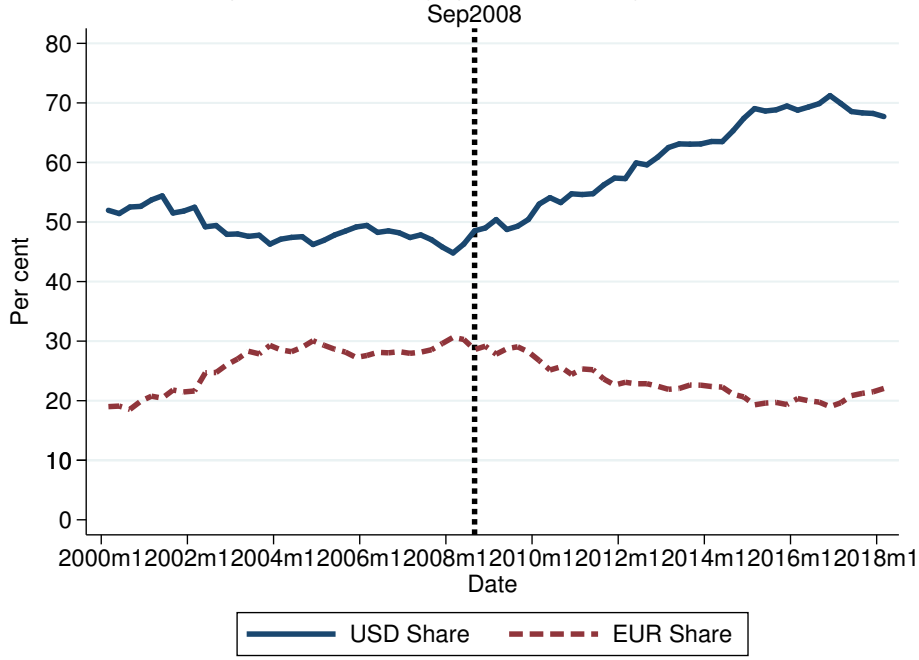
The Dollar as the Dominant Currency

Currency Denomination of Non-Bank Foreign Currency Debt

Volume by Currency



Share of USD vs EUR



Source: Bank for International Settlements

- Dollar is the dominant currency: $11.5 trillion debt outside the US.
- The fall and the rise of dollar's dominance: the GFC turning point

This paper: Questions

- Why is there a dominant currency?
- Why is it the dollar?
- What explains the fall and the rise of the dollar in the last 20 years?
- Optimal monetary policy?

This paper: Answers

- Why is there a dominant currency?
  Theoretical:
  - Nominal debt $\rightarrow$ debt currency choice matters (Fisherian DD channel)
  - DC: depreciate when stock market $\downarrow$ at corporate debt maturity (6-7y)
  - Role for monetary policy: stimulate in crises $\rightarrow \uparrow$ inflation $\rightarrow$ FX.

- Why is it the dollar?
  Empirical:
  - Dollar depreciates when the stock market falls (Horizon $>$ 1 year).
  - Micro data: Choose \$ for longer maturity debt.

- What explains the fall and the rise of the dollar in the last 20 years?
  Theoretical and empirical:
  - Inflation risk premia in the US and the Euro Area.

- Optimal monetary policy?
  Theoretical: (assigns weights to different countries)
  - Choose weights to reduce the welfare costs of higher dollar leverage.

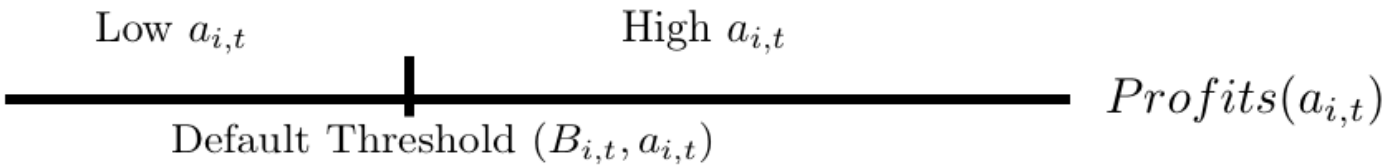
Main Contribution: The Debt View

- **Dollar's special role in the global financial system:**
  Goldberg and Tille (2008), Gopinath (2015), 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 (2018), Avdjiev, Bruno, Koch and Shin (2018)
- **Dominant currency (in General Equilibrium):**
  - **vehicle currency, unit of account:** Matsuyama, Kiyotaki and Matsui (1993), Rey (2001), Devereux and Shi (2013), Chahrour and Valchev (2017), Doepke and Schneider (2017), Drenik, Kirpalani and Perez (2018)
  - **trade view (invoicing):** Gopinath and Stein (2018), Mukhin (2017)
  - **safe asset view:** Farhi and Maggiori (2017), He, Krishnamurthy and Milbradt (2017), Bocola and Lorenzoni (2018)
  - **debt view: Nominal debt & Monetary policy. Does not rely on network effects, price stickiness, complementarities in pricing, safety demand.**

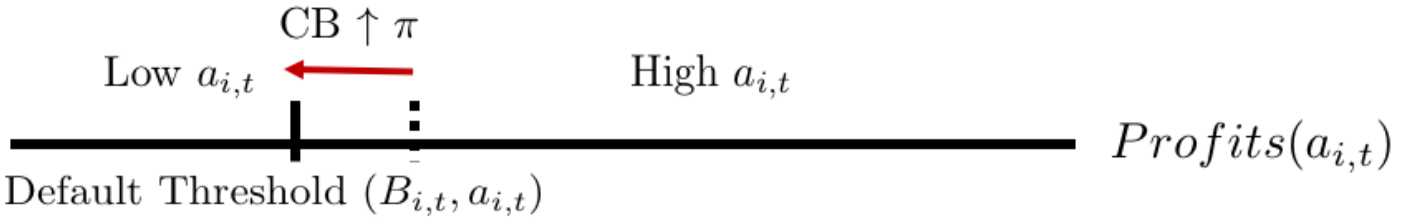
    Global debt overhang channel. Changes can be fast. Broad empirical evidence: macro, micro, historical.

The Main Mechanism

- Firms have nominal debt with face value: $B_{i,t}$.
- They receive productivity shocks $a_{i,t}$, compact support.



Higher inflation ($\rightarrow$ FX depreciation), thereby CB reduces threshold.



- Firms are better off $\rightarrow \downarrow$ real debt burdens. Ex-ante $\uparrow$ leverage.
- Households?
  - Dislike inflation as it lowers their real consumption (dominates).
  - Like it because inflation lowers the default probability.

International General Equilibrium

Model

- All firms are exporters, flexible prices, cash flows fully diversified.
- Capital structure: Equity + nominal defaultable debt (potentially in multiple currencies).
- Debt overhang costs (e.g., restructuring costs after default)

Main Mechanism

- International Fisher debt-deflation channel.
- Dollar debt: inflation in the US $\rightarrow$ FX $\rightarrow$ Real debt burden.
- Debt service cost $>$ operating profits $\rightarrow$ debt overhang.
- Debt overhang spills over through reduced demand + GVCs.

Central Bank

- Countercyclical policy rule: Output gap $\rightarrow$ inflation $\rightarrow$ FX.

Inflation Process and Exchange Rates

Inflation in country i:

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

- $OUT\_GAP_{t+1}(i) \;=\;$ drop(%) in output due to debt overhang
- $\phi_i > 0$ is the **degree of inflation stabilization** of monetary policy: *High $\phi_i \rightarrow$ large positive shocks to $\mathcal{P}_{i,t,t+1}$ in bad times $\rightarrow$ easing financial conditions for firms.*
- Inflation for the model; can be thought of easing financial conditions.
- $\varepsilon_{i,t+1}$ is (small) noise in monetary policy, compact support.
- $1/\sigma^2_{i,\varepsilon}$ is the **precision** of monetary policy

Exchange rates: $\mathcal{E}_{i,j,t,t+1} \;=\; \mathcal{P}^{-1}_{i,t,t+1}\mathcal{P}_{j,t,t+1}\,.$

- High relative inflation $\rightarrow$ depreciation.

Dominant Currency Debt Equilibrium: Assumptions

- issuing costs are independent of currency denomination. *(Note: Disadvantage to the $)*
- TFP shocks satisfy $a_{j,t} = a_t + \varepsilon^a_{j,t}$ for some common shock a_t and idiosyncratic TFP shocks $\varepsilon^a_{j,t}$ with small variance that are independent across countries and are also independent of a_t. *(Global shocks)*
  - We relax this in a few slides to get local currency and dominant currency mix (works in GE when debt overhang costs are small)

Dominant Currency Debt Equilibrium

$$\mathcal{P}_{i,t,t+1} = (OUT\_GAP_{t+1}(i))^{\phi_i} e^{\varepsilon_{i,t+1}}. \quad (2)$$

- There exists a *dominant currency debt equilibrium*:
  - all firms borrow in a single dominant currency.
  - even when there are others with almost identical characteristics.

Theorem

Suppose that ϕ_i are all pairwise different. Then, there exists a Dominant Currency Debt equilibrium. The dominant debt currency is the currency of the country with the highest index ϕ_j.

Theorem

Absent heterogeneity in the indices ϕ_i, firms always issue in the currency of the country with the highest degree of monetary policy precision, $1/\sigma_{i,\varepsilon}$.

Why Issue in Dollars?

Theorem

Issuing only in dollars is optimal if and only if

$$\frac{Cost_i(issue\ in\ j)}{Cost_i(issue\ in\ \$)} - 1 \ \leq \ e^{r_{j,t}} \frac{\mathrm{Cov}_t^{\$}\left(\left(PV_{t+1}^{\$}(profits)\right)^{-\ell}, \frac{XXX(j)}{USD}\right)}{E_t^{\$}\left[(PV_{t+1}^{\$}(profits))^{-\ell}\right]} \tag{3}$$

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

$$\mathrm{Cov}_t^{\$}\left(\left(PV_{t+1}^{\$}(profits)\right)^{-\ell}, \frac{XXX(j)}{USD}\right) \ \geq \ 0\,. \tag{4}$$

- Intuitive: issue in \$ if it co-moves positively with the (in USD) $PV^{\$}(profits) \sim$ *stock market*.
- A period $[t, t+1]$ is the horizon of the debt maturity of firms (6-7y).

Cost of issuance | USD index | Why not Argentine peso?

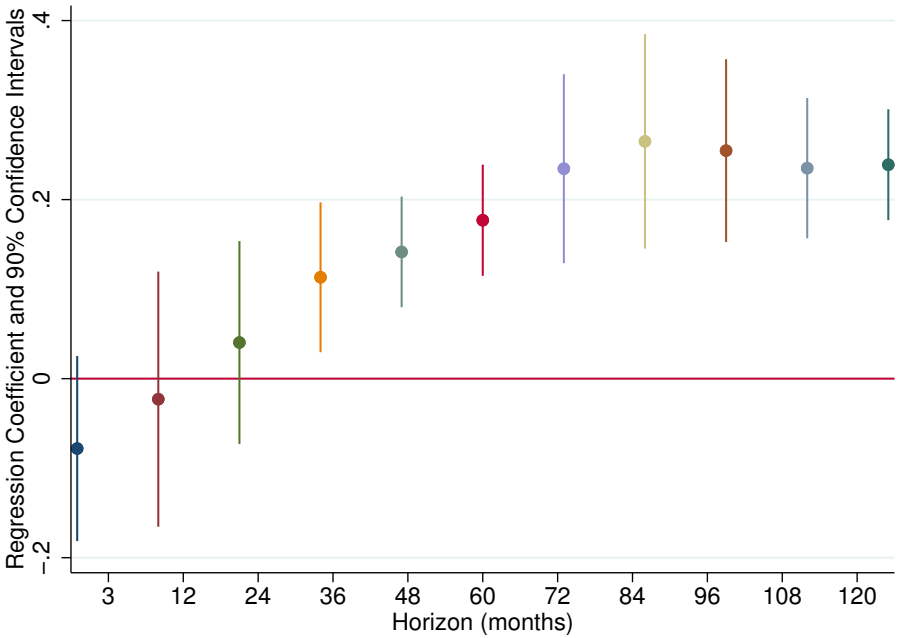
Why is the Dollar the Dominant Currency?

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

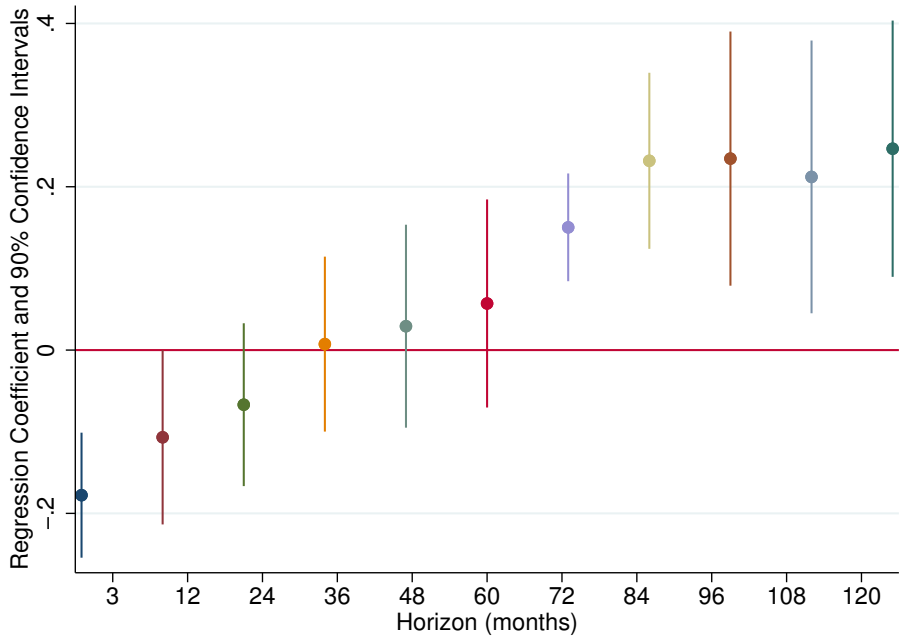
$$Return\_USD_t^h = \alpha^h + \beta_h Return\_SP500_t^h + \epsilon_t^h \,. \tag{5}$$

$$Return\_USD_t^h = \alpha^h + \beta_h Return\_MSCIACWorld_t^h + \epsilon_t^h \,. \tag{6}$$

S&P 500 Index



MSCI AC World Index



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. The dots are the corresponding β_h and the lines are the 95% confidence intervals. Standard errors are corrected using the Newey-West procedure, with h lags in each regression.

Debt Maturity and Currency Choice

Hypothesis BI-1: A longer debt maturity is associated with a higher propensity to issue dollar-denominated debt.

Sample:	(1) Full $\mathbb{1}(USD)$	(2) Full & $< 10y$ $\mathbb{1}(USD)$	(3) Partial & FC $\mathbb{1}(USD)$	(4) Full† $\mathbb{1}(USD)$	(5) Partial & FC† $\mathbb{1}(USD)$
$Maturity_w$	0.0195***		0.0203***	0.0405***	0.0786***
	(0.00294)		(0.00543)	(0.0148)	(0.0253)
$\mathbb{1}(Maturity > 1y)$		0.0343***			
		(0.00742)			
Controls	X	X	X	X	X
Industry FE	X	X	X		
Country*Month FE	X	X	X		
Firm*Month FE				X	X
Observations	99,283	72,382	6,826	4,127	727
R-squared	0.744	0.714	0.646	0.409	0.531
Mean of Dep. Var	0.330	0.247	0.842	0.344	0.635

Notes: Standard errors clustered by $Country * Year$ in parantheses. *, **, *** denote significance at the 10, 5 and 1% level respectively. Controls include the local currency amount of the size of the issuance and a dummy variable regarding the status of investment-grade status of the bond. Full sample includes all observations. Partial & FC refers to observations where the nationality of the company is not the United States, a country in the euro area, Japan, the Great Britain or Switzerland, but the currency is either USD, EUR, JPY, GBP or CHF. † means that the sample is further restricted only to firms that issued debt in multiple currencies in each month.

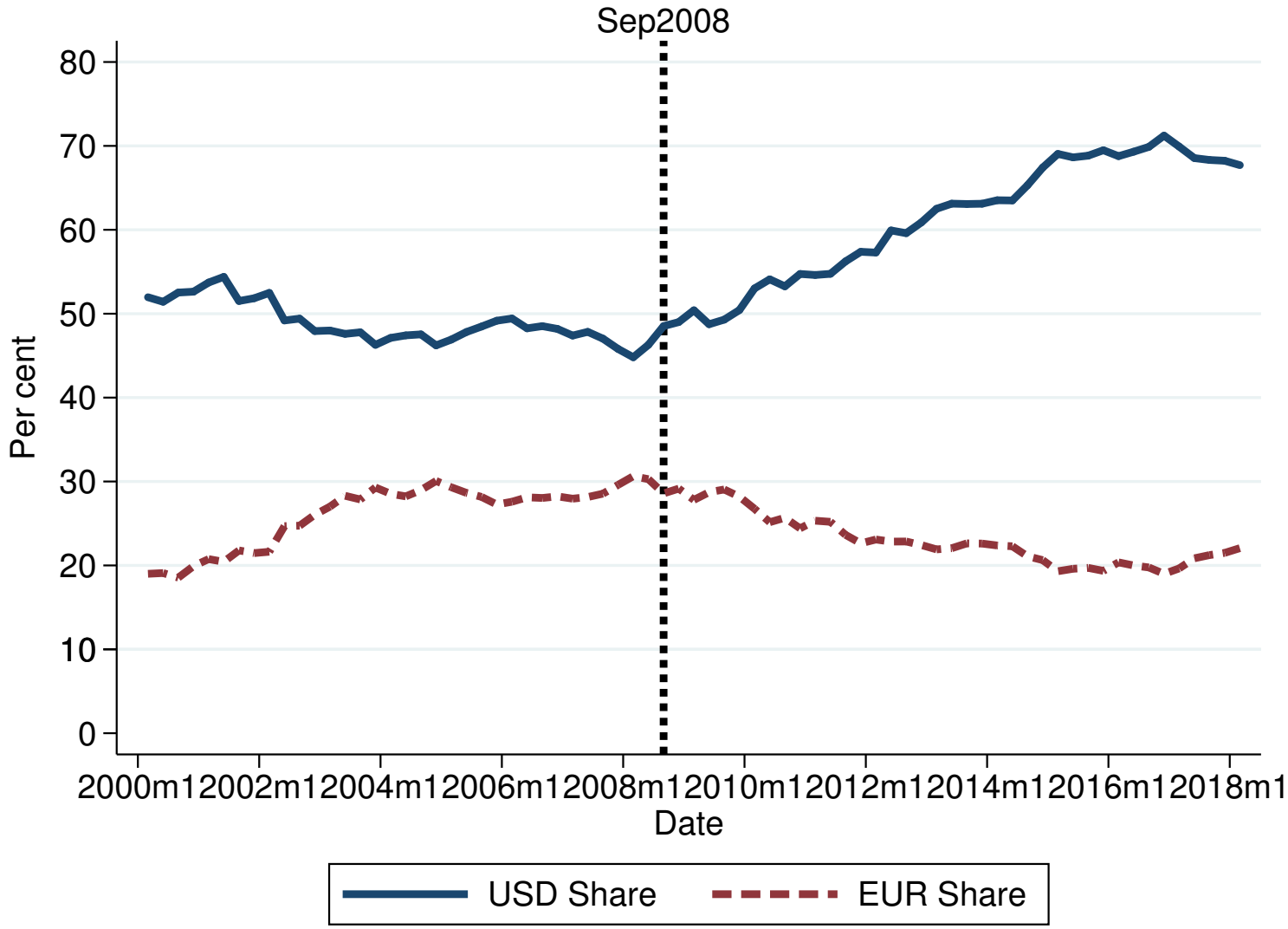
Data Description | Maturity by Currency

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

The Last Two Decades of the Dollar and the Euro



Inflation Risk Premium

- Markets learn about the true ϕ_i through past actions of CBs
- **Conjecture:** Markets have updated $\phi_\$ \uparrow$ for the Fed after 2008

- We can invert about these beliefs from financial asset prices:
  - *Inflation Risk Premium (IRP):* Covariance of inflation with investors' marginal utilities

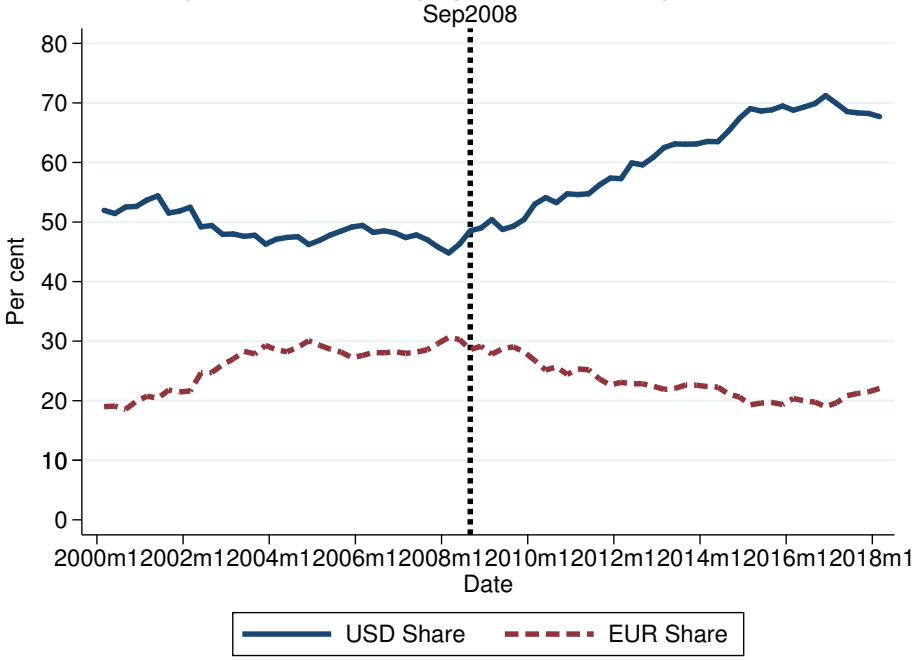
- **Theorem:** DC = highest *expected* ϕ_i = highest IRP
- **If true**, our model predicts that the dollar share should co-move positively with $IRP_{\$,t} - IRP_{€,t}$

Inflation Risk Premia and Dollar Dominance - 1

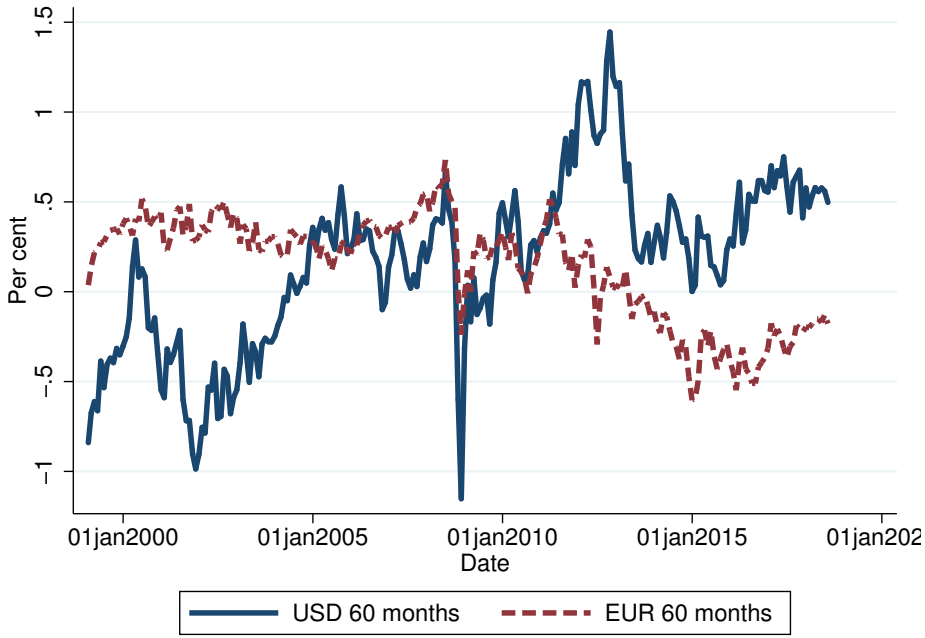
Et voila!

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

Share of USD vs EUR



5-year Inflation Risk Premium



Source: Hordahl and Tristani (2014), authors' calculations.

Inflation Risk Premia and Dollar Dominance - 2

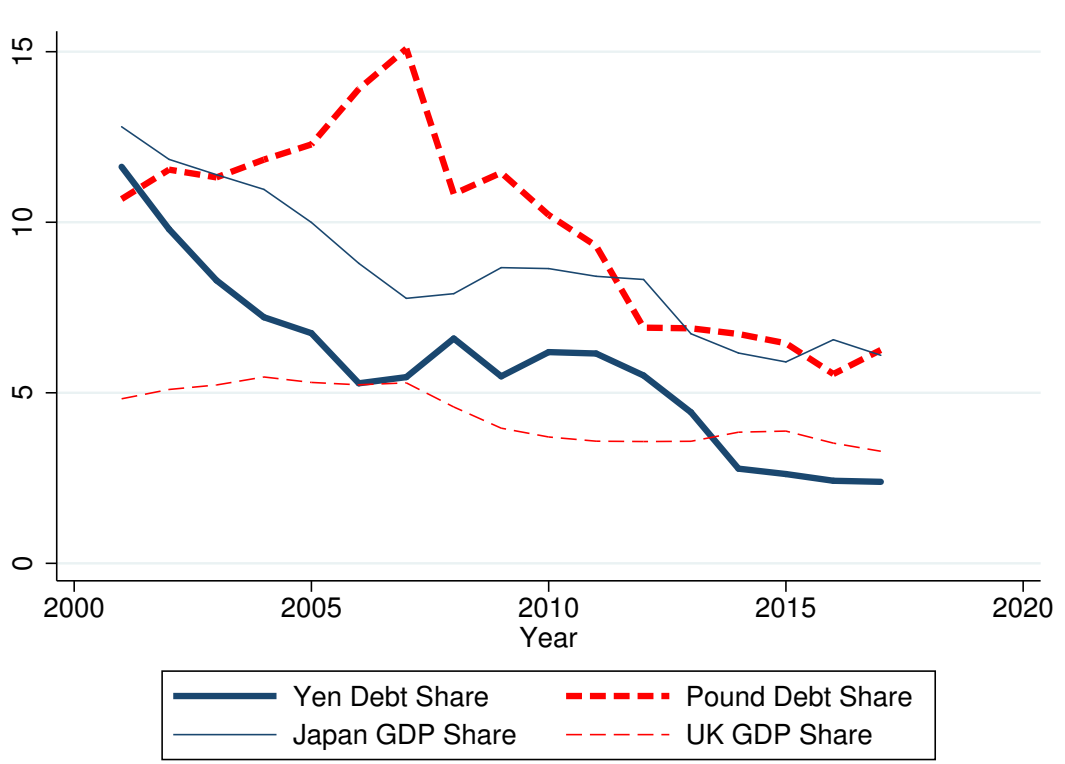
- Differences in IRPs predict dollar debt shares even with year dummies.
- Most of the explanation is from the euro IRP.
- This is great for our theory: Changes can occur in high frequency.

	(1) USD_t^{shr}	(2) USD_t^{shr}	(3) USD_t^{shr}	(4) USD_t^{shr}
$IRP_{\$,t}^{5Y} - IRP_{€,t}^{5Y}$	9.636***		1.553**	
	(1.129)		(0.718)	
$IRP_{\$,t}^{5Y}$		2.079*		0.841
		(1.053)		(0.688)
$IRP_{€,t}^{5Y}$		-22.71***		-4.863***
		(1.495)		(0.967)
Year dummy			✓	✓
Freq.	Q	Q	Q	Q
Observations	72	72	72	72
R-squared	0.528	0.786	0.986	0.989

Notes: Robust standard errors in parantheses. *, **, *** denote significance at the 10, 5 and 1% level respectively. USD_t^{shr} refers to the share of dollar debt including both bank loans and debt securities. $IRP_{\$,t}^{5Y}$ and $IRP_{€,t}^{5Y}$ refer to the 5-year inflation risk premium for the dollar and the euro as measured by Hordahl and Tristani (2014), respectively. Q and Y refer quarterly and yearly frequency since 2000.

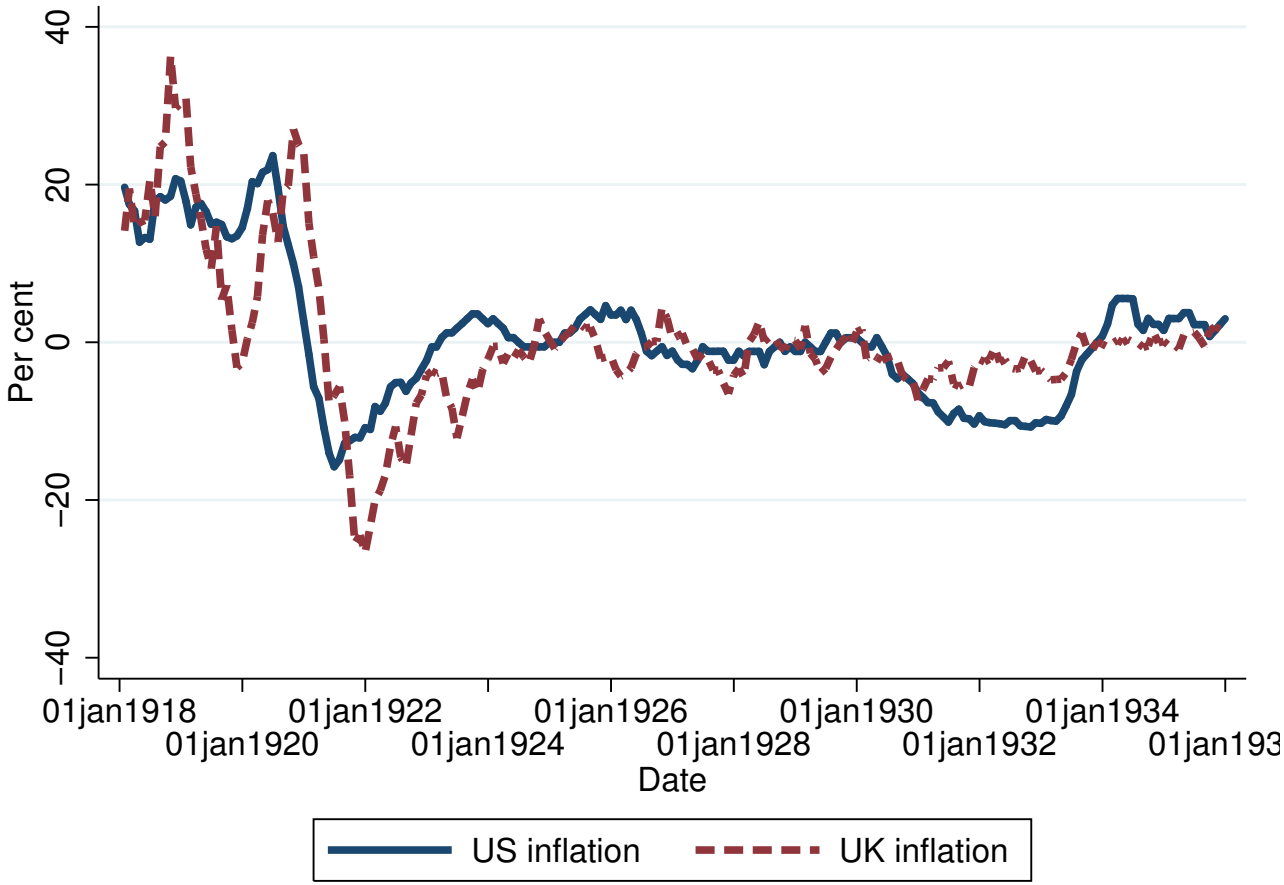
Yen vs Pound

- Challenge for some theories: Why is JPY not dominant (low rates)?
- Japan teaches us that it is not low inflation or rates.
  - It is the inflation countercyclicality. Japan consistently undershot.
- GDP: Japan $>$ UK but Debt: Yen $<$ Pound. Inflation rates by currency
- Even Japanese firms are reducing yen issuance (Source: Nikkei)



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 the DCDE

- 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*

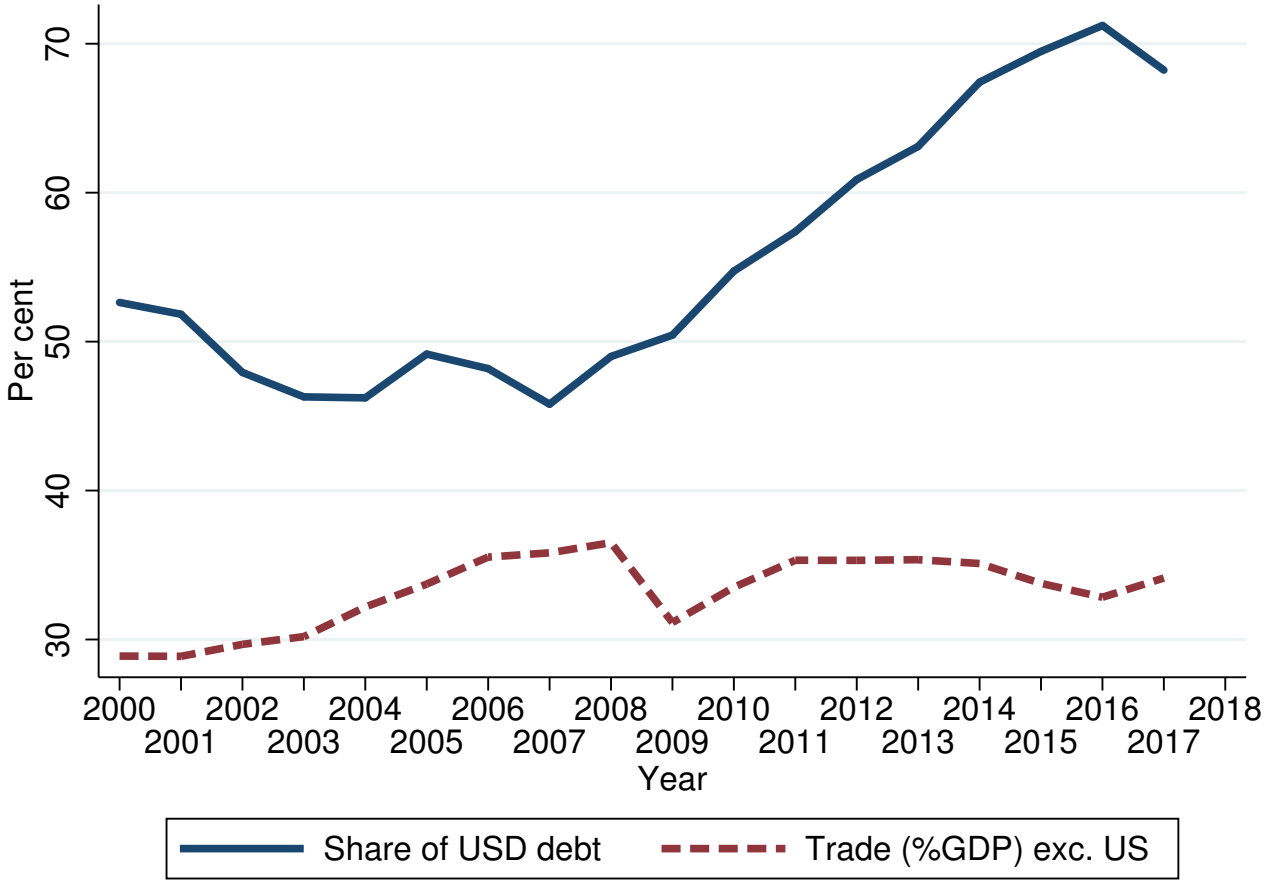
Conclusion

- We provide a "debt view" for the dollar's dominance.
- International Fisherian debt-deflation in general equilibrum.
- Monetary policy and inflation countercyclicality are key.
- Dollar is dominant: it depreciates in downturns for long horizons.
- If ECB wants euro as a dominant currency $\rightarrow \uparrow \pi$ countercyclicality.
  - Cœuré (2019).
- New angle/questions about CBs targeting FX, currency wars.
- Dollar might lose dominance faster than we think. Expectations.
- Future work:
  - Bring in price stickiness, trade invoicing and banks.

APPENDIX

DC Debt and Trade

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



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."

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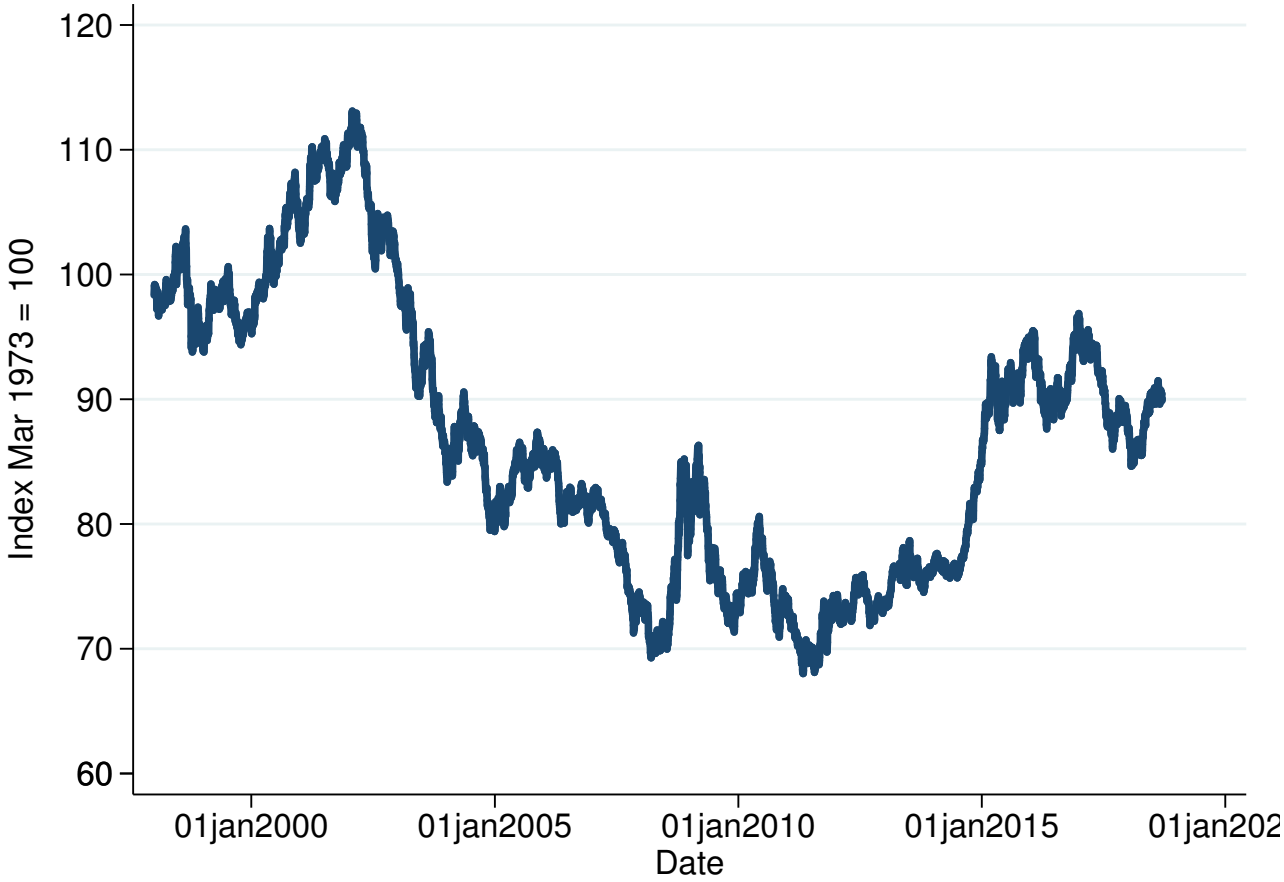
Trade-weighted USD Index Against Major Currencies



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The Dollar Versus Argentinian Peso

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

$$\mathcal{P}_{i,t,t+1} = (OUT\_GAP_{t+1}(i))^{\phi_i} e^{\varepsilon_{i,t+1}}. \quad (7)$$

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.

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Data Description

- Dealogic, ISIN level bond issuance data.
- Sample period: 2000-2019.
- 102,159 bonds by 23,992 firms in 110 countries.
- Identity, country, industry, date of issuance, maturity date, size, investment-quality
- Maturity winsorized at 5% (as there are perpetual bonds too):
  - Mean: 2,950 days, std: 2,646 days. min: 375, max: 10,958.

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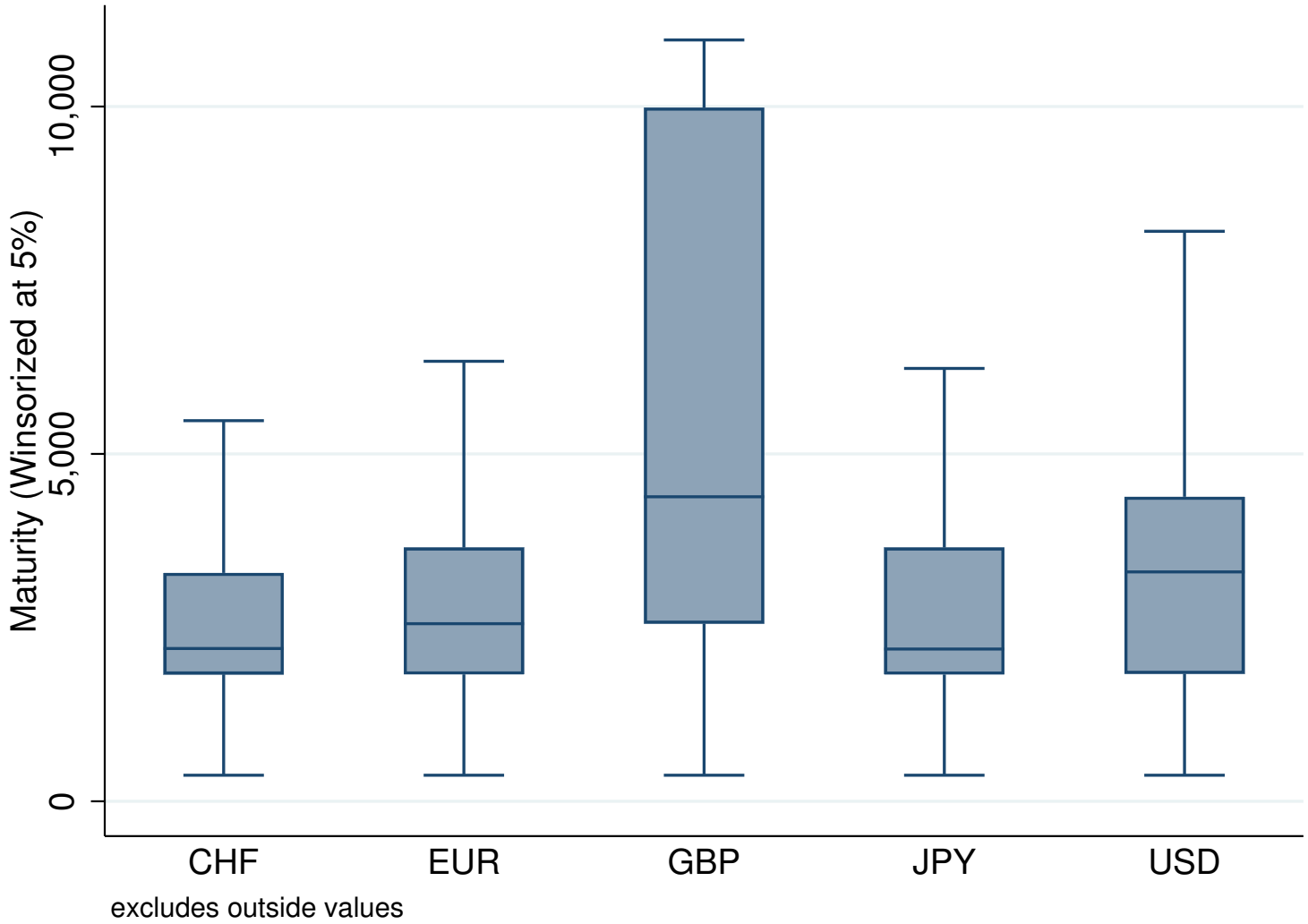
Summary Stats: Maturity by Currency



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Inflation rates by Currency