Global Trends in Interest Rates

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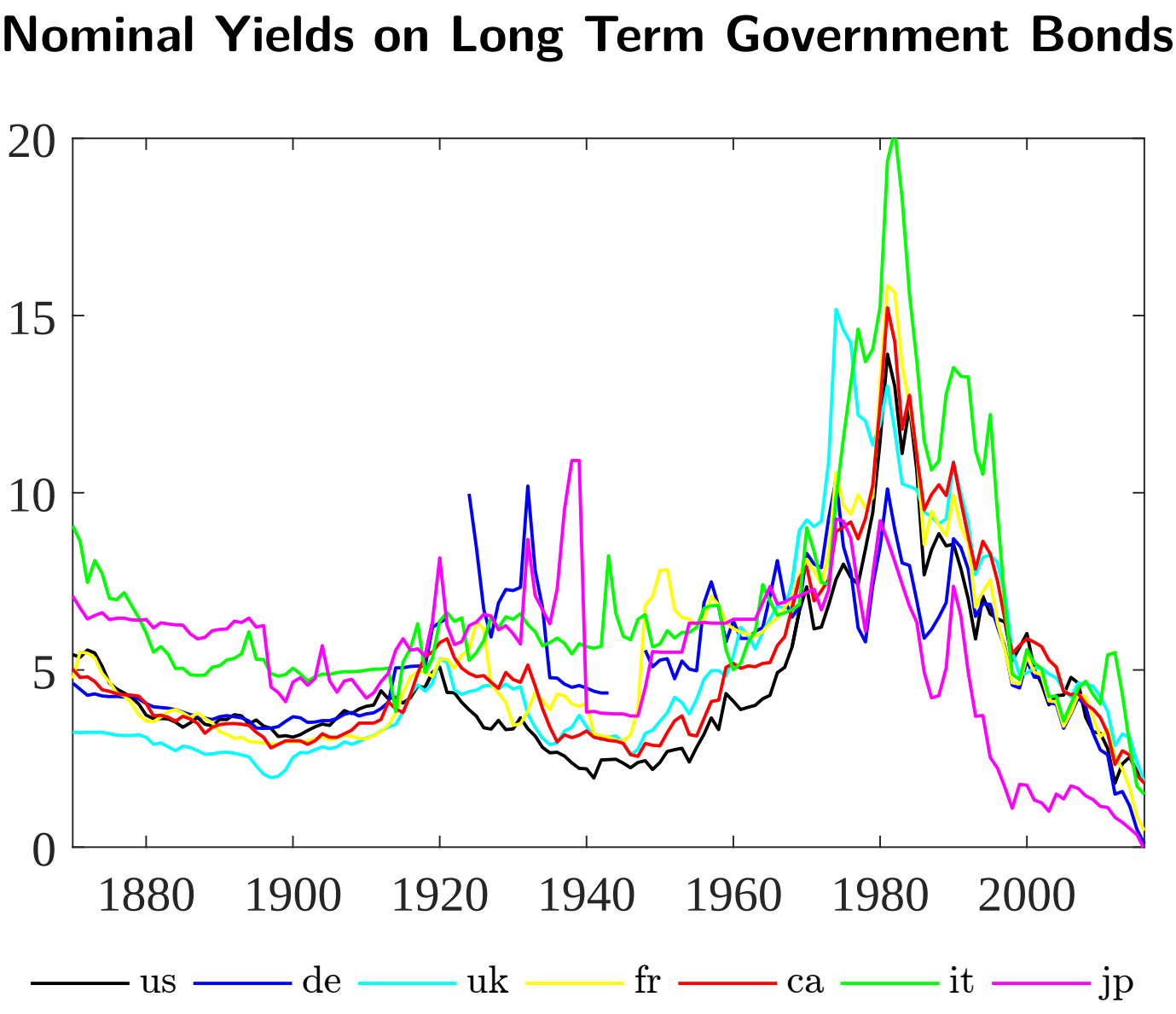
OMFIF

London, November 28, 2018

Global Interest Rates Are at Historical Lows



Low Global Rates: the Questions

- How real?
- How global?
- How secular?
- What are the main drivers?

Low Global Rates: the Questions

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- How global?
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- What are the main drivers?

To address these questions

- Estimate the trend in the world real interest rate and some of its drivers with data from 7 advanced economies since 1870, from the JST macrohistory database

Literature

- Extent and causes of the decline in global interest rates/r*
  - The saving glut/safety trap: Bernanke (2005); Caballero, (Farhi, (Gourinchas),...)
  - Holston, Laubach, Williams (2016); Hamilton, Harris, Hatzius, West (2016); Borio, Disyatat, Juselius, Rungcharoenkitkul (2017); ...
  - Del Negro, Giannone, Giannoni, Tambalotti (2017)
- UIP and PPP
  - ...; Chong, Jorda, Taylor (2010)
- Convenience, safety, liquidity
  - in gov't bonds: Krishnamurty, Vissing-Jorgensen (2012); ...
  - in exchange rates: Valchev (2017); Jiang, Krishnamurthy, Lustig (2018)

Outline

- Empirical strategy
- "Theory" for the long run
- Results
  - A "rates-only" benchmark model
  - Spreads and Convenience yields
  - Consumption
  - Demographics?

Estimating Trends

- A VAR with common trends (Stock and Watson, 1988)

$$y_t = \Lambda \bar{y}_t + \tilde{y}_t$$

- y_t are $n \times 1$ observables, $\bar{y}_t$ are $q \times 1$ *trends*

$$\bar{y}_t = \bar{y}_{t-1} + e_t$$

- $\tilde{y}_t$ are *stationary components* that follow an *unrestricted* VAR

$$\Phi(L)\tilde{y}_t = \varepsilon_t$$

- Bayesian estimation

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- Bayesian estimation
- Use theory to restrict Λ and interpret resulting trends
  - Restrictions across variables *and* countries

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The World Real Interest Rate: "Theory"

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- S_t : nominal exchange rate (\$/€)

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  - An empirical non starter, but...
- ...linear approximation OK for trends if higher moments are stationary

The World Real Interest Rate: Trends

- Stationary higher moments $\Rightarrow$ use linear approximation for trends

$$\overline{R}_t^{\$} - \overline{\pi}_t^{\$} = \overline{m}_t^{US}$$
$$\overline{R}_t^{€} - \overline{\pi}_t^{€} = \overline{m}_t^{US} - \overline{\Delta q_t}$$

  - q_t is the (log) real exchange rate

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  - In the long run, the world SDF is $\overline{m}_t^w = \overline{m}_t^{US} = \overline{m}_t^{EU}$
- $\overline{m}_t^w$ is a common factor: the trend world real interest rate $\overline{r}_t^w$

Convenience Yields

- Interest rates in dataset are from government (or similar) bonds
- Growing evidence that safety and liquidity of such bonds generates a convenience yield
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$$E_t\left[M^W_{t+1}(1+CY_{t+1})(1+R^{\$}_t)\frac{P^{\$}_t}{P^{\$}_{t+1}}\right]=1$$

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CY$\uparrow \Rightarrow$ interest rates on safe/liquid assets $\downarrow$ globally

Global Trends in Interest Rates

- In the long run

$$\overline{R}_{c,t} = \overline{\pi}_{c,t} + \overline{m}^{w}_{t} - \overline{cy}_{t}$$

for $c = 1, ..., 7$ countries

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$$\overline{R}_{c,t} = \overline{\pi}_{c,t} + \underbrace{\overline{m}_t^w - \overline{cy}_t^w}_{\overline{r}_t^w} - \overline{cy}_{c,t}^i$$

  for $c = 1, \ldots, 7$ countries

- Include country specific trend in convenience $\overline{cy}_{c,t}^i$: German bunds are not Italian BTPs
  - Also captures other long run deviations from no arbitrage

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Trends and Observables : Rates only

Observables (1870-2016)		Trends
Inflation	$\pi_{c,t}$	
Short term rates	$R_{c,t}$	
Long term rates	$R^L_{c,t}$	

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- $\overline{cy}^i_{c,t}$ identified from cross-section as c-specific idiosyncratic factor

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Long term rates	$R_{c,t}^{L}$	$+\overline{ts}_t^{w} + \overline{ts}_{c,t}^{i}$

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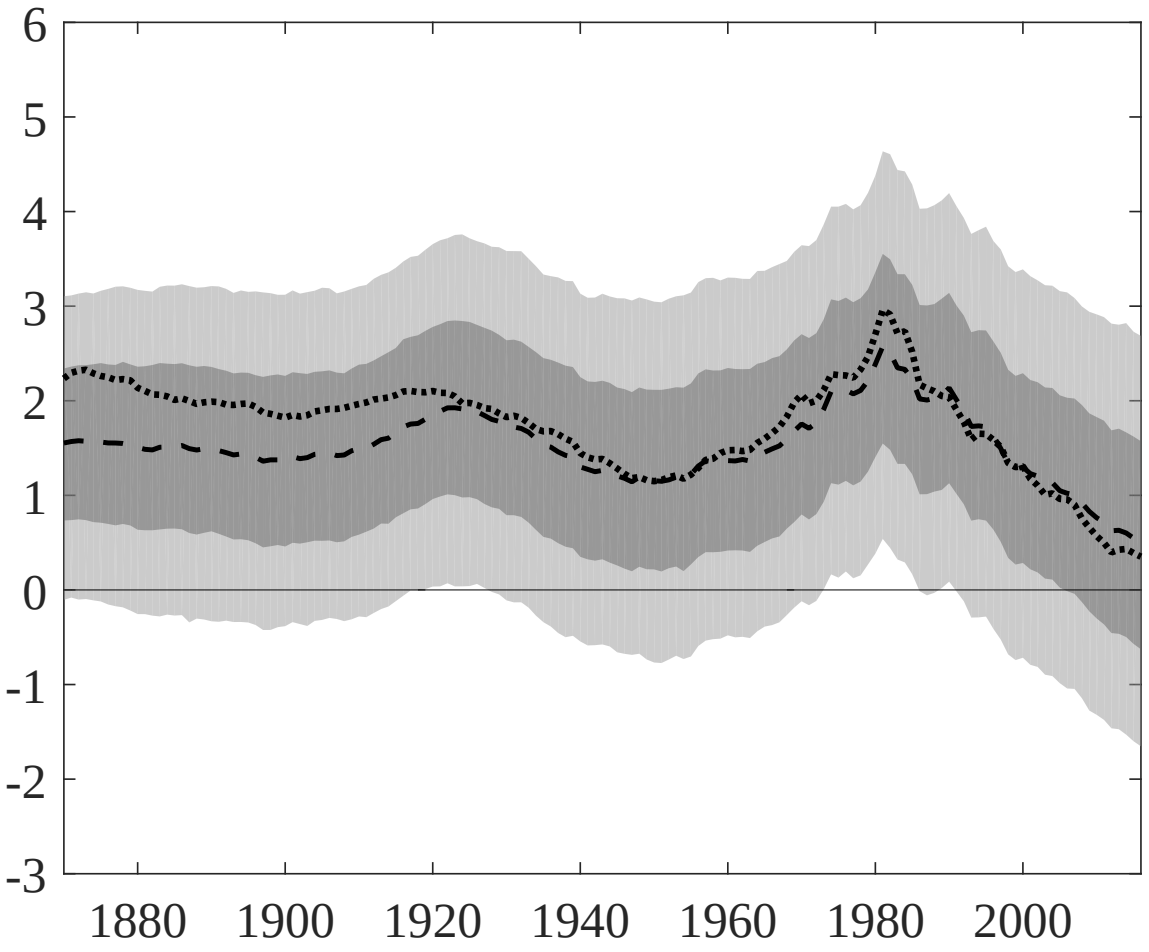
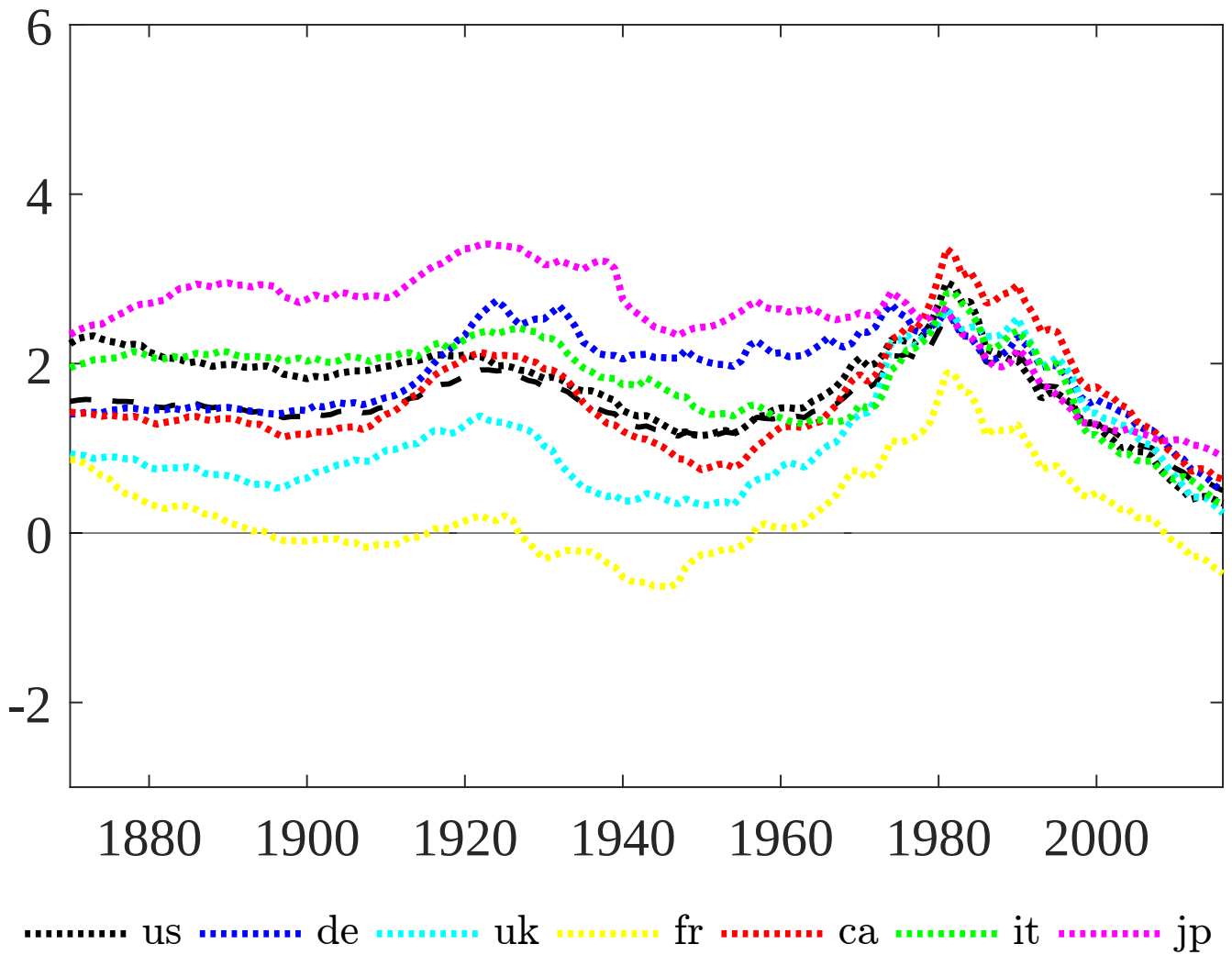
The US is the World, and the World is the US

$\bar{r}_t^w$(- -) and $\bar{r}_{US,t}$ (...)



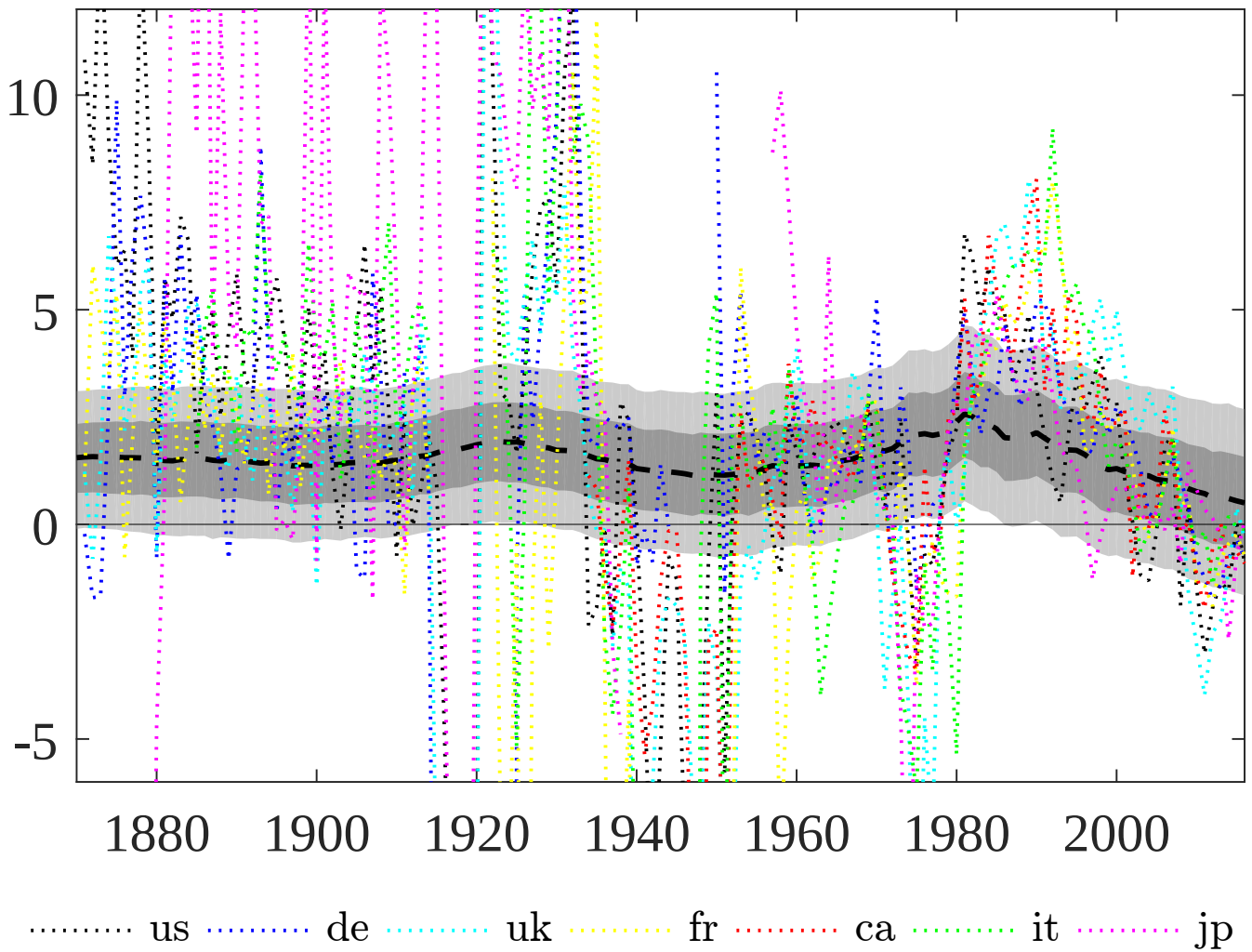
Global Convergence

$\bar{r}_t^w$ (- -) and $\bar{r}_{c,t}$ (...)



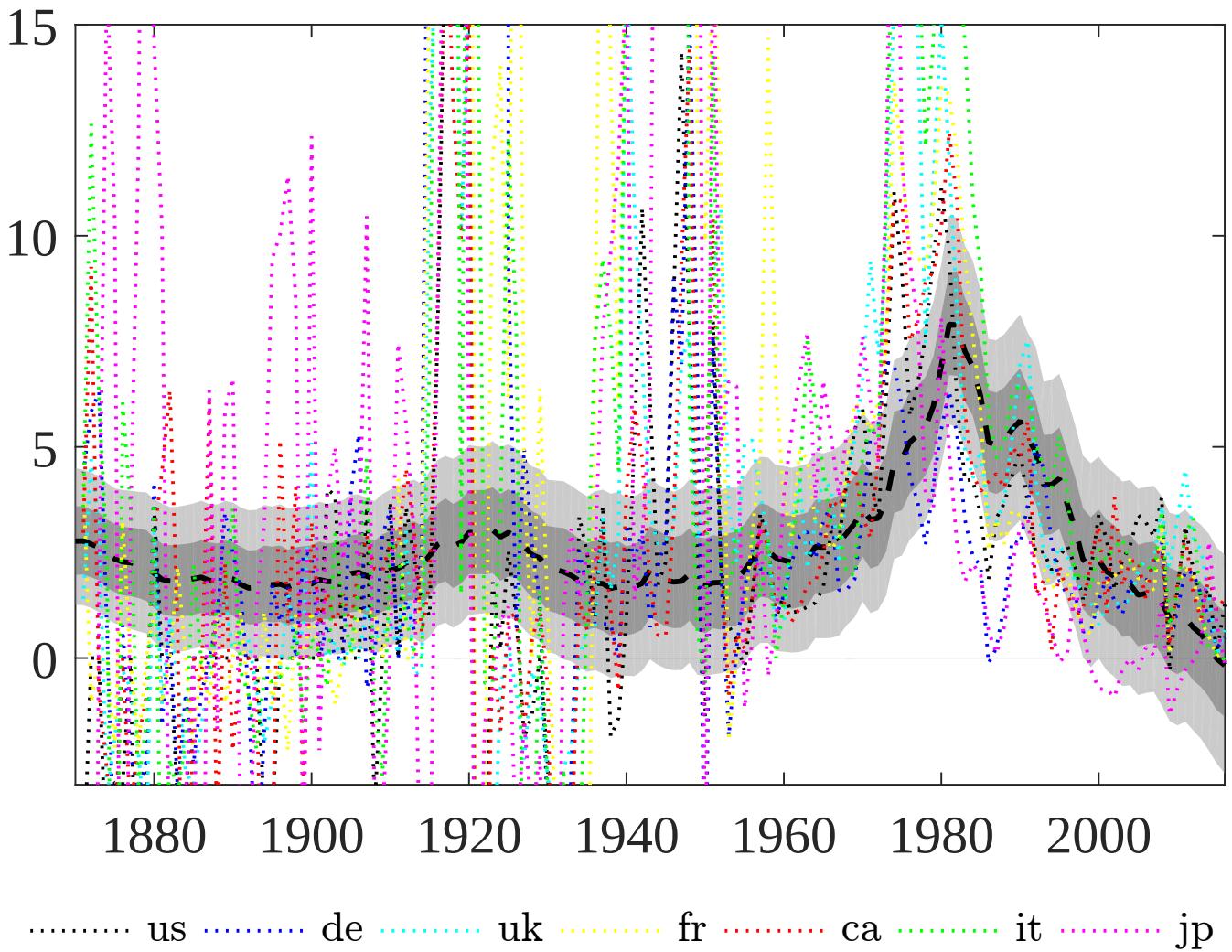
Trends and Observables: Real Rates

$\bar{r}_t^w$(- -) and $R_{c,t} - \pi_{c,t}$ (...)



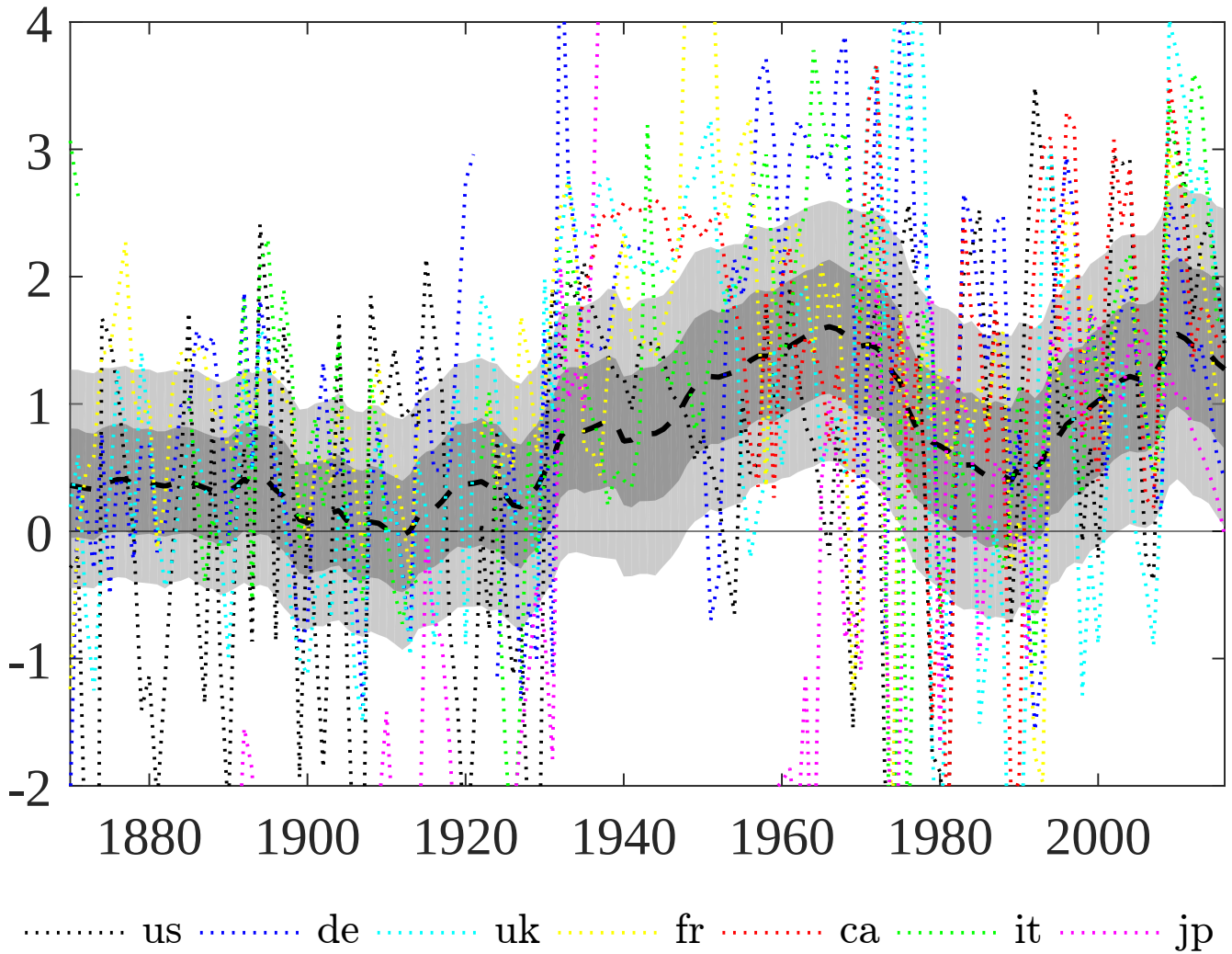
Trends and Observables: Inflation

$\overline{\pi}_t^w$(- -) and $\pi_{c,t}$ (...)



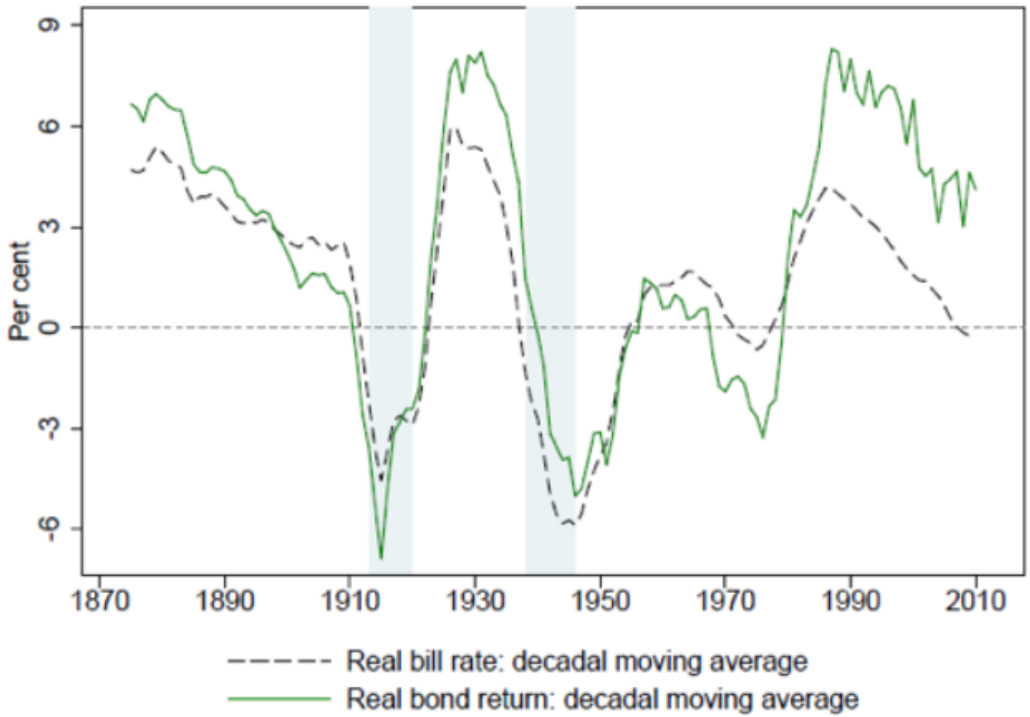
Trends and Observables: Term Spreads

$\overline{ts}_t^w$ (- -) and $R_{c,t}^L - R_{c,t}$ (...)



Trends and Decadal Moving Averages

Figure 2 The real returns on government debt have been low and volatile

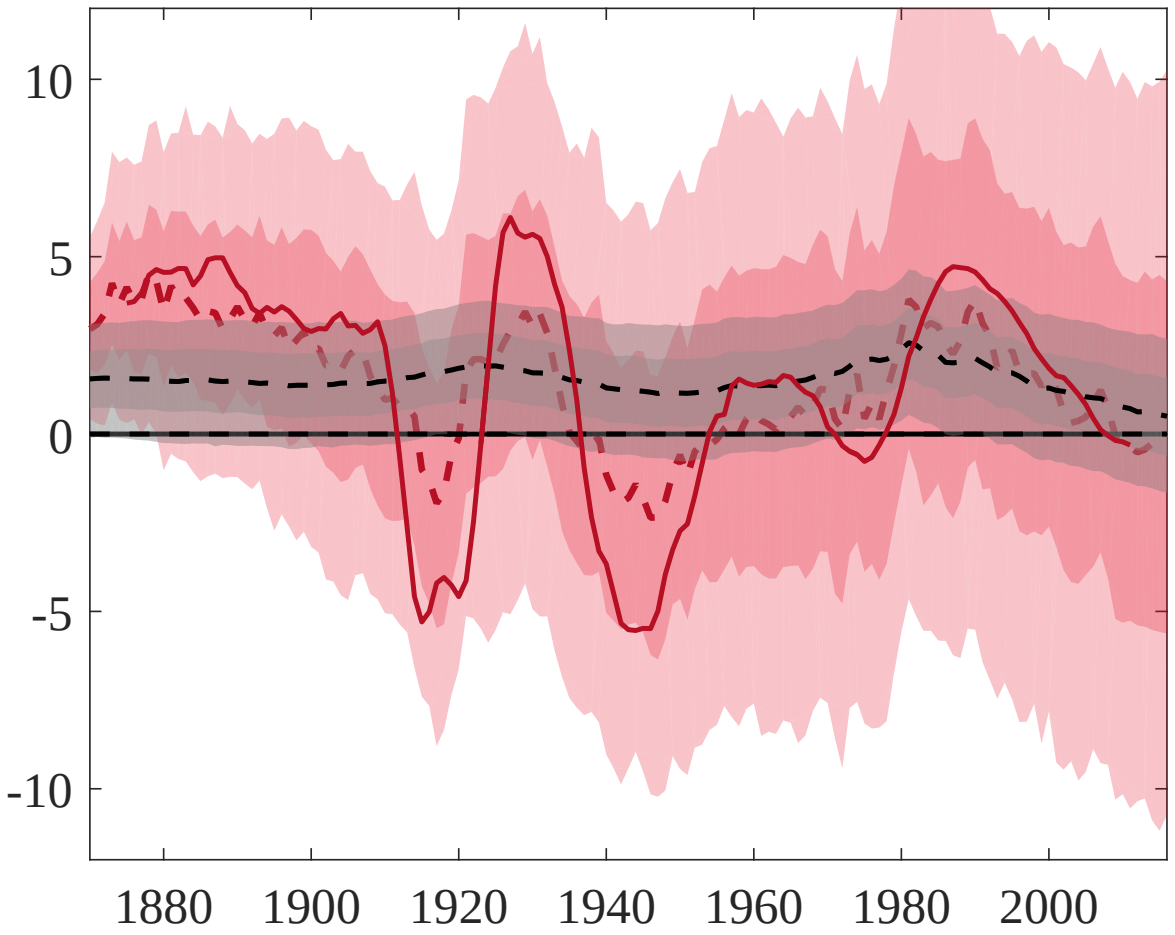


Note: real GDP weighted mean returns across 16 countries using decadal moving averages.

"(...) from a long-run perspective, the puzzle may well be why the safe rate was so high in the mid-1980s, rather than why it has declined so much since then." (from Jordà, Knoll, Kuvshinov, Schularick, Taylor, "The Rate of Return on Everything")

Trends and Decadal Moving Averages

$\overline{r}_t^w$ with different priors (- -) and JKKST decadal moving average (–)



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Trends and Observables: Spreads and Convenience Yields

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Long term rates	$R_{c,t}^{L}$	$+\overline{ts}_t^{w} + \overline{ts}_{c,t}^{i}$

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Long term rates	$R_{c,t}^L$		$+\overline{ts}_t^w + \overline{ts}_{c,t}^i$
US Baa yield	$R_{US,t}^{Baa}$	$\bar{\pi}_{US,t} + \overline{m}_t^w$	$+\overline{ts}_t^w + \overline{ts}_{US,t}^i$

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- Baa corporate bonds offer no safety/liquidity, as in KVJ

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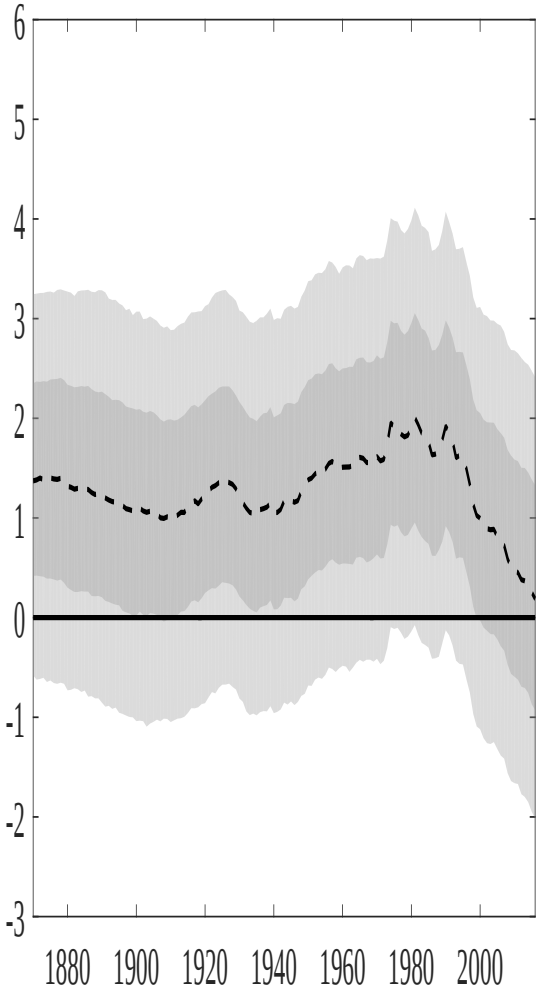
US Baa yield	$R_{US,t}^{Baa}$	$\bar{\pi}_{US,t} + \overline{m}_t^w$	$+\overline{ts}_t^w + \overline{ts}_{US,t}^i$
US Baa spread	$R_{US,t}^{Baa} - R_{US,t}^L$	$\overline{cy}_t^w + \overline{cy}_{US,t}^i$	

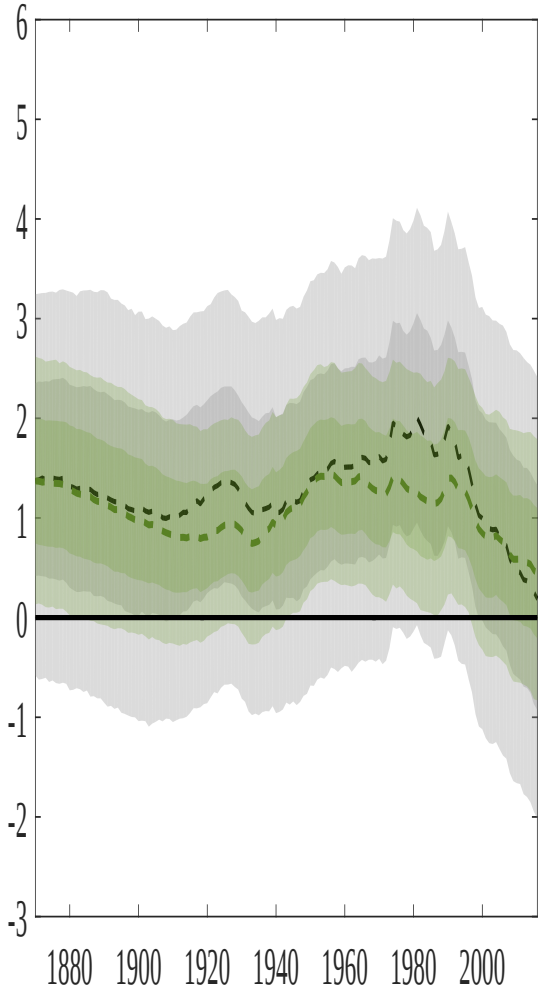
- $\overline{cy}_{c,t}^i$ identified from cross-section as c-specific idiosyncratic factor
- Baa corporate bonds offer no safety/liquidity, as in KVJ
- US Baa spread identifies $\overline{cy}_t^w$, given $\overline{cy}_{US,t}^i$

Results: $\overline{r}_t^w$ and Its Drivers

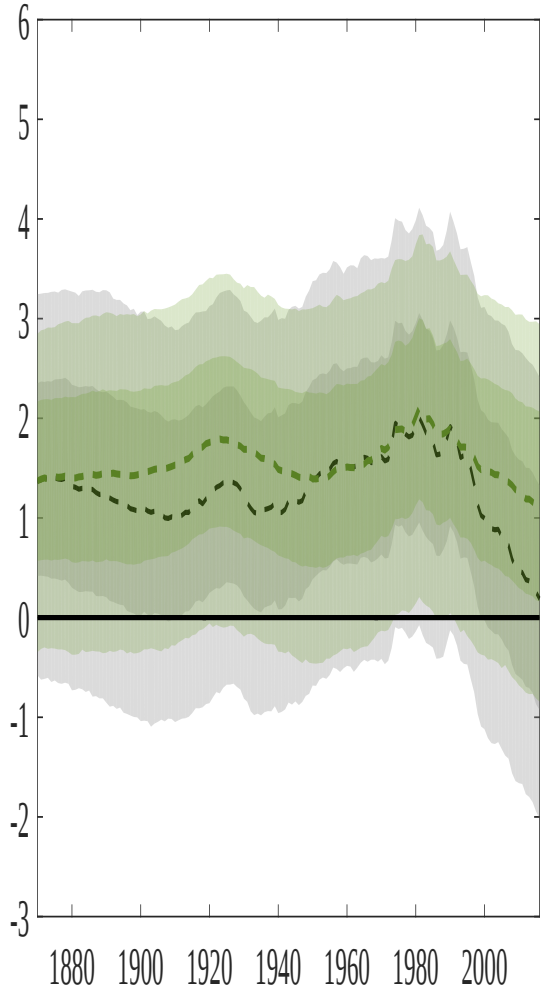
$\overline{r}_t^w$



$\overline{r}_t^w$ and $-\overline{cy}_t^w$

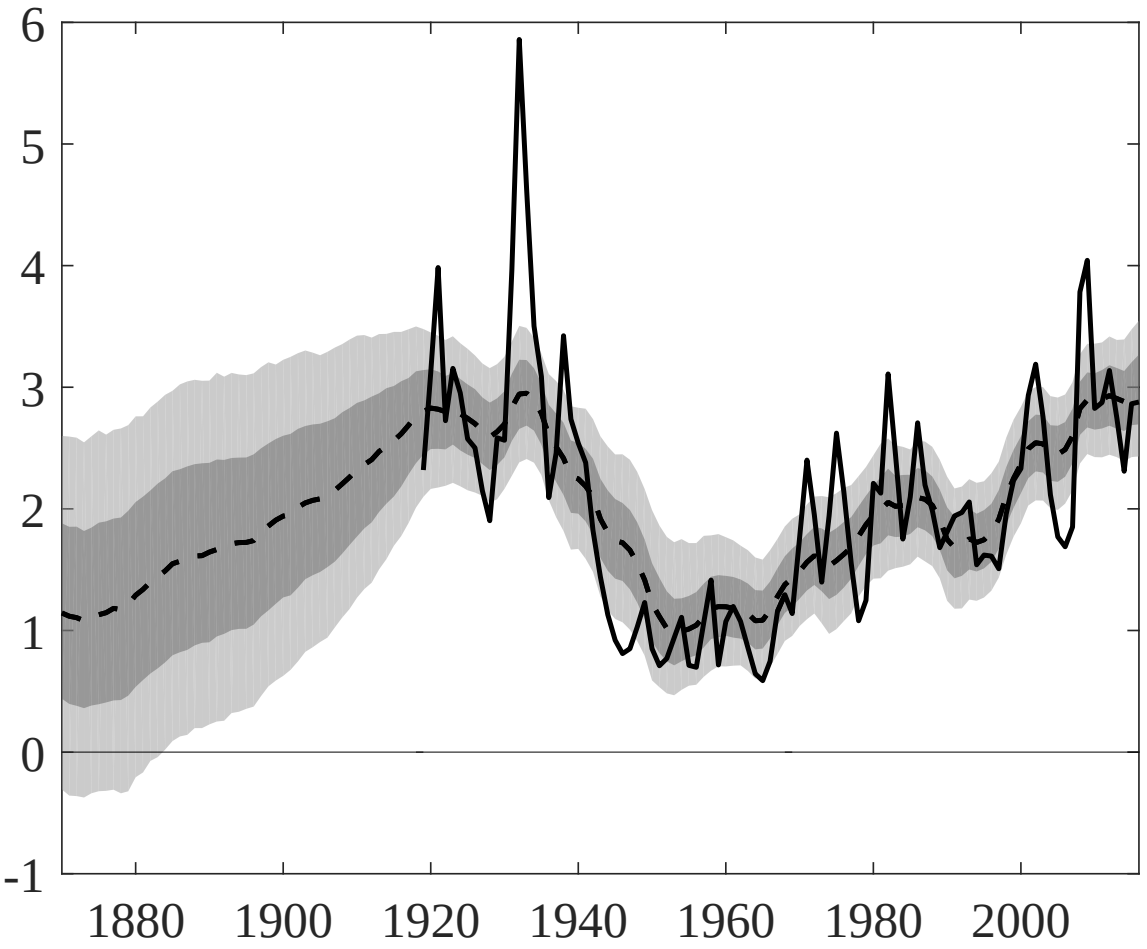


$\overline{r}_t^w$ and $\overline{m}_t^w$



Trends and Observables: Corporate Spreads

$\overline{cy}_{US,t}$(- -) and $R^{Baa}_{US,t} - R^{L}_{US,t}$ (—)



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A Model with Consumption

- What drives the world SDF? Standard macro-finance models suggest consumption "growth"
- In the long-run, we model this as

$$\overline{m}_t^w = \overline{g}_t^w + \overline{\beta}_t^w$$

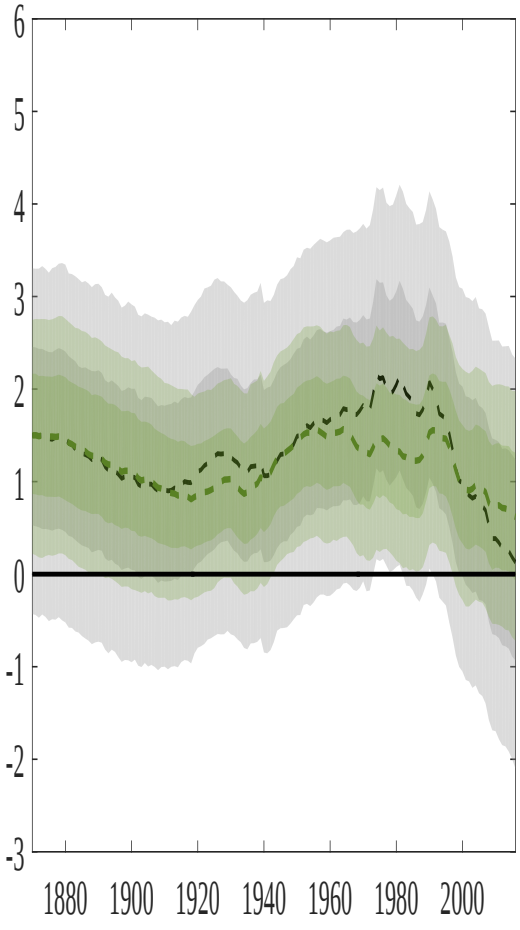
- $\overline{g}_t^w$ is a global factor in consumption growth

$$\overline{\Delta c}_{c,t} = \overline{g}_t^w + \bar{\gamma}_t^w + \bar{\gamma}_{c,t}^i$$

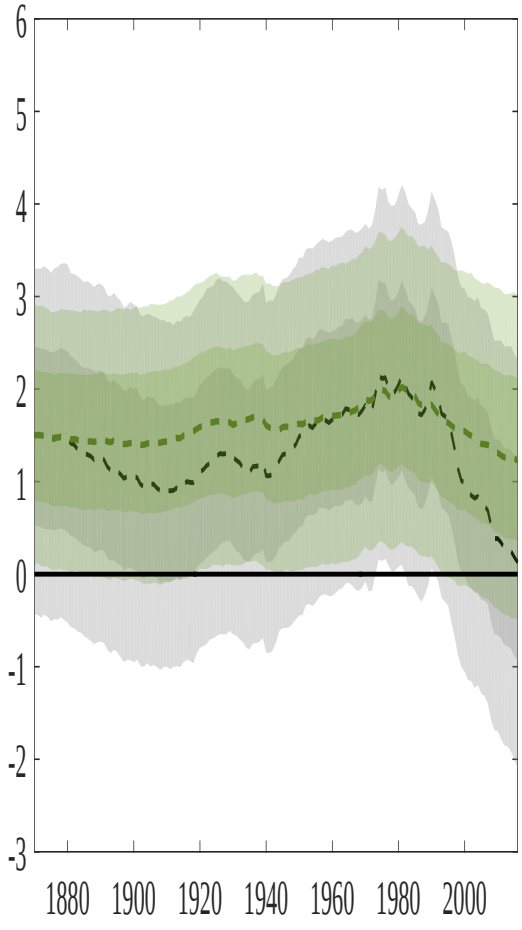
- Allow for both $\overline{\beta}_t^w$ and $\bar{\gamma}_t^w + \bar{\gamma}_{c,t}^i$ because real rates and consumption growth are only loosely related in the data, even in the long-run

Consumption Model: Results

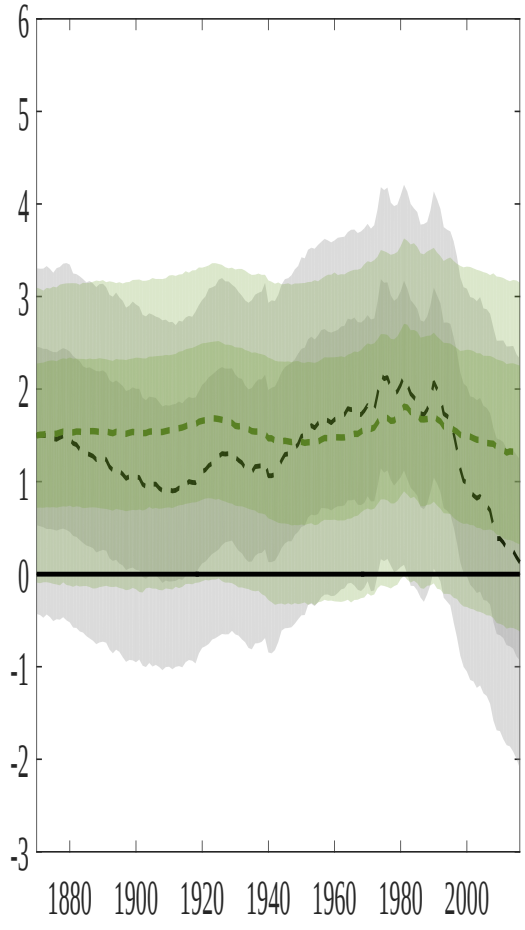
$\overline{r}_t^w$ and $-\overline{cy}_t^w$



$\overline{r}_t^w$ and $\overline{g}_t^w$



$\overline{r}_t^w$ and $\overline{\beta}_t^w$



Summary: Change in $\overline{r}_t^w$ in the Consumption Model

	1980-2016	1980-1997	1997-2016
$\overline{r}_t^w$	-1.93^{***}	-0.70^{*}	-1.22^{***}
	$(-3.18, -0.69)$	$(-1.56, 0.19)$	$(-2.18, -0.29)$
$-\overline{cy}_t^w$	-0.71^{*}	-0.07	-0.65^{**}
	$(-1.51, 0.11)$	$(-0.66, 0.52)$	$(-1.25, -0.02)$
$\overline{g}_t^w$	-0.74^{**}	-0.40^{*}	-0.35
	$(-1.50, -0.03)$	$(-0.89, 0.08)$	$(-0.88, 0.19)$
$\overline{\beta}_t^w$	-0.47	-0.22	-0.24
	$(-1.21, 0.31)$	$(-0.73, 0.30)$	$(-0.78, 0.30)$

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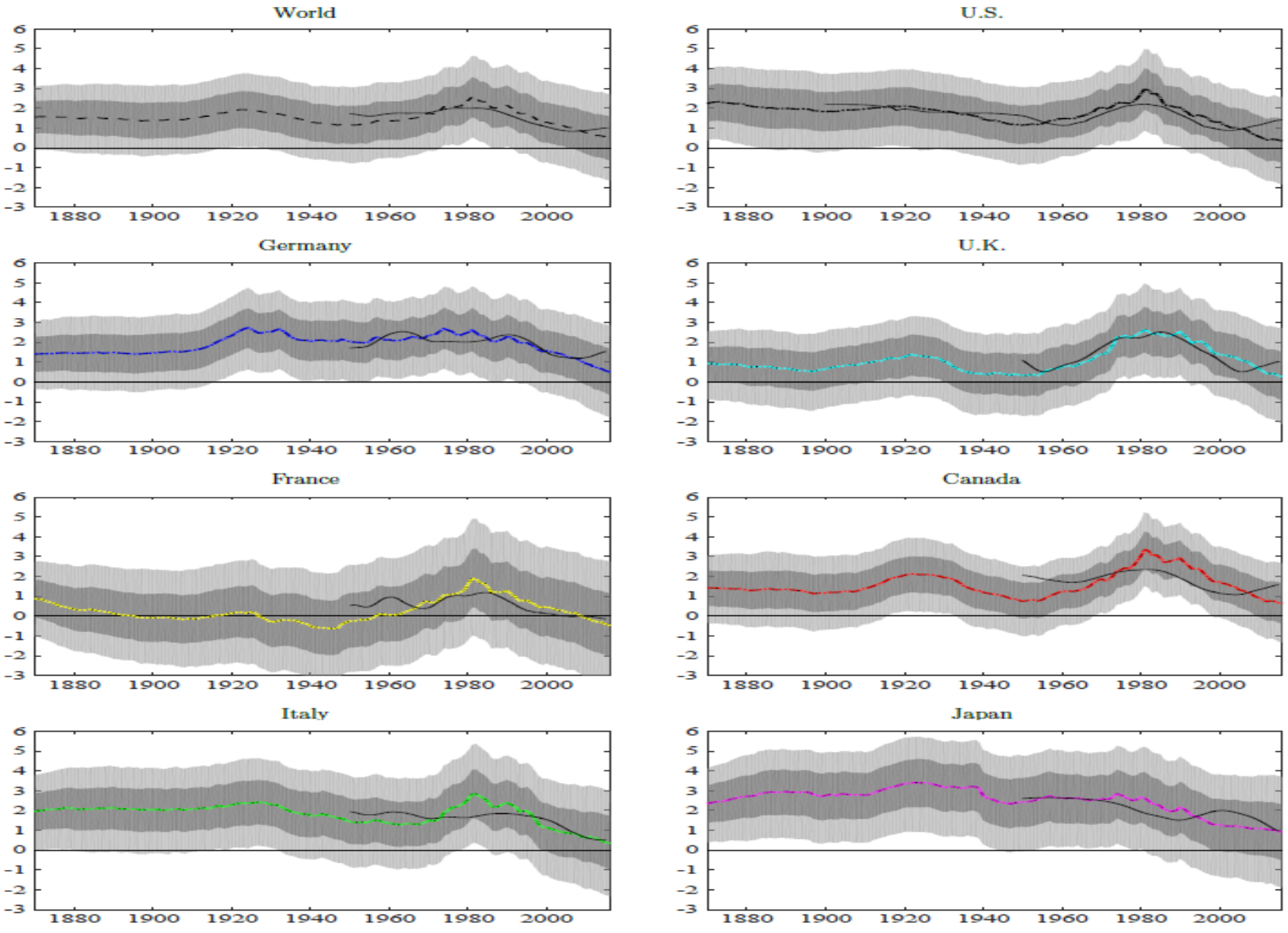
- Partly captured by convenience yield, if old prefer safe assets
- Idea: saving behavior changes through life cycle⇒demographic structure matters
  - Supply of saving affects "equilibrium" real interest rate
- Many possible channels (e.g. Gagnon, Johannsen, Lopez-Salido, 2016)
  - Longer life expectancy increases desired saving, given retirement age
    - But old dissave, and switch portfolio to safe assets
  - Demographic composition (young/middle/old) affects borrowing/lending balance
    - M(iddle)Y(oung) ratio (Geanakoplos, Magill, Quinzii, 2004; Favero, Gozluklu, Yang, 2016)

The Role of Demographics: Some Evidence

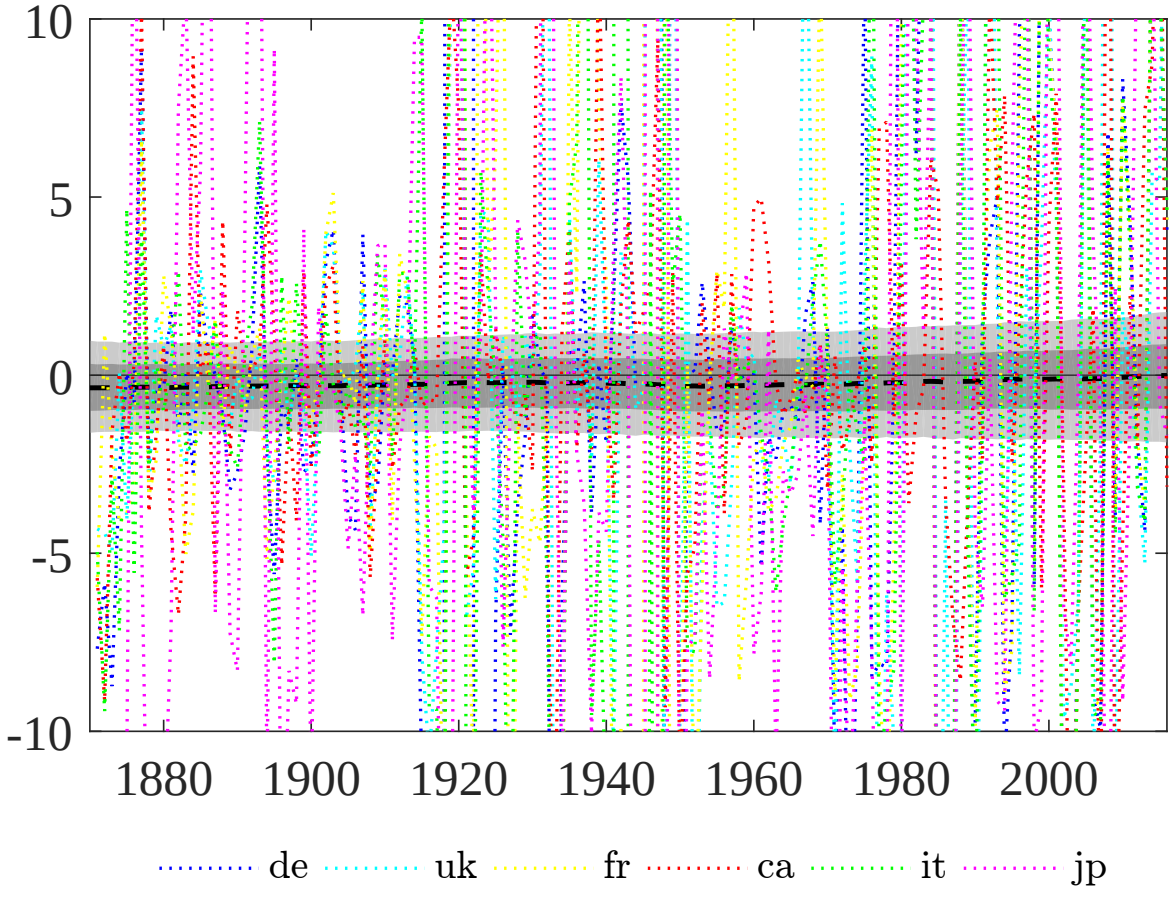


Conclusions

- The trend in the world real interest rate declined by about 2 pps in the past 3-4 decades, after fluctuating around 2% for a century
- The convenience yield for safe/liquid assets is a key driver of this decline, especially since the mid 1990s
- Lower global growth is a second crucial factor, starting around 1980
- Demographics is also likely to play a role, but it is hard to capture it parsimoniously within our framework

What About Exchange Rates?

$\overline{\Delta q_t}^w$(- -) and $\Delta q_{c,t}$(- -)



What About Exchange Rates?

$\overline{\Delta q}^{i}_{c,t}$(- -) and $\Delta q_{c,t} - \frac{1}{n}\sum_{1=1}^{n} \Delta q_{c,t}$(- -)