Global financial cycles and risk premiums

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Focus on the **international transmission of financial center monetary policy**

What we find

1. The global co-movement in credit, house prices, and equity prices has reached **historical highs** in the past three decades.
2. Particularly strong increase in **equity price synchronization** since the 1980s
3. The main driver of equity price co-movement is **synchronization of risk premiums**, not dividends
4. **Financial center monetary policy** plays an important role for shifts in risk appetite

Where this fits in

- **Financial cycle and long-run asset markets**
  Claessens et al. (2011), Drehmann et al. (2012), Aikman et al. (2014) and Schuler et al. (2015); Jordà, Knoll, Kuvshinov, Taylor and Schularick (2018).

- **Global financial synchronization**
  Bruno and Shin (2014); Cerutti et al. (2014); Obstfeld (2014); Rey (2015).

- **Monetary policy and risk premiums**
  Dedola and Lombardo ()2012); Devereux and Yetman (2010); Fostel and Geanakoplos (2008); Krishnamurty and Muir (2017); Ward (2018); Miranda-Agrippina and Rey (2018); Kuvshinov (2018)

Data

- 1870-2016, annual, 17 countries:

  Australia, Belgium, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, U.K., U.S.

- Credit, house prices, equity prices,
  GDP, consumption, investment and CPI-series

  Jordà-Schularick-Taylor Macrohistory Database
  (Jordà, Schularick & Taylor 2016)
  http://www.macrohistory.net/data

- Dividends and equity return premium

  The Rate of Return on Everything, 1870–2015
  (Jordà, Knoll, Kuvshinov, Schularick & Taylor 2018)

www.macrohistory.net/data

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JORDÀ-SCHULARICK-TAYLOR MACROHISTORY DATABASE

The ***Jordà-Schularick-Taylor Macrohistory Database*** is the result of an extensive data collection effort over several years. In one place it brings together macroeconomic data that previously had been dispersed across a variety of sources. On this website we provide convenient no-cost open access under a license to the most extensive long-run macro-financial dataset to date. Commercial data providers are strictly forbidden to integrate all or parts of the dataset into their services or sell the data (see Terms of Use and Licence Terms below).

The database covers 17 advanced economies since 1870 on an annual basis. It comprises 25 real and nominal variables. Among these, there are time series that had been hitherto unavailable to researchers, among them financial variables such as bank credit to the non-financial private sector, mortgage lending and long-term house prices. The database captures the near-universe of advanced-country macroeconomic and asset price dynamics, covering on average over 90 percent of advanced-economy output and over 50 percent of world output.

Assembling the database, we relied on the input from colleagues, coauthors and doctoral students in many countries, and consulted a broad range of historical sources and various publications of statistical offices and central banks. For some countries we extended existing data series, for others we relied on recent data collection efforts by others. Yet in a non-negligible number of cases we had to go back to archival sources including documents from governments, central banks, and private banks. Typically, we combined information from various sources and spliced series to create long-run datasets spanning the entire 1870–2014 period for the first time. The table below lists the available series.

Download Data ▼ Documentation ▼ How to Cite ▼ Research ▼

The Global Financial Cycle, 1870-2016

Filtering and synchronicity

- Baxter-King band-pass filter for baseline (findings robust to other filters)
- Use wide 2 to 32 year band
- Report 15-year rolling-window Spearman bilateral correlations
- Global measure is the average of the bilateral correlation coefficients:

$$\bar{s}_t = \frac{\sum_i \sum_{j<i} s_t^{i,j}}{N}; \qquad N = \frac{n(n-1)}{2}. \tag{1}$$

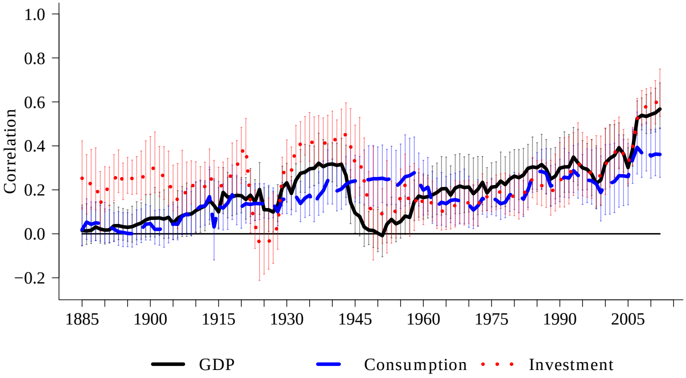
And a GDP-weighted equivalent:

$$\bar{s}_t^{\omega} = \sum_i \sum_{j<i} \omega_{i,j,t}\, s_t^{i,j}, \qquad \text{with} \tag{2}$$

$$\omega_{i,j,t} = \frac{(GDP_{i,t} + GDP_{j,t})}{\sum_i \sum_{j<i}(GDP_{i,t} + GDP_{j,t})},$$

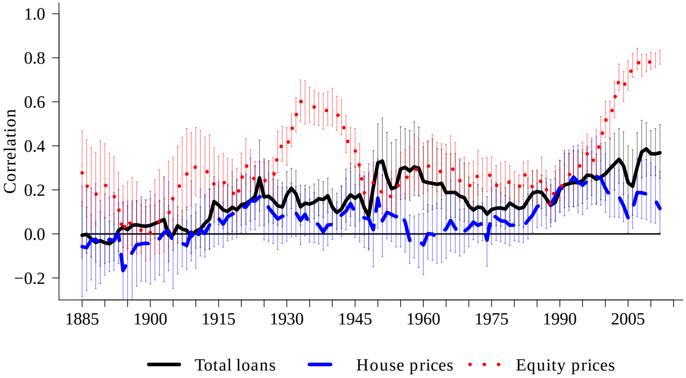
Business cycle synchronization

More synchronization, especially after WW2



Financial cycle synchronization

Asset prices growing more synchronized, especially equities



What are the sources of rising equity price co-movement?

Equity price determinants:

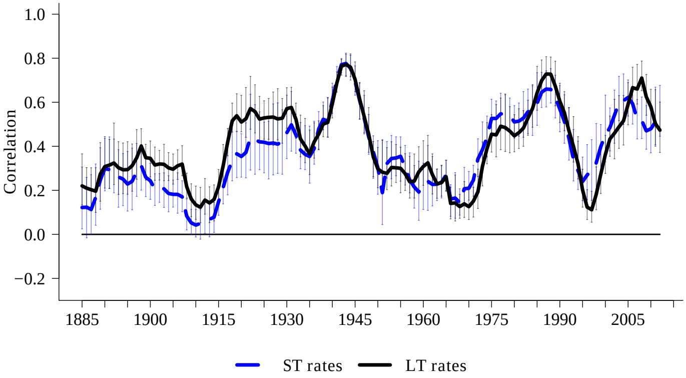
- dividends D
- risk-free rate R
- equity risk premiums ERP

We can directly observe *dividends* and *risk-free rates*

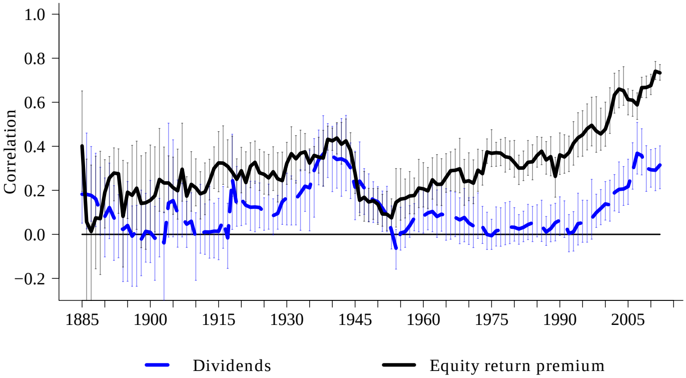
The residual time-varying equity risk premium is a measure for investor's *risk appetite*: the compensation required to bear equity market risk

We can study the global co-movements of all three components: dividends, risk-free rates, risk premiums

Co-movement of safe rates *R* within historical range



Dividend *D* and esp. return premium *ERP* comovement up



Decomposing equity prices

- Calculate risk neutral investor's price Q^{RN}, based on present value of dividends D for safe rates R

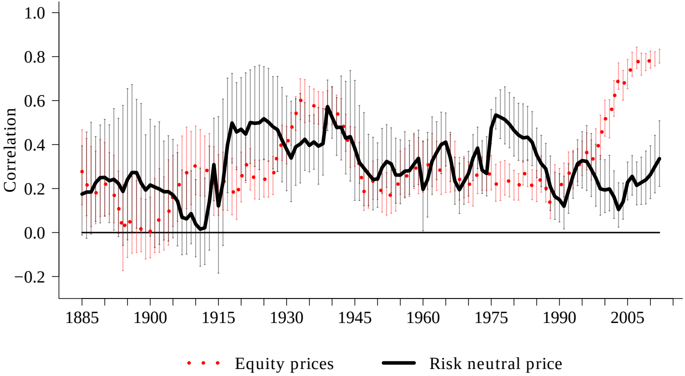
$$Q_t^{RN} = \sum_{k=1}^{\infty} \left(\prod_{j=1}^{k-1} R_{t+j}^{-1} \right) D_{t+k}$$

- How much equity price co-movement is due to co-movement in risk neutral investor's price Q^{RN} vs. residual component "risk appetite" ρ?

$$Q_t = Q_t^{RN} \rho_t$$

→ Compare comovement in Q_t^{RN} and Q_t

Most equity price co-movement due to risk appetite ρ



Takeaways so far

Real and financial cycle synchronization trending up in the past 150 years

Surging equity price synchronization since 1980s due to global **risk appetite synchronization**

Where does global synchronization in risk appetite come from?

Global risk-taking

Synchronized risk-taking in international markets: Bekaert et al., 2013; Miranda-Agrippino and Rey, 2015.

Global reach of U.S. monetary policy (Canova, 2005; Kim, 2001). Ehrmann et al. (2011)

Mechanisms: Bruno and Shin (2014), Bacchetta and van Wincoop (2013), Ward (2018)

Financial center monetary policy and global equity prices

Calculate international response of equity prices Q and risk neutral investor's price Q^{RN} to financial center short-term rate changes ΔR^c

Local projections: let y be equity prices, dividends or safe rates; X_i controls; $h = 0, ..., 4$

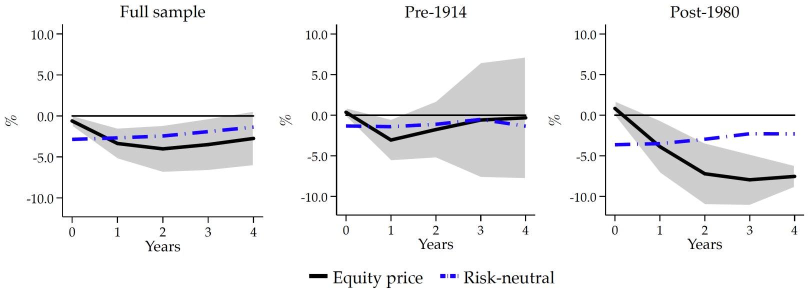
$$\Delta_{h+1} y_{i,t+h} = \alpha_i^h + \sum_{k=1}^{5} \beta_k^h \Delta y_{i,t-k} + \sum_{k=0}^{5} \gamma_k^h \Delta R^c_{i,t-k} + \sum_{k=0}^{5} \delta_k^h X_{i,t-k} + u_{i,t+h}$$

Intuition: (1) estimate effect of center policy changes on international dividends and risk free rates, (2) this yields the price change for a risk-neutral investor; (3) compare with actual effect of policy changes on equity prices.

Difference between Q_t^{RN} and Q_t : effect of policy on equity risk premium.

The response of global equity markets

Figure: Pre-1914 vs. Post-1980 equity price responses

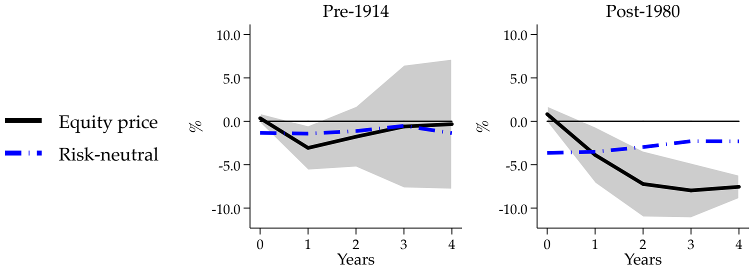


Notes: Cumulative impulse response functions to +1ppt increase in financial center interest rates. Risk-neutral – risk neutral price (Q^{RN}). Center rate – financial center (U.K. and/or U.S.) short-term risk-free rate own response. Confidence bands calculated on the basis of Driscoll-Kraay standard errors.

⇒ Excess equity price responses are a new phenomenon!

Financial center has large impact on risk premiums today

Figure: Pre-1914 vs. Post-1980 equity price responses



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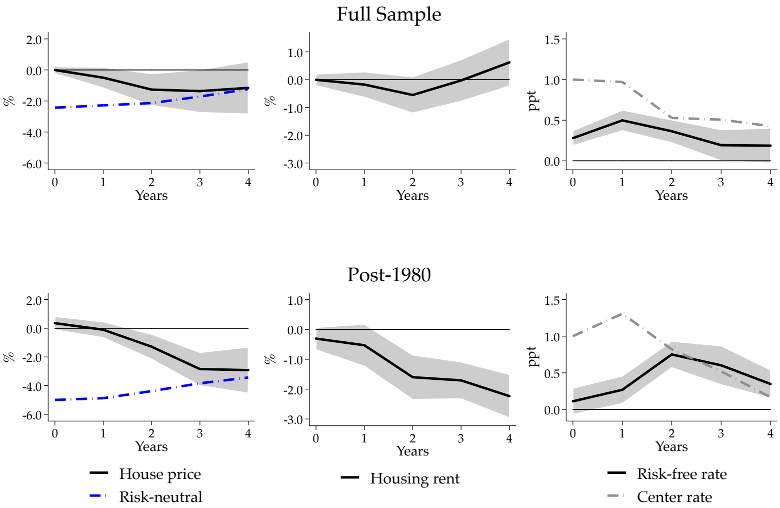
The response of global house prices



⇒ No excess house price response, i.e. risk premiums not correlated. Kuvshinov (2018): Time Varying Risk Puzzle. No co-movement of discount rates between equity and housing in long-run sample. No joint pricing kernel...

Can countries decouple from the effects of financial center policy with a floating exchange rate regime?

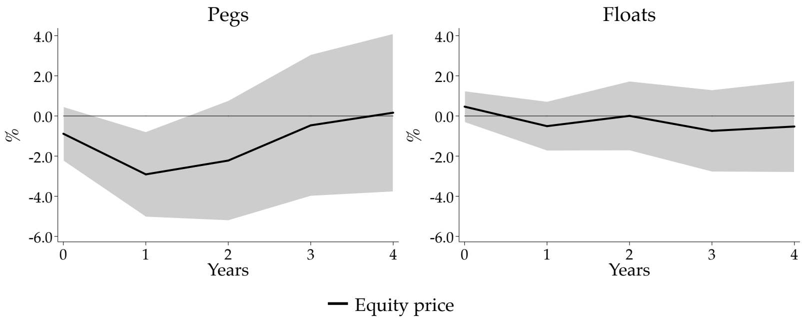
Do exchange rate regimes make a difference?

Use peg/float distinction from Ilzetzki et al. (2017) and estimate local projections for floating/fixed:

$$\Delta_h y_{i,t+h} = \alpha_i^h + \sum_{k=1}^{L} \beta_k^h \Delta y_{i,t-k} + \sum_{k=0}^{L} \gamma_k^h \Delta R_{t-k}^c + \sum_{k=0}^{L} \delta^h \Delta R_{t-k}^c \times float_{i,t} + \sum_{k=0}^{L} \phi_k^h X_{i,t-k} + u_{i,t-1+h}, \quad h = 1, ..., H \,, \tag{3}$$

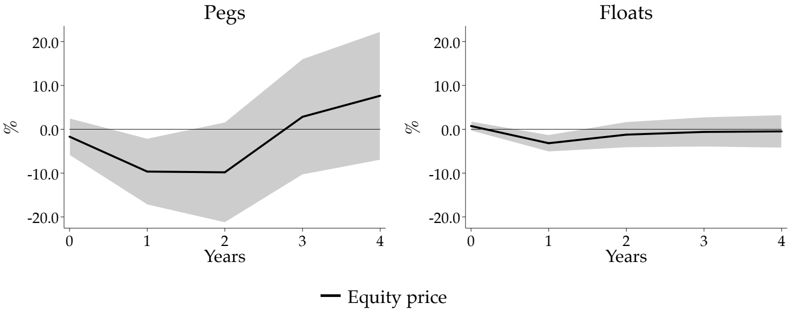
where α_i are country-fixed effects, $\Delta_h y_{i,t+h}$ are h-year changes the dependent variable and $u_{i,t+h}$ are error terms.

Yes for the full sample



All years.

Much less today



Post WW2.

Growing spillovers

Equity price response, full sample:

	(1) Year 0	(2) Year 1	(3) Year 2	(4) Year 3	(5) Year 4
Pegs	-0.88	-2.91***	-2.22	-0.46	0.16
	(0.69)	(1.08)	(1.52)	(1.80)	(2.01)
Floats	0.46	-0.50	0.00	-0.74	-0.52
	(0.40)	(0.62)	(0.88)	(1.04)	(1.16)
Peg=Float (p-value)	0.05*	0.02**	0.14	0.87	0.73
Observations	810	810	810	810	810
R^2	0.57	0.57	0.44	0.37	0.31

Equity price response, Post-1945:

	(1) Year 0	(2) Year 1	(3) Year 2	(4) Year 3	(5) Year 4
Pegs	-1.46	-8.36**	-6.94	3.05	6.63
	(2.23)	(3.79)	(5.55)	(6.46)	(7.17)
Floats	0.94*	-3.10***	-1.17	0.12	-0.06
	(0.57)	(0.97)	(1.43)	(1.66)	(1.85)
Peg=Float (p-value)	0.27	0.15	0.29	0.64	0.34
Observations	577	577	577	577	577
R^2	0.74	0.70	0.55	0.52	0.48

$\Rightarrow$ Peg-float distinction blurs in the second half of the sample

Policy Shocks

Instrumenting policy changes

LP instrumental variable approach:

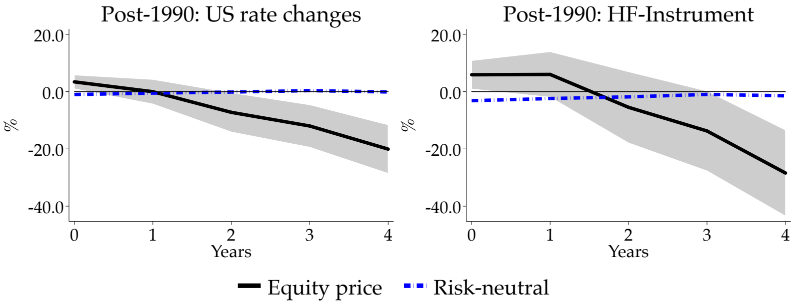
$$\Delta_h y_{i,t+h} = \alpha_i^h + \sum_{k=1}^{5} \beta_k^h \Delta y_{i,t-k} + \sum_{k=0}^{5} \gamma_k^h \Delta \hat{R}^c_{i,t-k} + \sum_{k=0}^{5} \delta_k^h X_{i,t-k} + u_{i,t+h}, \tag{4}$$

$\hat{R}^c_t$ is prediction from a first-stage regression of the effective federal funds rate R^c on the high-frequency instruments:

$$R^c_t = \theta_0 + \theta_1 FF1_t + \theta_3 FF3_t + \theta_6 ED6_t + \theta_9 ED9 + \theta_1 2ED12 + \epsilon_t\,, \tag{5}$$

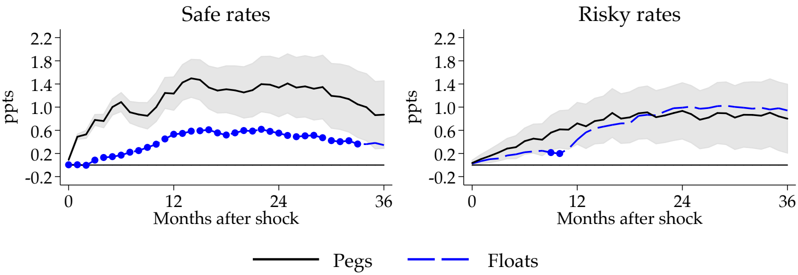
where $FF1, FF3, ED6, ED9$ and $ED12$ are Gertler-Karadi high-frequency instruments.

Robustness: high frequency instrument



$\Rightarrow$ OLS results robust to using Gertler-Karadi IV

Risk premium effects in bond markets



Source: Felix Ward 2017. **Global risk taking, exchange rates, and monetary policy.**

Conclusions and policy implications

Conclusions

- **Financial cycle synchronization** up for past 150 years
- **Increasing equity price synchronization** since 1980 due to **global risk appetite synchronization**
- **U.S. monetary policy a trigger of risk appetite** across global equity markets

Policy implications

- Risk-appetite spillovers can confound monetary policy and financial stability targets
- Potential role for macropru and capital account policies
- Potential benefits to international economic policy coordination