# What Anchors for the Natural Rate of Interest?

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# Secular decline in real interest rates

## Prevailing explanations

- Natural rate, S-I factors
  - Secular stagnation, savings glut, safe asset shortage
- Monetary factors "neutral" in the long-run

## What if…

- Market rates diverged from natural rate persistently
- Monetary policy not neutral in the long-run
  - Financial cycle

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# Real interest rates and S-I factors

## S-I a theory for the natural rate applied to market rate

- Equality to market rate a maintained hypothesis
- Underlying theory not tested

## A long historical perspective (Borio et al (2017))

- Since 1870-2016, 19 countries
- Direct link with "usual suspects"
  - Growth, productivity, demographics, income distribution, relative price of capital

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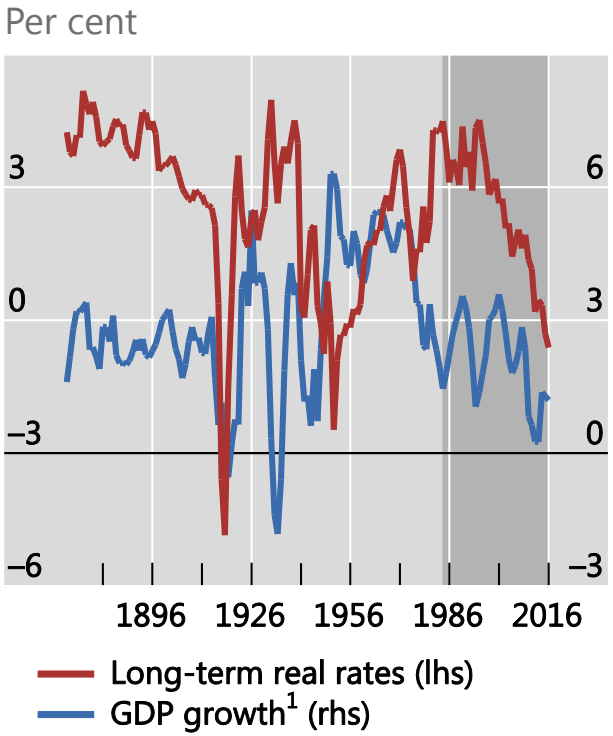
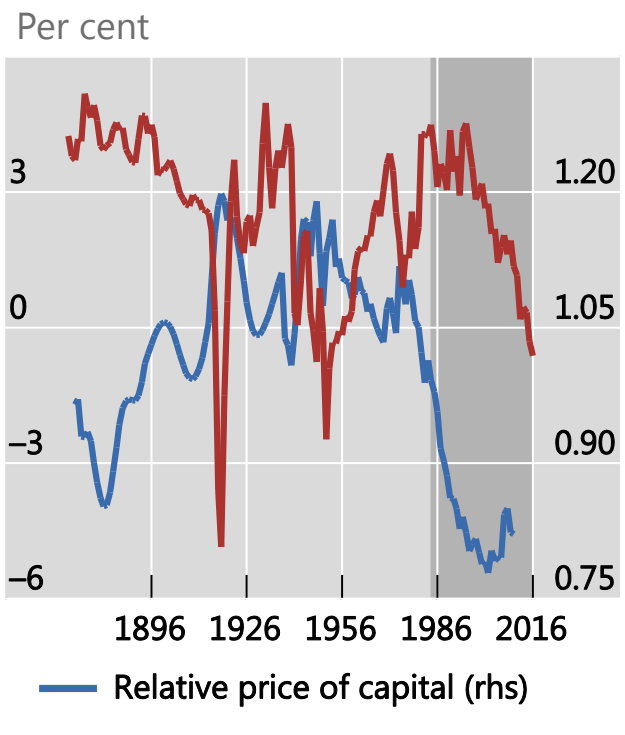
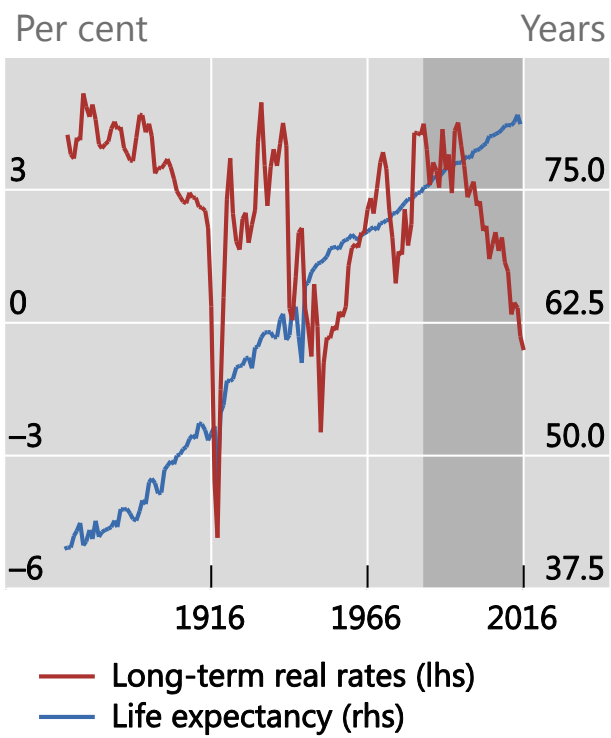
# Real interest rates and S-I factors

## Link or no link?




Note: Median values of 19 advanced countries

# Real interest rates and S-I factors

## Usual suspects: Not guilty

| | (1) Full sample | (2) Gold standard | (3) Interwar | (4) Postwar | (5) Pre-Volcker | (6) Post-Volcker |
|---|---|---|---|---|---|---|
| GDP growth (+) | –0.09** | –0.00 | –0.07 | 0.08 | 0.07 | 0.03 |
| Population growth (+/–) | –0.83* | –0.50 | 0.25 | –0.77** | –0.00 | –0.68 |
| Dependency ratio (+) | 0.02 | –0.03 | –0.04 | 0.03 | 0.14*** | –0.03 |
| Life expectancy (–) | 0.04 | –0.20*** | 0.41 | 0.23** | 0.47*** | –0.32*** |
| Relative price of capital (+) | 0.01 | 0.11** | –0.06 | –0.00 | –0.06* | 0.01 |
| Income inequality (–) | 0.10* | –0.01 | 0.00 | –0.26*** | –0.10 | –0.10 |
| Constant | –1.97 | 15.33*** | –17.90 | –14.27* | –42.48*** | 31.18*** |

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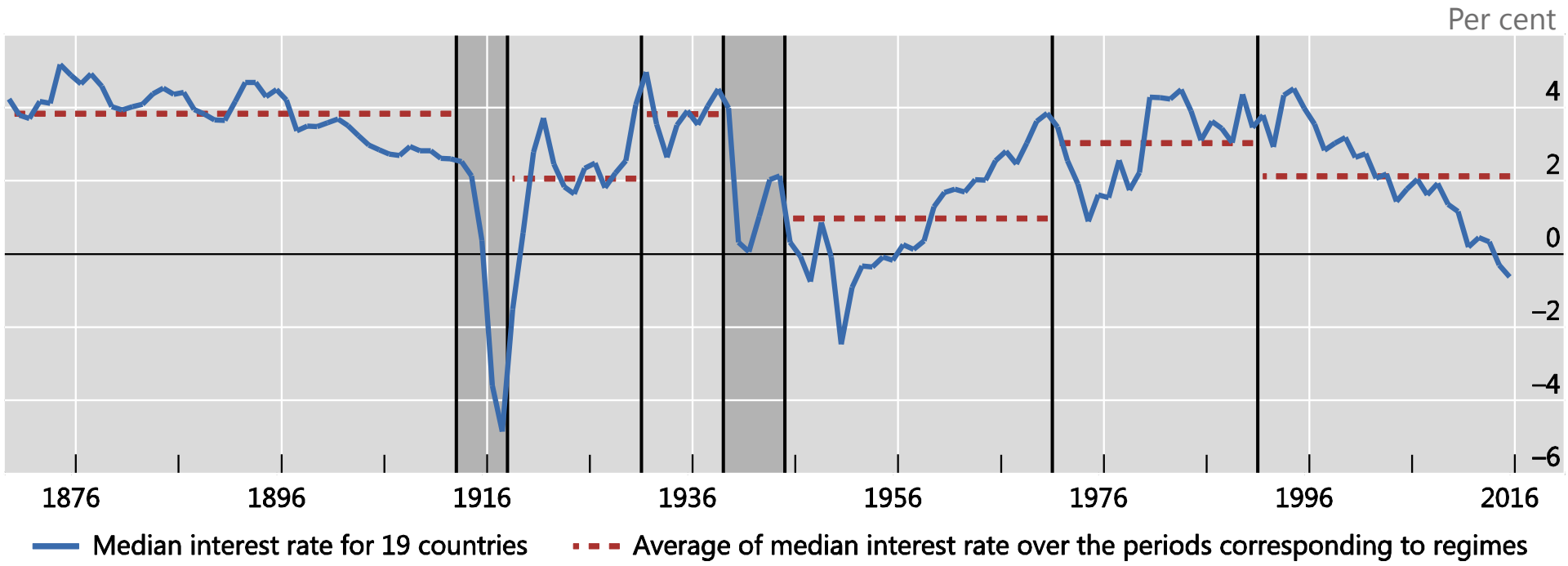
# Real interest rates and S-I factors

## Monetary regimes and real long-term rate




- Globally, monetary policy of anchor countries outperform S-I factors

# Safe asset shortage?

## Key elements

- Change in relative demand/supply of safe assets
- Higher spread between risky and safe assets

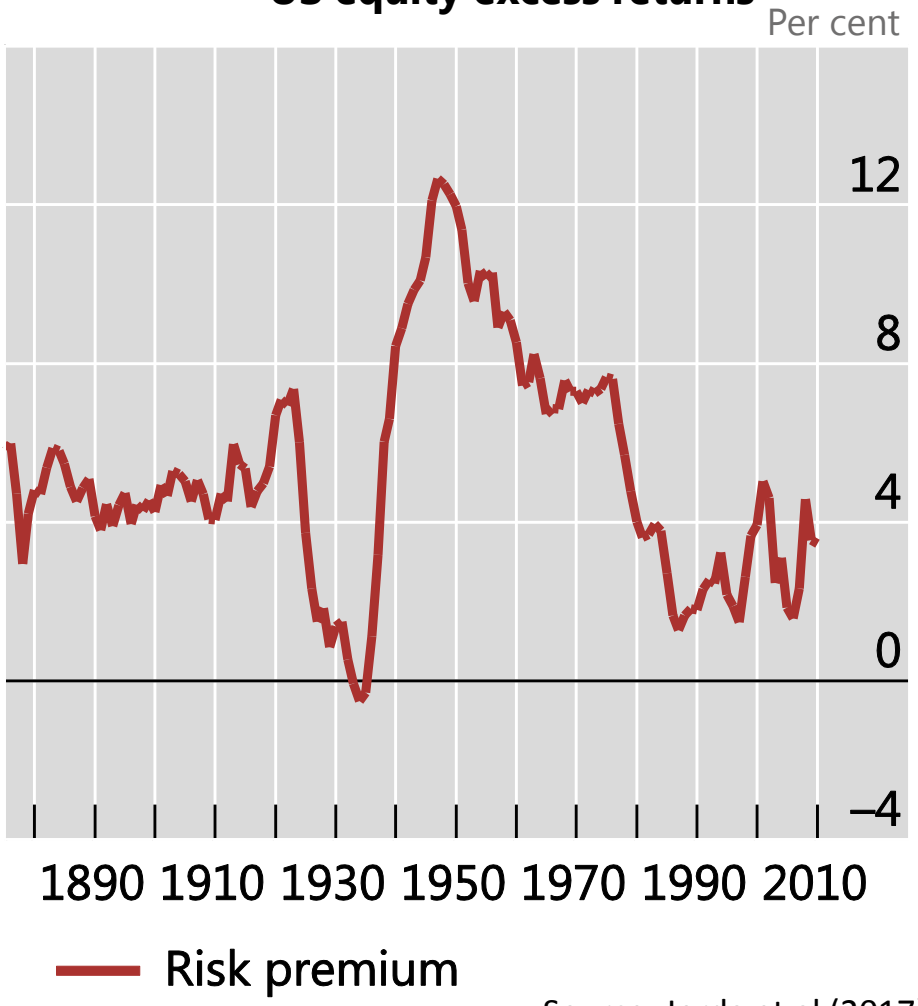
## But...

- Conceptual and empirical drawbacks

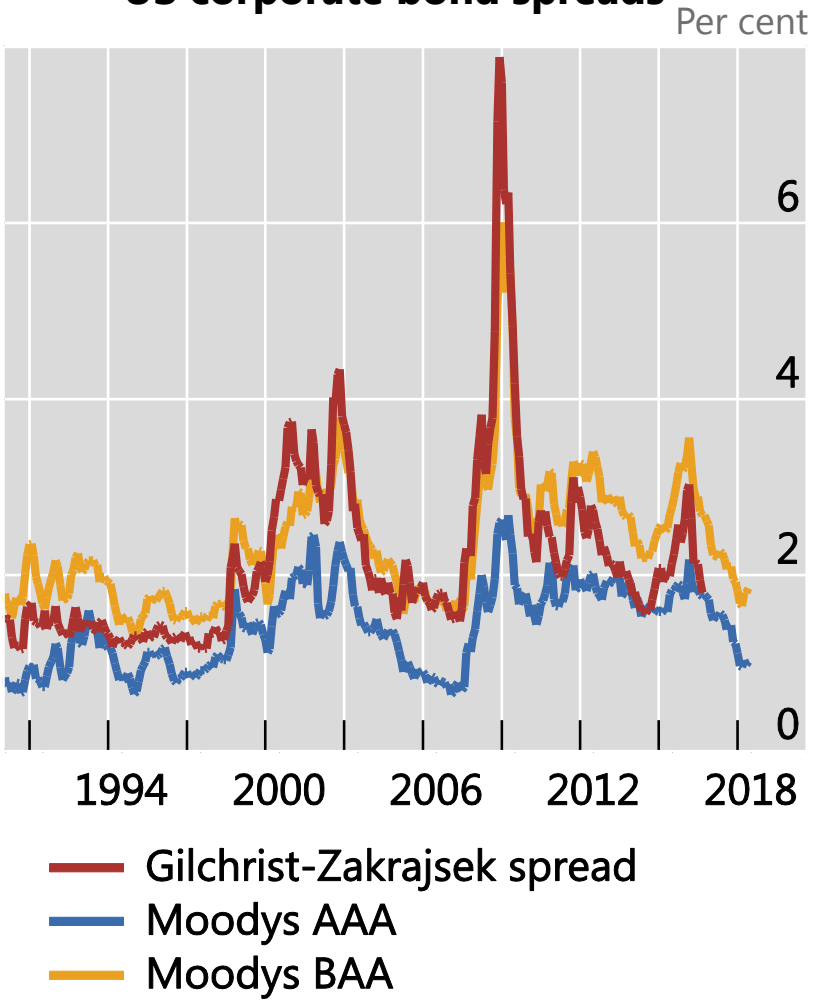
# Safe asset shortage?

## Premia and spreads: widen or tighten?

**US equity excess returns**




**US corporate bond spreads**

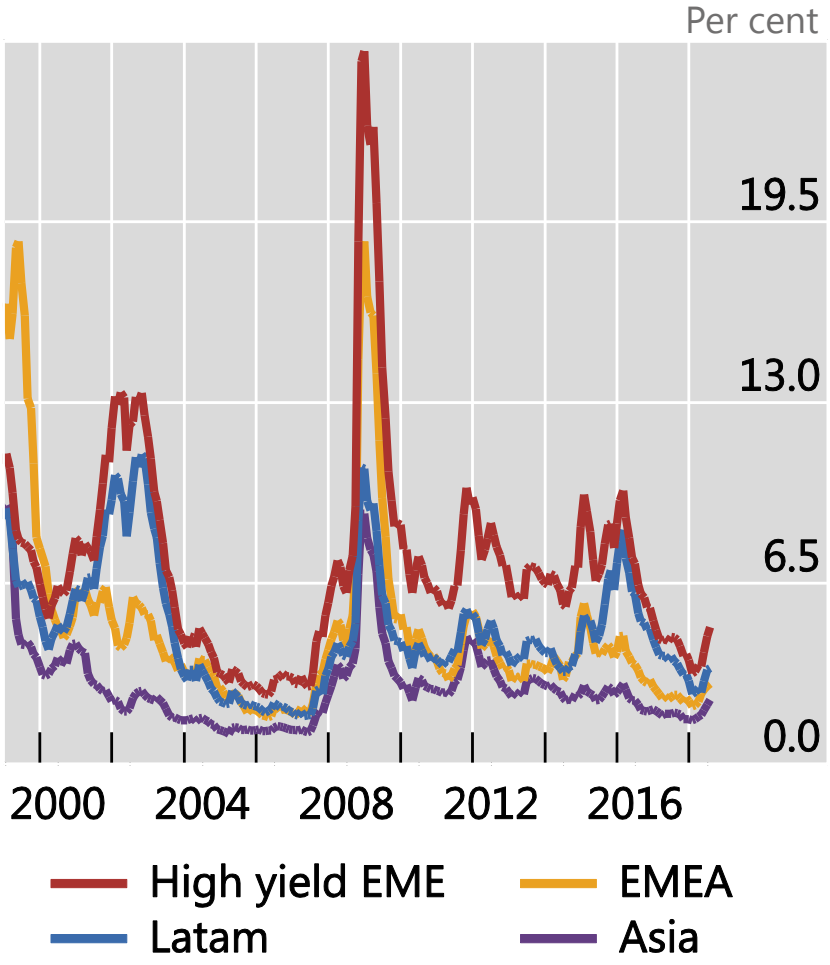



Source: Jorda et al (2017)

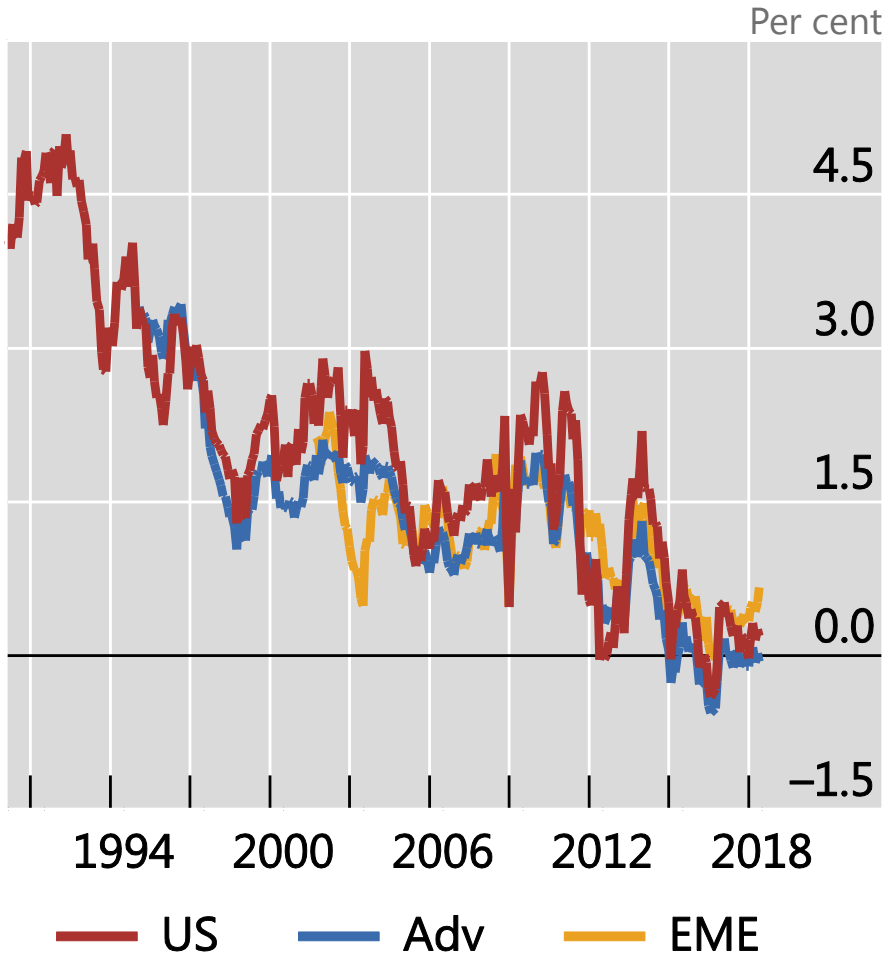
# Safe asset shortage?

## Premia and spreads: widen or tighten?

**Global corporate bond OAS**



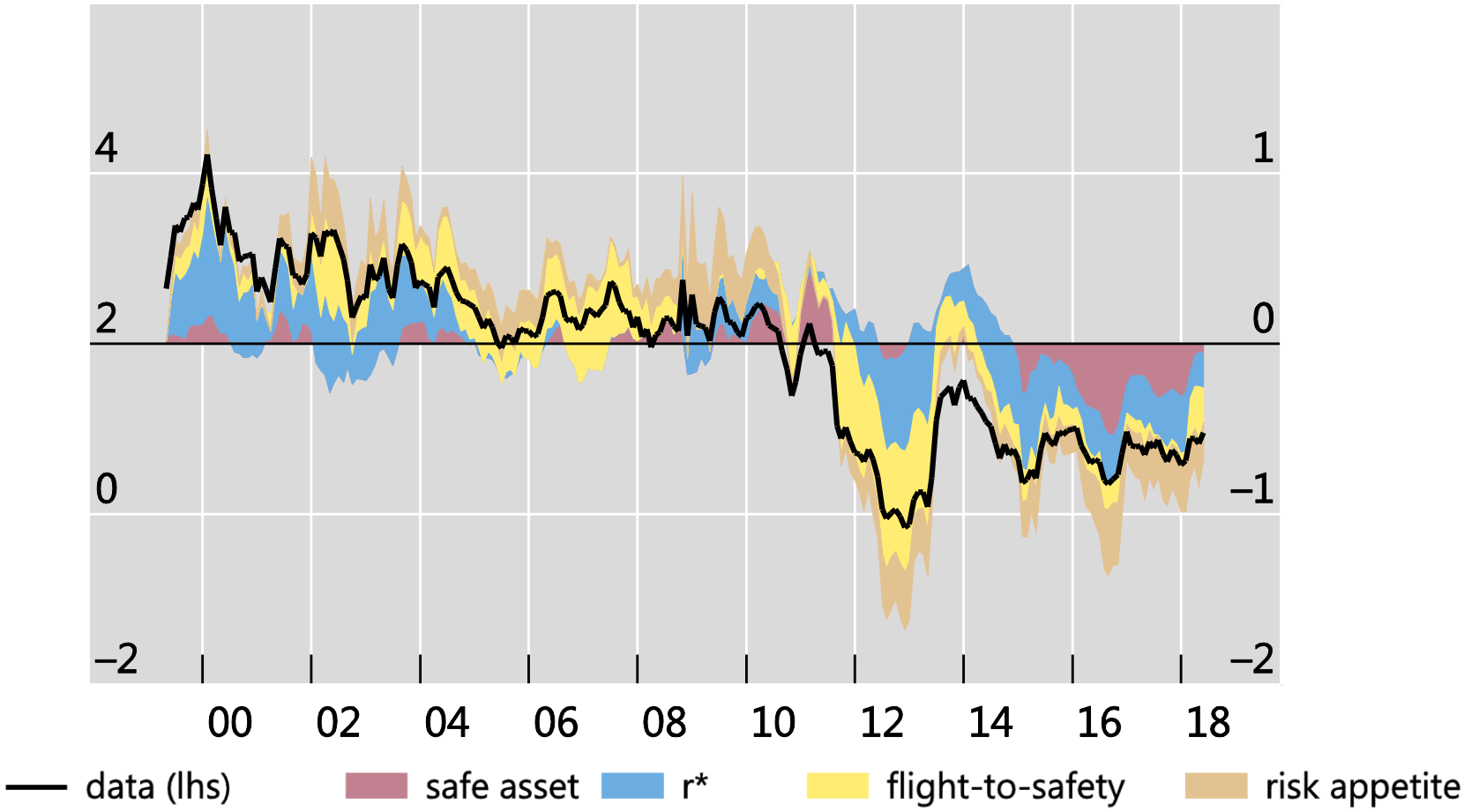

**10-year sovereign bond term premia**



# Safe asset shortage?

## Sign-restricted VAR: Contribution of SAS small

**Historical decompositions of real 5y5y rate**
(Percent)



# What compass for monetary policy?

## Natural rate model-dependent

- Inflation sufficient?
- Equilibrium should be sustainable
  - Financial instability incompatible with sustainability
  - Defitinition of natural rate should encompass "financial equilibrium"

## The long hand of the financial cycle

- Credit booms predict busts
- Busts leave long-lasting scars
- Monetary non-neutrality

# An empirical model

## Key Ideas (Juselius et al. (2017))

- Financial cycle anchored to two long-run relationships that pin down sustainable credit-GDP ratio
  - Leverage gap

$$\widetilde{lev}_t = (cr_t^r - y_t^r) - \beta_{lev} p^r_{A,t} - \overline{lev}$$

  - Debt service gap

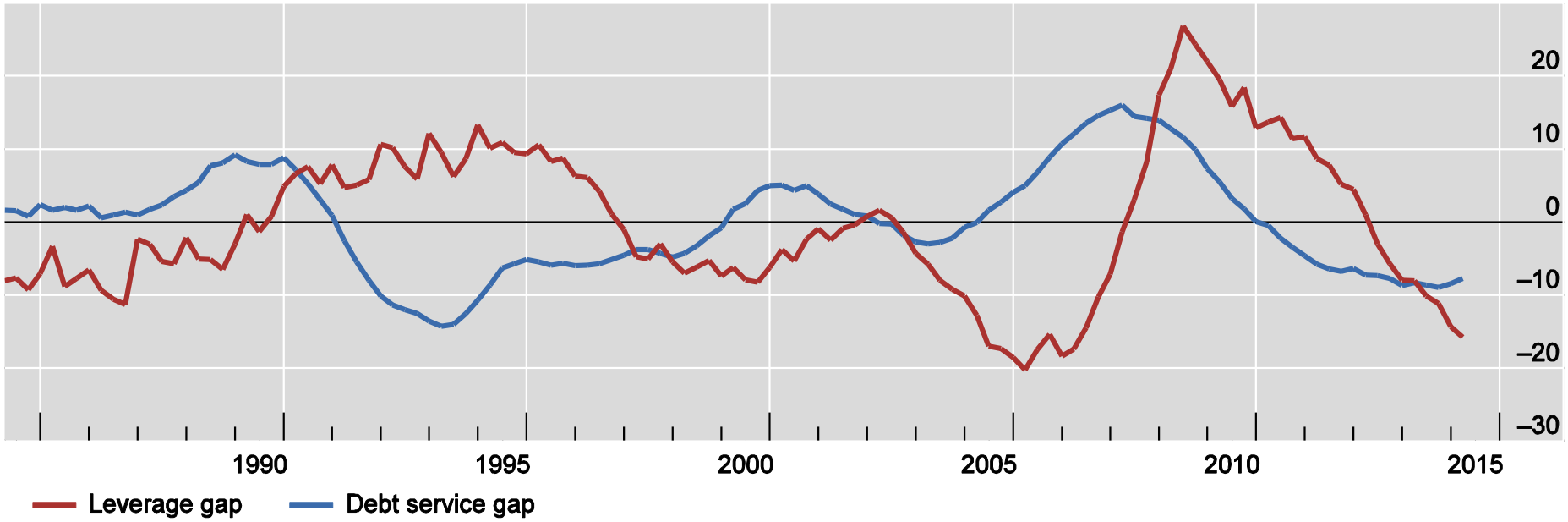
$$\widetilde{dsr}_t = (cr_t^r - y_t^r) + \beta_{dsr} i_{L,t} - \overline{dsr}$$

where $cr_t^r$ = real credit, $y_t^r$ = real output, $p^r_{A,t}$ = real asset price, $i_{L,t}$ = nominal average lending rate on stock of credit

- Credit-to-GDP, real asset prices, and nominal lending rate proportional in the long-run

# An empirical model

## US Leverage and Debt Service Gaps



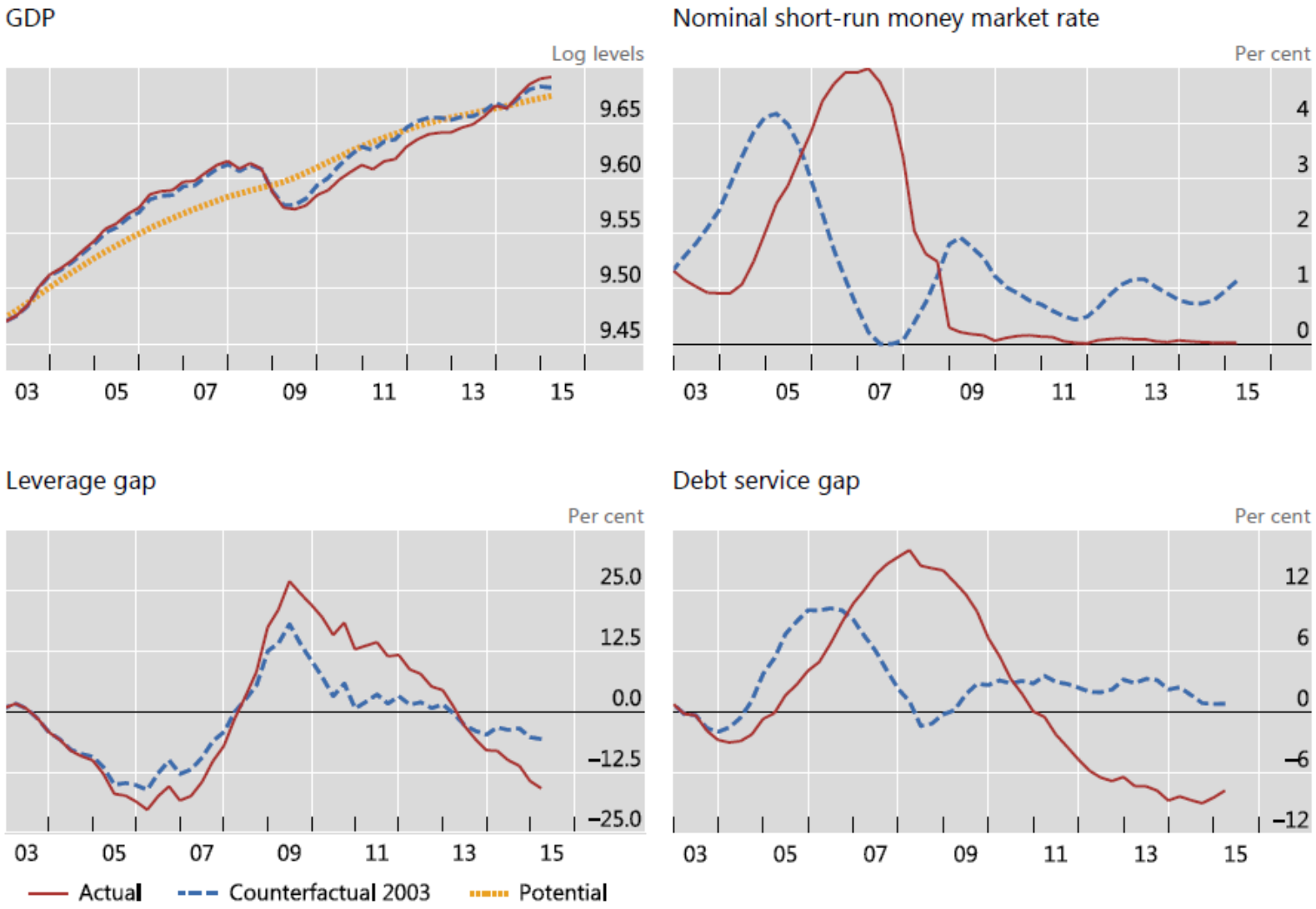

Source: Juselius et al. (2017)

## The two gaps interact…leading to endogenous cycles

- Output effects large and very persistent
- Crisis not result of shocks

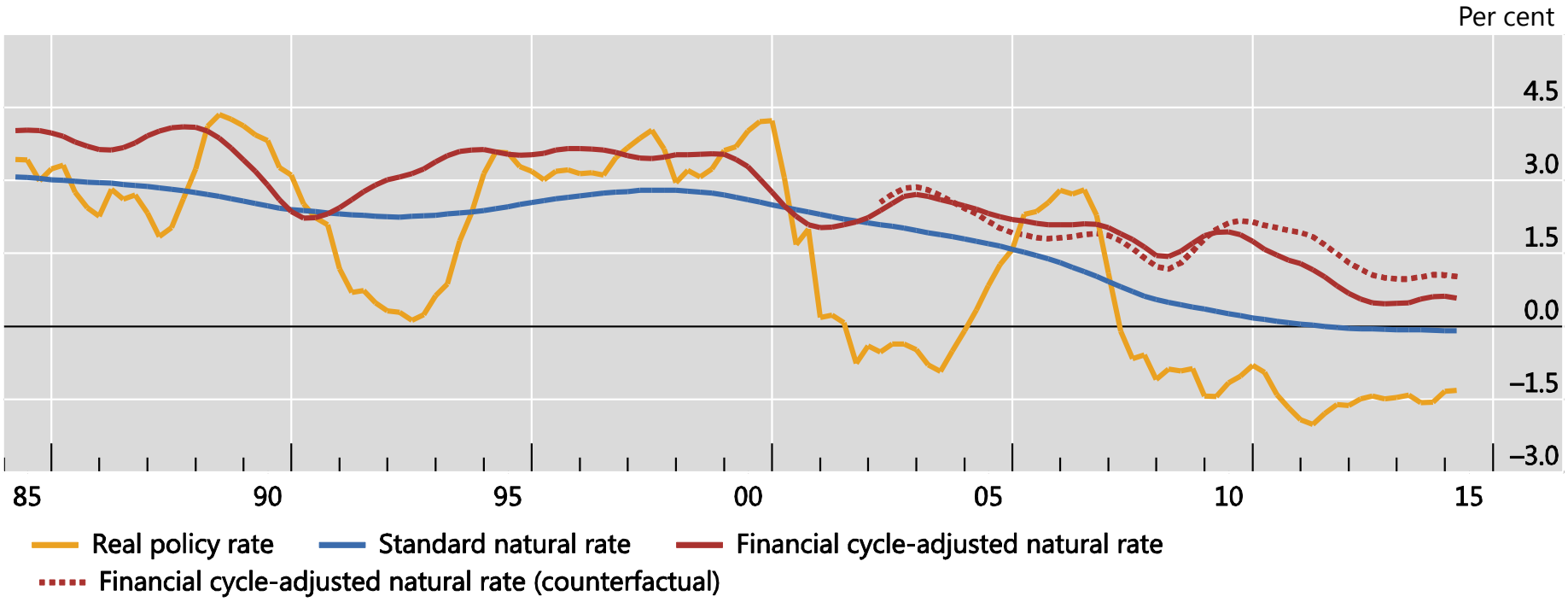
# An empirical model

## Policy can smooth the financial cycle



# An empirical model

## What anchors for the natural rate of interest?



# A theoretical model

## Underlying theme

- Multiplicty of outcomes subject to policy
- Path-dependency
  - Busts linked to booms
  - CB reaction function conditions vulnerability to boom-bust, thus intertemporal policy trade-off

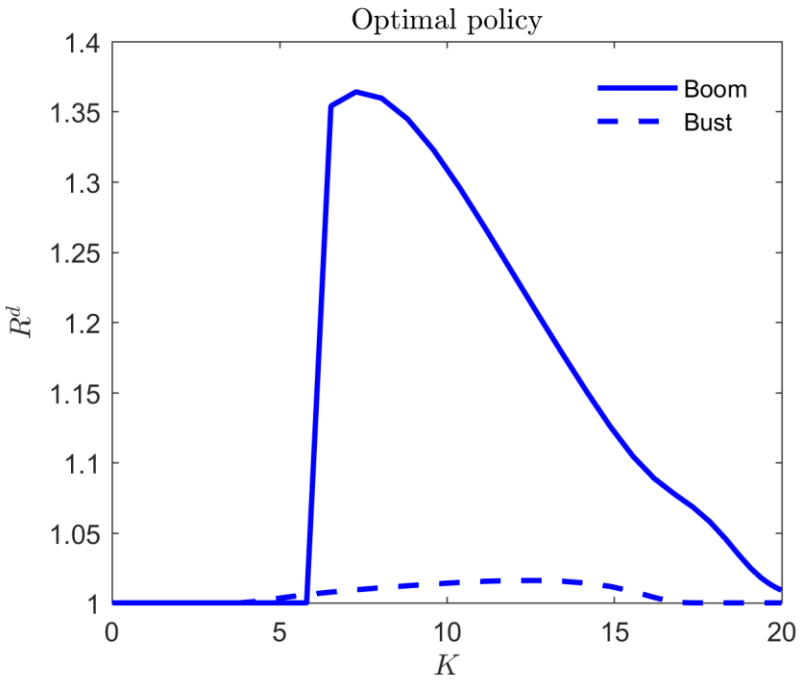
# A theoretical model

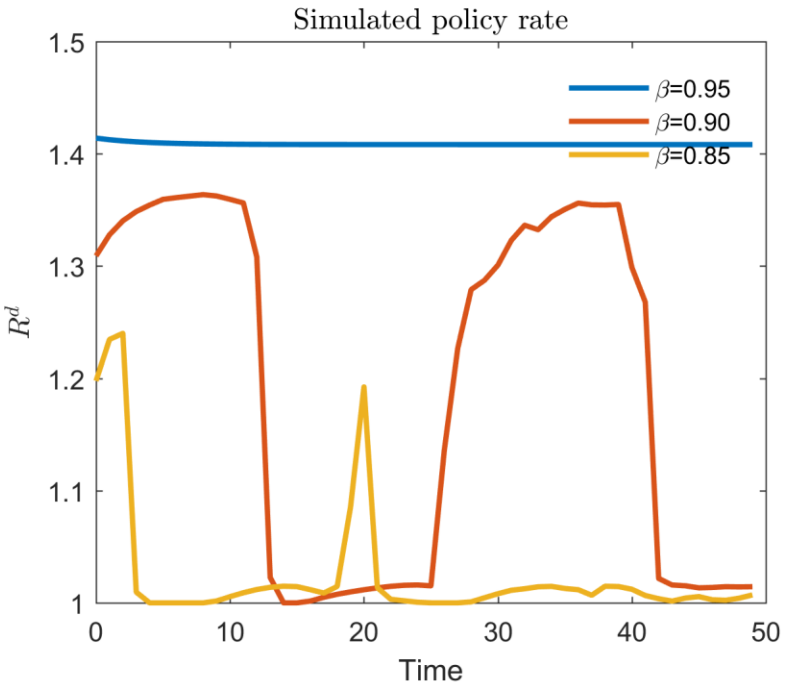
## Key features

- OLG of firms and households; financing essential
- Strategic complimentarity among banks
  - Pool of borrowers depends on loan rate
- Multiple equilibria
  - Boom: low rate, ample credit, high output
  - Bust: high rate, scarce credit, low output
  - Regime switch conditional on bank capital
- Policy determines risk-taking, hence bank profits and evolution of bank capital

# A theoretical model

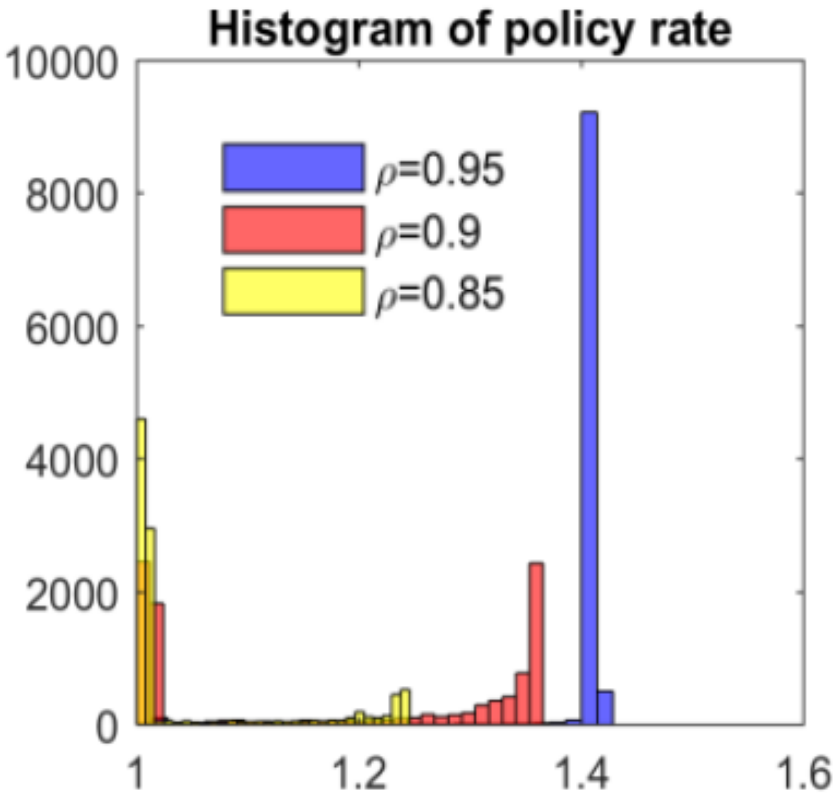
## Monetary hysteresis

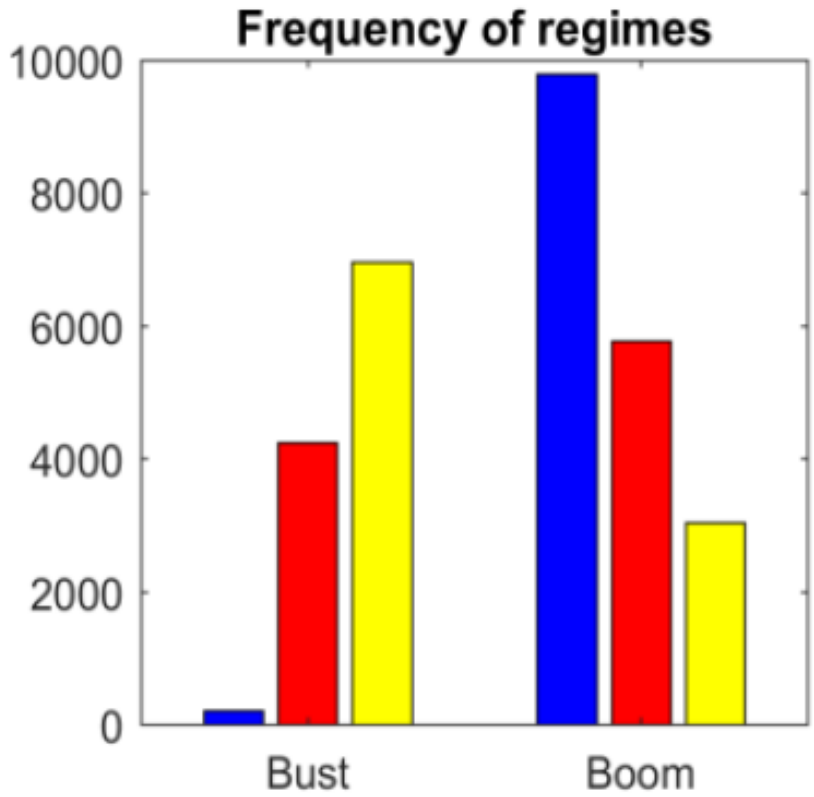


# A theoretical model

## Monetary hysteresis



# Conclusion

## What anchors for the natural rate of interest?

- Path-dependence implies that asymmetric policy may bias rates down over successive cycles
- Endogneity of natural rate to policy undermine it as anchor for policy

## Policy frameworks

- Monetary policy is the ultimate financial anchor; Sets the price of leverage
- Potential for highly persistent effects needs to be recognized;
  - Monetary policy *is* the wind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