Perspectives on the Future of Asset Pricing: Macroeconomics and Monetary Policy

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  - **Macro factors matter**: Chen, Roll, and Ross (1986); Lettau and Ludvigson (2001); Parker and Julliard (2004); Koijen, Lustig, and Van Nieuwerburgh (2017); Savov (2011); Bansal, Kiku, and Yaron (2016); Ghosh, Julliard, and Taylor (2016).
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- Large announcement effects (macro and monetary policy news) Ai and Bansal (2018); Jarocinski and Karadi (2019)
- Structural change (slowing growth, rising profit shares, growing inequality, low real rates)
- Global financial crisis showed important feedback effects between financial markets and real economy.

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- **Question not whether macroeconomy matters but how**.

Does the Macroeconomy Matter?

- **Many possible reasons evidence is mixed**: models gross simplifications; data are mismeasured and limited in terms of what is covered, estimation tools restrictive, information sets unobserved.
- But, most above work based on **aggregate data**. Can also ask: are we looking at the wrong XS moments?
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- But, most above work based on **aggregate data**. Can also ask: are we looking at the wrong XS moments?
- Is the representative agent framework too much of an abstraction?
  - XS tail risks: Schmidt (2016); Constantinides and Ghosh (2017)
  - Profit/labor shares: Danthine and Donaldson (2002); Favilukis and Lin (2016); Favilukis and Lin (2013); Favilukis and Lin (2015); Gomez (2016); Farhi and Gourio (2018); Lettau and Ludvigson (2013); Greenwald, Lettau, Ludvigson (2013, 2019)l Lettau, Ludvigson, and Ma (2019).

Topic 1: Distributional Shifts

- Profound distributional shifts in macroeconomy.
- Growing evidence heterogeneity matters.
- *What are the consequences for stock prices and other asset values of redistributive shocks and redistributive trends?*

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- So why do monetary policy announcements seem to matter so much for stock prices if macro models and macro evidence imply transitory effects of policy?
  - **Asset pricing** has little to say...
- Are we looking at the wrong aspects of monetary policy? Are macro models wrong? Both?

Topic 2: Monetary Policy and Asset Values

- *How, why, and to what degree does monetary policy affect the stock market and other assets?*

Topic 1:
Distributional Shifts

Distributional Trends

- Survey of Consumer Finances (SCF)
- Definitions of income categories for the ith household:
  - $Wag_{i,t} \equiv$ annual wage and salary income.
  - $Cap_{i,t} \equiv$ sum of business, interest, dividend, realized capital gains, and pension fund income.
  - Let $Oth_{i,t} \equiv$ transfers and social security income.
  - Total log income $y_{i,t} \equiv \log\left(Wag_{i,t} + Cap_{i,t} + Oth_{i,t}\right)$.
- Stock wealth ith household: any non-zero direct+indirect holdings.

Distributional Trends

- Stock wealth is highly concentrated.

Panel A: Percent of Stock Wealth, sorted by Stock Wealth					
Percentile of Stock Wealth	1989	1998	2004	2013	2016
$< 70\%$	0.01%	1.30%	1.35%	0.84%	0.98%
$70 - 85\%$	3.12%	7.42%	7.41%	5.92%	5.81%
$85 - 90\%$	4.19%	6.45%	6.70%	6.17%	5.46%
$90 - 95\%$	11.16%	11.28%	13.26%	12.67%	11.89%
$95 - 100\%$	81.54%	73.93%	71.21%	74.54%	75.86%
Panel B: Percent of Total Income, sorted by Stock Wealth					
Percentile of Stock Wealth	1989	1998	2004	2013	2016
$< 70\%$	43.64%	42.29%	40.76%	37.64%	35.61%
$70 - 85\%$	17.58%	18.81%	17.43%	16.31%	15.72%
$85 - 90\%$	7.36%	7.48%	7.74%	7.52%	6.79%
$90 - 95\%$	8.13%	8.48%	9.83%	10.92%	10.75%
$95 - 100\%$	23.28%	22.94%	28.28%	27.62%	31.12%
Panel C: Stock Market Participation Rates					
	1989	1998	2004	2013	2016
Raw (*rpr*)	31.7%	49.3%	49.7%	48.8%	52.1%
Wealth-weighted	12.3%	18.1%	20.1%	18.6%	18.5%

Source: Survey of Consumer Finance 1989-2016. Total income includes wage, business income, interest and dividend, capital gains, pension account, social security, and transfers/others. The wealth-weighted participation rate is calculated as value weighted ownership$\equiv$ $0.01\left(w_{99-100\%}\right) + 0.04(w_{95-99\%}) + (\ rpr\ \text{-}\ 0.05)(1 - w_{5\%}) + (1 - rpr)\ (0)$, where $w_{x\%}$ is the proportion of stock market wealth owned by top x% stockowners.

Distributional Trends

- Fraction of total *income* earned by top stockowners trending up

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- On a wealth-weighted basis participation rates far lower and *falling* since 2004

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Distributional Trends

Explaining the cross section of total income

Model: $y_i = \alpha + \beta^{\text{Age}} \cdot \text{Age}_i + \sum_j \beta_j^{\text{Edu}} \cdot \text{Edu}_{i,j} + \sum_j \beta_j^{\text{Wag}} \cdot \text{Wag}_{i,j} + \sum_j \beta_j^{\text{Sto}} \cdot \text{Sto}_{i,j} + \epsilon_i$

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Effect of: (partial R^2)										
Age	0.01	0.02	0.04	0.02	0.01	0.01	0.00	0.01	0.01	0.01
Education	0.08	0.05	0.04	0.02	0.03	0.02	0.02	0.02	0.01	0.02
Wages	0.29	0.26	0.29	0.29	0.23	0.25	0.18	0.27	0.23	0.23
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Distributional Trends

- Age unimportant; education of declining importance.

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Distributional Trends

- 1989: Wages far more important than stock ownership

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- 2016: Stock ownership far more important than wages

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Distributional Trends

- *Stock ownership increasingly important determinant of income*

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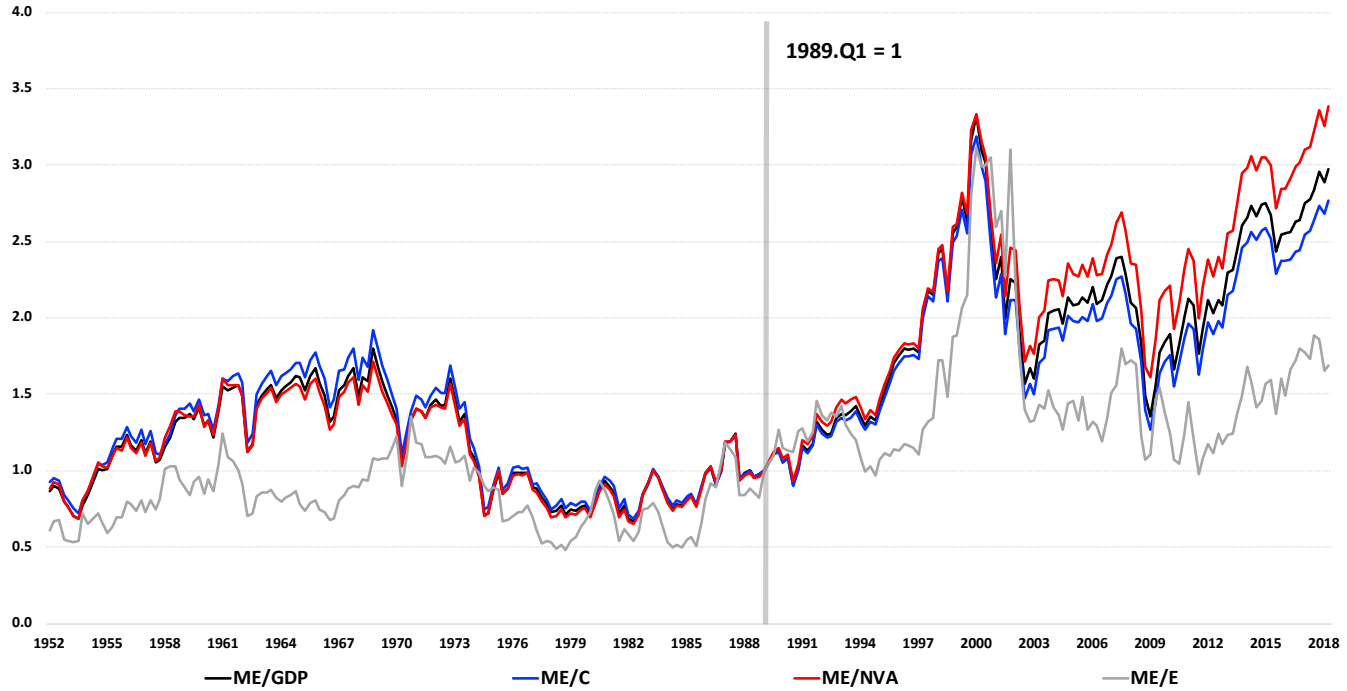
Stock Market v.s Broader Economy

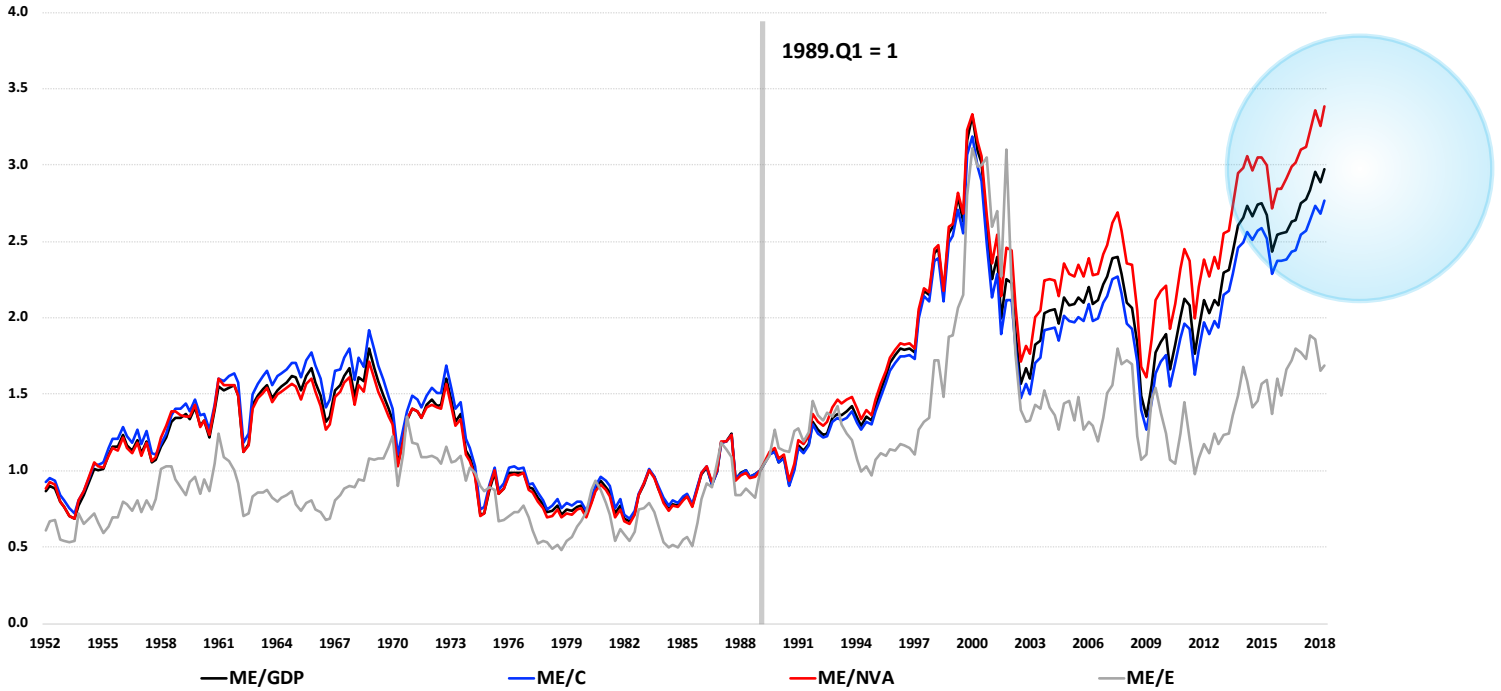
- ME= Total value of market equity of the NFCS.



Notes: **ME:** Nonfinancial Corporate Sector Stock Value. **E:** Nonfinancial Corporate Business After-Tax Profits. **GDP & C:** Current Dollars GDP and personal consumption expenditures. **NVA:** Net Value Added of Nonfinancial Corporate Sector. The sample spans the period 1952:Q1-2017:Q4.

Stock Market v.s Broader Economy

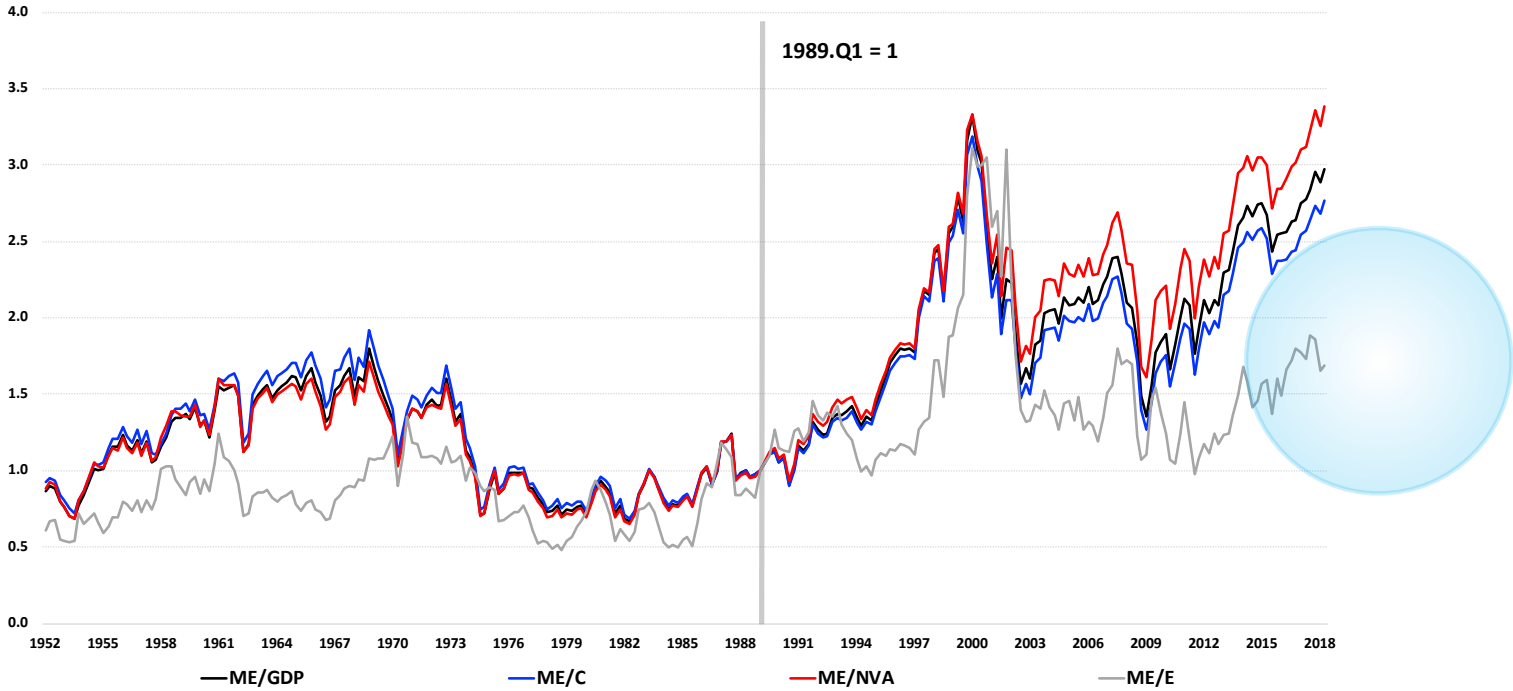
- ME relative to 3 different measures of agg. economic activity is at or near post-war high, and has *trended up*.



Notes: **ME:** Nonfinancial Corporate Sector Stock Value. **E:** Nonfinancial Corporate Business After-Tax Profits. **GDP & C:** Current Dollars GDP and personal consumption expenditures. **NVA:** Net Value Added of Nonfinancial Corporate Sector. The sample spans the period 1952:Q1-2017:Q4.

Stock Market v.s Broader Economy

- Notably, ME/E not near post-war high.



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Distributional Trends and Market Trends

Greenwald, Lettau, and Ludvigson (2019)

- Equity priced in the model by a representative *shareholder*, akin to wealthy household or large institutional investor.
- Remaining agents just **supply labor**, play no role in asset pricing.
- Shareholder preferences subject to a shock alters **appetite for risk**.
- Estimate **full dynamic model** that incorporates time variation in:
  - Expect. **growth of rewards** generated from productive activity
  - How rewards are **apportioned** between shareholders and labor
  - **Equity risk premium** and expected future path of **short rates** in near- and long-term
- Apply model to data on the corporate sector over period 1952:Q1-2017:Q4.

Growth Decompositions

- **Market's rise**: **43%** since 1989 and 19% over full sample attributable to **reallocation of rewards to shareholders** without changing size of rewards.

	Panel: Market Equity		
Contribution	1952-2017	1952-1988	1989-2017
Total	1405.81%	151.23%	477.34%
Earnings Share, s_t	18.65%	-23.4%	42.54%
$s_{LF,t}$	17.04%	-21.65%	37.90%
$s_{HF,t}$	1.52%	-1.75%	4.64%
Risk Premium	25.74%	20.51%	24.41%
$x_{LF,t}$	25.69%	20.83%	24.31%
$x_{HF,t}$	0.05%	-0.32%	0.10%
Risk-Free Rate	2.16%	-8.52%	8.48%
$\delta_{LF,t}$	2.11%	-8.57%	8.35%
$\delta_{HF,t}$	0.05%	0.05%	0.13%
Real PC Output Growth	53.54%	111.41%	24.57%

Notes: The table presents the growth decompositions for the real value of market equity (top panel) or the market equity-output ratio (bottom panel). The persistence parameter of the risk price is set to its baseline value of 0.85. The sample spans the period 1952:Q1-2017:Q4. Source: Greenwald, Lettau, and Ludvigson (2019).

Growth Decompositions

- **Market's rise**: **24%** since 1989 and 26% over full sample attributable to declining **risk-premium**.

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Growth Decompositions

- **Other components since 1989**: much smaller role for $r_{f,t}$

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Growth Decompositions

- **Economic Growth** contributes **just 25%** since 1989; 54% over full sample.

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Growth Decompositions

- **1952-1988**: Δy_t explained **111%** of market's rise. But...

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Growth Decompositions

- That **37 year period** created *less than half* wealth created in **29 years** since 1989.

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Unanswered Questions

- **Central observation**: persistent rise in equity values over last 30-40 years *relative* to aggregate economy.
- **Why have factors shares changed so persistently?** Will these trends continue? Do the reasons for the changes matter? How is it related to broader trends in inequality and economic growth?
- **Suggestion**: **trends, heterogeneity, and economic inequality** could be playing a central role in asset pricing.

Topic 2:
Monetary Policy and Asset Values

Motivation: Asset Valuations & Monetary Policy

- Estimate $cay^{MS} = \alpha_{\xi_t} + \epsilon_t^{CAY}$, & $MPS_t^{MS} = \mu_{\xi_t} + \epsilon_t^{MPS}$, ξ_t 2-state Markov switching system with synchronized regimes.

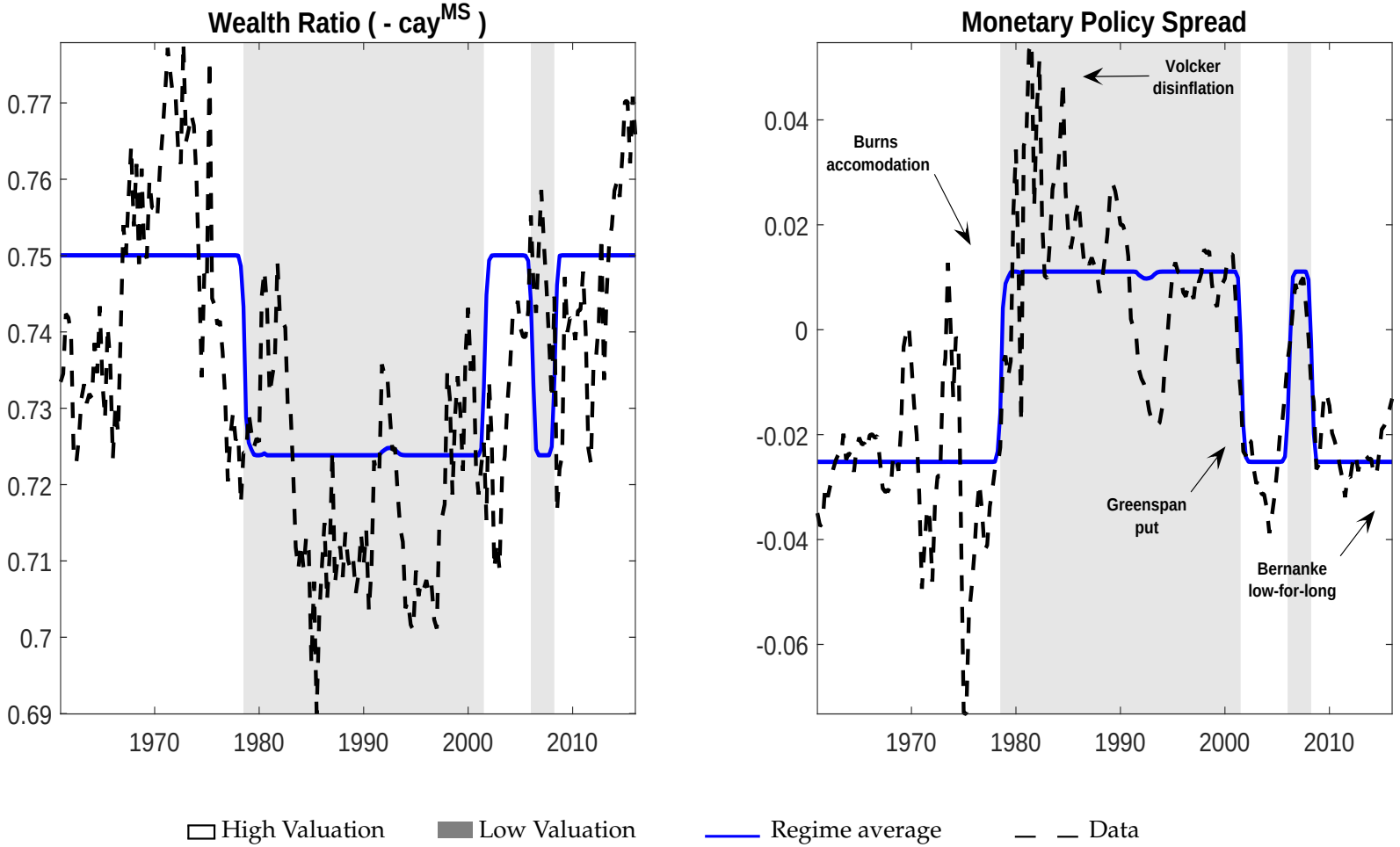
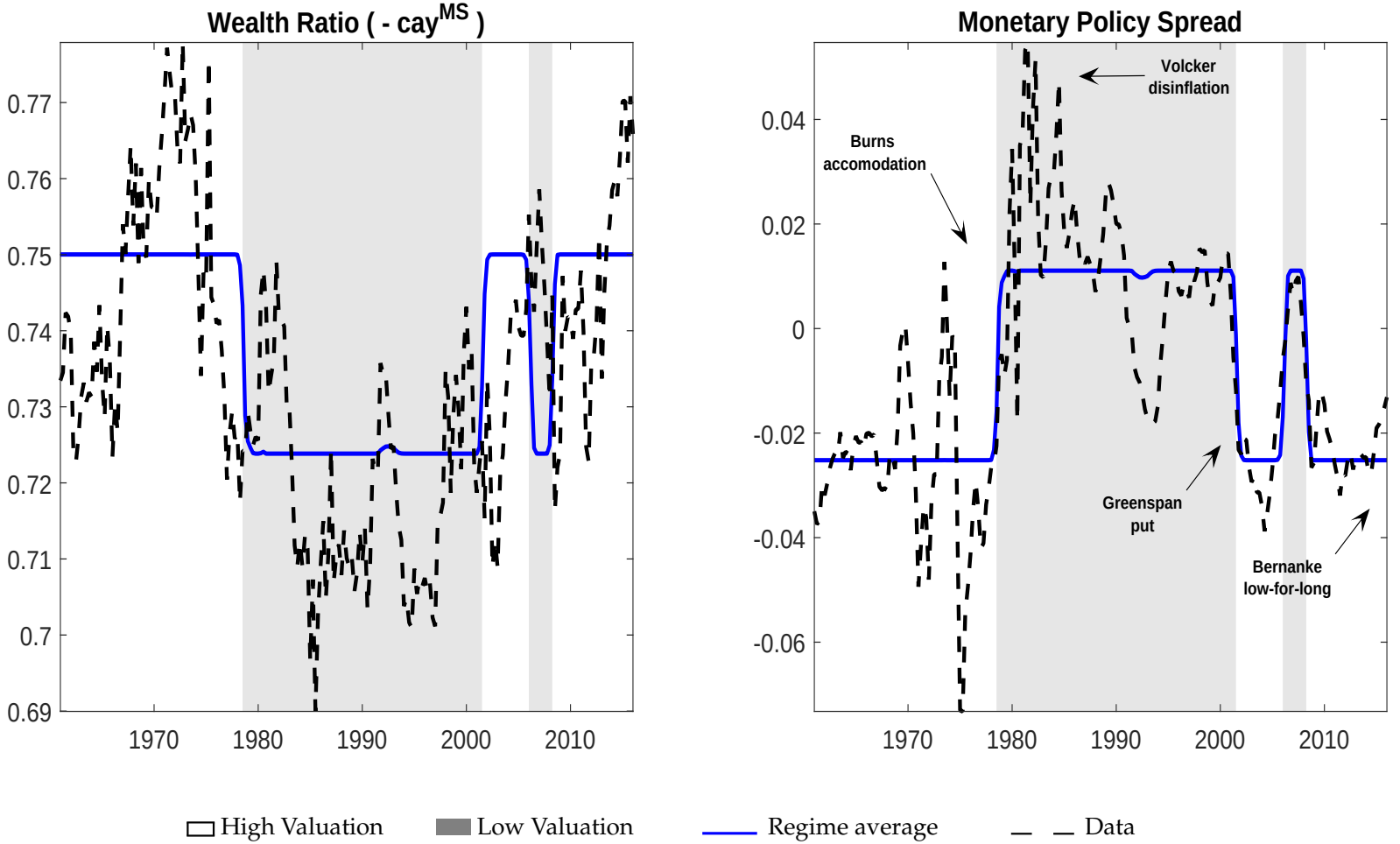


Figure plots the wealth ratio ($-cay$) and the monetary policy spread $MPS_t \equiv FFR_t - \text{Expected Inflation}_t - r_t^*$. r^* is from Laubach and Williams (2003). The sample spans 1961:Q1-2017:Q3. Source: Bianchi, Lettau, and Ludvigson (2016).

Motivation: Asset Valuations & Monetary Policy

- Wealth ratio, MPS in 5 subperiods fluctuate around **distinct means**



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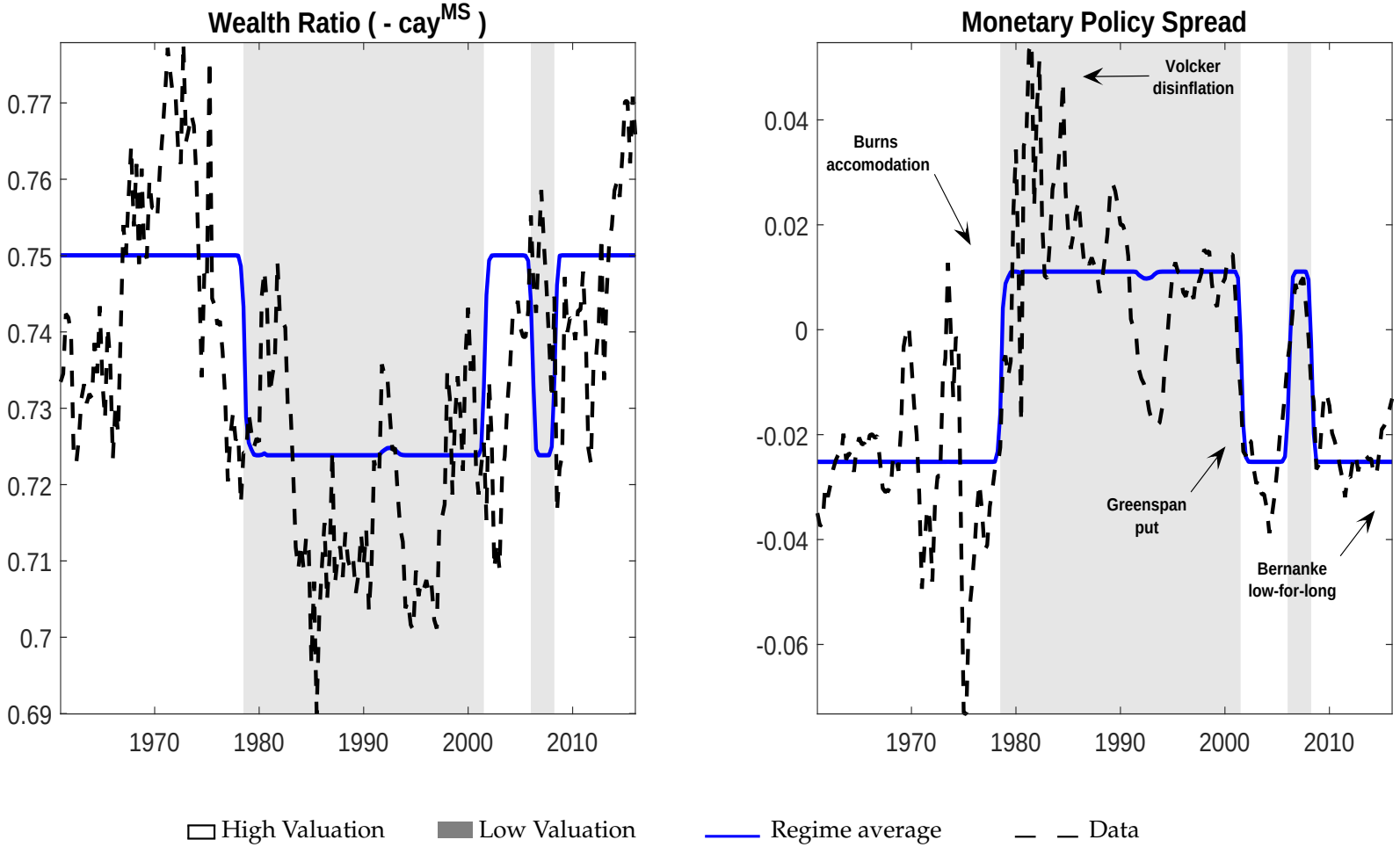
Motivation: Asset Valuations & Monetary Policy

- **High wealth ratio subperiods** coincide with **Low MPS subperiods**.



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Long-lasting Effects of Monetary Policy?

- Estimates suggest lower frequency co-movements of policy rates and asset valuations.
- Can this plausibly be due to *monetary policy*?
  1. **Macro models** imply only short-run effects of monetary policy "shocks"on real variables.
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  - Hard to make sense of findings unless *something* associated with announcement is expected to have a persistent influence on real economy.
- Most above discuss **information** and **risk-premia** channels.
- I want to focus on different channel: **real short-term interest rates**.

A DSGE Model with Persistent Monetary Effects

Bianchi, Lettau, and Ludvigson (2016)

- Prototypical New Keynesian Model (Galí (2015)) w/ 3 Gaussian shocks (in green) but w/ 3 modifications:

$$y_t = \delta y_{t-1} - \sigma \left[i_t - \phi \pi_t - (1-\phi)\,\overline{\pi}_t - r \right] + d_t \qquad \text{Euler equation, IS}$$

$$\pi_t = \overline{\pi}_t + \frac{\kappa}{1-\beta\phi}\left[y_{t-1} - y^*_{t-1} \right] \qquad \text{Phillips curve}$$

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  2. **Learning and adaptive expectations:** Agent learns about *trend* inflation $\overline{\pi}_t$ using constant-gain learning (Malmendier and Nagel (2015)) + backward-looking rule to form expectations of y_{t+i}.
  3. **Perceived** $\overline{\pi}_t \neq \pi_t^T$: Agents don't directly observe π_t^T and/or CB announcements not viewed as fully credible or informative.

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Estimation: Model w/ Persistent Non-neutrality

- Estimation: Implied expected inflation process must be consistent with **survey data**.
- All MS parameters $(\pi^T_{\xi_t}, \psi_{\pi,\xi_t}, \psi_{\Delta y,\xi_t})$ **freely estimated**, could in principle show no regime changes in policy rule.
- **Data**: GDP growth, inflation, federal funds rate, mean of Michigan survey of inflation expectations.

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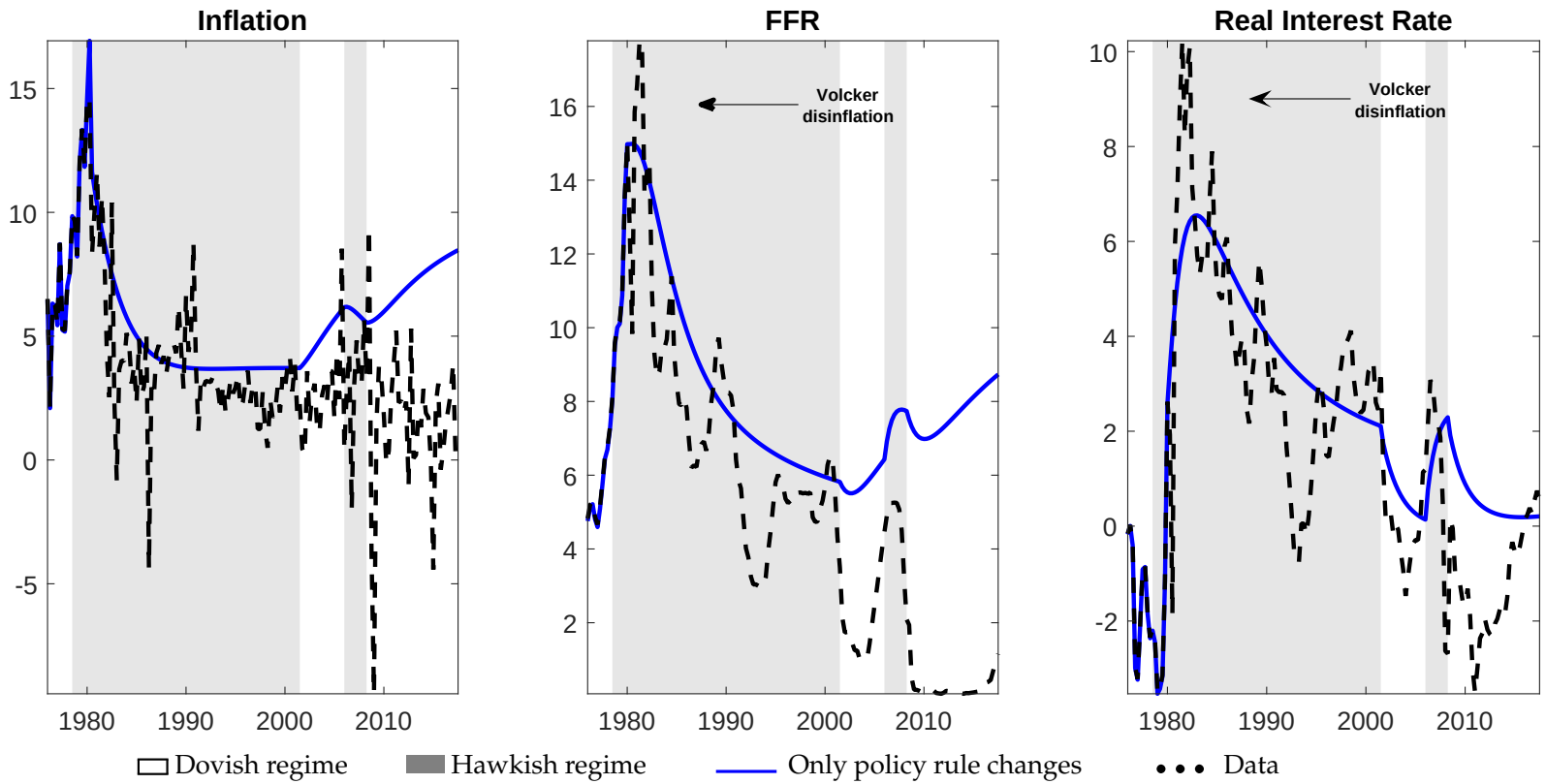
- **Data**: GDP growth, inflation, federal funds rate, mean of Michigan survey of inflation expectations.
- **Result: large regime shifts.** High valuation regimes are **Dovish** m.p. regimes; low valuation regimes are **Hawkish** m.p. regimes.
- **Dovish regime** has a high π^T and low activism on inflation deviations from target relative to activism on growth.
- **Hawkish regime** has a low π^T and high activism on inflation deviations from target relative to activism on growth.

Systematic Policy Role in Driving Real Rates

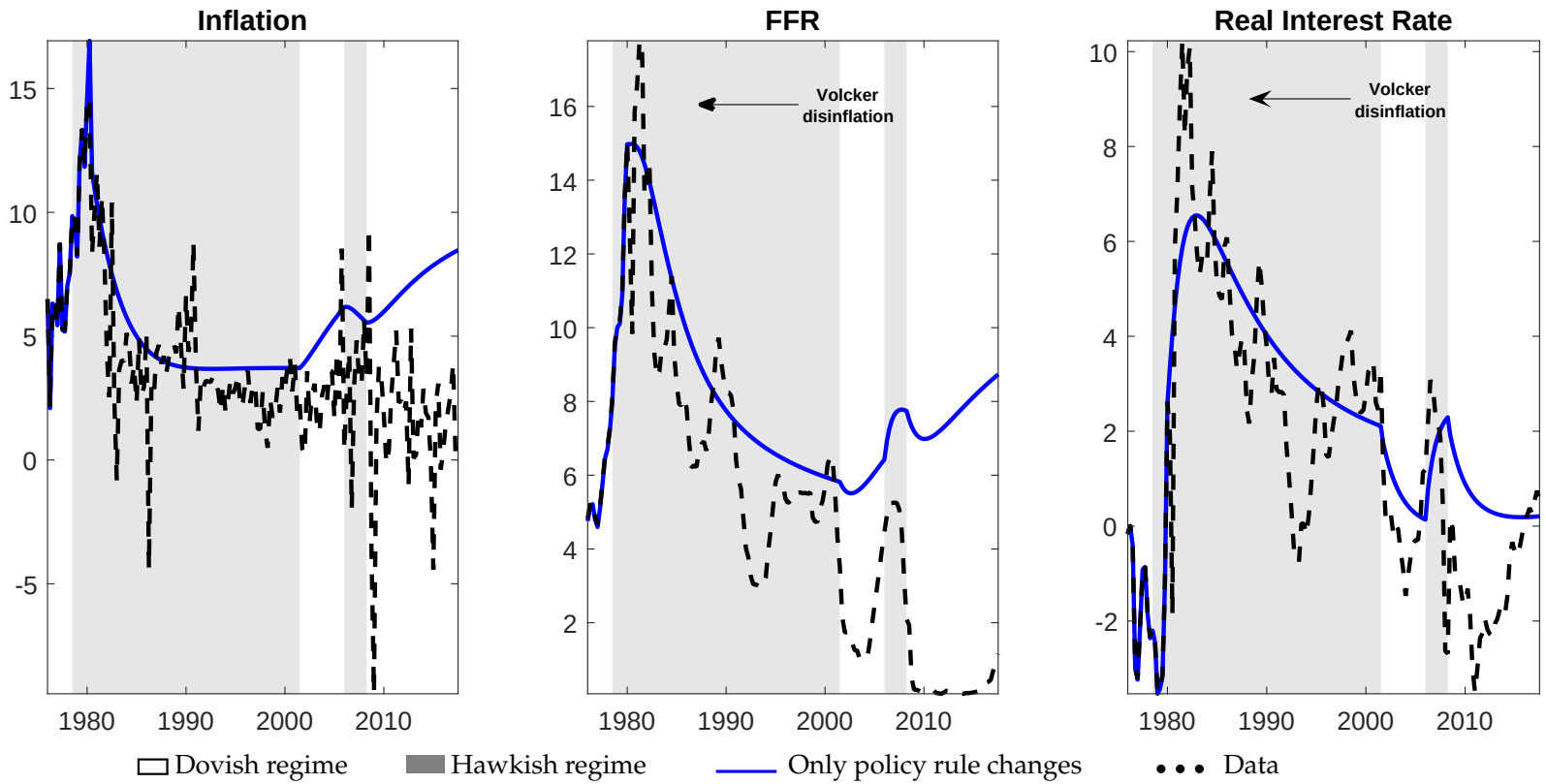
- A prominent episode. Start economy in 1980:Q1 (peak π) and shut down all est. Gaussian shocks.



The Volcker disinflation. Simulation starts the economy as it was in 1980:Q1. The blue line shows estimated fluctuations generated *only* by shifts in the policy rule. **Dovish regime** has a high π^T and low activism on inflation deviations relative to activism on growth. **Hawkish regime** has a low π^T and high activism on inflation deviations relative to activism on growth. Real interest rate is the difference between the FFR and expected inflation based on the model solution. The sample spans 1961:Q1-2017:Q3. Source: Bianchi, Lettau, and Ludvigson (2016).

Systematic Policy Role in Driving Real Rates

- **Blue line**: estimated movements *purely the result* of behavior of monetary authority (inflation target, activism).



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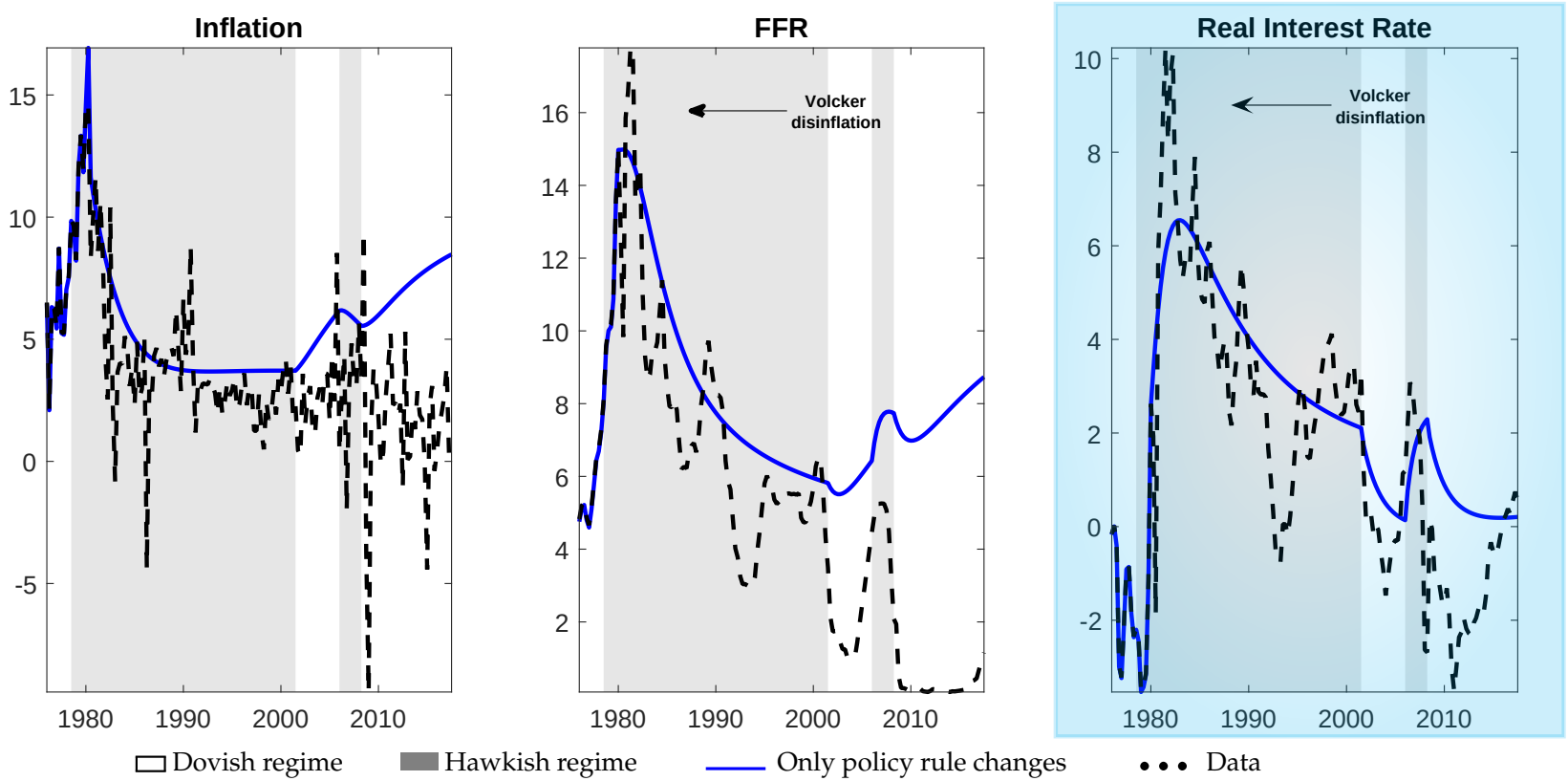
Systematic Policy Role in Driving Real Rates

- Large, low frequency movements in real rate, and **most of its downward trend since 1980** attributable to changes in policy rule.



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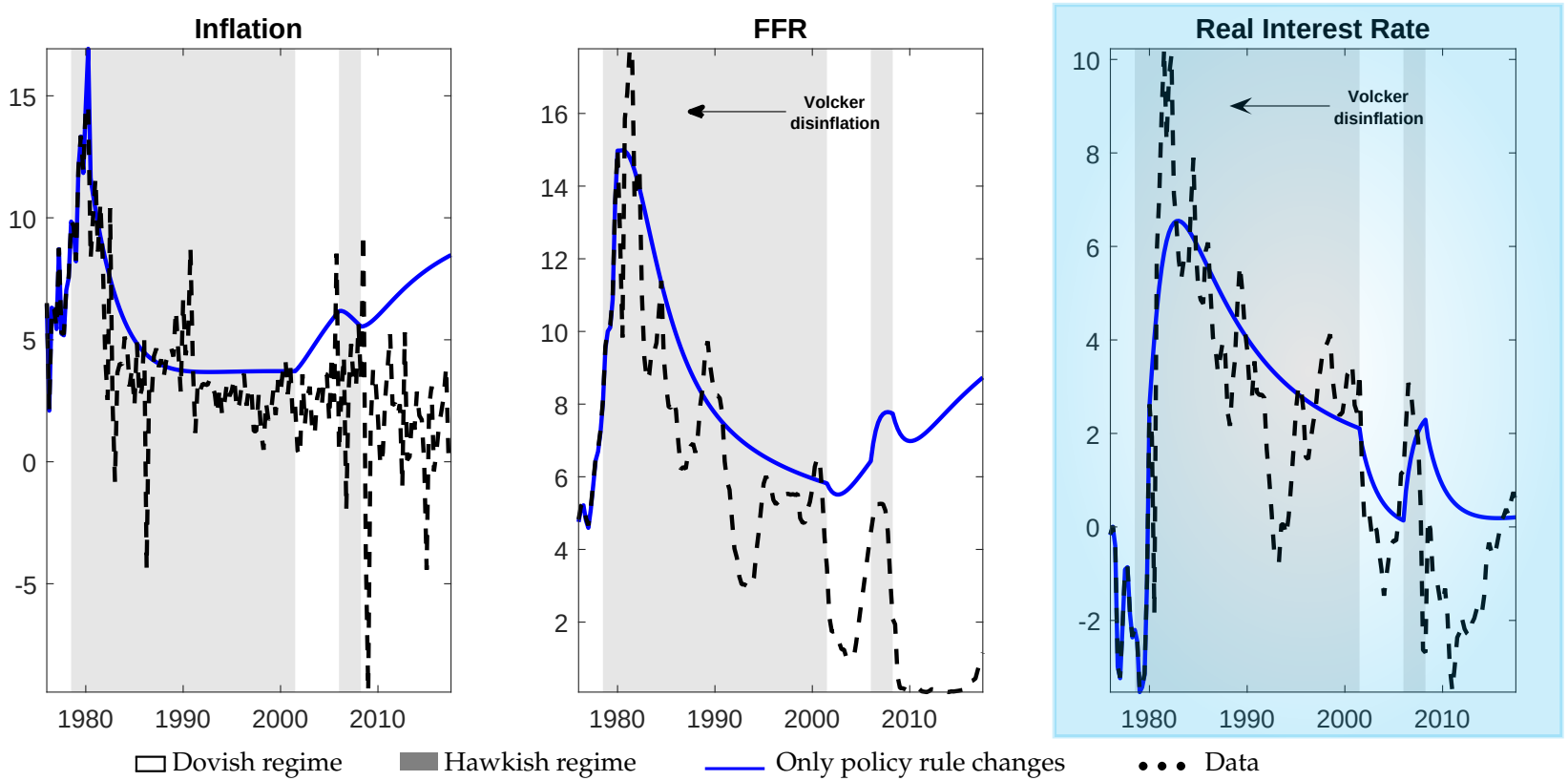
Systematic Policy Role in Driving Real Rates

- Mon. policy *shocks* have transitory effects.



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Dovish Monetary Policy and Reaching for Yield?

- Use estimation to identify component of real interest rates, RIR_t^{MP}, driven *only* by changes in policy rule.
- **Find**: When RIR_t^{MP} *declines*, equity risk-premia *decline*, consistent with a reach-for-yield (RFY).
- **Suggestion**: Persistently low or high interest rate environments, associated with shifts in *conduct* of monetary policy may have economic effects quite different from monetary policy "shocks".

Unanswered Questions

- We aren't first to suggest monetary policy *shocks* may not be most important for asset prices (e.g., Cochrane and Piazzesi (2002)).
- *Why* does the CB change the conduct of monetary policy? (Possibly in *reaction* to markets): (Cieslak and Vissing-Jorgensen (2017)).
- More evidence needed to understand how asset markets interact with *systematic conduct* of monetary policy.

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  - Model of preferences for retail investors and households?
- What is the role, if any, of banking sector in transmission of monetary policy to asset values? (Important starts: Drechsler, Savov, and Schnabl (2014); Piazzesi and Schneider (2015); Piazzesi, Rogers, and Schneider (2018)).

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