PRINCETON

Inflation Risks

Ricardo Reis

London School of Economics

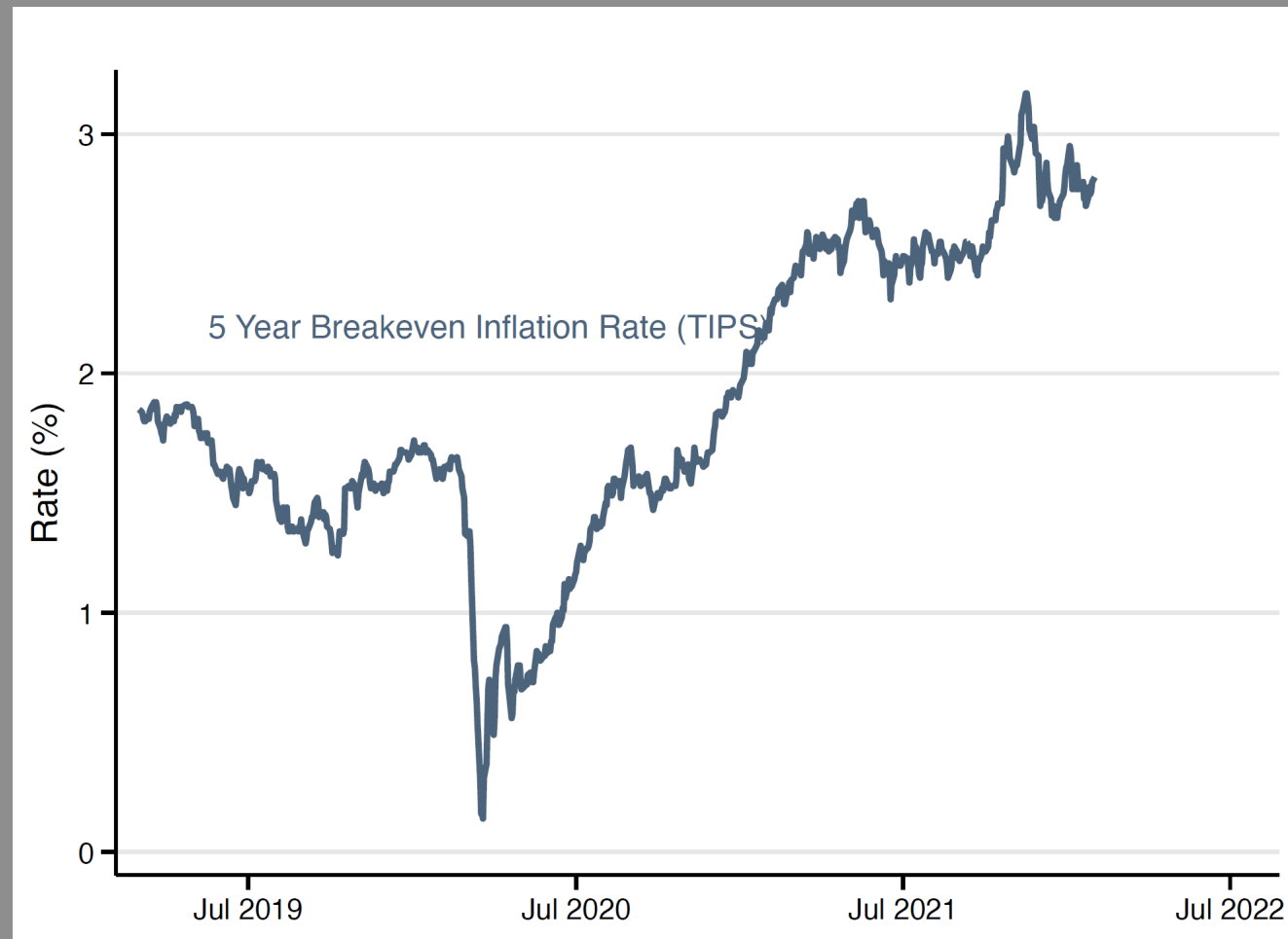17. Feb. 2022   Markus Brunnermeier

Inflation Expectations – by whom?

- Households – wage bargaining
- Firms – price setting and wage bargaining
- Bond traders

- What drives expectations? Salience prices

Inflation Whipsaw

- Break even inflation (US Treasury vs. TIPS)

5 Year Breakeven Inflation Rate (TIPS)

- Figure 11-1 The Resilient Society

"Inflation price signals"

- Distorting prices via QE

- Trust in break even
  - Push yields of nominal bonds down
  - Push yield of real bonds (TIPS) down by less

- How does it affect the inflation swaption market?
  - How to correct for this effect?

Inflation Anchor

- Uncertainty and dispersion in expectations
- Household inflation expectations (NY Fed)
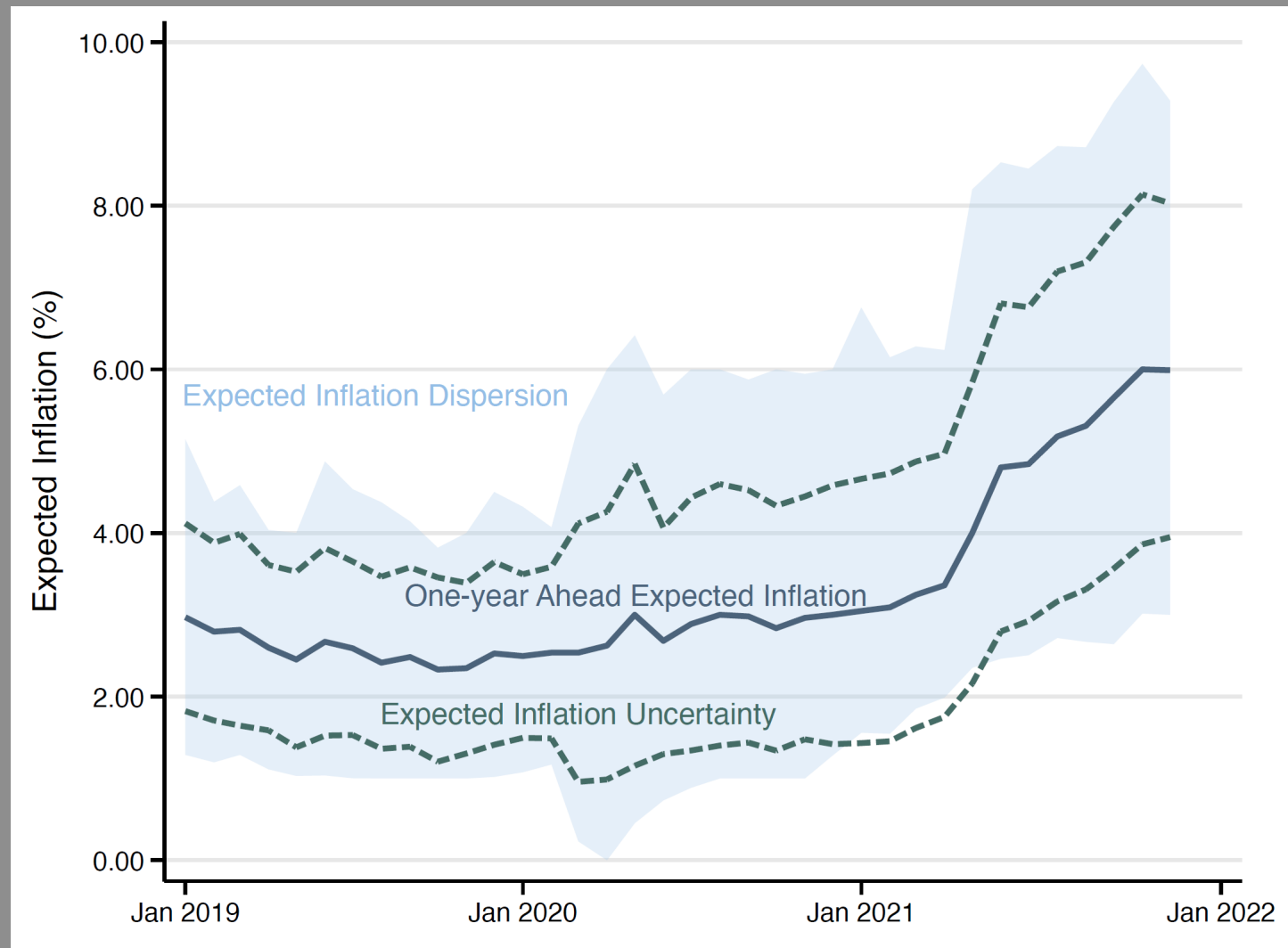
- Fig 11-3 The Resilient Society

Green inflation

- Energy price increase in
  - "transitory" - non-core (assumed in forecasts)
  - "permanent"

- Green revolution
  - Discourage energy production
  - Increases pricing power of existing producers
    - Cartel (OPEC 2.0) created by green policy ⇒ larger profits

- Some propose:
  Remove energy price increase from basket
  - Changing the goal post (hurts consumers nevertheless)
    - Communist Rumania change measure of temperature

Inflation and labor share/inequality

- Inflation in order to push down real wages
  - Labor share declines further ⇒ inequality
  - Less unemployment (if there is output gap)

- Inflation erodes nominal savings
  - The "rich" hold real assets
  - Hits lower and middle class   ⇒ inequality

Poll

1. What is the probability that inflation
   will stay above 4% btw 2027-2032
   a. Less than 1% probability   b. Prob. 1% - 5%
   c. Prob.   5% - 10%   d. Prob. 10% - 20%
   d. Prob. 20% - 40%   e. prob. above 40%

2. For the Euro area: what is the bigger risk?
   a. Persistent inflation
   b. Persistent deflation

3. To sustain the record-high debt levels
   higher inflation ≥ 3% over the next few years
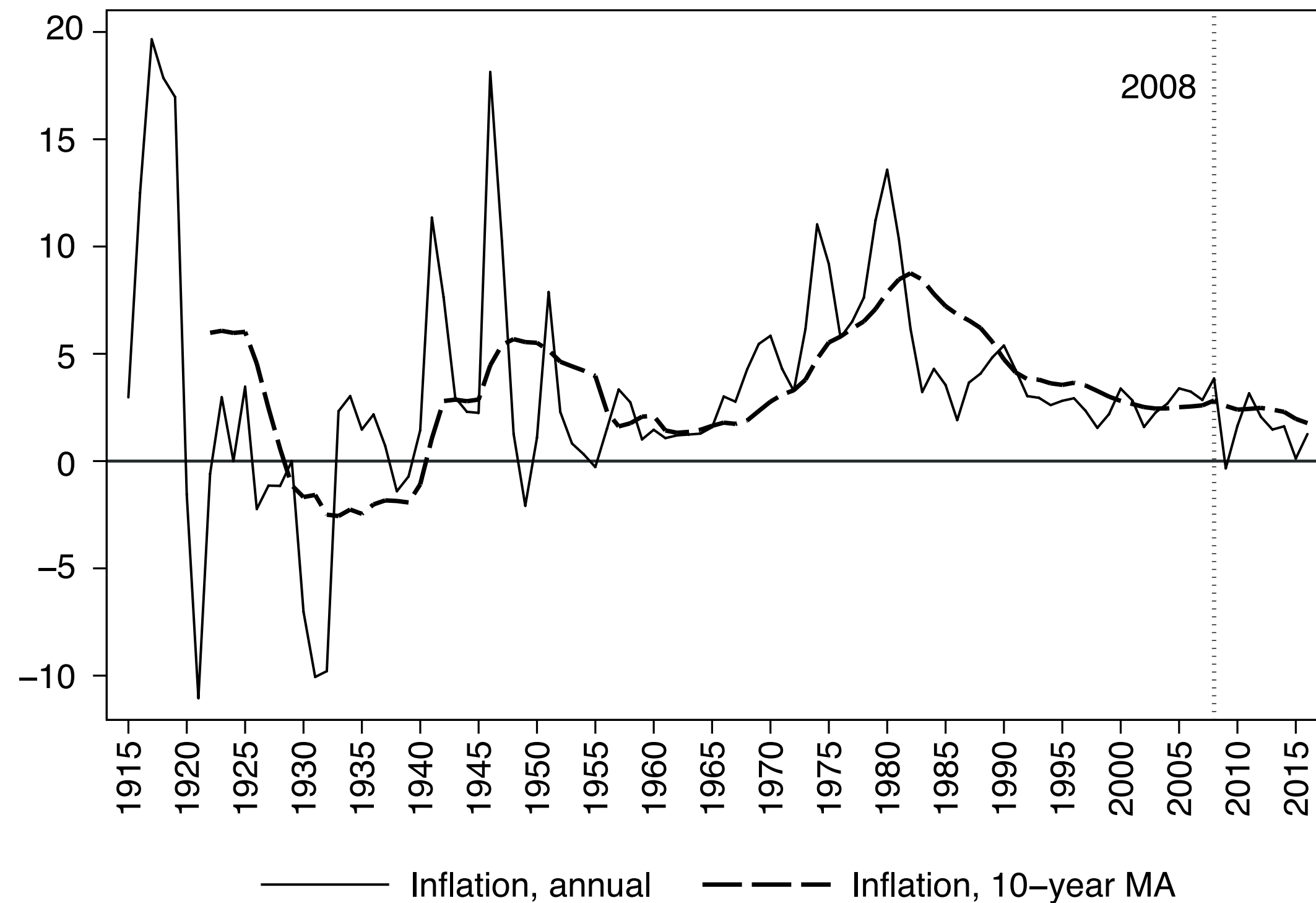   would be a
   a. Risk
   b. Blessing

INFLATION RISKS

Ricardo Reis
LSE

17th of February, 2022
Markus academy
Online

The context

History of inflation

B: United States, 1915-2016

Gold Standard
(1717-1913)
μ=0.5%
σ=6%

WW1 & WW2
(1914-1945)
μ=3.6%
σ=8.8%

Bretton Woods
(1946-1973)
μ=4.8%
σ=2.7%

Up to EMS crisis
(1974-1993)
μ=8.7%
σ=5.6%

Great Mod.
(1994-2008)
μ=1.9%
σ=0.7%

Post GFC
(2008-2016)
μ=2.2%
σ=1.4%

Inflation, annual — — — Inflation, 10–year MA
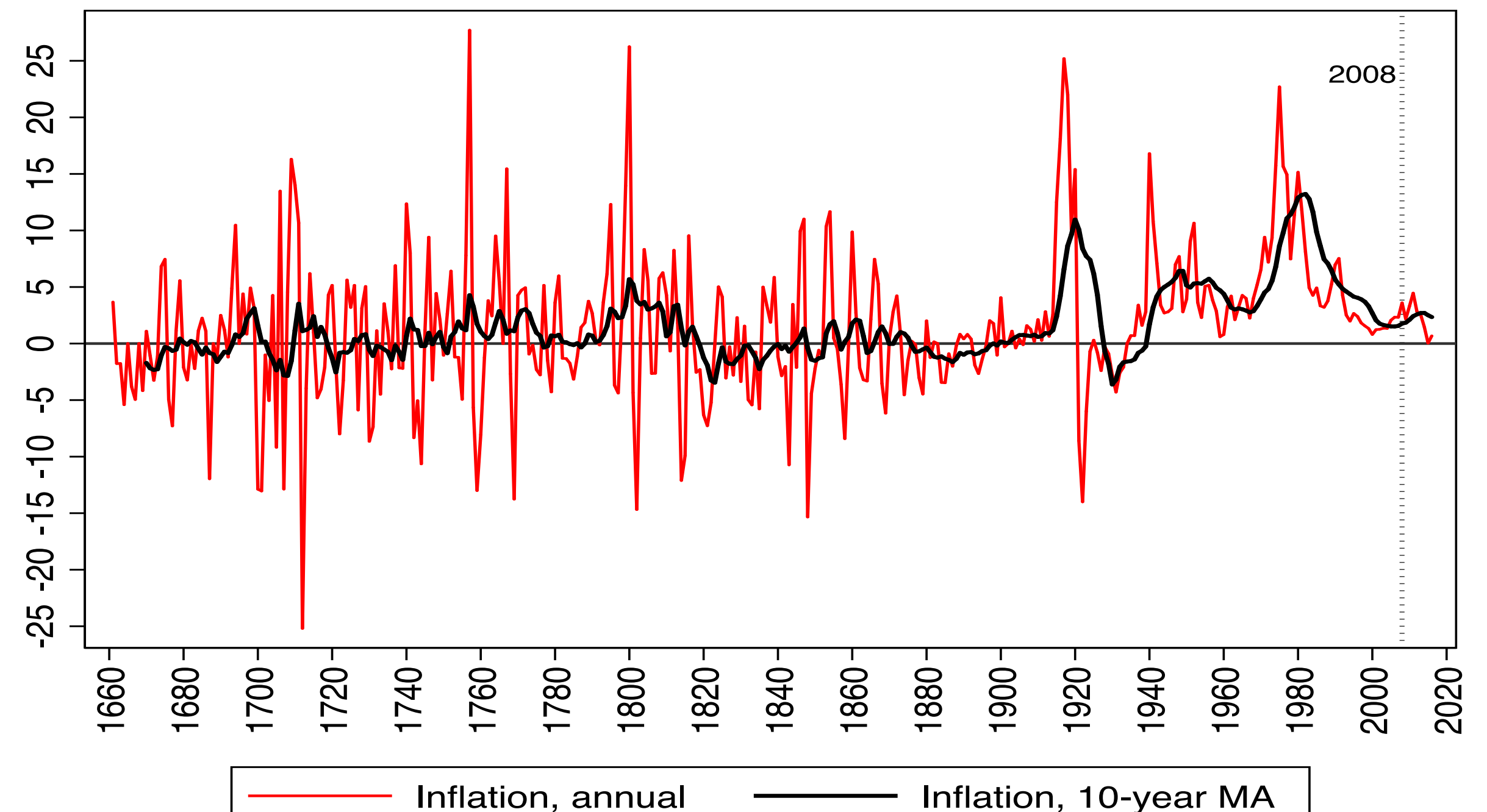
Inflation, annual —— Inflation, 10-year MA

Three pillars

- Central bank independence
- Inflation targeting
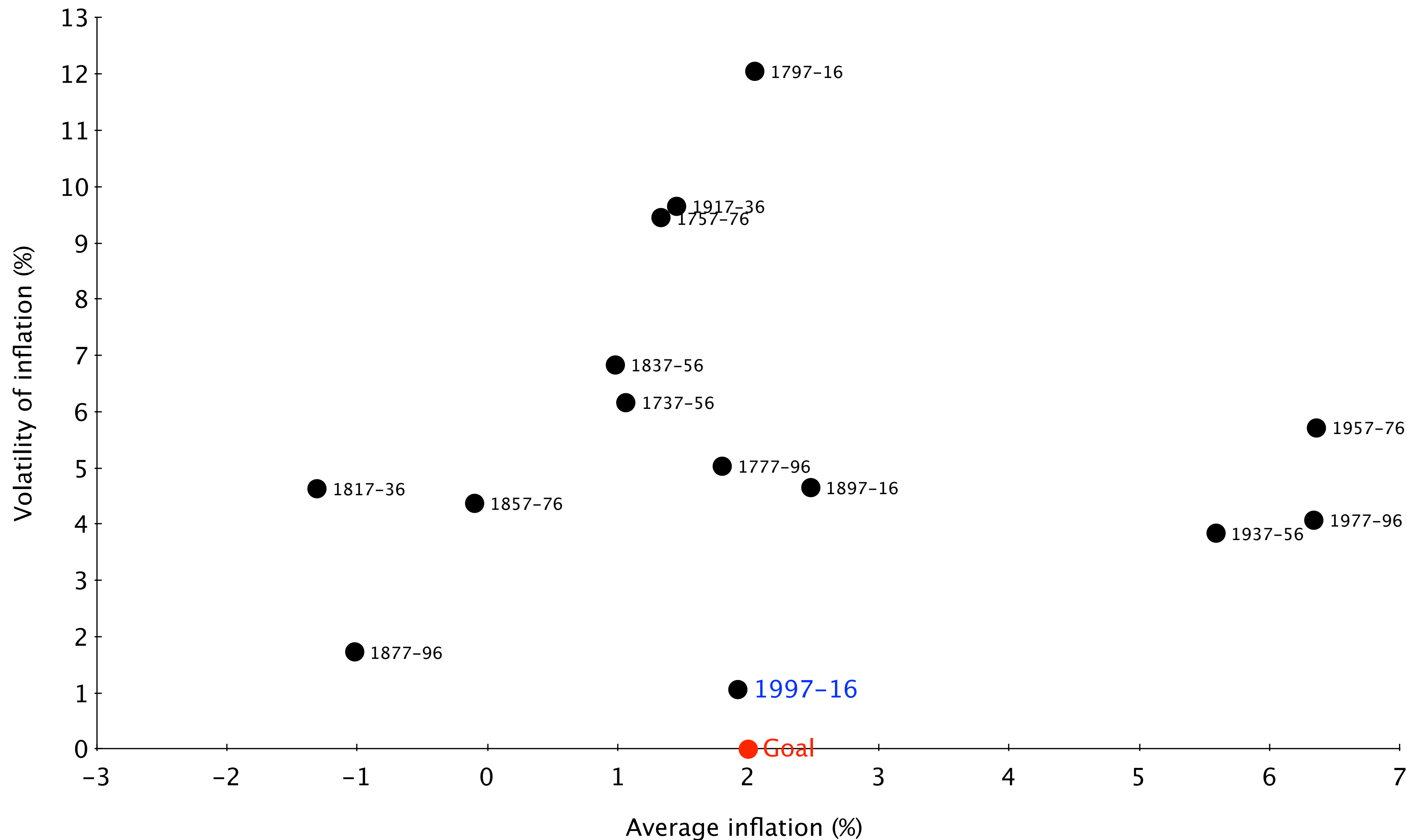- Primacy of the short-term interest rate set in transparent and predictable way

In 400 years, best 20 years, astounding success

Source:: Reis (2017)

3

Evolution in decade pre-pandemic

- **Going long**
  With low equilibrium real interest rates (r*), move to focus increasingly on longer interest rates (forward guidance, quantitative easing)

- **Capital of inattention**
  Expectations of inflation anchored, credibility of central bank, no indexation

- **Shift weight to real activity**
  Especially since slow and unequal recovery from great financial crisis

- **Financial dominance**
  Preventing any crashes, supporting markets, providing safety net to global system, centrality of the Treasury market

The pandemic and beyond

2020 response to the pandemic

- **Going long**
  Sharply, decisively, far commitments and ballooning balance sheet

- **Capital of inattention**
  Expectations stayed anchored, focus on real activity, flat Phillips curve

- **Shift weight to real activity**
  Strong stimulus, prevent scars of recession, err on side of doing more.

- **Financial dominance**
  Liquidity facilities, support of Treasuries, new swap lines and repo facility

Success

2021 challenge and…

Many upwards pressures on inflation

- Success of 2020 policies, robust recovery
- Different recovery, faster, because intertemporal substitution
- Elevated monetary aggregates from all the savings of stimulus programs
- Fiscal stimulus package, very large
- Supply disruptions and bottlenecks
- Concerns about public debt and inflating it away

Kept very expansionary monetary policy. Looking at 2021H1, maybe did too much, maybe too long. But not if focus on average inflation and balance risks

…2021 mistake: the "no pasa nada" regime

Speech

August 27, 2021

Monetary Policy in the Time of COVID

Chair Jerome H. Powell

At the "Macroeconomic Policy in an Uneven Economy," economic policy symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming (via webcast)
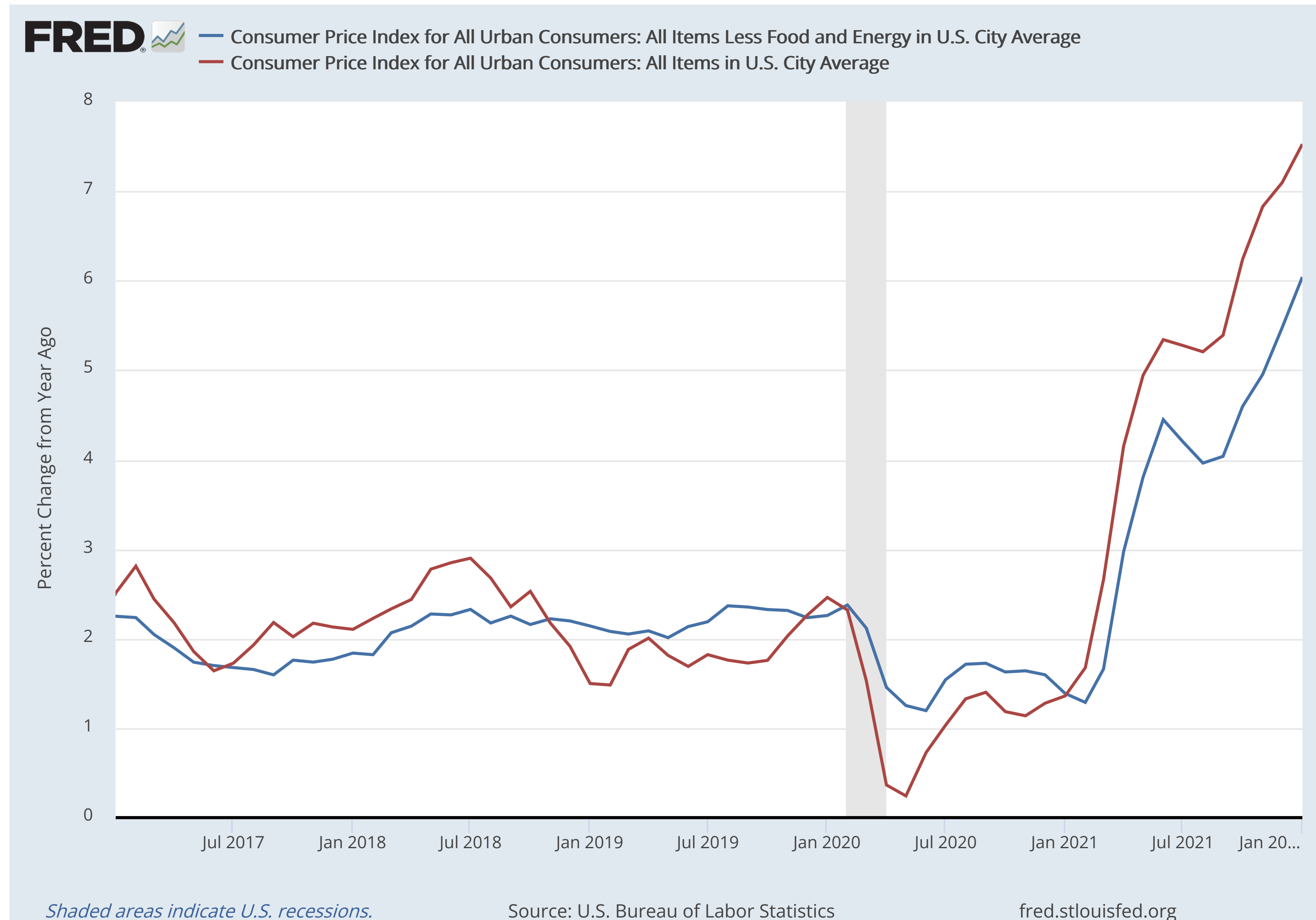
Share ➤

◼◀ **Watch Live** ⬈

Where data was mixed, see only the roses

Why it happened?

- Groupthink

- Fighting the last battle

- Financial dominance

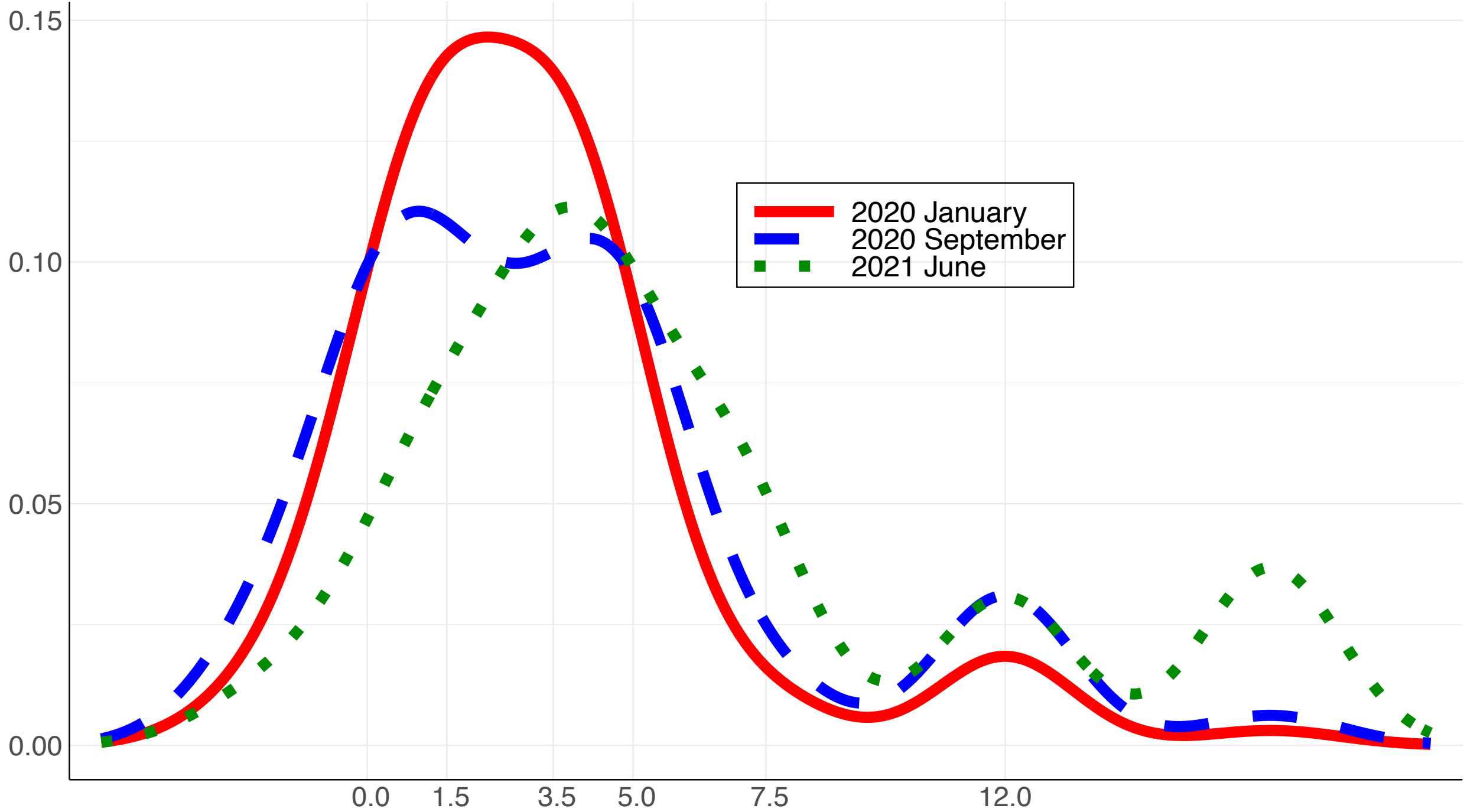- Polarization of debate

- Political balances

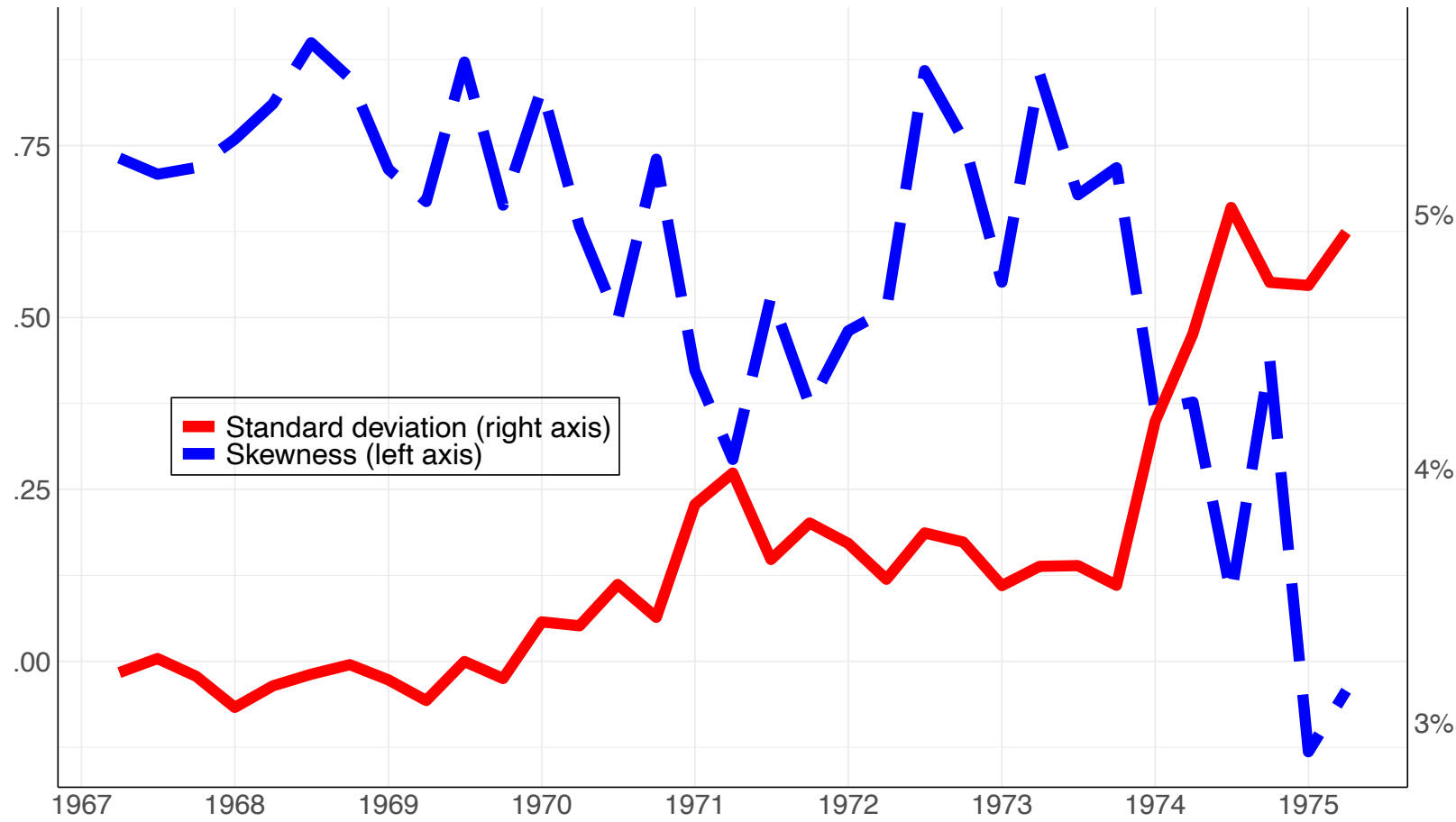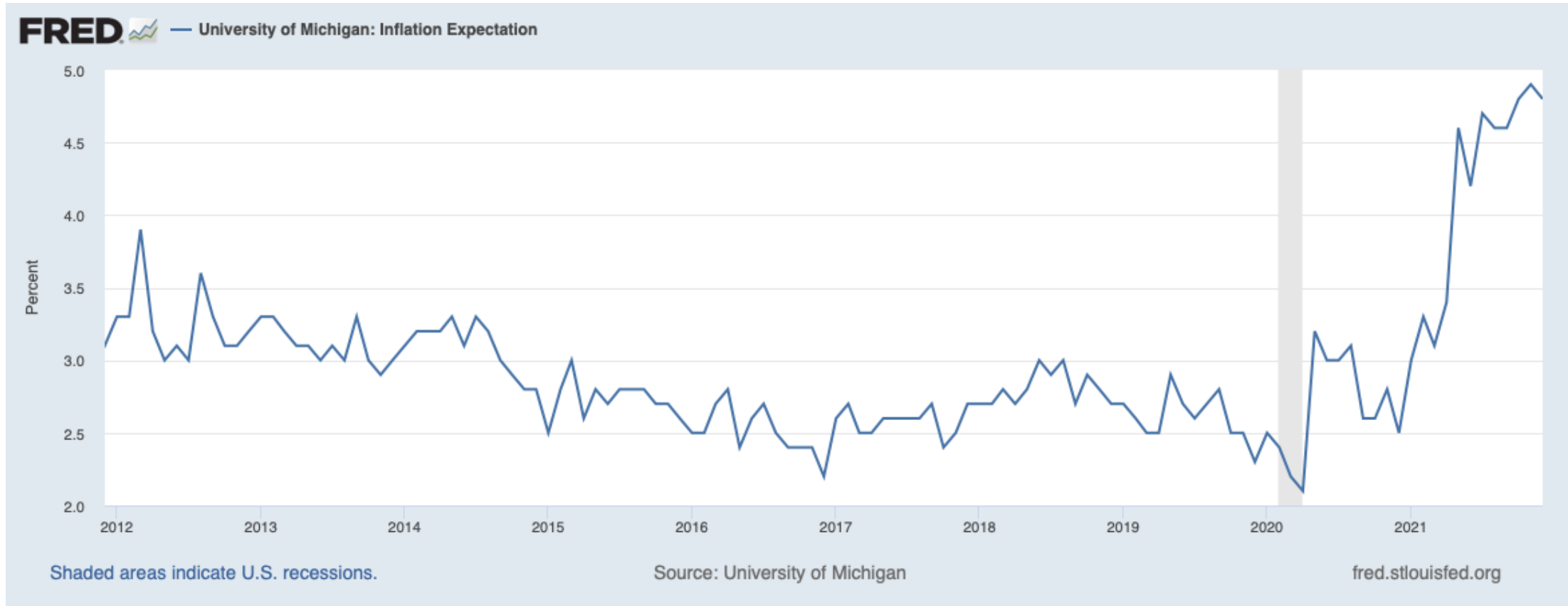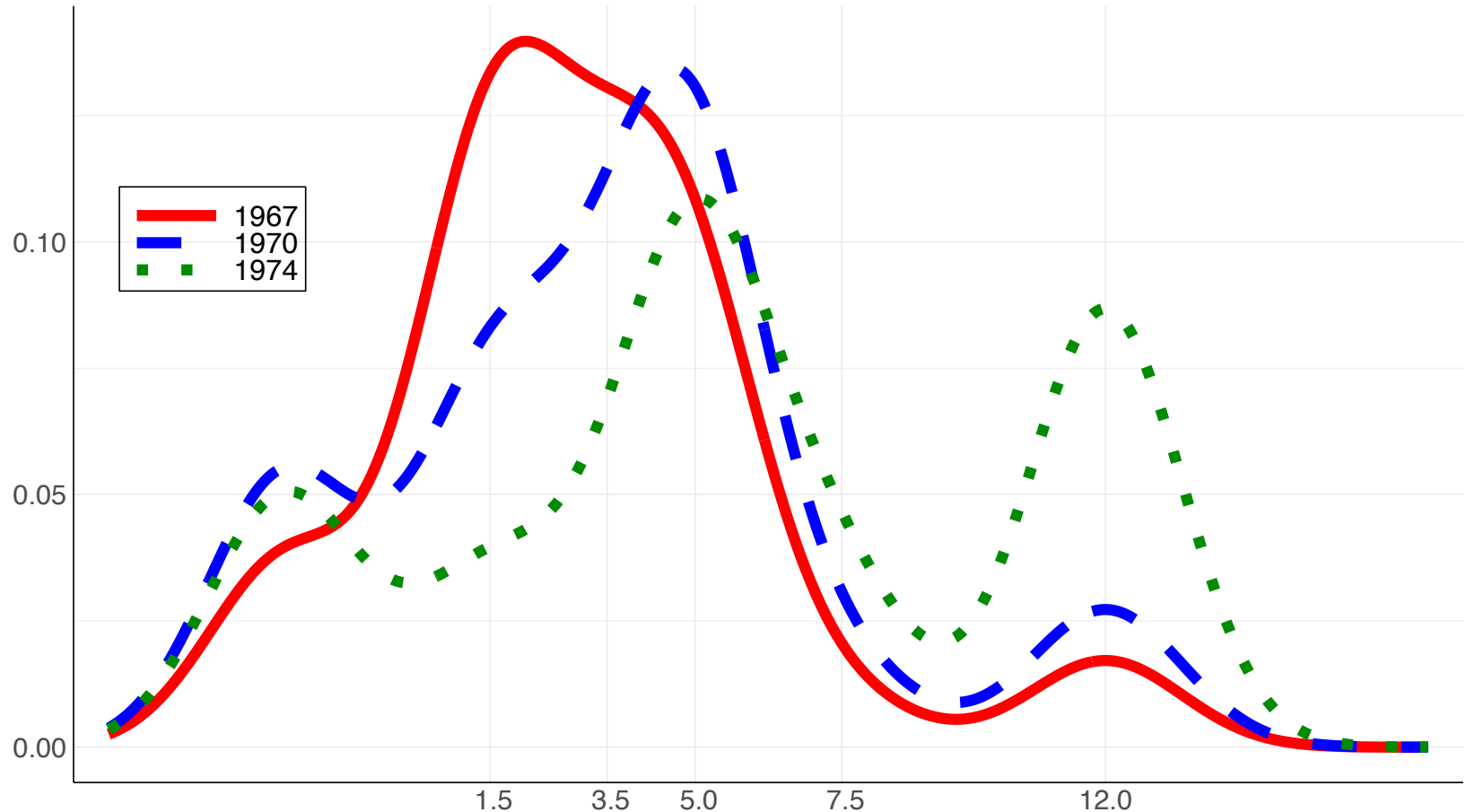- maybe just Bad Luck?

No pasa nada: inflation

Measurement of inflation is hard

Extract "pure inflation" that takes out relative prices, the one that is about monetary policy, about changes in value of dollar
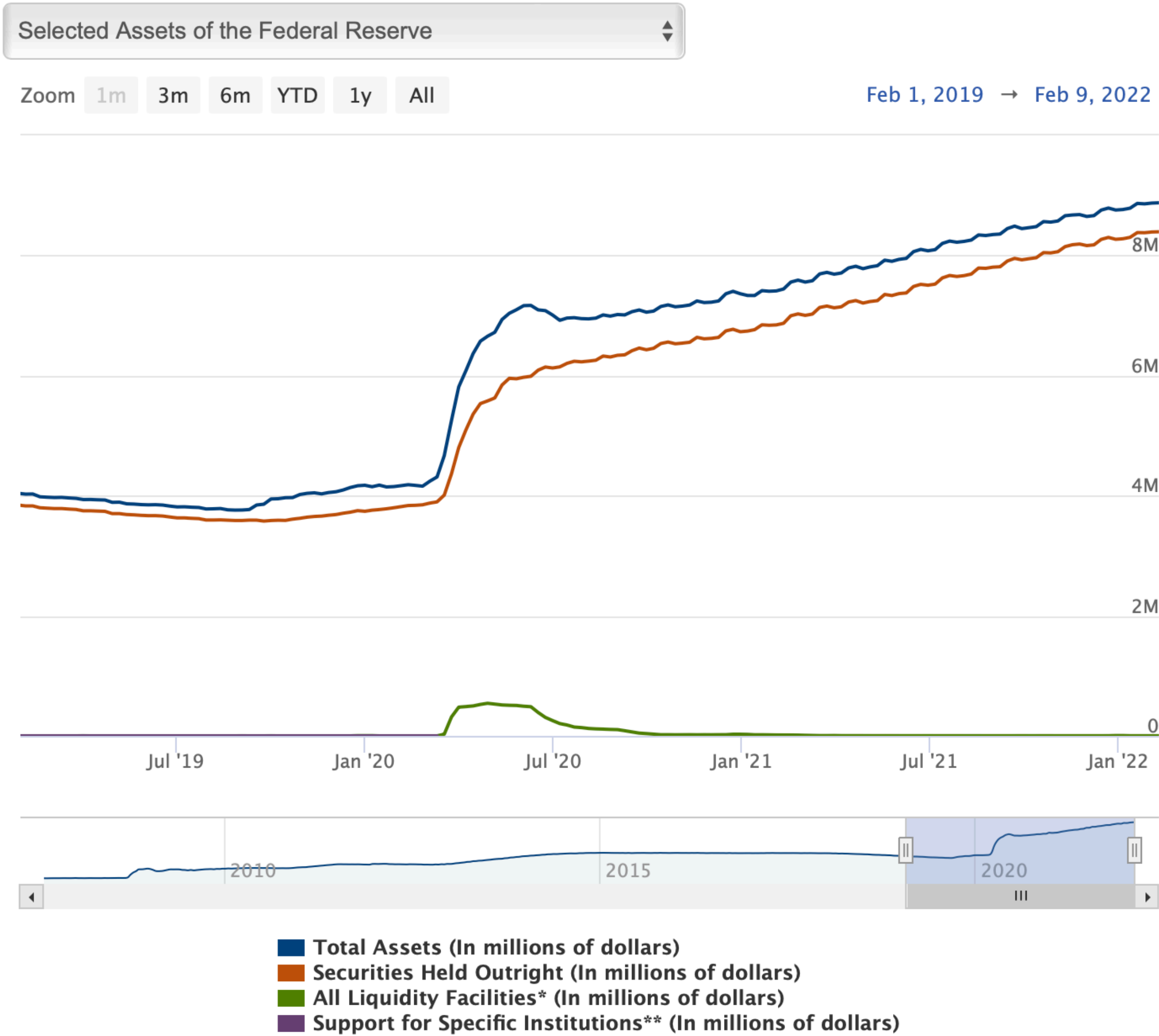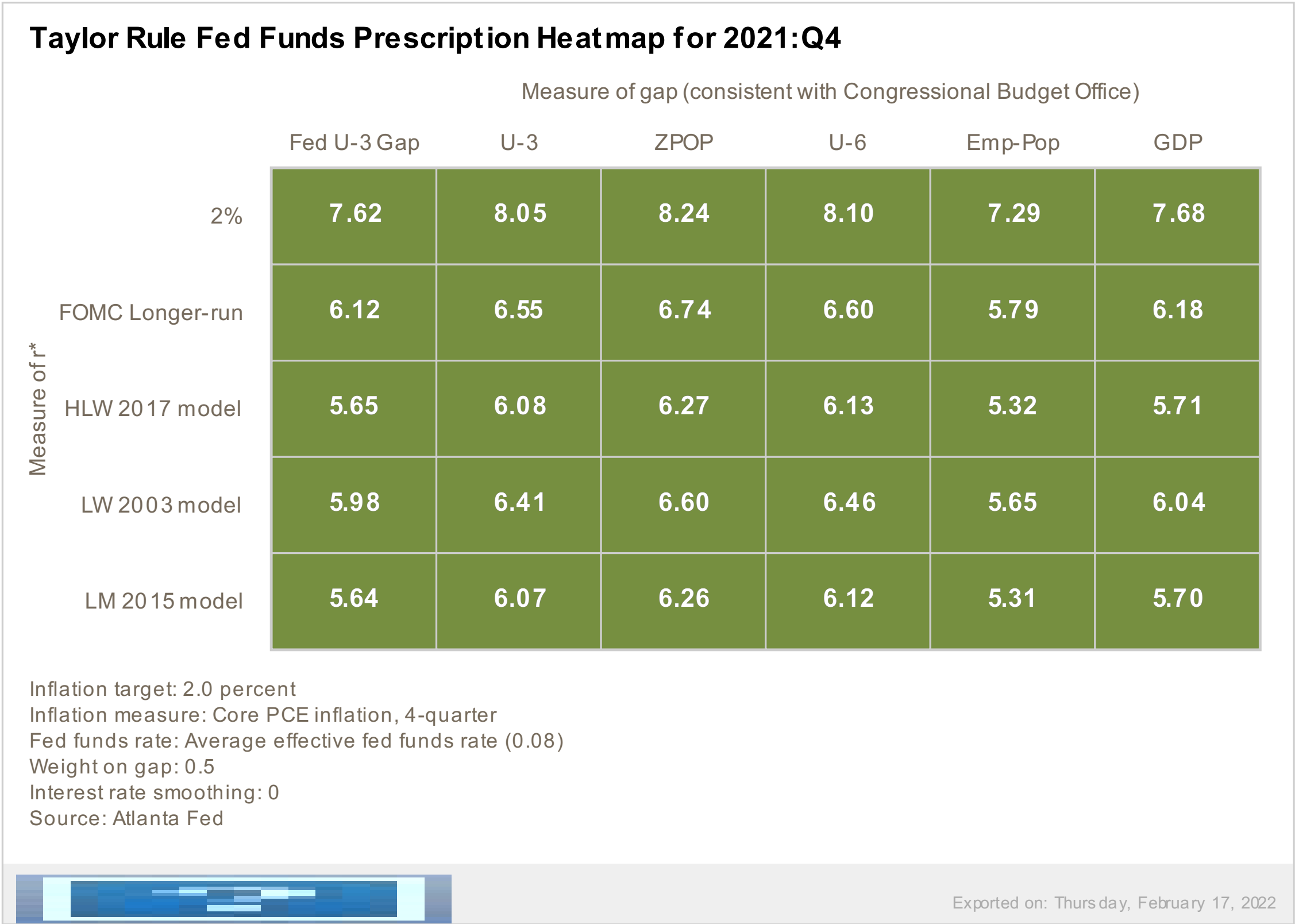
9

No pasa nada: expectations

No pasa nada: policy setting

Taylor Rule Fed Funds Prescription Heatmap for 2021:Q4

Measure of gap (consistent with Congressional Budget Office)

Measure of r*	Fed U-3 Gap	U-3	ZPOP	U-6	Emp-Pop	GDP
2%	7.62	8.05	8.24	8.10	7.29	7.68
FOMC Longer-run	6.12	6.55	6.74	6.60	5.79	6.18
HLW 2017 model	5.65	6.08	6.27	6.13	5.32	5.71
LW 2003 model	5.98	6.41	6.60	6.46	5.65	6.04
LM 2015 model	5.64	6.07	6.26	6.12	5.31	5.70

Inflation target: 2.0 percent
Inflation measure: Core PCE inflation, 4-quarter
Fed funds rate: Average effective fed funds rate (0.08)
Weight on gap: 0.5
Interest rate smoothing: 0
Source: Atlanta Fed

Exported on: Thursday, February 17, 2022

Selected Assets of the Federal Reserve

Zoom 1m 3m 6m YTD 1y All

Feb 1, 2019 → Feb 9, 2022

- ■ **Total Assets (In millions of dollars)**
- ■ **Securities Held Outright (In millions of dollars)**
- ■ **All Liquidity Facilities* (In millions of dollars)**
- ■ **Support for Specific Institutions** (In millions of dollars)**

Source:: Atlanta Fed Taylor rule tracker and Board of Governors

Finally, came the pivot

‘No more Mr Nice Guy’: Fed chair signals tougher stance on inflation

Jay Powell refuses to rule out string of aggressive rate rises to bring US prices under control

Jay Powell repeatedly dodged questions about the central bank's thinking now that inflation appears to be persistent © Financial Times

Colby Smith in Washington JANUARY 27 2022

💬 69 🖨️

- 6 months too late. consequence: inflation will be high in 2022

- Two hard-to-distinguish accounts:

Inflation shock turned out to be persistent
or
Six months of "no pasa nada" monetary policy made it persist

The inflation risks beyond 2022

Most likely: engineer a soft landing

Conclusion

- Seven of the eleven episodes were arguably "pretty soft" landings: 1965-66, 1967-69, 1983-84, 1988-89, **1994-95,** 1999-2000, and 2004-06.
- In three other cases, there was never any intention to make it "soft": 1972-74, 1977-80, 1980-81.
- In 2004-06 and 2015-19, it certainly wasn't tight money that caused the deep recessions that followed.
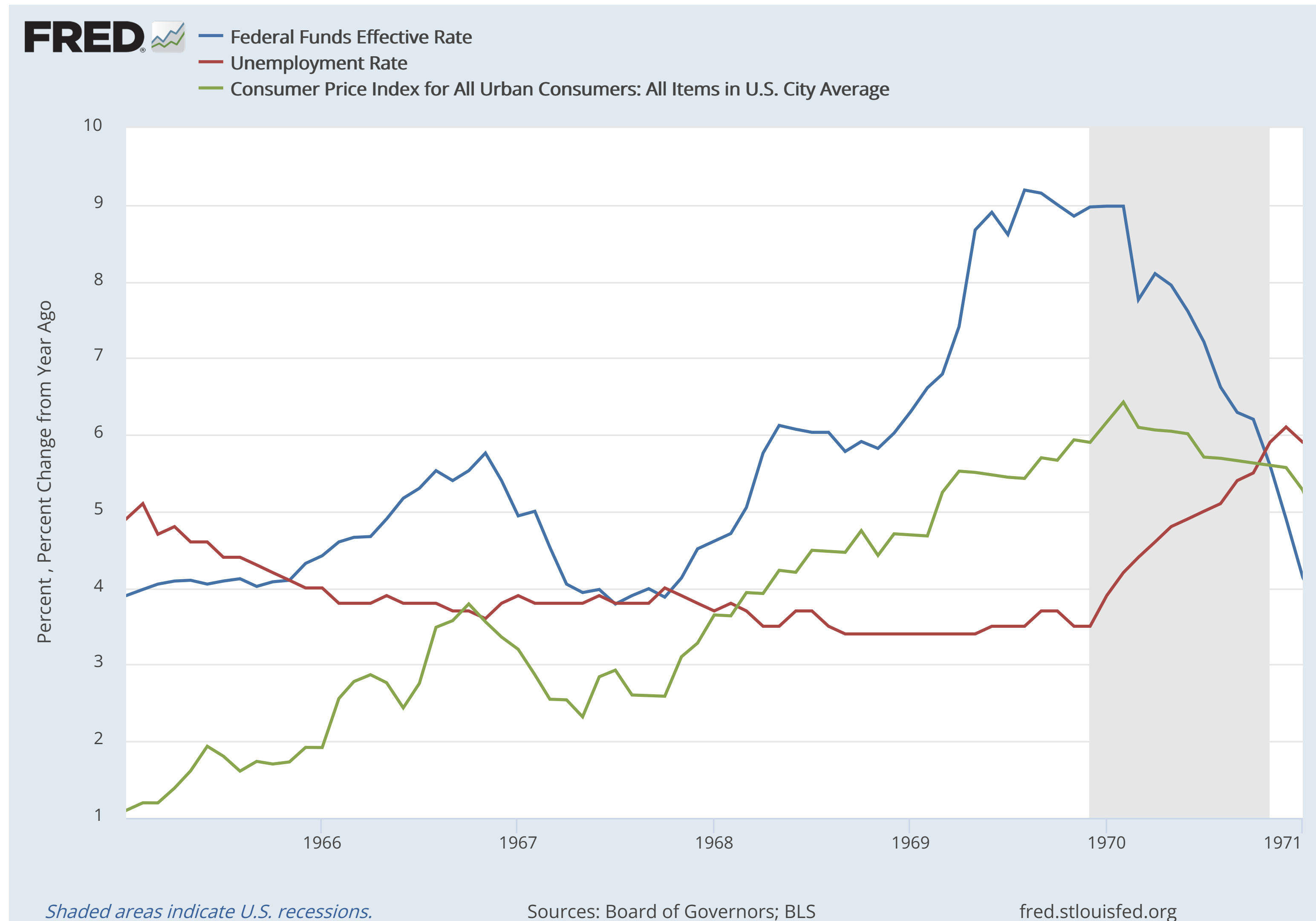- **So soft landings can't be all that hard to achieve.**

If so, mistake of 2021:H2 more than offset by success of 2020, will be forgotten

The danger: a recession in 2023-24

Shaded areas indicate U.S. recessions.   Sources: Board of Governors; BLS   fred.stlouisfed.org

The mistake of 1965-68 and the 1969-70 recession

- One of the "exogenous" monetary policy shocks in Romer and Romer's work.

- Let expectations drift, hit brakes too late.

- Reis (2022) "Losing the Inflation Anchor" and Blinder discussion.
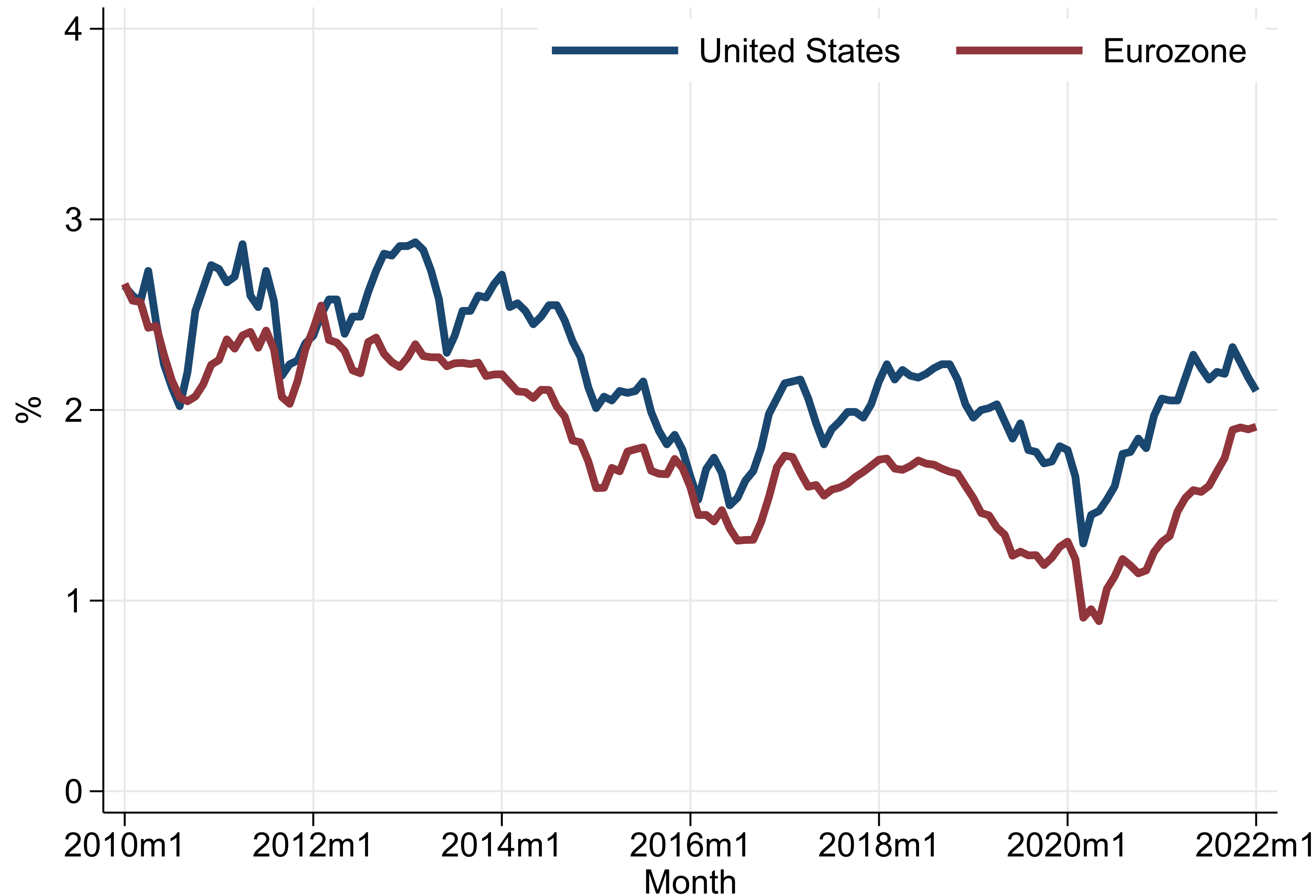
The panic: an inflation disaster
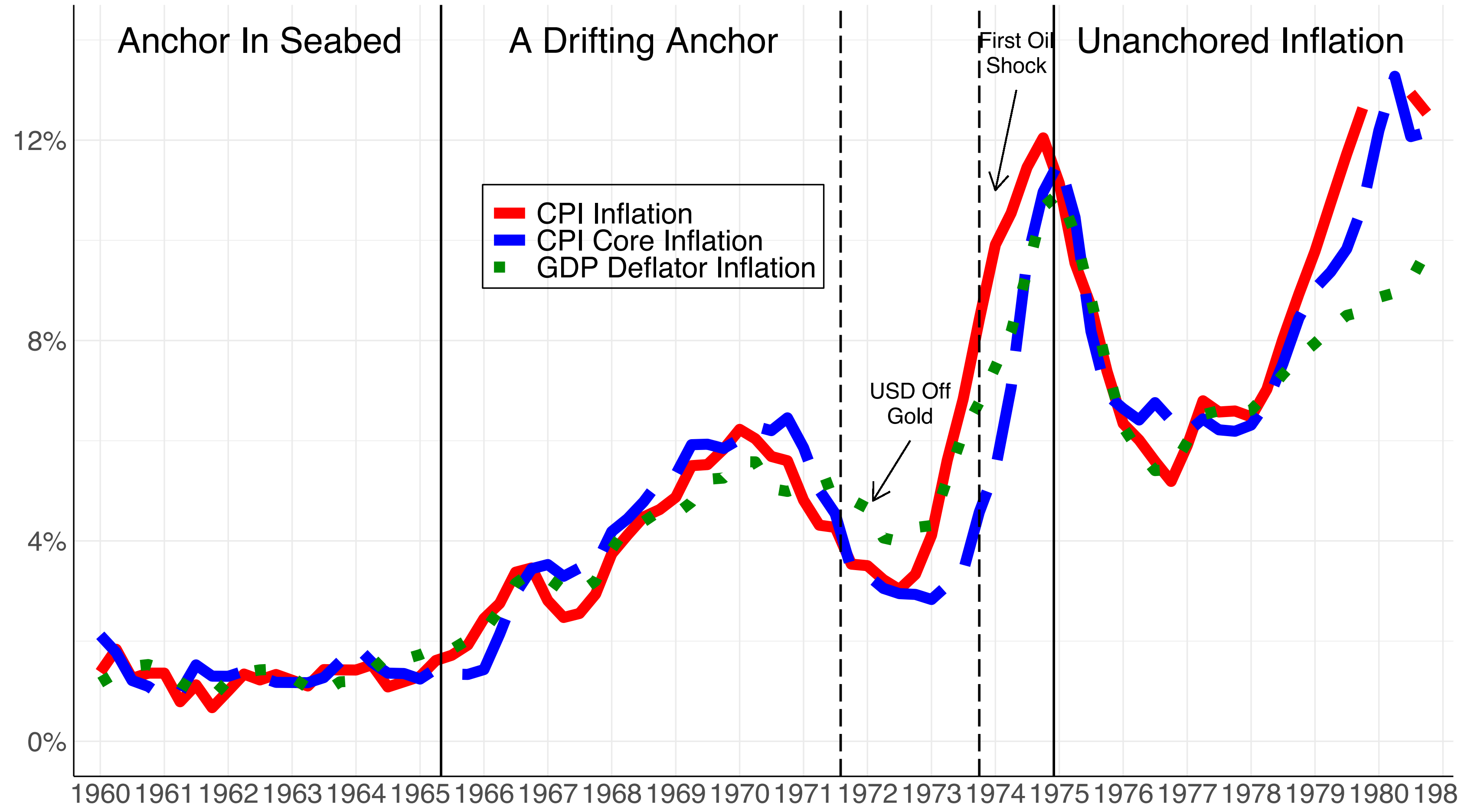
1968-71: anchor drifting

As inflation accelerated, Martin, July 1969, "*inflationary psychology remained the main economic problem*" Indexation spreads.

1971-74: anchor adrift

Burns on wage and price controls "*In this new psychological environment, our trade unions may not push quite so hard for a large increase in wage rates, since they would no longer be anticipating a higher inflation rate. And in this new psychological environment, our business people would not agree to large wage increases quite so quickly*"

The panic: an inflation disaster?

- 5-year, 5-year expected inflation

- From 5-year and 10-year swaps (or break-evens)

- No big concern.

- But this is not about disasters…

How likely is an inflation disaster?

What is the current date t market perceived probability that inflation will be persistently above or below the annual target between T and T + H? For example, what is the current probability that average inflation will be above 4% between 5 and 10 years from now?
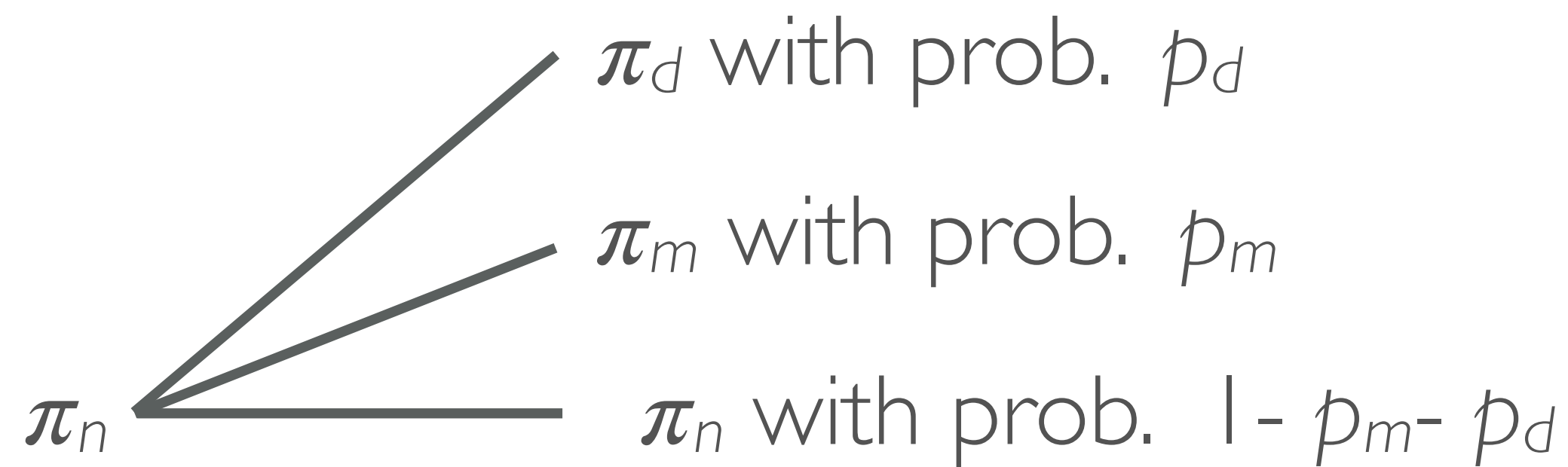
$$\Phi_t^{dh} = Prob[\pi_{T,T+H} > H(\bar{\pi} + d)]$$

$$\Phi_t^{dl} = Prob[\pi_{T,T+H} < H(\bar{\pi} - d)]$$

$$T = 60, H = 60,$$

$$\bar{\pi} = 2\%/12, d = 2, 3/12\%$$

Start with reported option prices

π_d with prob. p_d

π_m with prob. p_m

π_n

π_n with prob. $1 - p_m - p_d$

- An option that pays one $ if disaster at period 1 sells for

- $a_d(1) = p_{nd} \, m_d \, \exp(-\pi_d)$

- Build probability $n_d(1) = a_d(1)$ $\exp(i(1))$ since positive and add to ~~interest rate~~
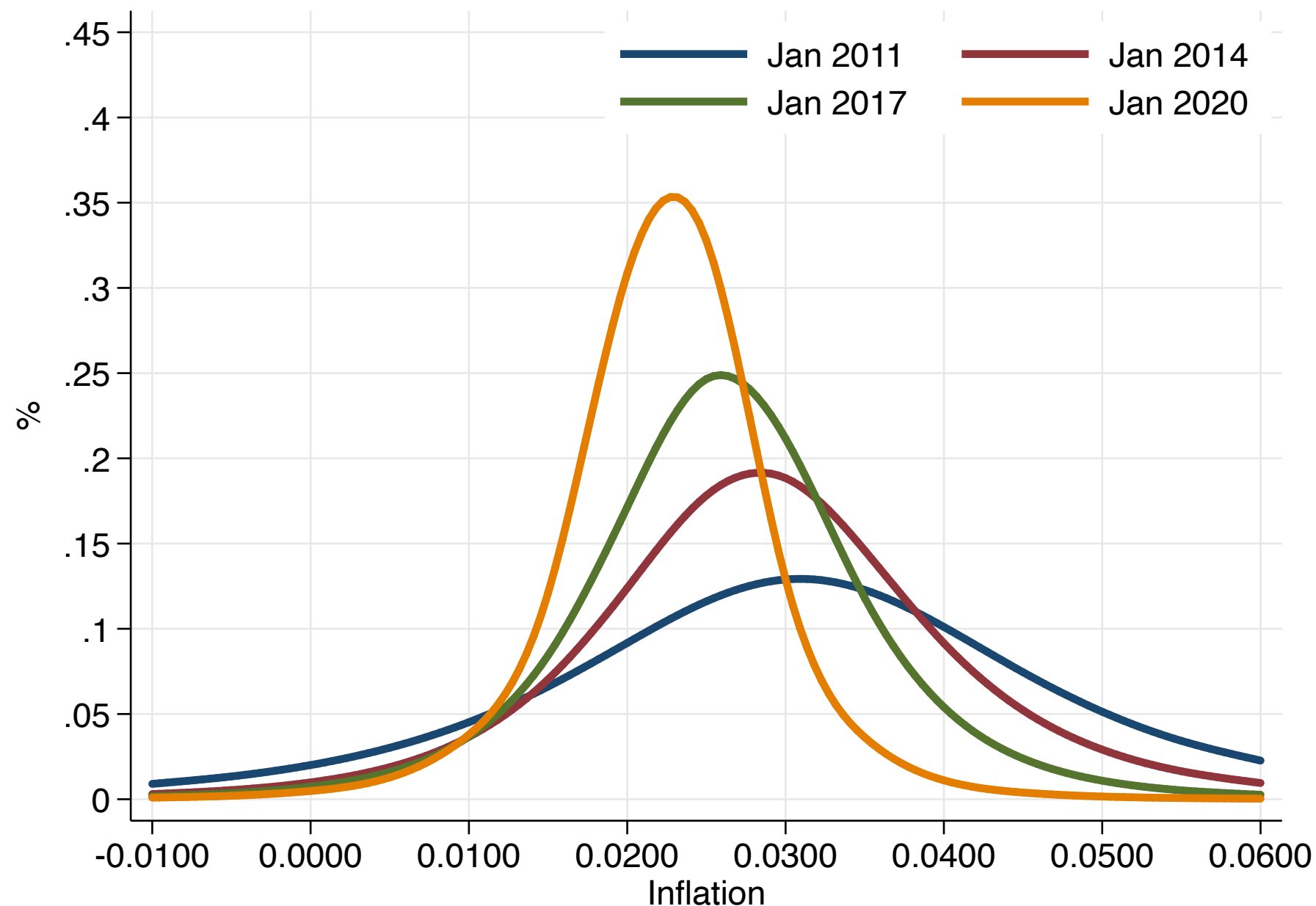
Measurement: data from inflation options with different strike prices, can measure sensitivity of the price to the strike, at horizon 5 or 10
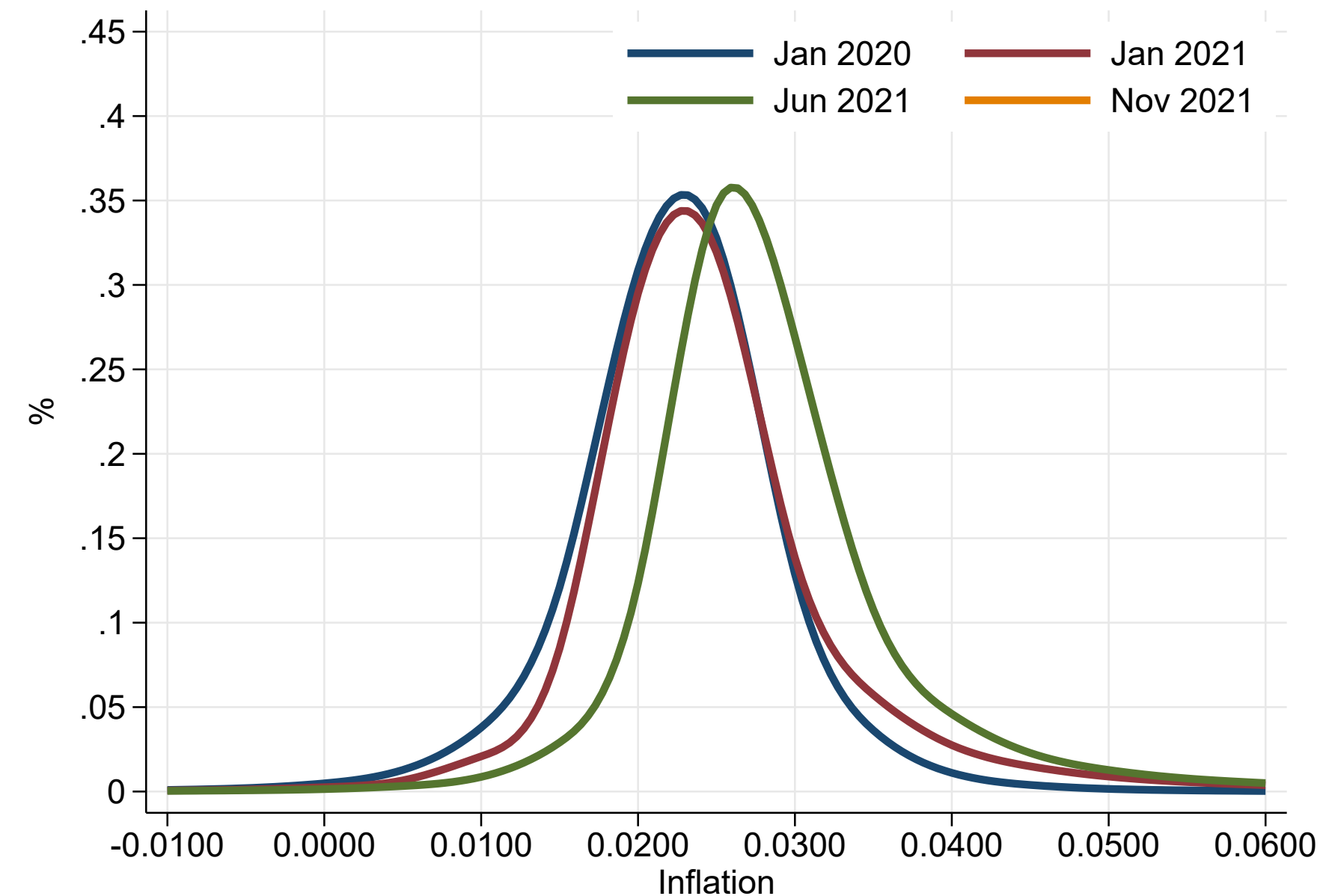
But:

- not a forward horizon
- risk-adjusted probability
- even with risk-neutrality not the desired p_{nd}

First adjustment: Arrow-Debreu probabilities
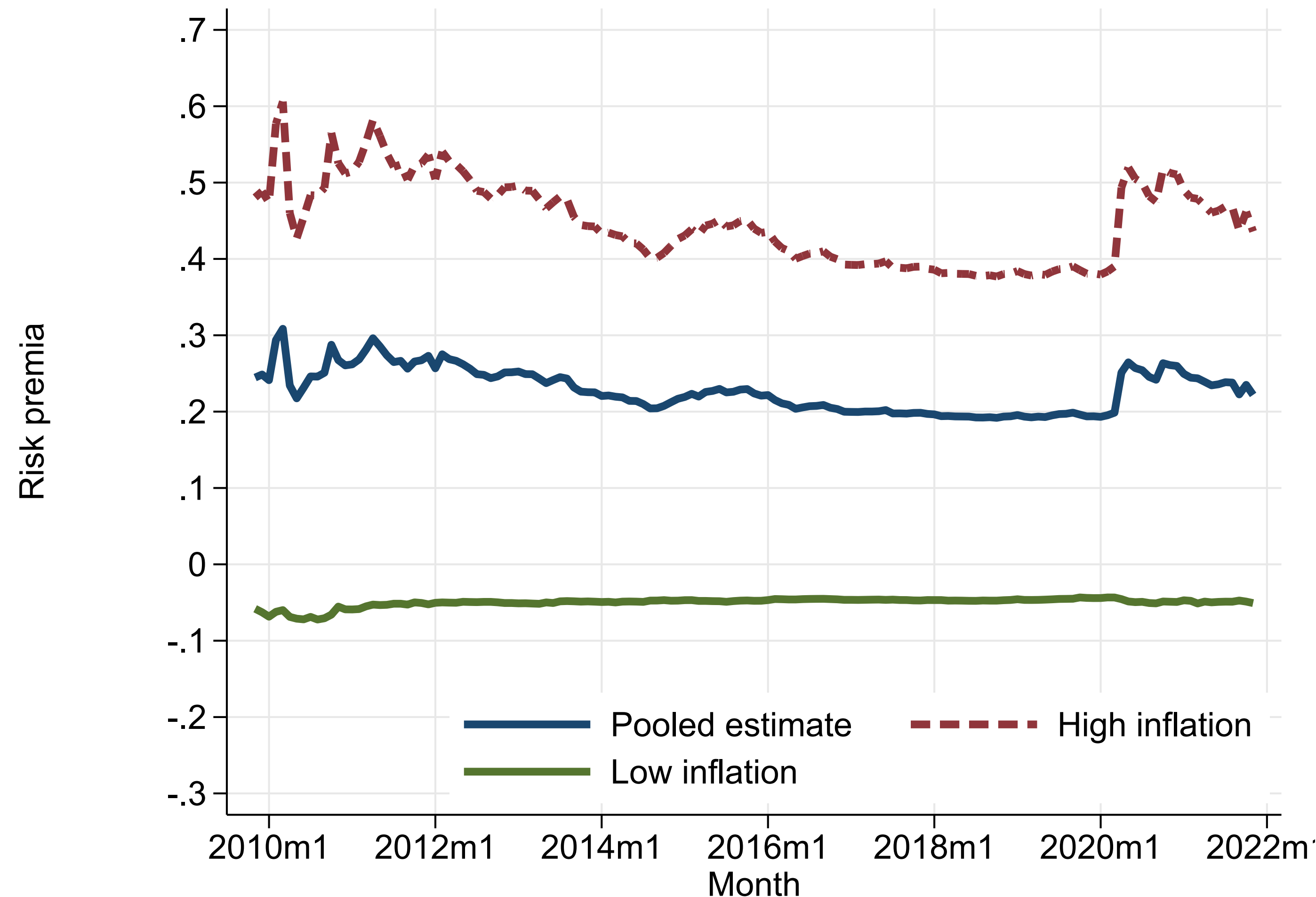
The anchoring of 2011-19

The 2021 drift

- When option pays $1, that $1 is worth less in real consumption units

- Option is less valuable than might think, takes for lower prices, would understate probability

Second adjustment: risk adjustments

Disaster inflation risk premia

- Disasters literature for stock prices and real activity

- Identify inflation disasters similar using 150 years of data across countries

- Finding: not all inflation disasters were output disasters, size of those disasters very asymmetric
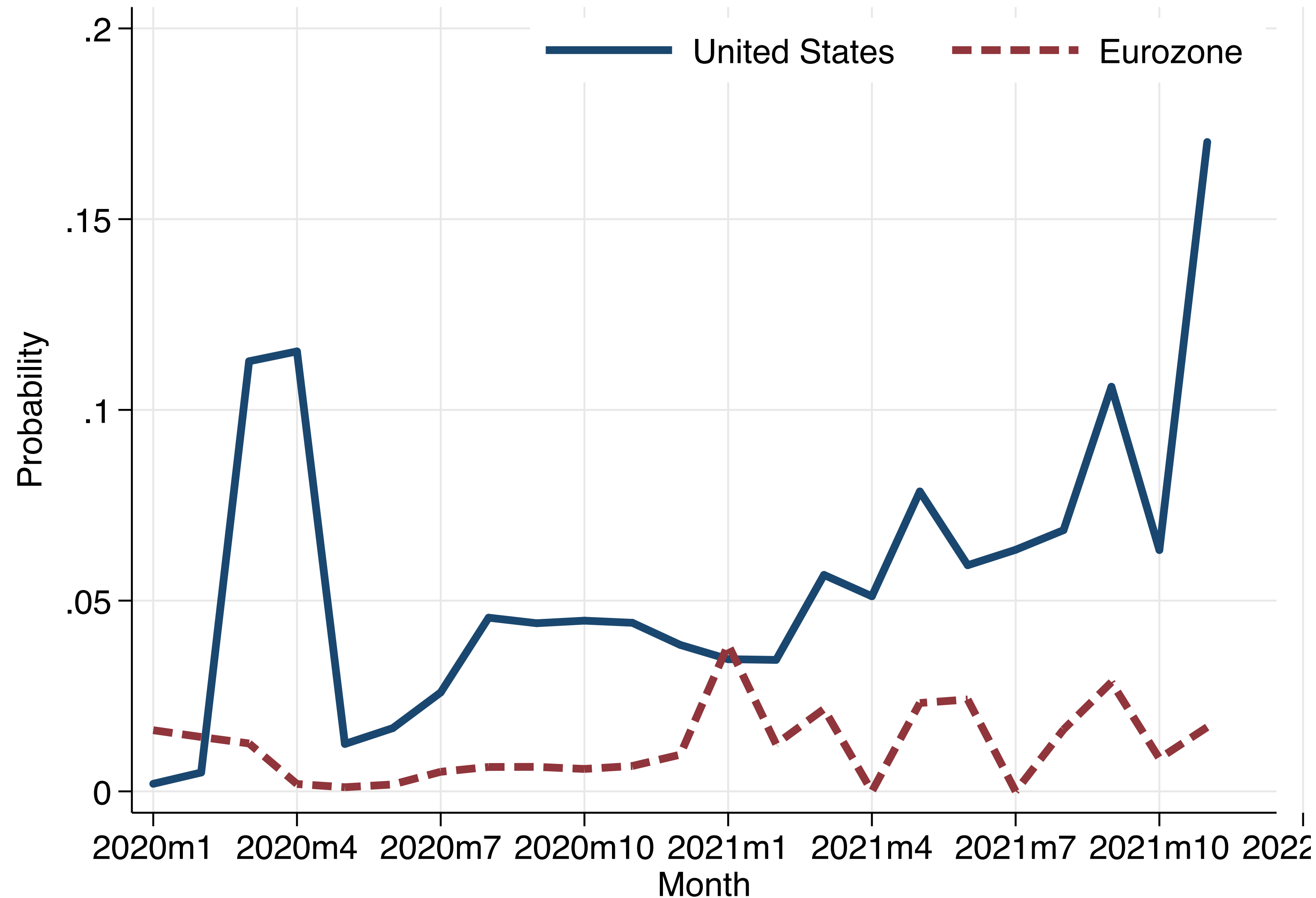
Third adjustment: horizon

Stochastic volatility and jumps
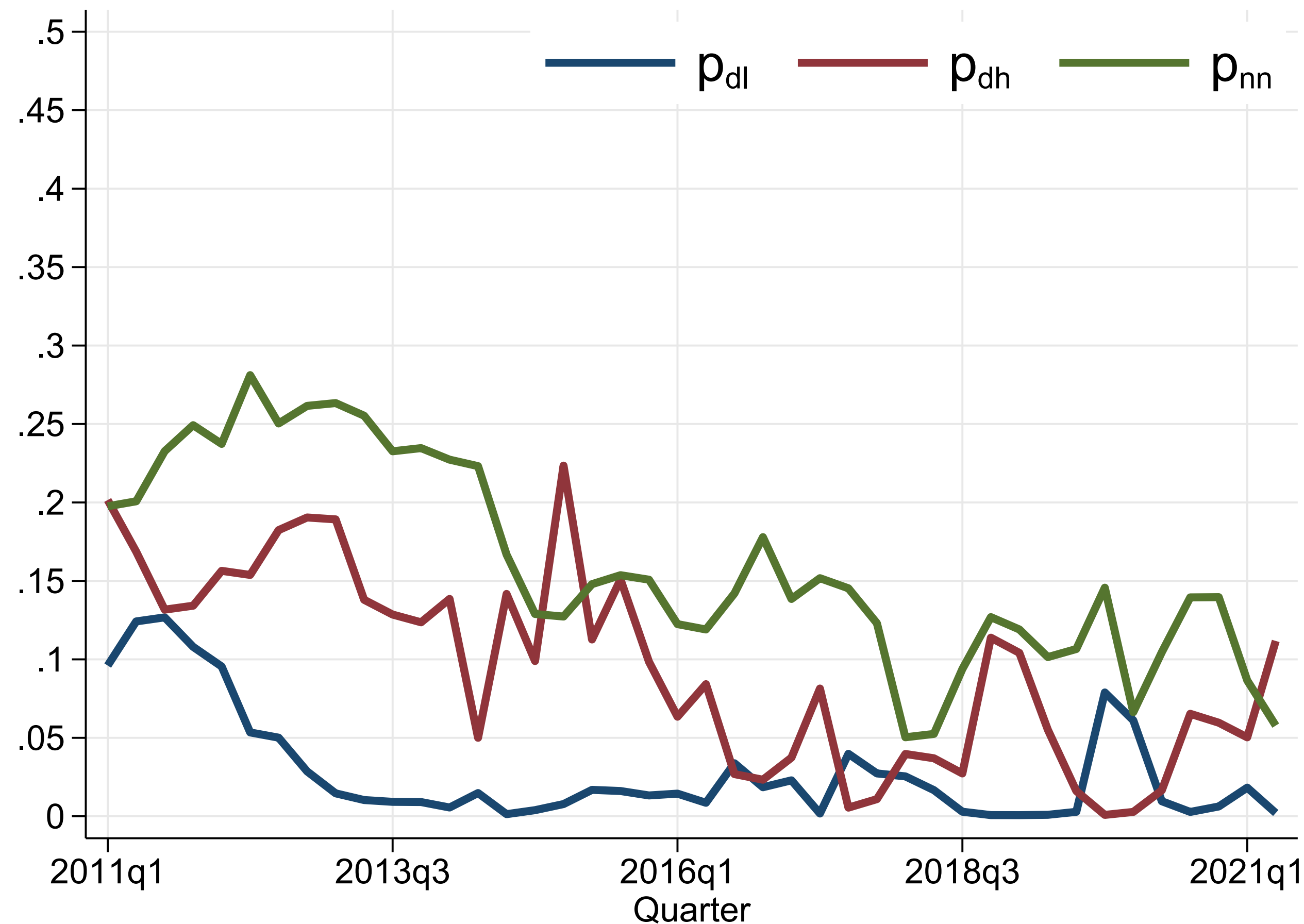
- Inflation is sluggish to take of, builds up

- 5-year or 10-years probabilities will understate 5y5y

- Interesting fact: 5y probability of disaster exceeded 10y in US data first time last three months.

The probability of a high inflation disaster
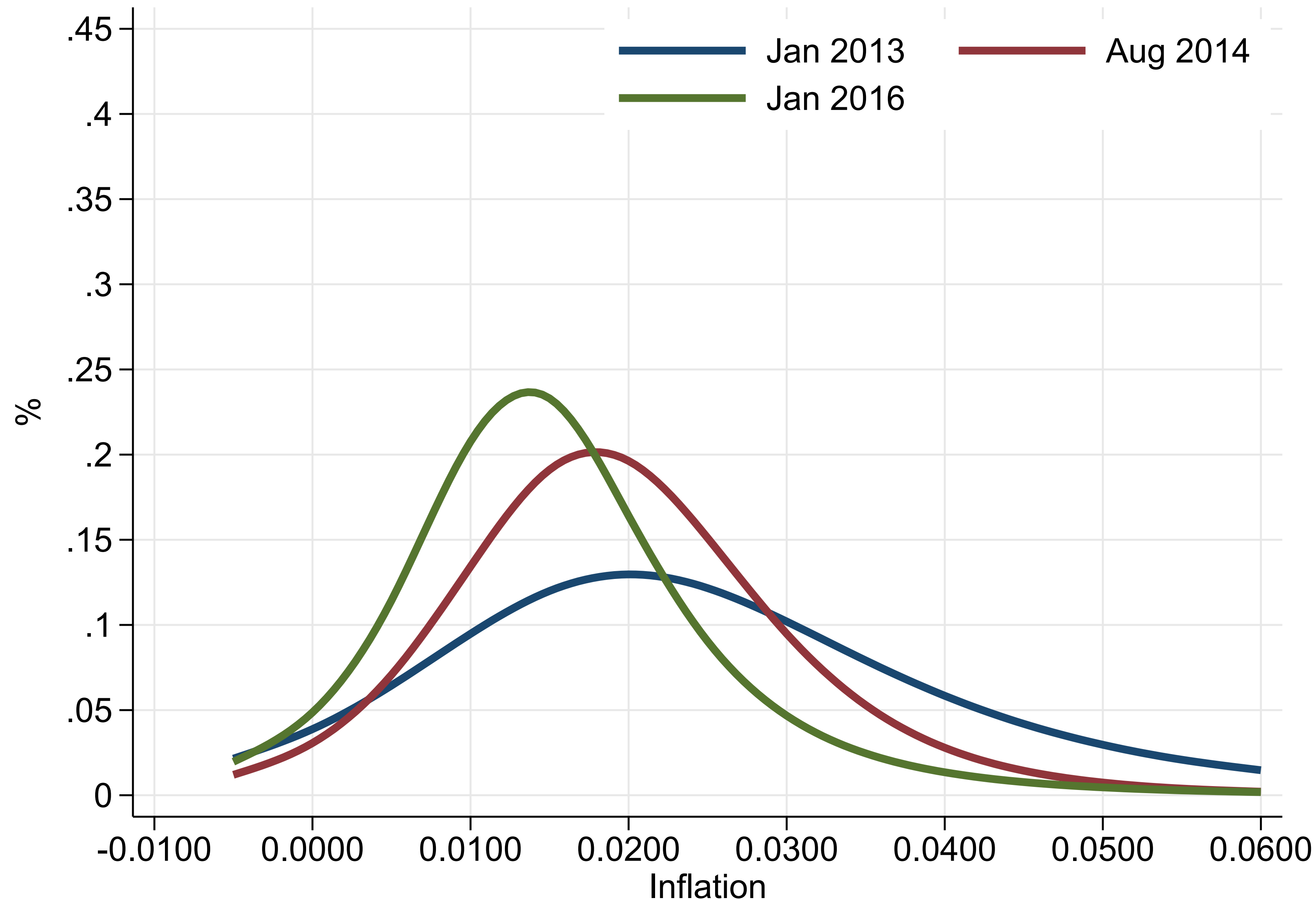
Inflation 5y5y > 4%

- Last data point: November 2021

- In a sense shockingly high

- Risk tolerance of Federal Reserve

- But far from inevitably high

The Euro-area different challenge
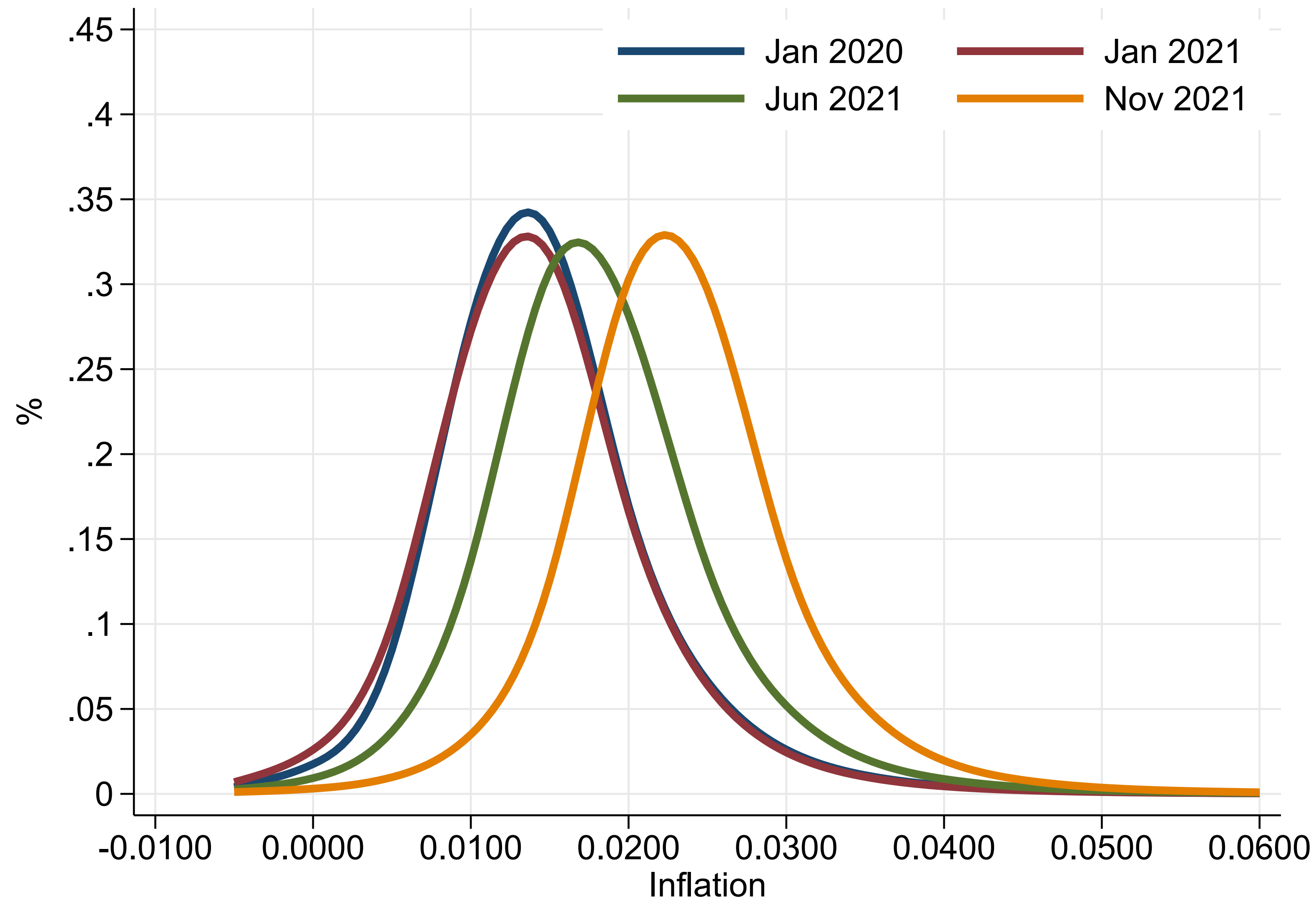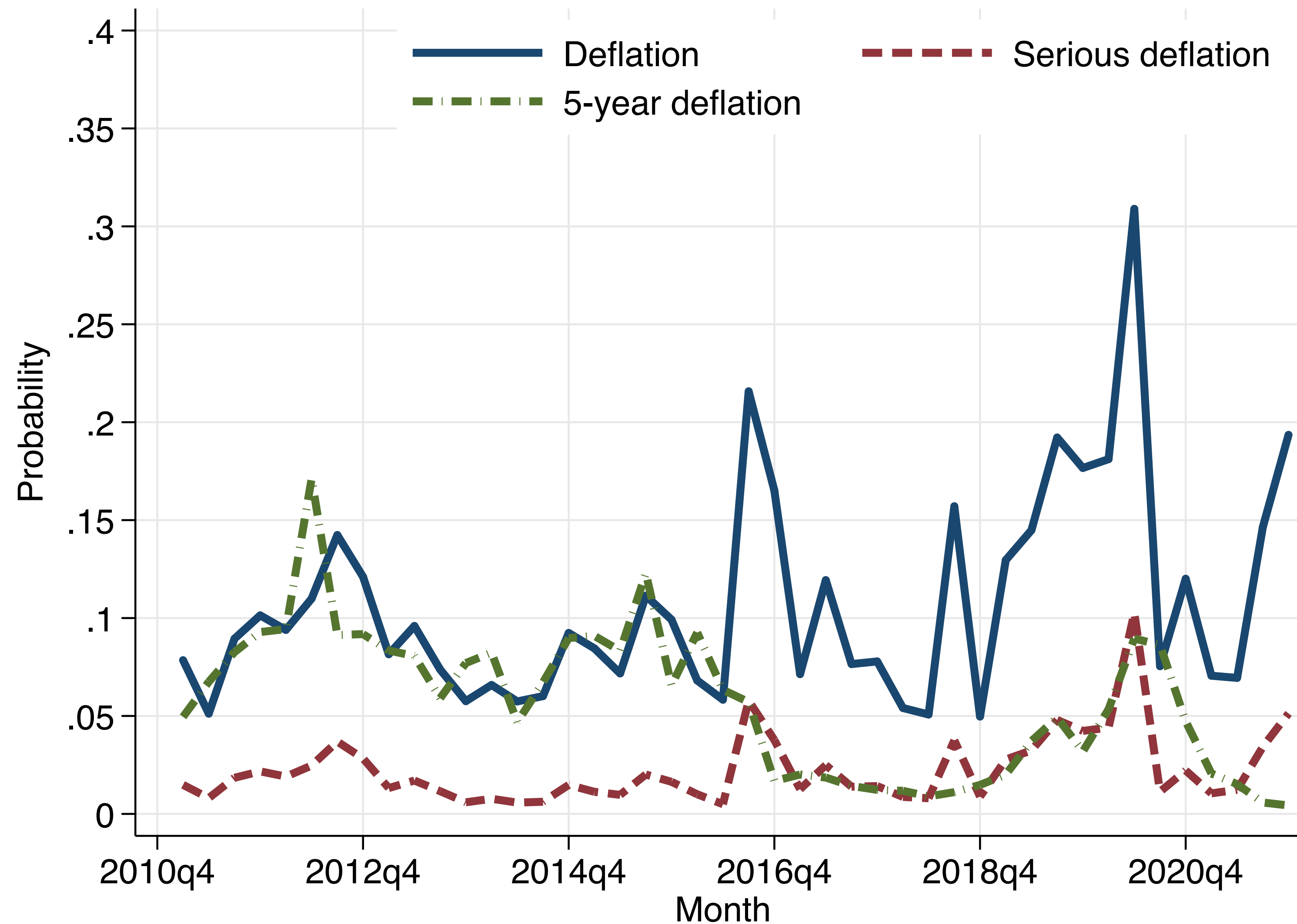
Pre-crisis: deflation risk and the birth of QE

- At best kept deflation risk stable

- But probability of inflation near 1% became solidified.

Pandemic drift only very recently above target

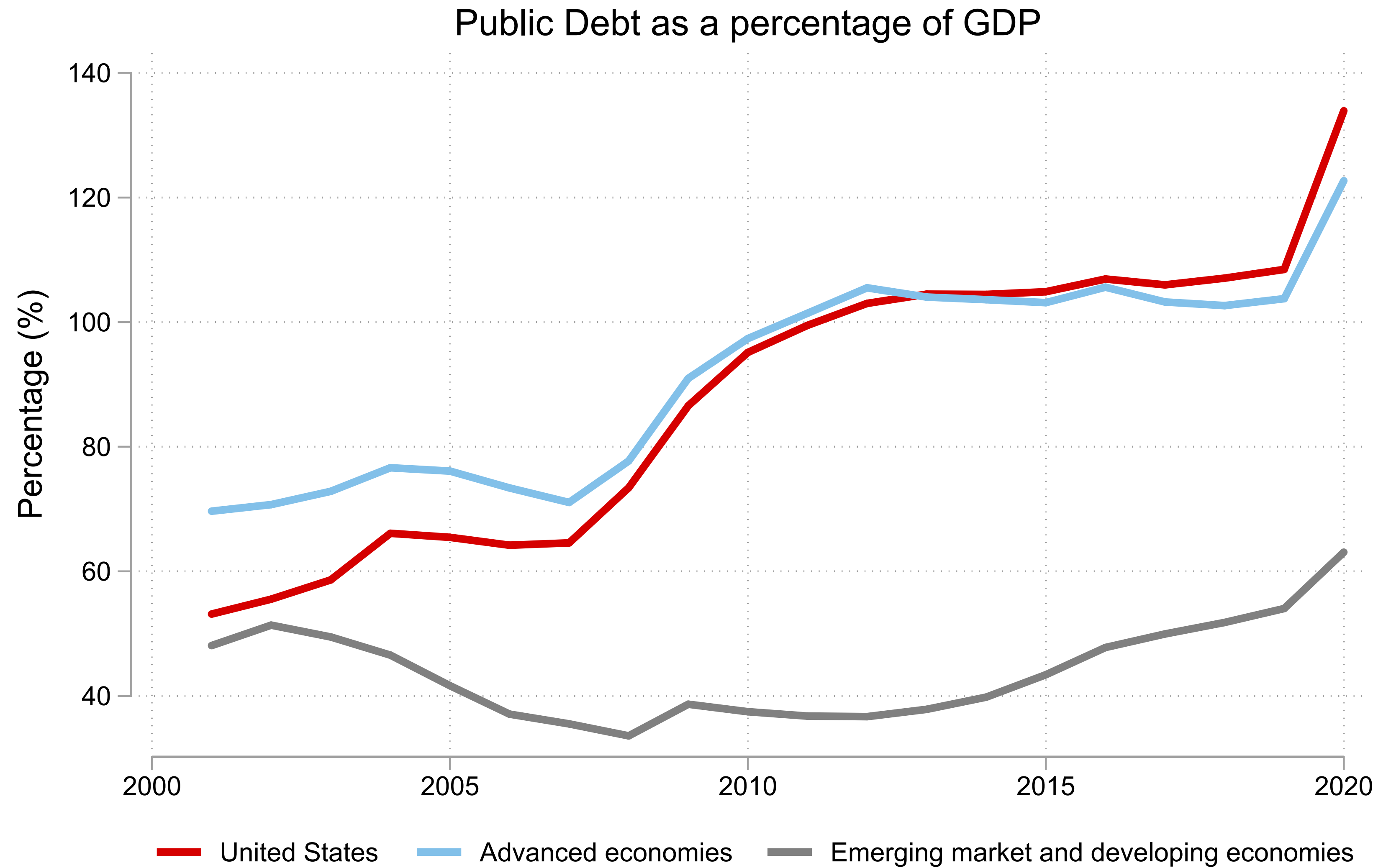# Lingering stubborn deflation-trap risk

- QE and others reduced short-term deflation risk

- But deflation trap risk remained

- Up and down with pandemic but still there

- (In US, flat line)

Caught in between US 2021 and Japan 2001

- **Upwards pressure on inflation** like United States in 2021. But.
  - smaller increase (e.g., no fiscal stimulus, no checks deposited)
  - more driven by energy, less broad based
  - starting from lower point
  - desire to move it relative to past 5 years
  - similar danger of being too slow.

- **Downwards pressure for deflation** like Japan in 20+1
  - strategy review affirming desire to average at 2%
  - first time it crosses it, tighten swiftly
  - expectations anchored at 0-1% for two decades…

- **Institutional weakness:** fragmented debt markets, lack of European safe asset (SBBS)

What is wrong with
a little (or a lot of) inflation?

Public debt had been growing…

Public Debt as a percentage of GDP

Legend: United States — Advanced economies — Emerging market and developing economies
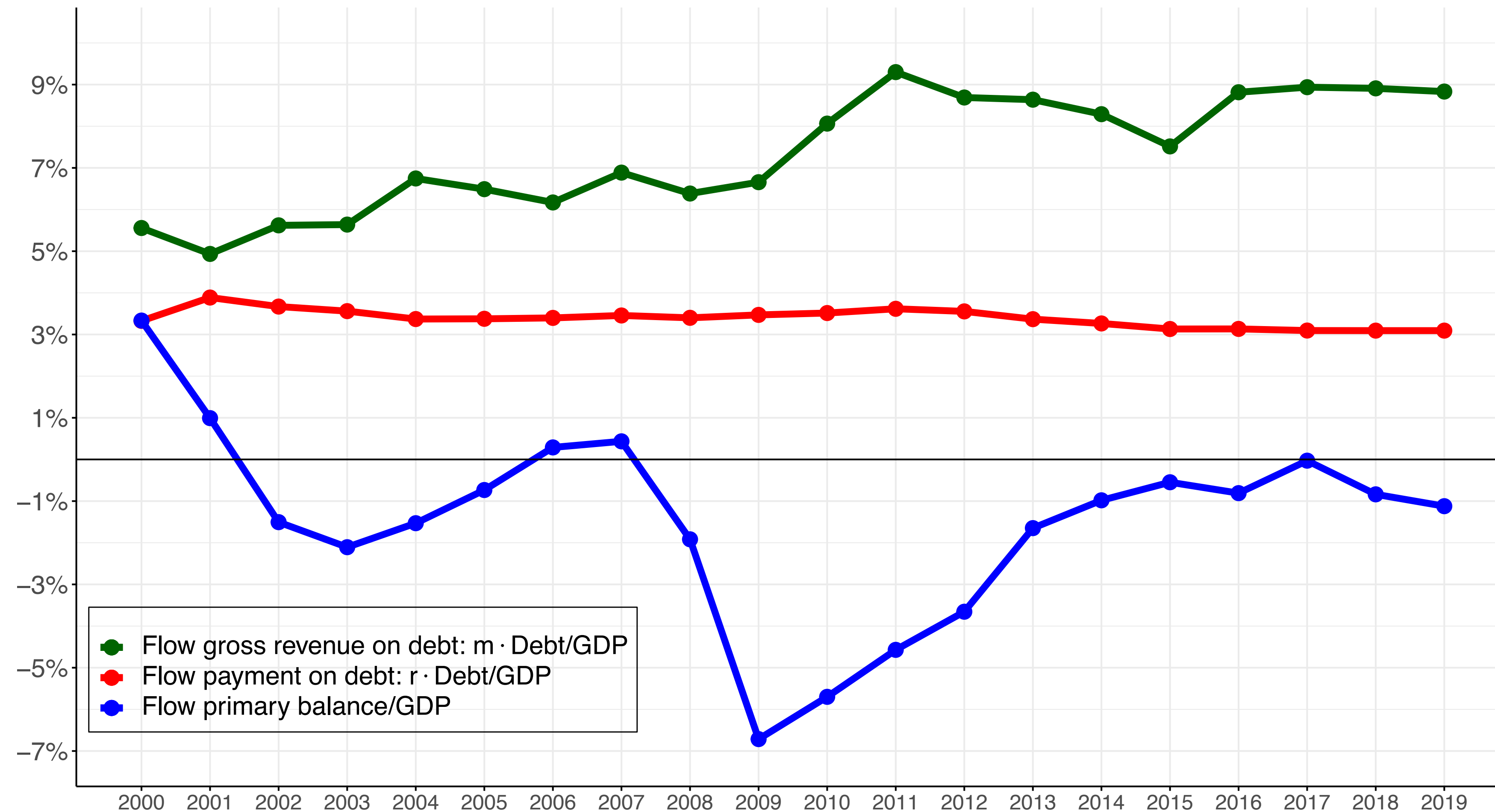
How was this possible?

$$Debt/GDP = EPV_{m-g}(PrimaryBalance/GDP) + EPV_{m-g}\ ((m\text{-}r)Debt/GDP)$$

- Debt revenue term: present value of supplying the service flow that makes public debt special. In which case *m-r* is a

  - risk premium ; safety premium
  - collateral premium ; repression premium
  - liquidity premium ; bubble premium
  - seignorage (i) ; habitat premium

Debt revenues have been sustaining debt

$$Debt/GDP = EPV_{d\text{-}g}(PrimaryBalance/GDP) + EPV_{d\text{-}g}((d\text{-}r)Debt/GDP)$$

G7 countries

Legend:
- Flow gross revenue on debt: $m \cdot Debt/GDP$
- Flow payment on debt: $r \cdot Debt/GDP$
- Flow primary balance/GDP

Because r fell, but m did not. Role of inflation?

m, r and g for the US
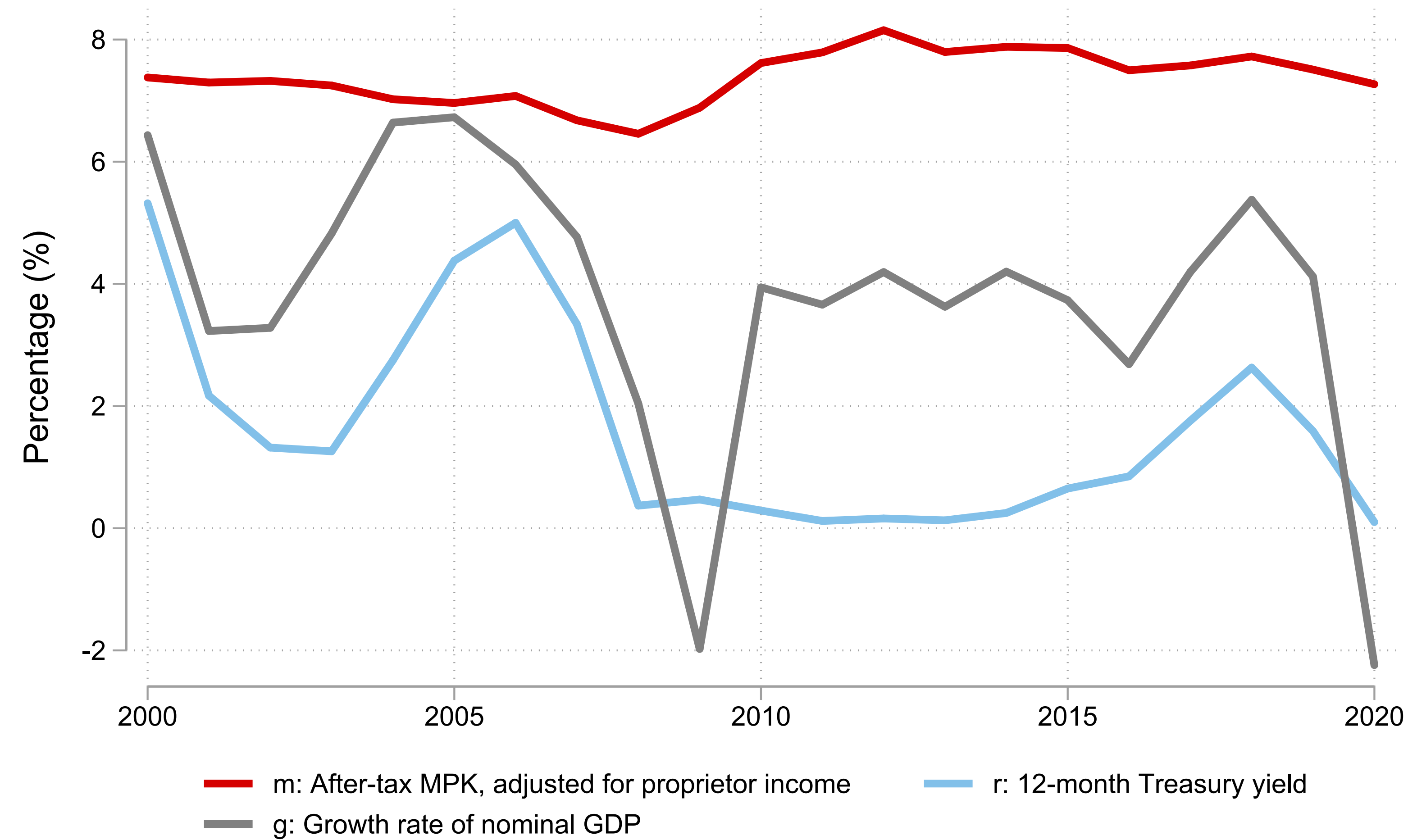
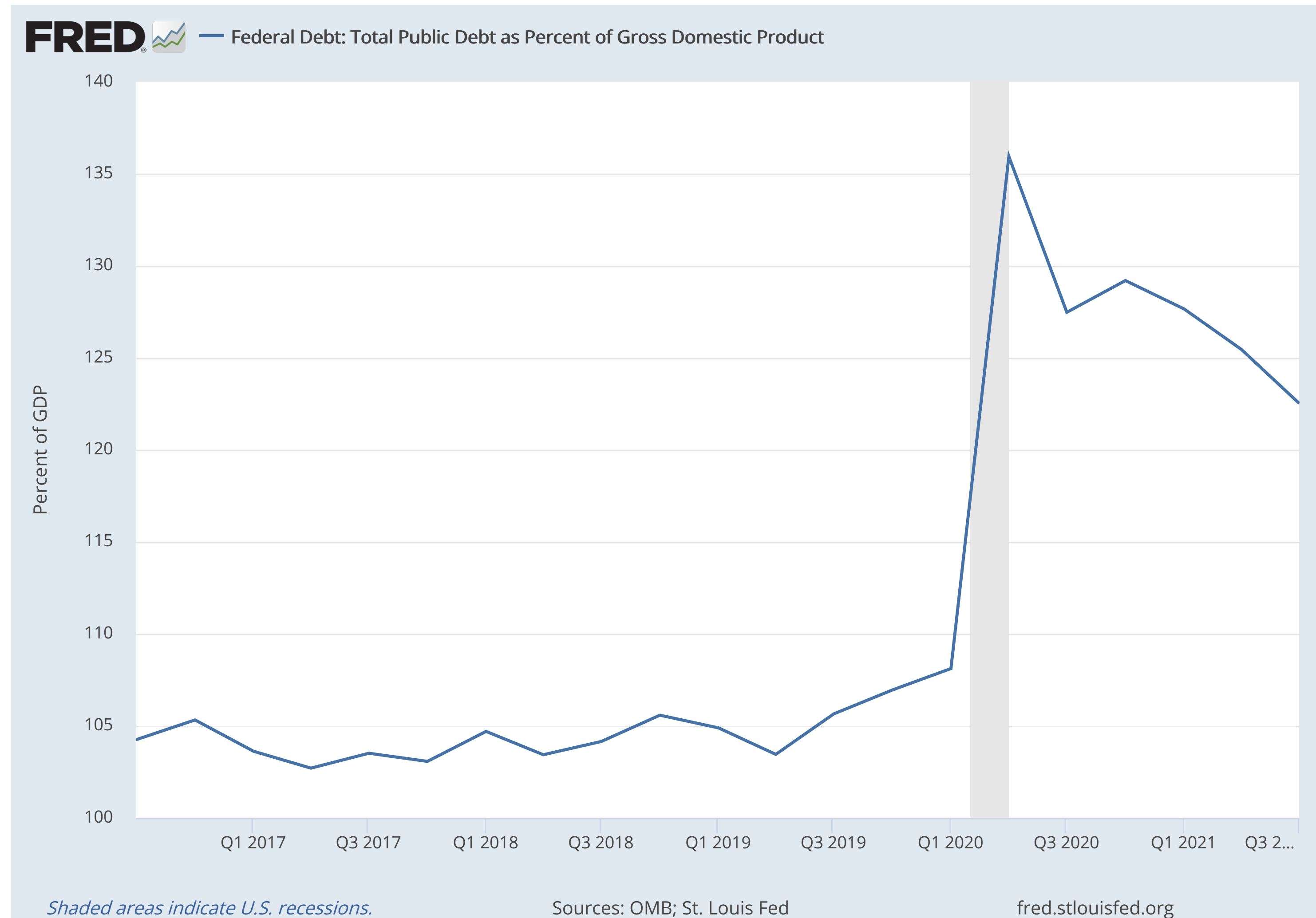Table 1: Average annual returns (2000-20) for measures of m and r

Measure	%
Market Return / Marginal Product of Capital (m)	
Income Measure	
(i) Ratio of Capital Share and Capital-to-Output	10.5
(ii) (i) minus corporate income tax	9.6
(iii) (ii) minus proprietors' labor income	7.4
(iv) (iii) minus rent payments	6.2
(v) (iii) minus land rents and adjusted for market power	10.1
Equity Measure	
(i) S&P 500 stock market index	8.2
(ii) Wilshire 5000 stock market index	8.4
(iii) Housing	8.2
(iv) Expected stock returns	6.6
Corporate-bond Measures	
(i) Senior unsecured	5.8
(ii) AAA-rated bonds	5.8
(iii) BBB-rated bonds	6.8
(iv) Expected return on BAA-rated bonds	5.3
Money Measures	
(i) Interbank rate	2.2
(ii) Foreign bonds	1.9
Return on government bonds (r)	
(i) Yield/Return on Treasuries	1.6
(ii) Return on average-maturity Treasuries	3.9

Legend:
- m: After-tax MPK, adjusted for proprietor income
- r: 12-month Treasury yield
- g: Growth rate of nominal GDP

33

The importance of price stability commitment

To keep the debt "specialness", the debt revenues large

- Protect safety of public debt from inflation risk
   remove fear of debt monetization

- Anchor inflation expectations
   remove fear of higher interest rates over future debt

- Eliminate inflation risk premium
   both on bonds and over taxation

- Reaffirm focus on inflation for central bank policy
   macro prudential policy not steered towards financial repression

- Guide balance sheet policy
   income risks in balance sheet and extent of fiscal backing

But doesn't inflation help to pay the debt?

FRED 📈 — Federal Debt: Total Public Debt as Percent of Gross Domestic Product

Shaded areas indicate U.S. recessions.   Sources: OMB; St. Louis Fed   fred.stlouisfed.org

- Only if unexpected, temporarily

- And US debt maturity is so low that cannot last long

- Keeping debt sustainability today requires more independent central banks, a stronger case for price stability.

Conclusion

Points in this lecture

1. 1990-2020 period was a remarkably successful monetary regime at controlling inflation

2. 2020 was a success for monetary policy, 2021 (second half) came with the emergence of an upside risk, need deft landing to prevent a new recession.

3. How large is the risk of a new inflation regime? For the US, scarily elevated, but still time to act and track record of soft landings. For the EZ, deflation trap risk still seems relevant in spite of pandemic and strategy review

4. Why is the case for keeping to the old inflation regime even stronger today? Because with large debt, need to keep debt revenues high