Inflation Tail Risks

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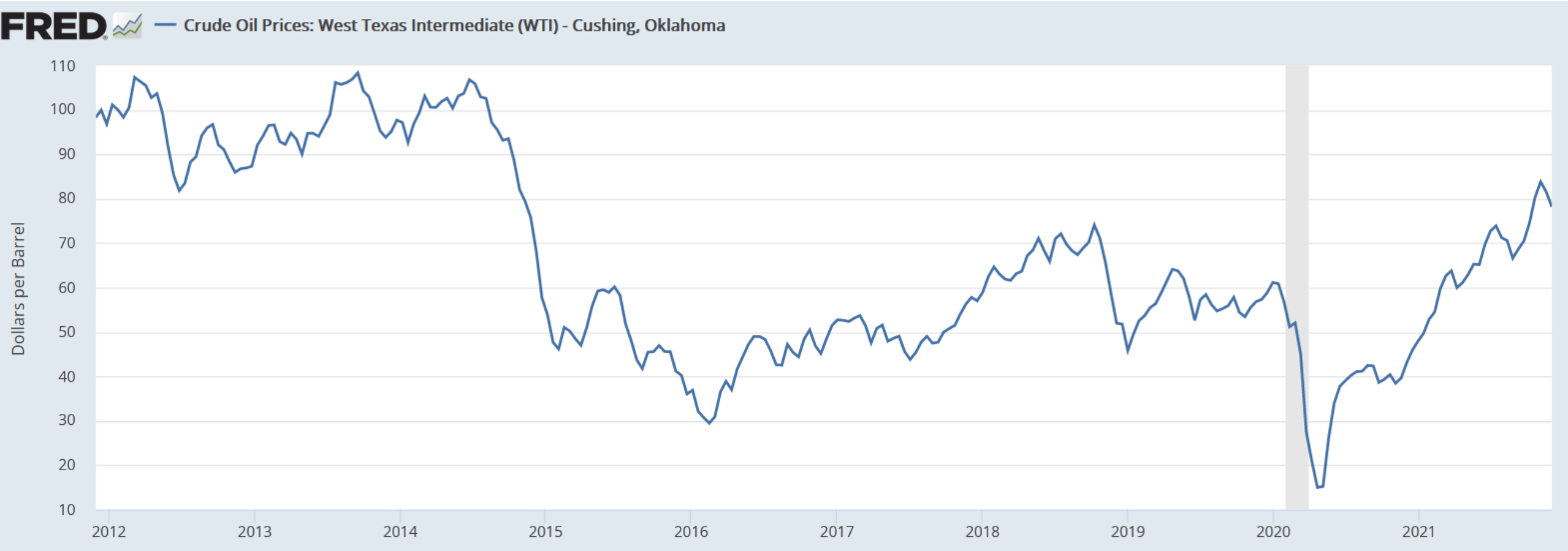
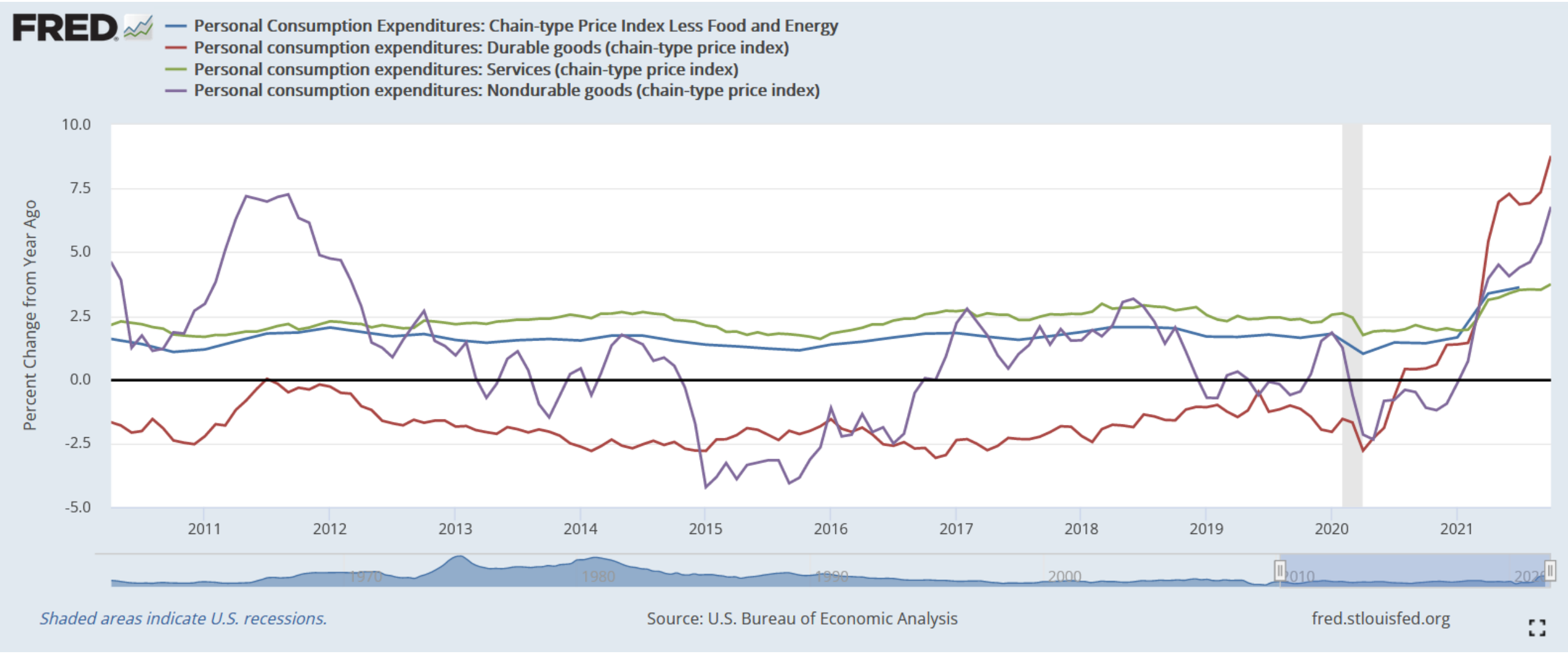
Money and Banking

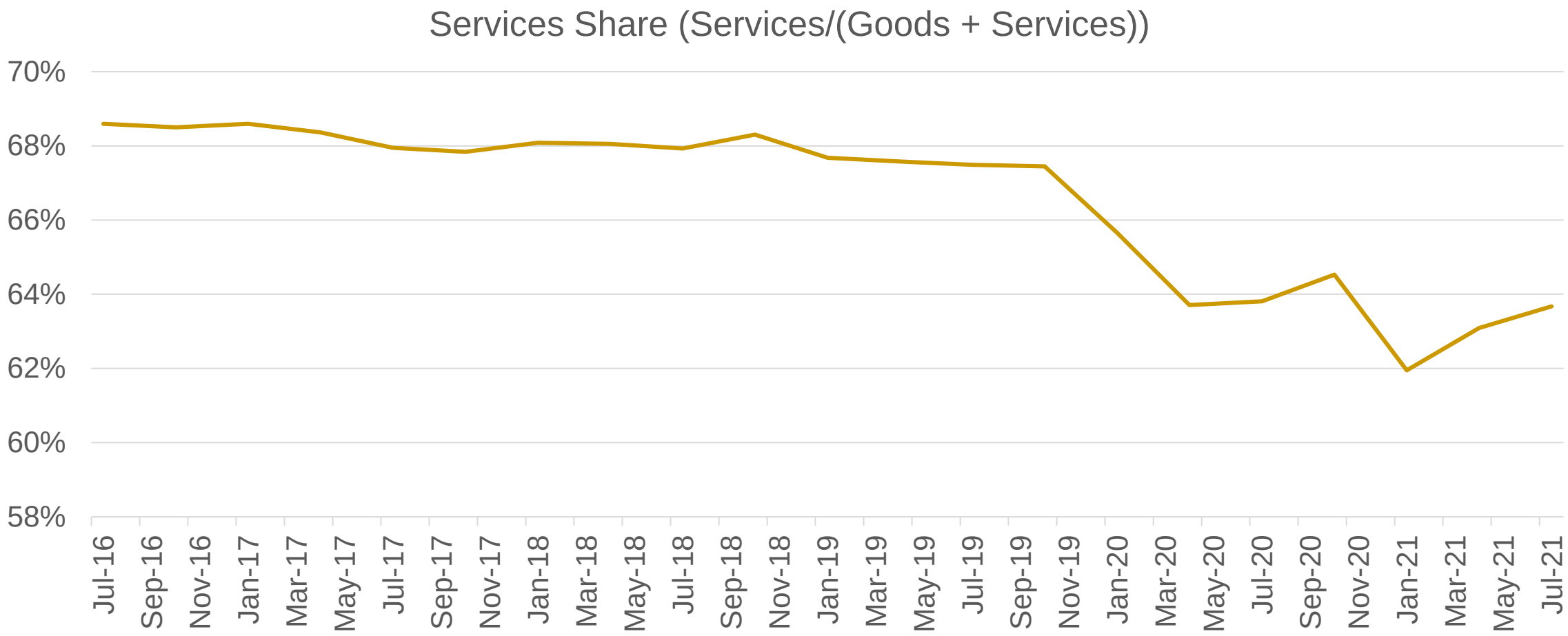
WHAT IS CAUSING INFLATION?


FRED
Crude Oil Prices: West Texas Intermediate (WTI) - Cushing, Oklahoma
Dollars per Barrel
110
100
90
80
70
60
50
40
30
20
10
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021

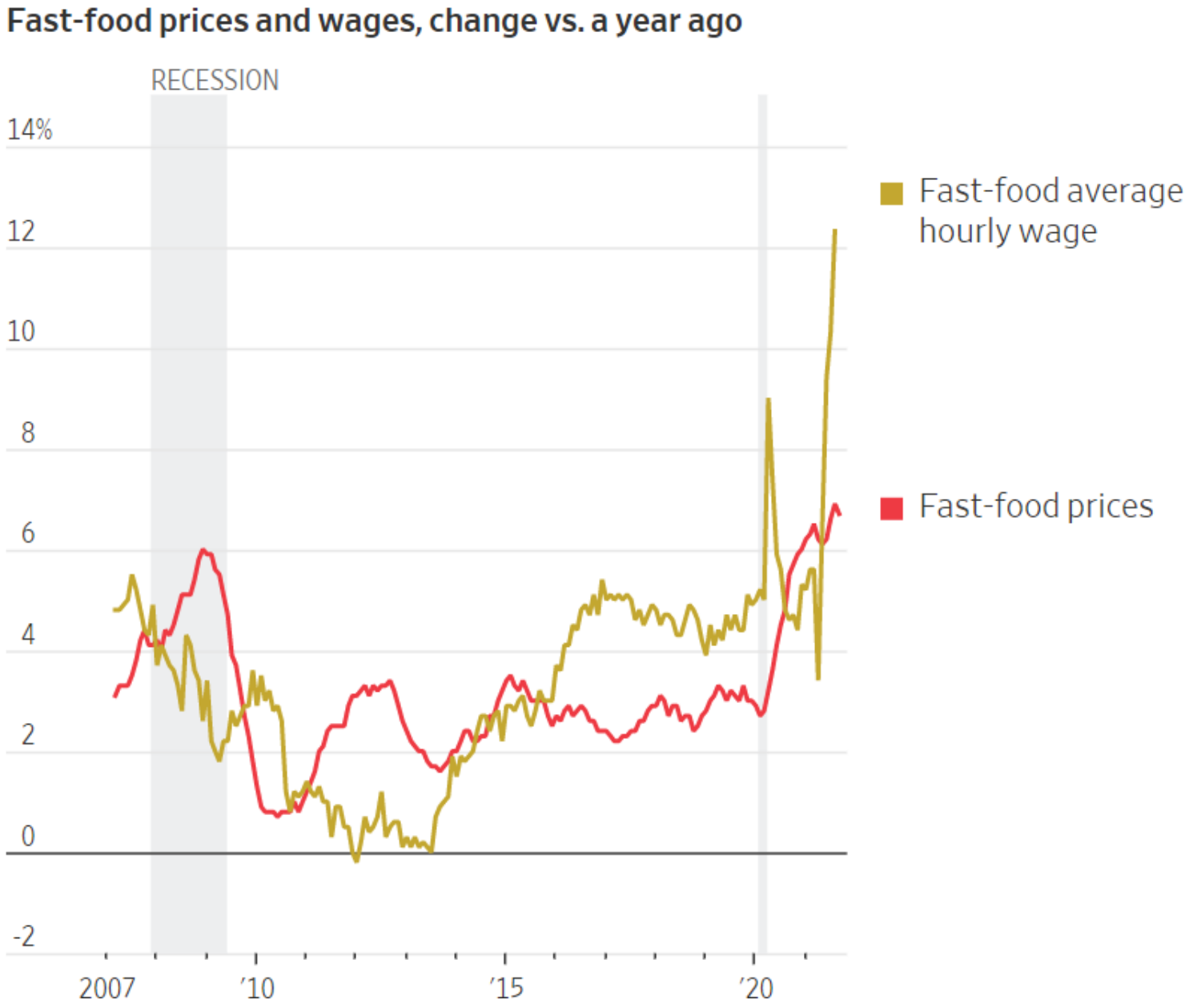
Year-on-year inflation



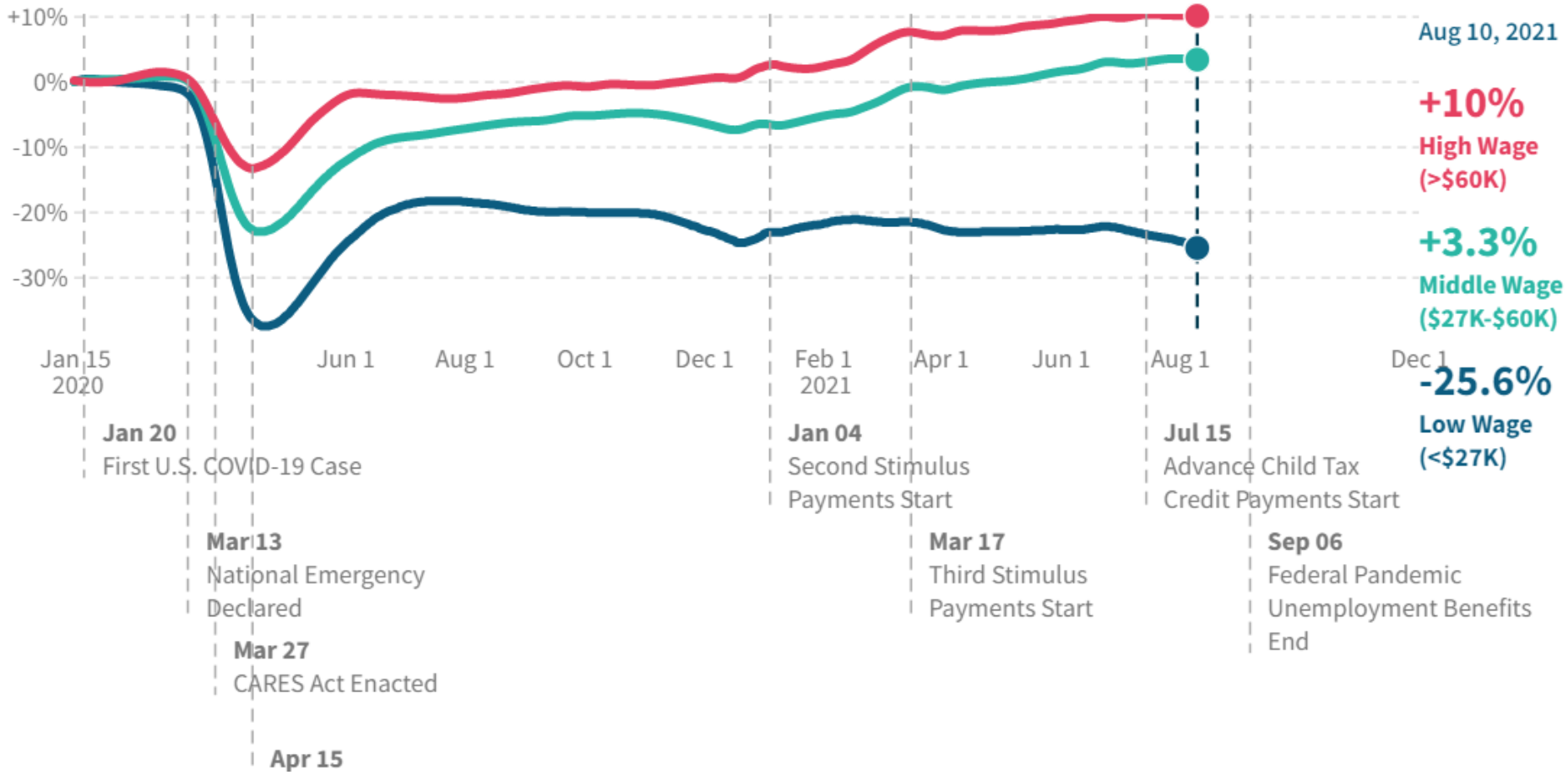
Services share from NIPA Personal Consumption



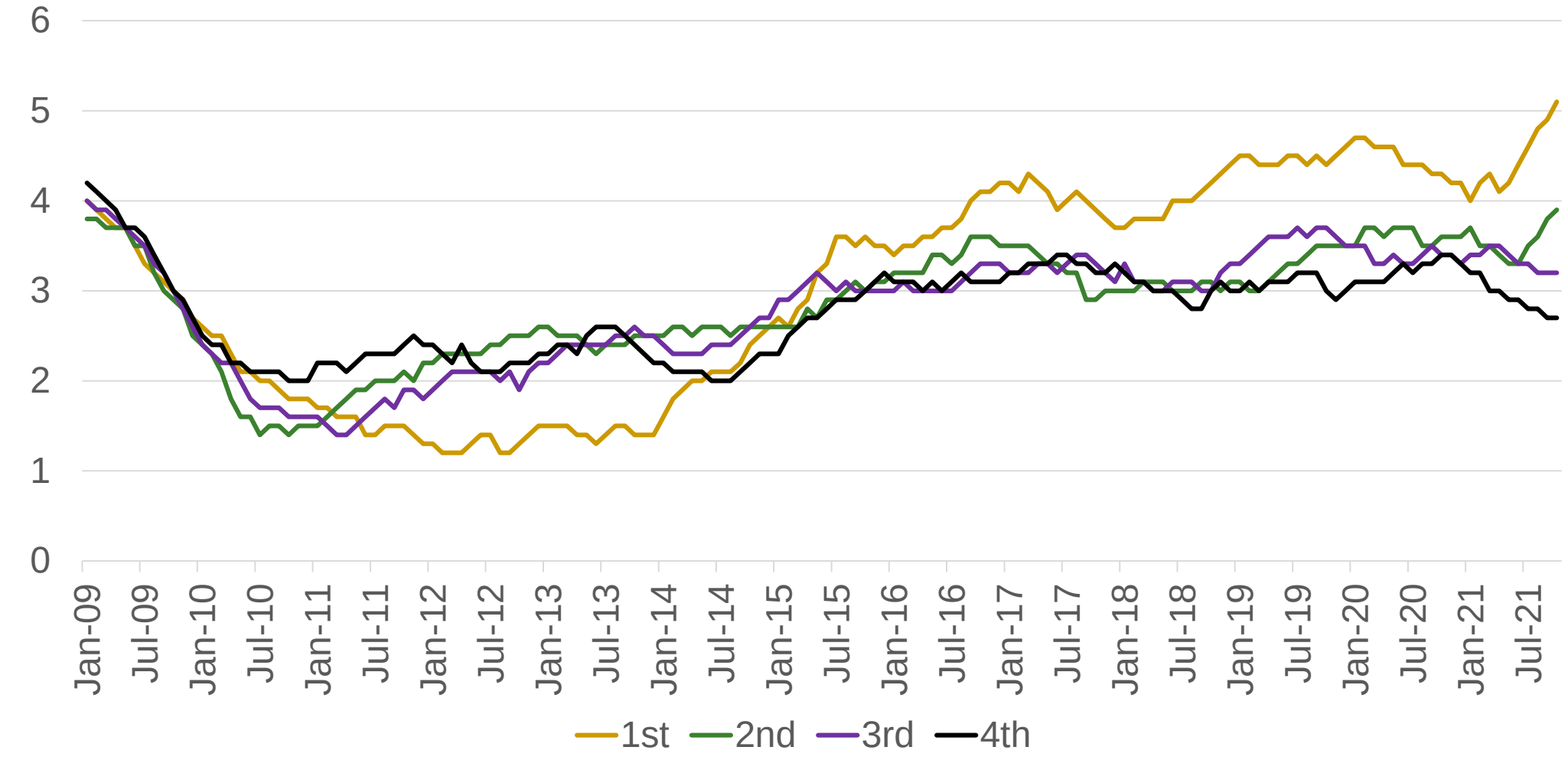
Wages and Prices



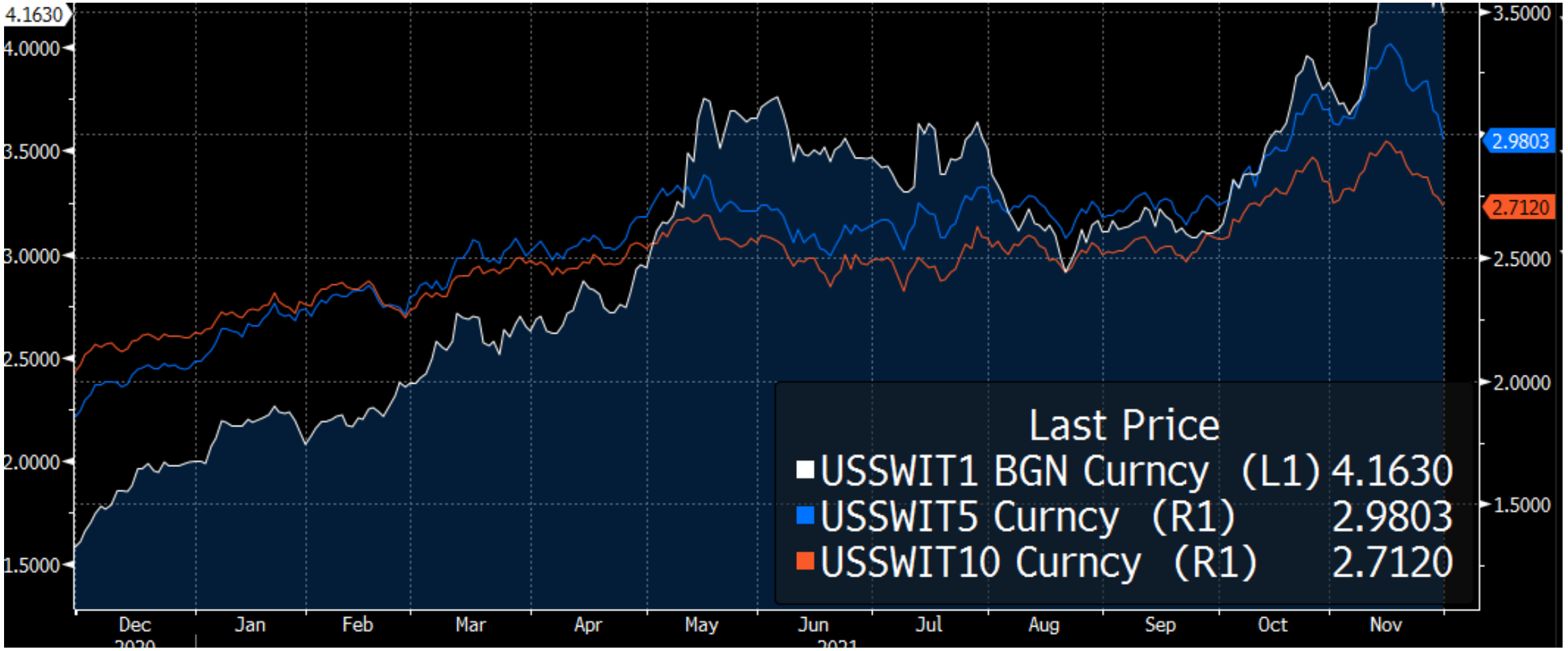
Quantity of labor



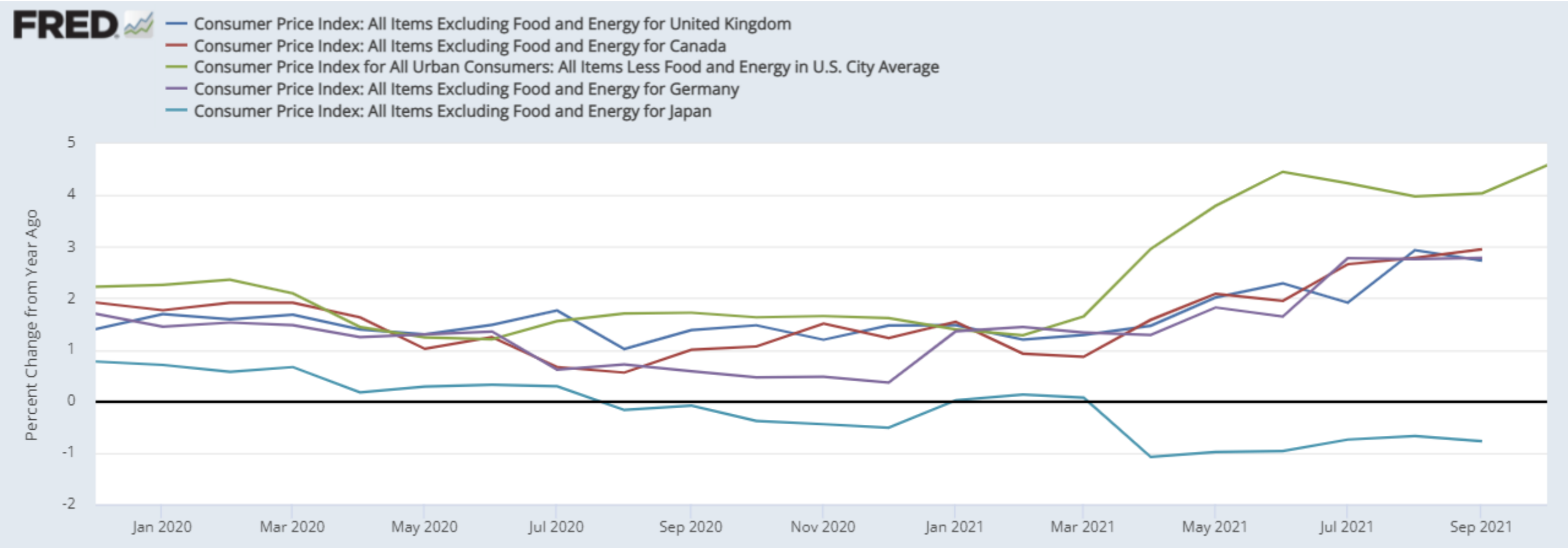
Price of labor: 1st quartile (yellow) is lowest wages



Inflation swaps: 1 year, 5 year, 10 year



Uneven inflation around the world



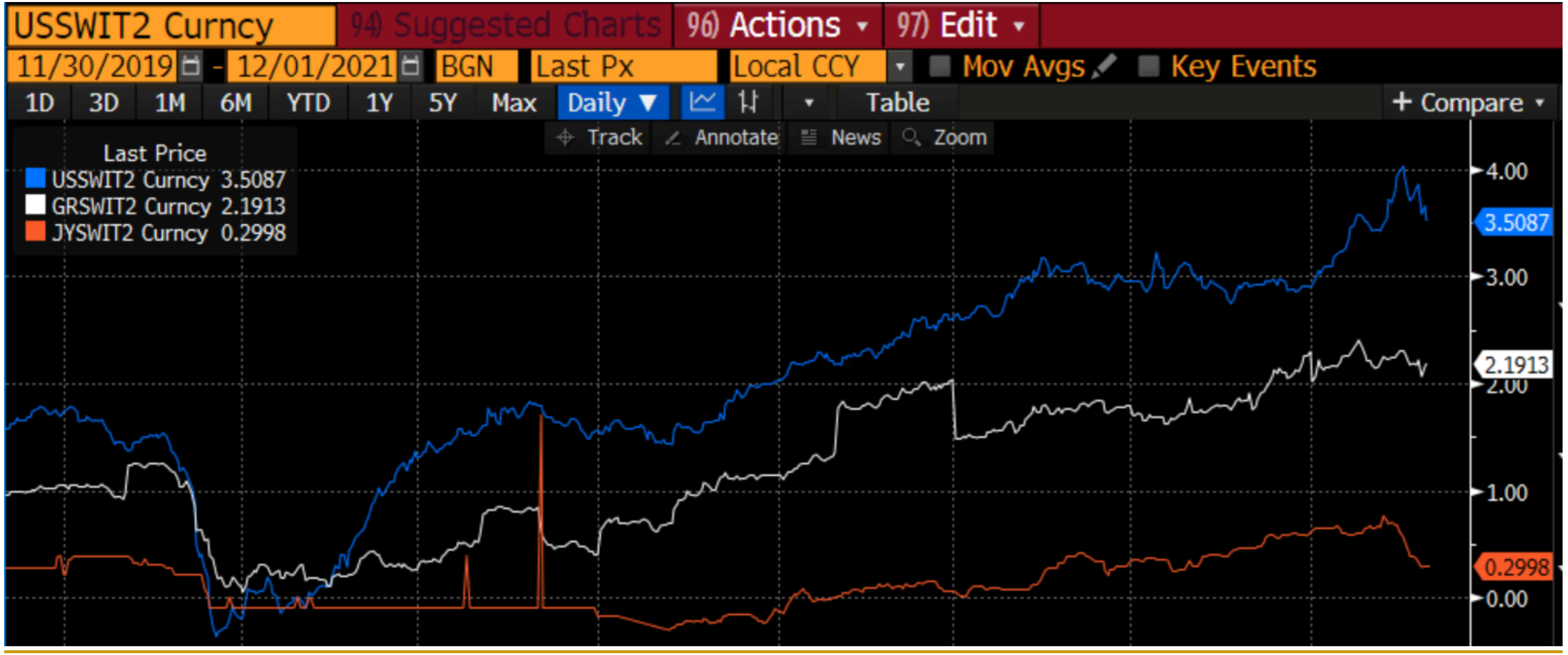
Uneven downturn and recovery (real GDP annual)

	2020	2021 est	2022 IMF proj
United States	-3.8%	5.7%	4.3%
Germany	-4.6	2.9	4.4
United Kingdom	-10.2	6.4	4.4
Canada	-6.4	5.1	3.8
Japan	-4.3	2.7	3.6
Italy	-8.6	5.9	4.3

Fiscal support differences

	Fiscal Support (% of GDP)	Loans, Equity, Guarantees
US	25.6%	2.4%
UK	16.2	16.1
Australia	16.1	1.8
Japan	15.9	28.3
Canada	14.6	4.0
Germany	11.0	27.8
Italy	8.5	35.3

Blue = US; White = Germany; Red = Japan
All series are 2-year CPI Inflation Swap



UK inflation swap is RPI (overstates by about 1%)

5y-5y forward inflation: US (blue); Euro (white)

INTEREST RATES

Charlie Evans (President of Chicago Fed) in 2011

"Suppose we faced a very different economic environment: *Imagine that inflation was running at 5% against our inflation objective of 2%. Is there a doubt that any central banker worth their salt would be reacting strongly to fight this high inflation rate? No, there isn't any doubt. They would be acting as if their hair was on fire.* We should be similarly energized about improving conditions in the labor market."

Source: https://www.chicagofed.org/publications/speeches/2011/09-07-dual-mandate

Taylor Rule with only inflation (i.e., u near u*)

$$i_{ff} = \Pi + r^* + (\Pi - \Pi^*) - K_2 (u - u^*)$$

- If inflation at 4.1%; target (Π^*) is 2%
- Suppose growth rate steady state is 1% (r*)
- Then … i_{ff} should be 7.2%

Inflation and interest rates

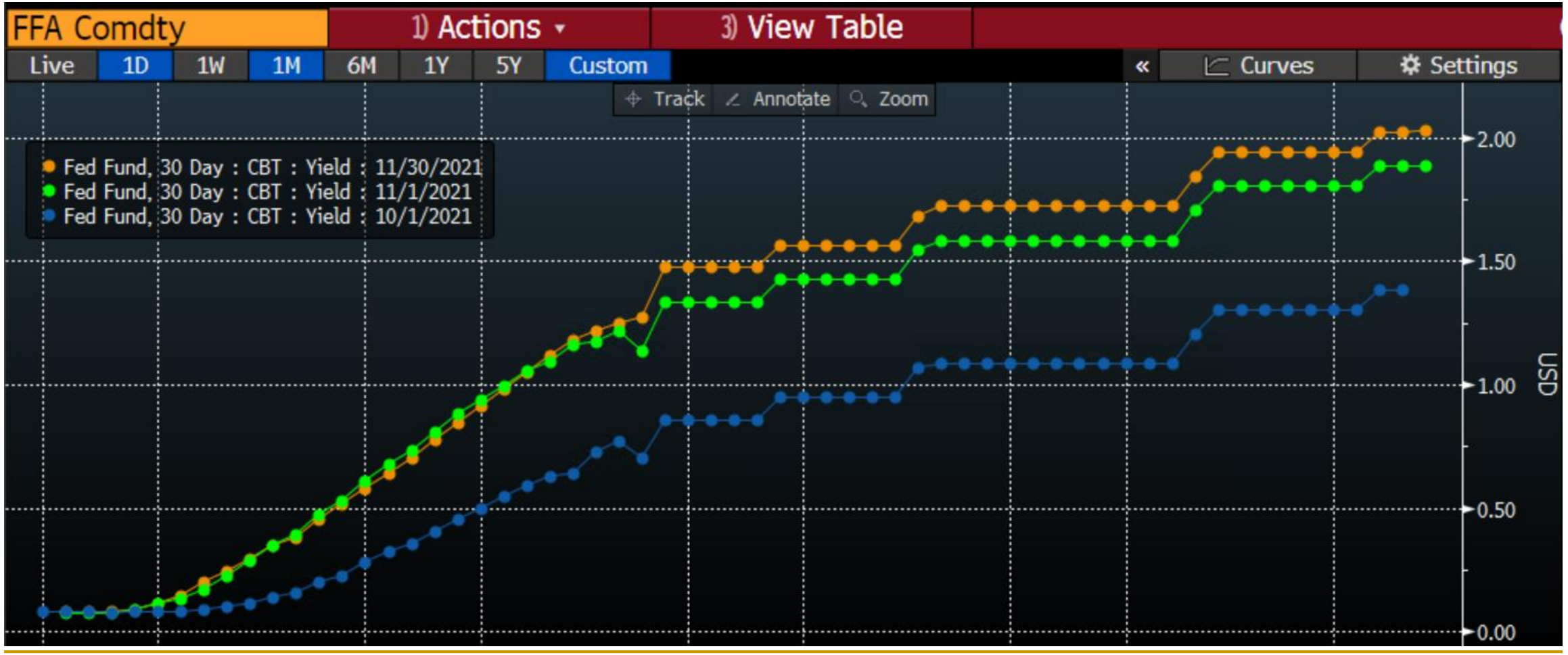
- Expected inflation is now about 4.1% for the next one year
- One-year nominal rates around 0.5%
- Real rate = -3.6%
- *Buy stuff now? But what … transitory vs permanent*

Taylor Rule with only inflation (i.e., u near u*)

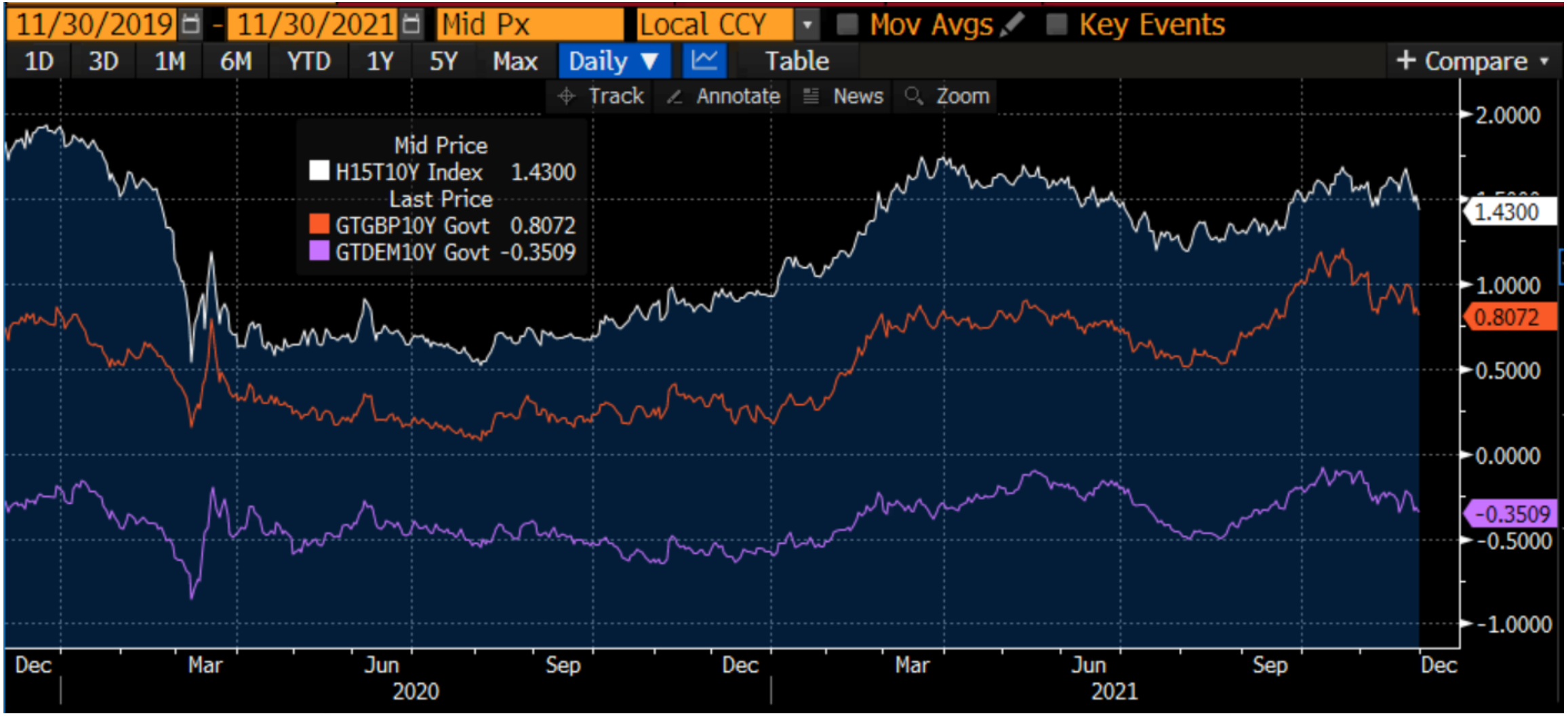
$$i_{ff} = \Pi + r^* + (\Pi - \Pi^*) - K_2 (u - u^*)$$

- If inflation at 3%; target (Π^*) is 2%
- Suppose growth rate steady state is 1% (r*)
- Then … i_{ff} should be 5%

Fed Funds Futures



10 year bond yields: US(white), UK (red), Germany (purple)



Inflation tail risk .. if it ends up raising long rates

- Real estate
- Equity valuations
- Government fiscal situation can worsen

Inflation, housing and affordability

- Buy $300K home, with 20% down ➔
  - $240K mortgage at 4%, monthly payment = $1,146
- Suppose household has monthly income of $4000. Rule of thumb for payment-to-income around 28%
  - Affordable payment = $1,120
  - So, the 300K home is just about affordable

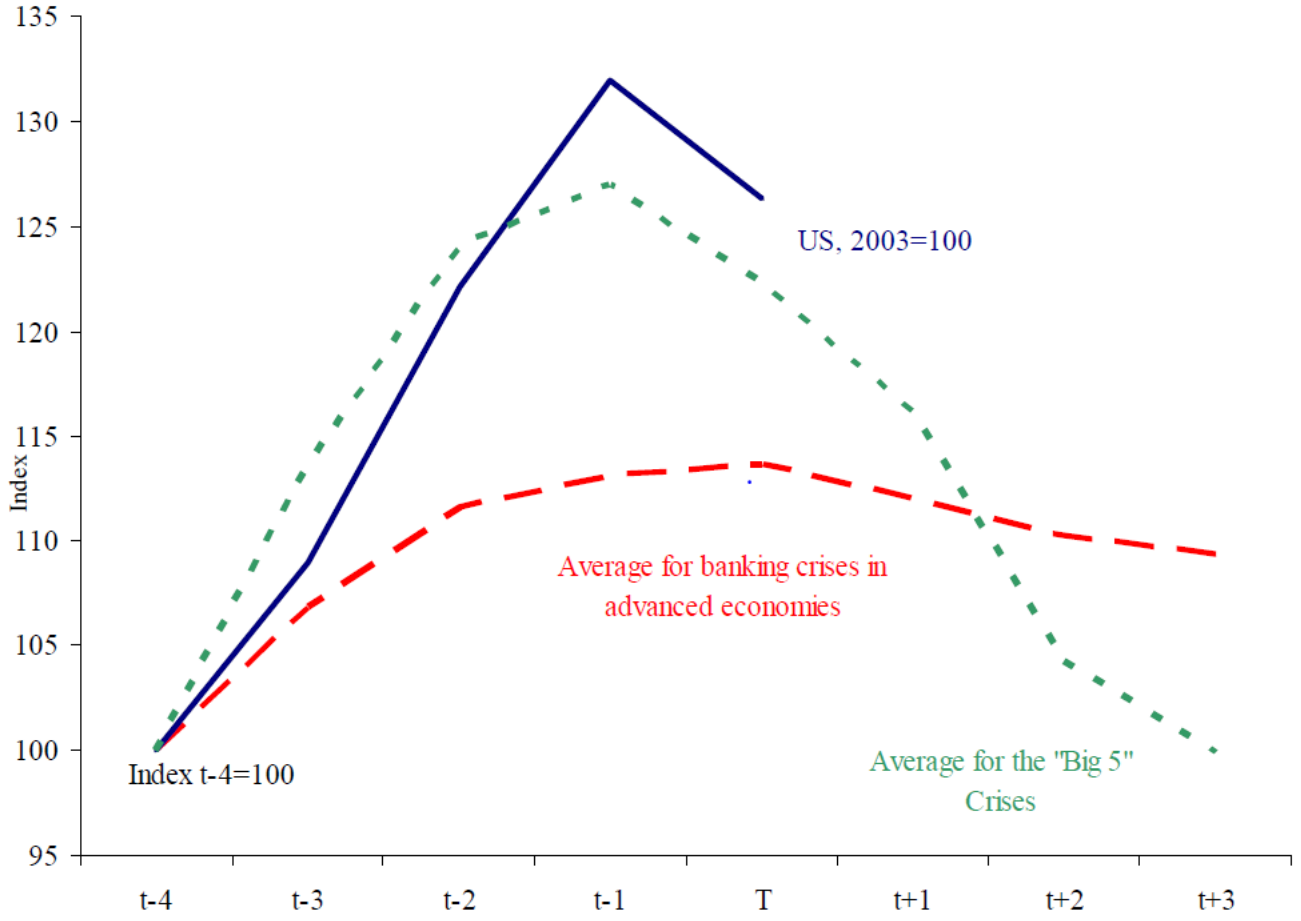
Inflation and affordability

- Suppose inflation goes from 2% to 4% and mortgage rates rise from 4% to 7%
  - inflation + fed raises rates to combat inflation
  - $240K mortgage at 7%, monthly payment = $1,597

- Today monthly income still $4000 (grows at 4% with inflation).
  - Affordable payment still = $1120
  - So, max home price affordable = $\frac{1120}{1597} X300K = \$210K$ vs $300K

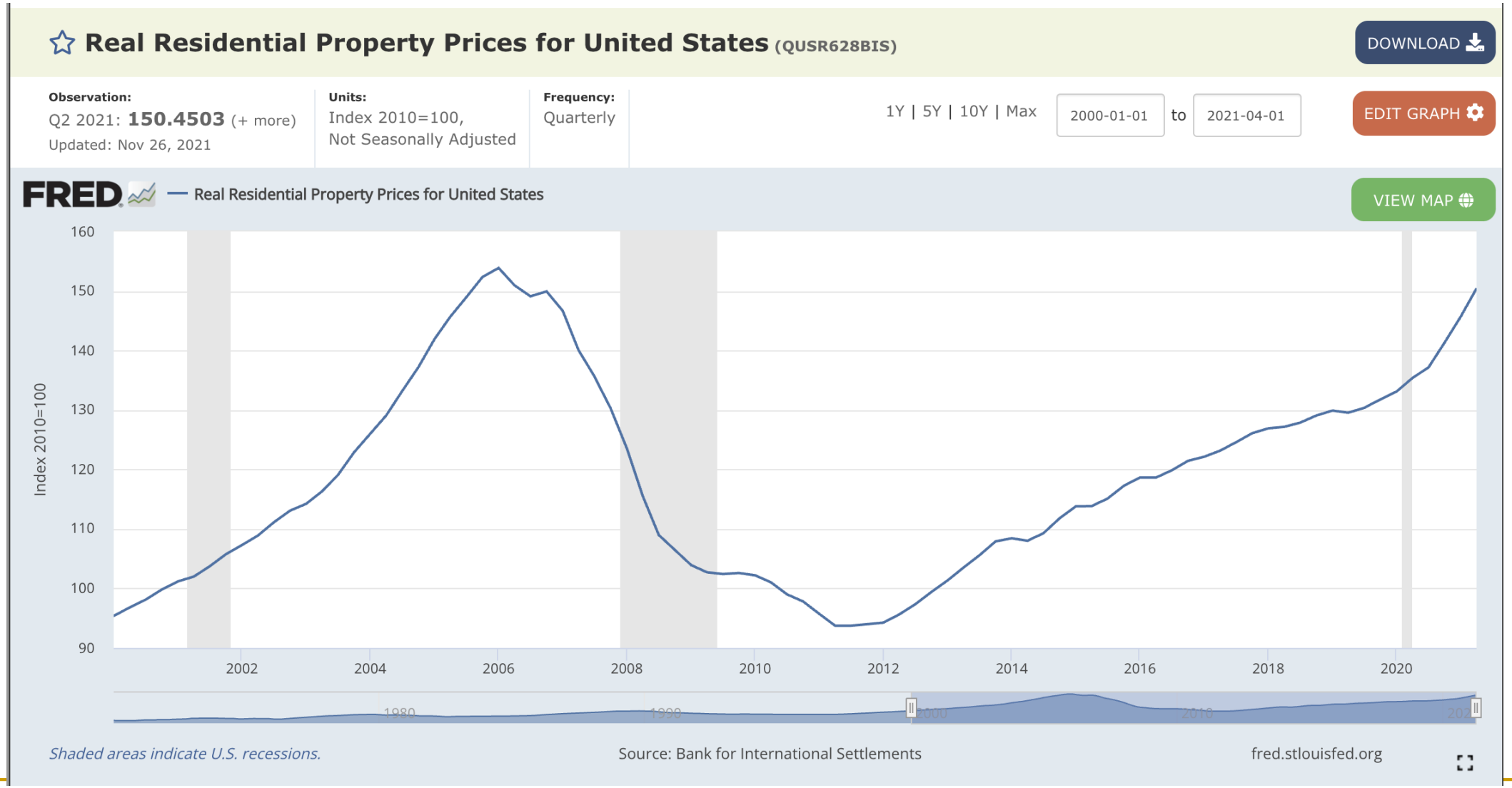
Real estate and crises

Figure 1: Real Housing Prices and Banking Crises



Reinhart and Rogoff (2008): “Big 5” = Spain (1977), Norway (1987), Finland (1991), Japan (1992)

Real estate and crises



Firm valuation

- Gordon growth formula:

$$P = \frac{D}{(r + \pi + ERP) - (g_{nominal} + \pi)}$$

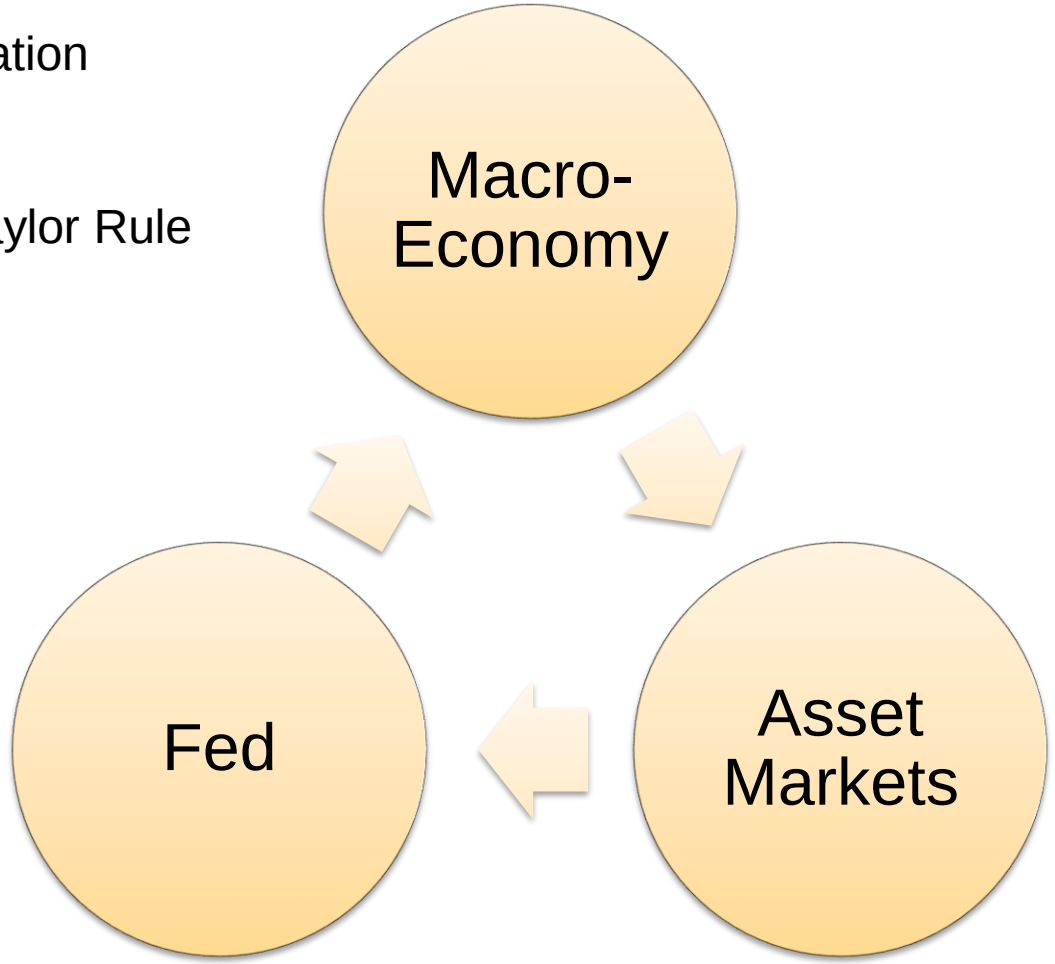
- Inflation roughly a wash for a very long-duration asset
- For short-duration assets, Fed hikes can weigh more heavily
- But if real estate falls ... Spending feedbacks, ERP rises

Takeaways

- Inflation is likely tied to uneven recoveries and bottlenecks
  - Faster recovery, fiscal support in US hits various bottlenecks
  - Some of that around the world
- Despite inflation and expected inflation, long-term nominal yields have remained stable
  - And despite a very dovish Fed
  - Puzzling to me … much lower growth prospects?
- If long rates react more normally, there are other risks…

Our coverage in one slide:

- Inflation determination
- Labor market, unemployment
- Fed objectives, Taylor Rule

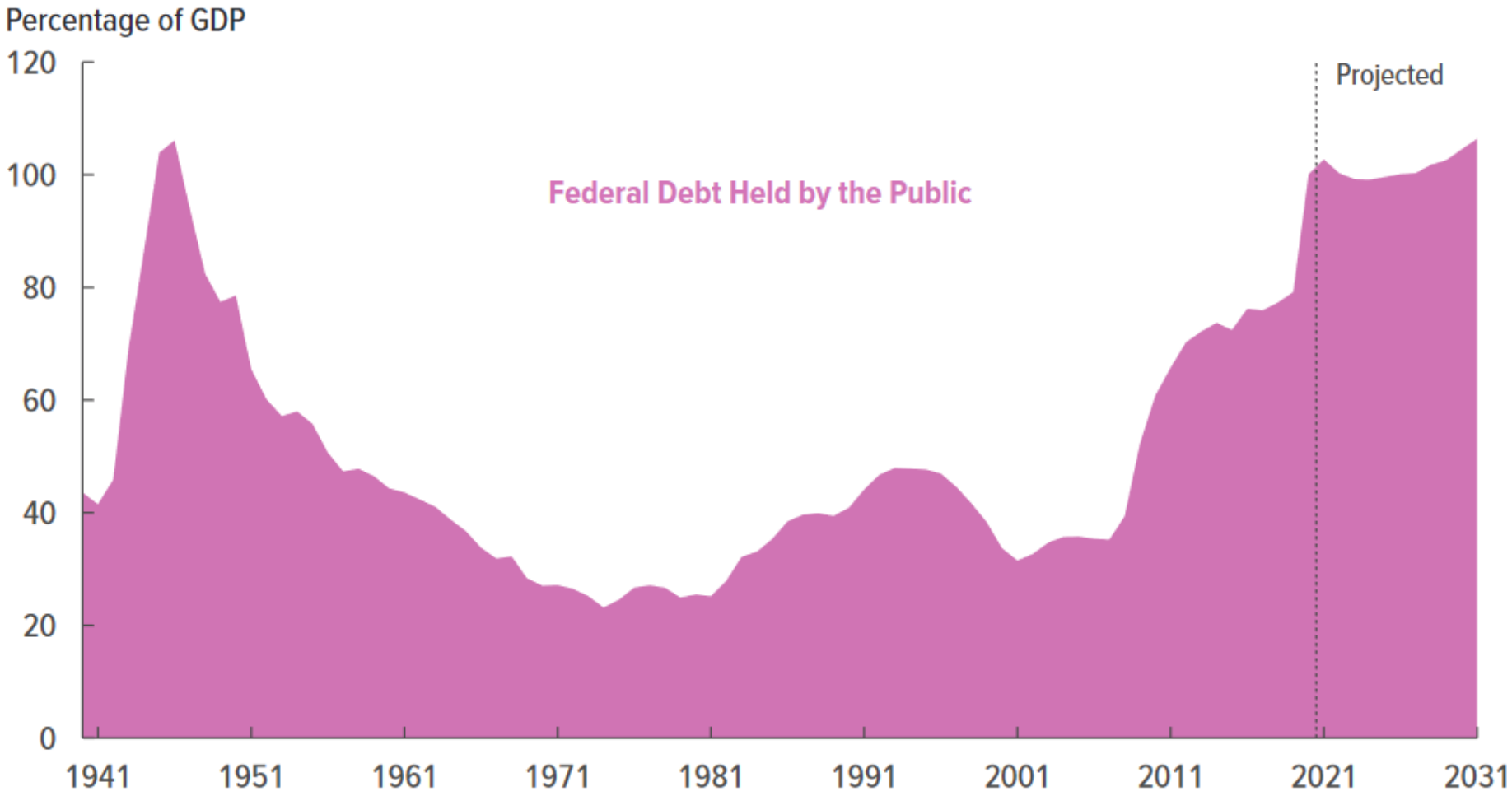


- What is “money”?
- Monetary system
- Bank reserves
- Fed balance sheet
- Policy tools
- Quantitative easing

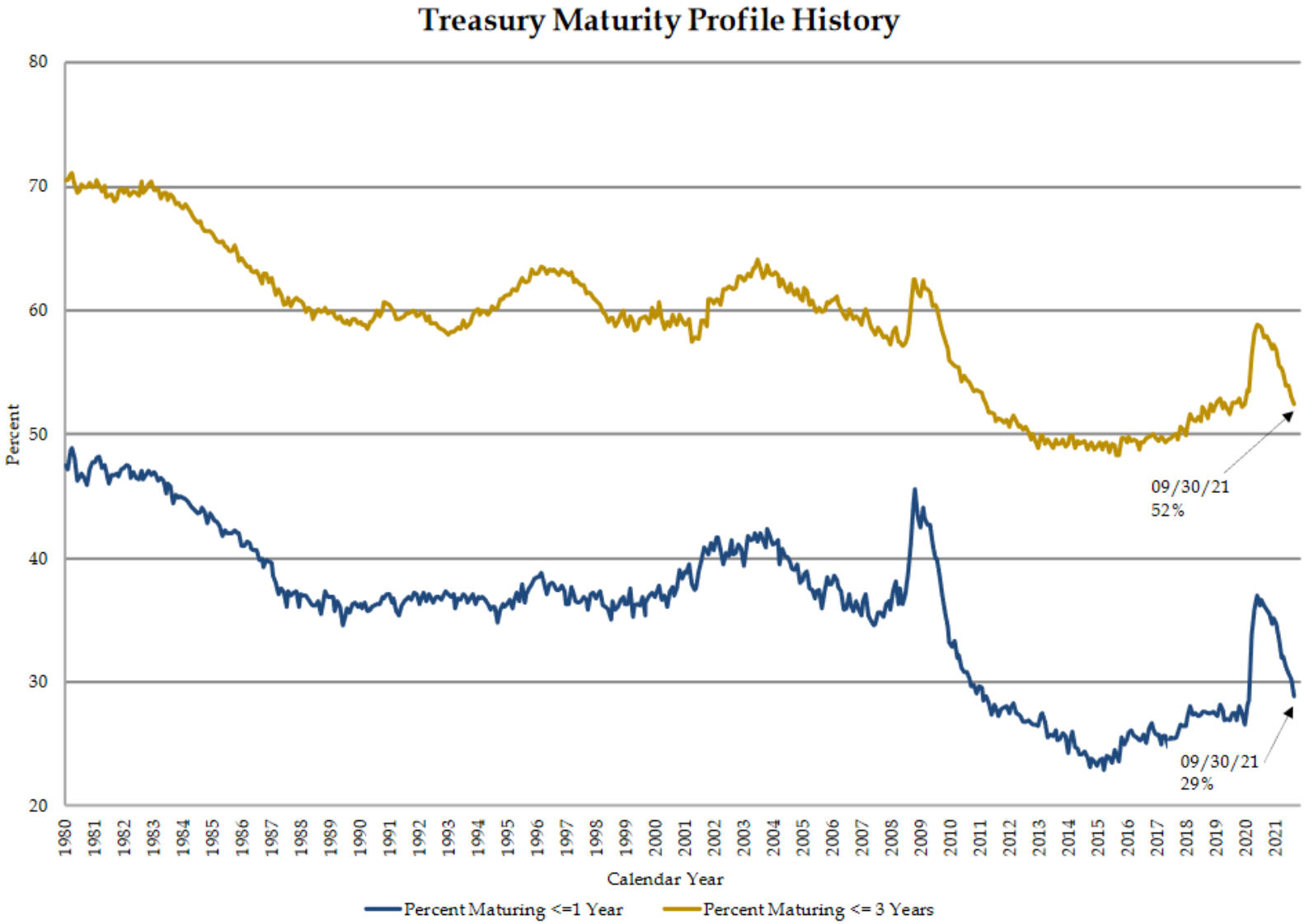
- Debt markets
- Yield curve analytics
- Expectations hypothesis
- Long maturity bond yields
- Stock market valuation

EXTRA: GOVERNMENT FINANCES

Government debt



Government debt maturity



Inflation scare and debt

- Suppose all debt is short-term and there is an inflation scare

$$i = r + \pi - LiqPrem$$

- And $g = r + \pi$
- Debt still sustainable.
- Tax receipts grow at the rate of inflation

Inflation and debt

- Suppose now debt is all long-term and inflation rises from π_0 to π_1

$$i = r + \pi_0 - LiqPrem$$

- And $g = r + \pi_1$
- Tax receipts grow at the rate of inflation; interest rate locked in
- Debt is “inflated” away
  - Reality is in the middle since 30 - 50% of debt is short-term

Inflation, debt, and Taylor rule

- Go back to debt is all short-term.
- Fed has historically raised rates approx two-for-one with inflation

$$i = r + b\,\pi \qquad with \qquad b = 2$$

- So $g - i = \ LiqPremium \ - (b - 1)\pi$
- Debt is not sustainable
- Does that mean that the Fed will be strong-armed to set $b = 1$?