# Discussion of Pflueger and Rinaldi, "Why Does the Fed Move Markets So Much? A Model of Monetary Policy and Time-Varying Risk Aversion"

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Advances in Monetary Economics Conference
International Monetary Fund (online)
July 19, 2021

# Overview

Summary of Paper:

1) Incorporates Campbell-Cochrane habits into standard NK model

2) Explains quarterly risk premia, volatility, correlations for equities, debt

3) Explains high-frequency stock market responses to FOMC announcements

Preview of My Comments:

1) Paper uses two high-frequency empirical facts as motivating evidence
   • one of those two facts is not really right (and also not necessary)

2) Incorporation of Campbell-Cochrane habits into NK model is very elegant

3) Compare and contrast Campbell-Cochrane habit approach to Epstein-Zin preferences approach
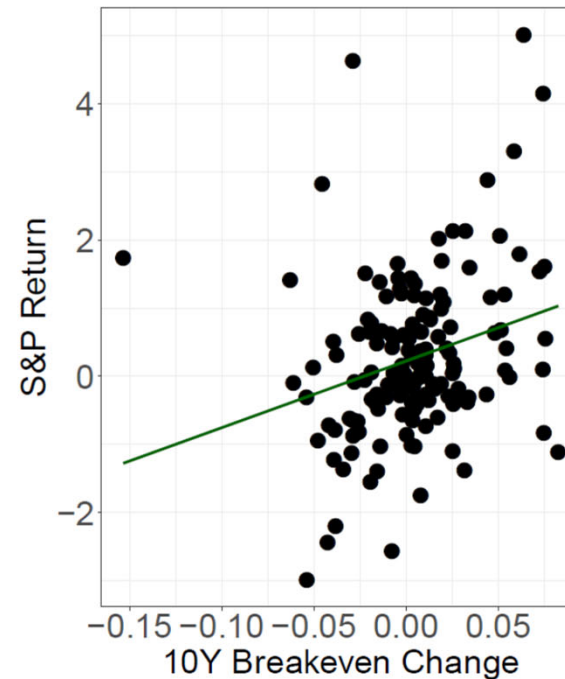
# Comment #1: Two High-Frequency Empirical Facts



Figure 1: Stocks and Bonds on FOMC Dates

Panel A: Stocks and the Federal Funds Rate
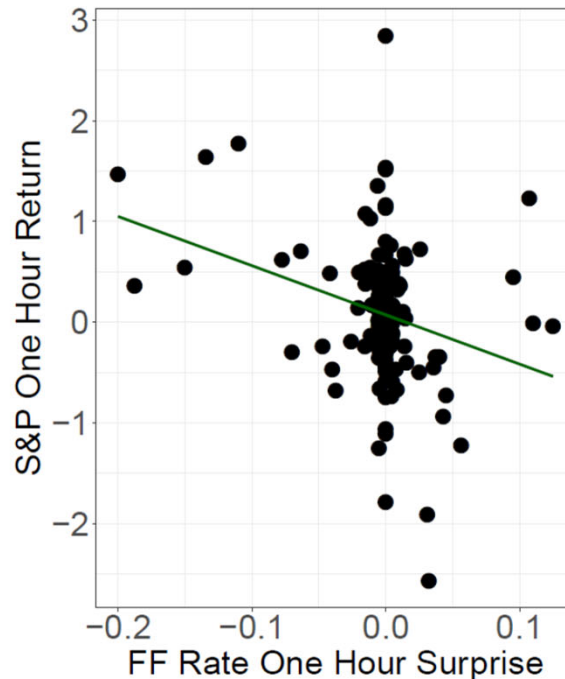
Panel B: Stocks and Breakeven Inflation

- Paper treats federal funds rate surprise and 10Y breakeven surprise on FOMC dates as *independent* dimensions of monetary policy
- Paper interprets each of these figures as *causal*, with second shock a "long-term inflation" shock

# Comment #1: Two High-Frequency Empirical Facts

- But a long literature finds substantial effects of federal funds rate surprises on far-ahead forward nominal interest rates and breakeven inflation:
    - Gurkaynak-Sack-Swanson (2005 AER)
    - Gurkaynak-Sack-Swanson (2005 IJCB)
    - Gurkaynak-Levin-Swanson (2010 JEEA)
    - Beechey-Wright (2009 JME)
    - Bu-Rogers-Wu (2021 JME)

- All of these papers find substantial correlation between the two
    - note: the correlation between fed funds rate and breakeven inflation is stronger when you focus on *far-ahead forward* breakeven inflation

- Natural to interpret the change in the federal funds rate as causing change in long-term inflation expectations or inflation risk premia
    - see Gurkaynak-Sack-Swanson (2005 AER), Gurkaynak-Levin-Swanson (2010 JEEA) for more details

# Comment #1: Forward Interest Rates

- Gurkaynak, Sack, and Swanson (2005 AER) plot nominal forward interest rate responses to federal funds rate surprises:
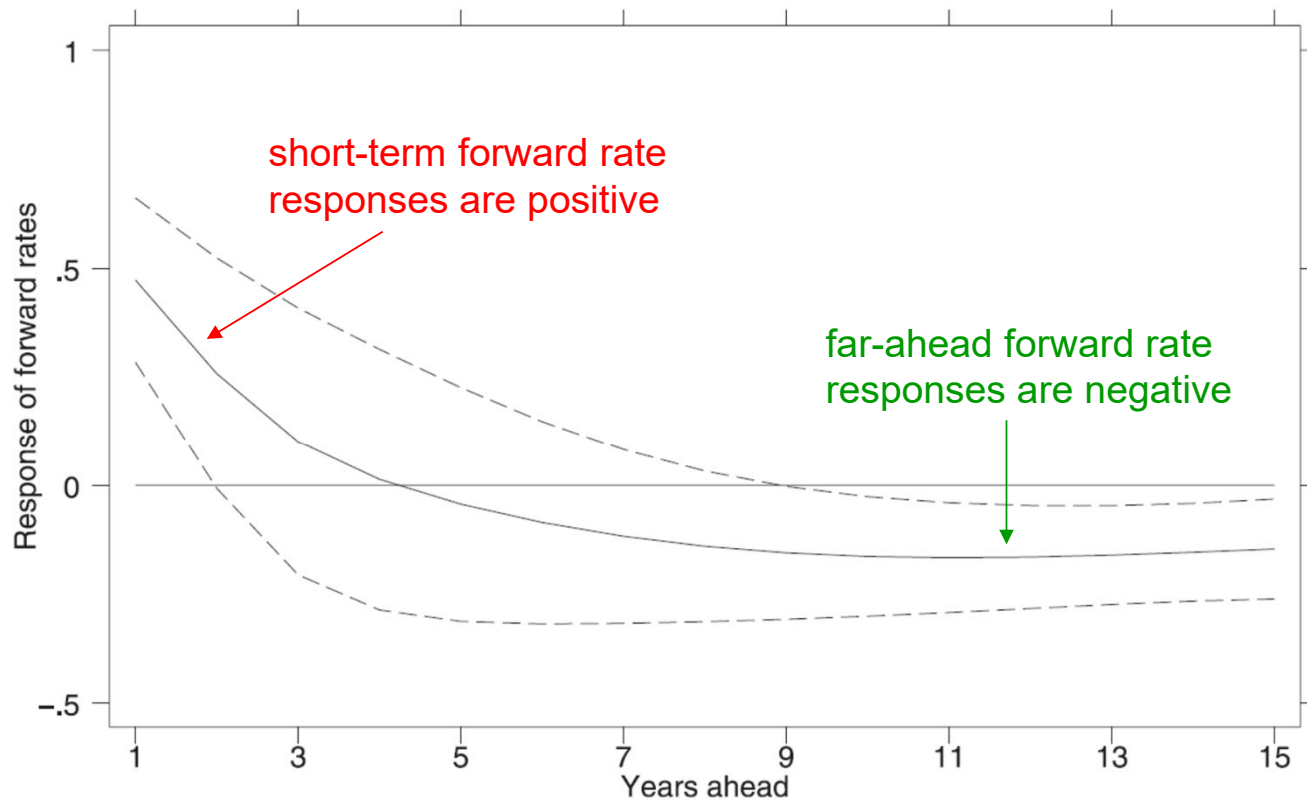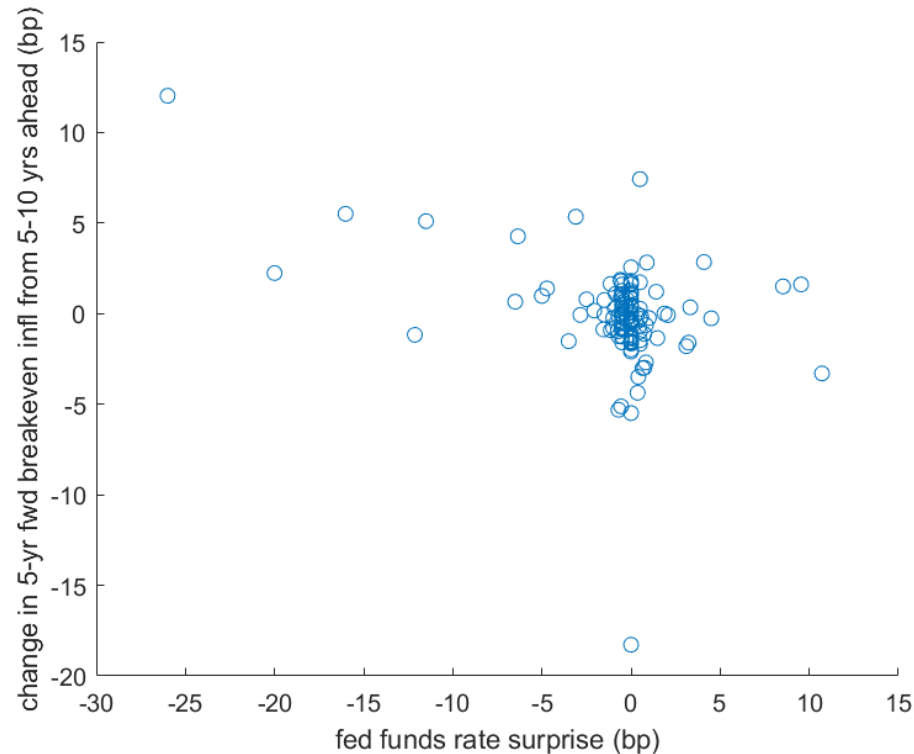


FIGURE 3. RESPONSE OF FORWARD RATES TO MONETARY POLICY SURPRISES

# Comment #1: Updated Plot of Forward Breakeven Responses

Scatter plot of high-frequency (30-minute) changes in 5-year forward breakeven inflation rate from 5 to 10 years ahead against federal funds rate surprises:

sample: all FOMC announcements from 3/2004 – 6/2019

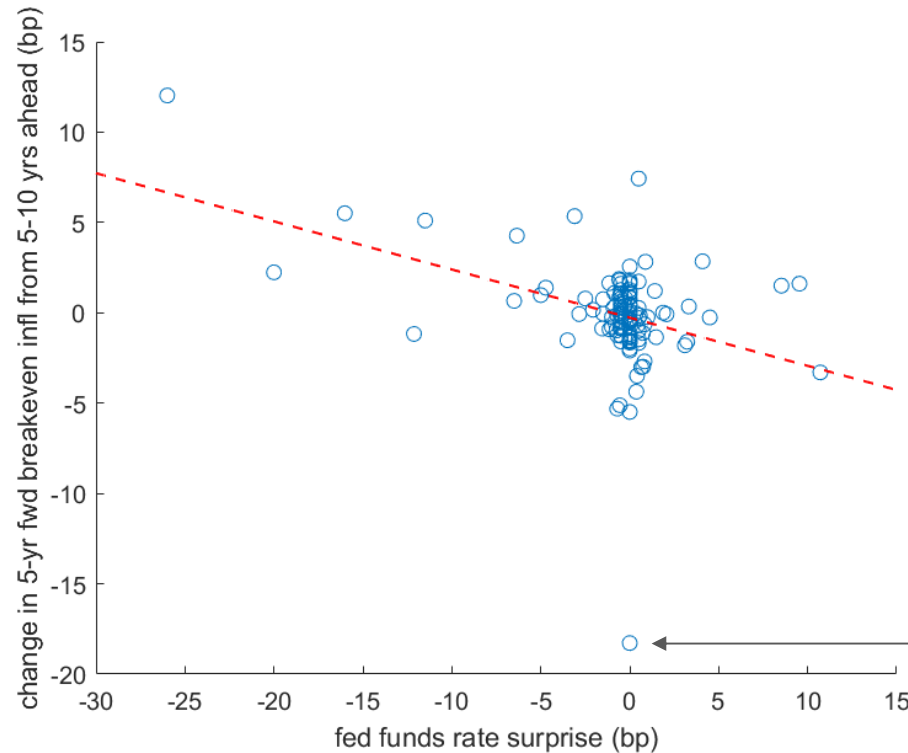# Comment #1: Updated Plot of Forward Breakeven Responses

Scatter plot of high-frequency (30-minute) changes in 5-year forward breakeven inflation rate from 5 to 10 years ahead against federal funds rate surprises:



sample: all FOMC announcements from 3/2004 – 6/2019

slope: −.27
t-statistic: − 4.91

(outlier is 3/18/2009; t-statistic excluding outlier is − 6.27)

# Comment #1: Long-Term Inflation Expectations

- Negative response of far-ahead forward inflation expectations to fed funds rate surprises is intuitive:

$$i_t = (1 - c)[\bar{\pi}_t + a(\bar{\pi}_t - \pi^*) + by_t] + ci_{t-1} + \varepsilon_t^i$$

- A surprise tightening in $i_t$ could be due either to a positive $\varepsilon_t^i$
  or to a negative change in $\pi^*$ (both of which are unobserved)
  - market participants seem to price in both possibilities

- See Gurkaynak, Sack, and Swanson (2005 AER), Gurkaynak, Levin, and Swanson (2010 JEEA) for more discussion, details
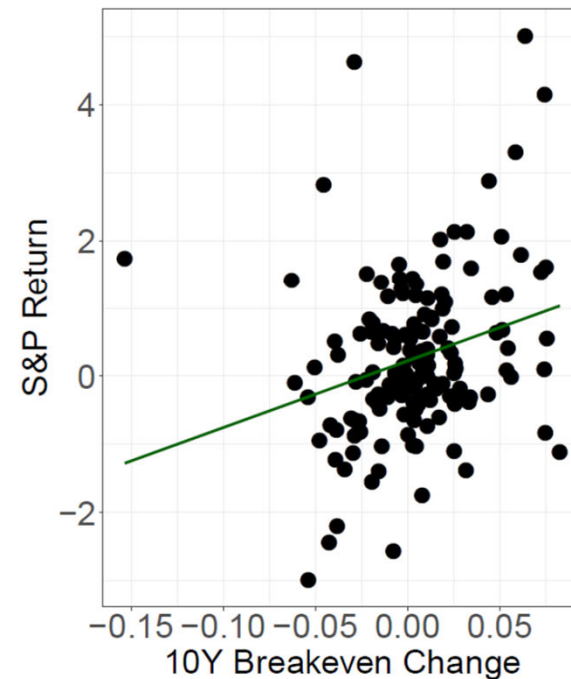
# Comment #1: Bottom Line

Figure 1: Stocks and Bonds on FOMC Dates

Panel A: Stocks and the Federal Funds Rate
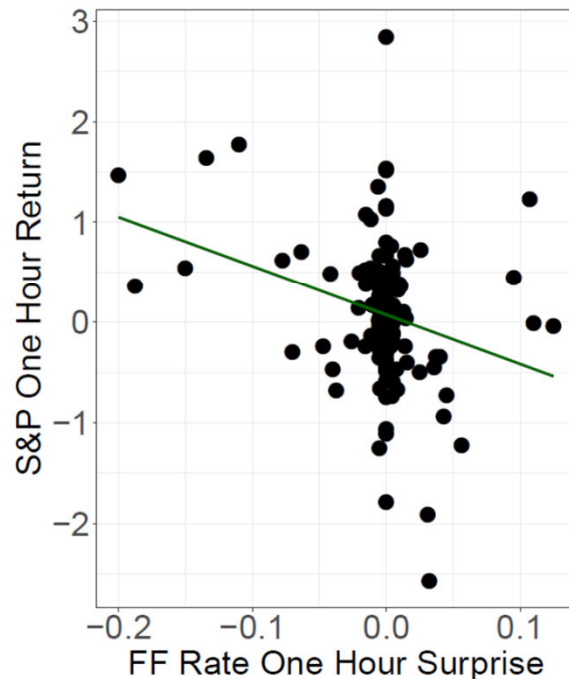
Panel B: Stocks and Breakeven Inflation

- Long-term breakeven inflation changes around FOMC announcements are closely related to fed funds rate surprises
- The second figure is not surprising and is not evidence of an independent "long-term inflation" shock

# Comment #1: Bottom Line

The second figure is also not necessary:

- The paper accomplishes a great deal already
- It's interesting enough to match quarterly asset price data and high-frequency response of stock prices to federal funds rate surprises

# Comment #2: Incorp. of C-C Habits into NK Model is Very Elegant

Incorporating Campbell-Cochrane habits into a NK model is very difficult:

- Campbell-Cochrane habits imply very high risk aversion (CRRA of 60 on average, over 100 in recessions)

- Households that are so risk averse want to insure themselves in any way possible

- C-C habits also imply households hate high-frequency variation in consumption the most (Otrok, Ravikumar, Whiteman, 2002 JME)

- So households will do everything possible to smooth consumption:
    1. use precautionary savings
    2. vary labor supply as necessary to maintain consumption

- C-C habits shut down the first channel by exactly balancing precautionary savings and intertemporal substitution motives

- But the second channel is usually a big problem…

# Comment #2: Incorp. of C-C Habits into NK Model is Very Elegant

- Campbell-Cochrane (1999 JPE) is an endowment economy
  - shuts down labor variation by assumption
  - Lettau-Uhlig (2000 RED) and Rudebusch-Swanson (2008 JME) show that allowing for labor variation drives risk premia back to almost zero

- Campbell-Pflueger-Viceira (2020 JPE) is a reduced-form 3-equation NK model (with no labor)
  - shuts down labor variation by assumption

- This paper is a *fully structural* NK model
  - uses GHH preferences to solve the problem:

$$\sum_{t=0}^{\infty} \beta^t \, u(C_t - v(L_t))$$

  - labor supply only varies in response to real wage changes (no income/wealth effect)

# Comment #2: Incorp. of C-C Habits into NK Model is Very Elegant

- GHH preferences:

$$U_t = \frac{\left((C_t - H_t) + (C_t^{home} - H_t^{home})\right)^{1-\gamma} - 1}{1 - \gamma}$$

$$C_t^{home} = A_t N_t \frac{\int_0^1 (1 - L_{i,t})^{1-\chi} \, di}{1 - \chi}.$$

- Elegant solution to a long-standing problem in habits models

- Note: normally, GHH preferences not consistent with balanced growth
  - but by formulating leisure in term of home production, this problem is also solved

# Comment #3: Campbell-Cochrane Habits v. Epstein-Zin Preferences

In Macro-Finance, there are two main approaches to matching risk premia on assets:

- Campbell-Cochrane habits
- Epstein-Zin preferences

This paper takes the first approach; my own work has taken the second:

- Rudebusch and Swanson (2012 AEJMacro)
- Swanson (2019), "A Macroeconomic Model of Equities and Real, Nominal, and Defaultable Debt"

Epstein-Zin preferences:

$$V_t \equiv u(c_t, l_t) + \beta \left( E_t V_{t+1}^{1-\alpha} \right)^{1/(1-\alpha)},$$

- $\alpha = 0$ corresponds to standard expected utility preferences
- $\alpha > 0$ increases risk aversion without affecting intertemp. elast. of subst.

# Comment #3: Campbell-Cochrane Habits v. Epstein-Zin Preferences

Both approaches can explain:
- quarterly risk premia, volatility, correlations for equities, debt
- countercyclical risk aversion
- countercyclical risk premia
- high-frequency stock market responses to FOMC announcements
  - mechanism is essentially just countercyclical risk premia

Some advantages of Epstein-Zin preferences:
- functional form for Campbell-Cochrane habits extremely complicated, special in order to balance precautionary savings and intertemp. subst.
- EZ preferences separate risk aversion from intertemp. subst.
- EZ preferences work with any period utility function
- high risk aversion in EZ preferences can be viewed as a stand-in for uncertainty (Barillas, Hansen, Sargent, 2009 JET) or heterogeneous households with uninsurable idiosyncratic risk (Schmidt, 2016)

# Summary

Summary of Paper:

1) Incorporates Campbell-Cochrane habits into standard NK model

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