

Discussion of Pflueger (2023)  
“Back to the 1980s or Not?  
The Drivers of Inflation and Real Risks In Treasury Bonds”

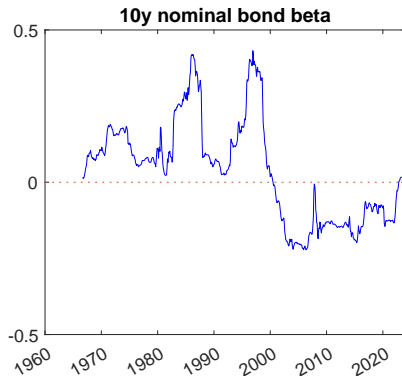
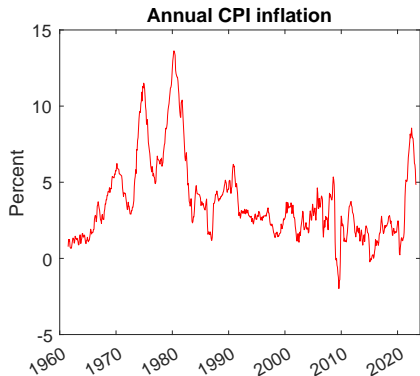
Min Wei  
Federal Reserve Board

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The opinions expressed in this presentation are my own and do not  
reflect the views of the Board of Governors or its staff.

# Motivation



Note: Five-year rolling bond beta based on three-month holding period returns.

- ▶ Empirical facts
  - ▶ Inflation changed from counter-cyclical to pro-cyclical since around 2000 (Li 2002, Baele et al 2010)
  - ▶ Stock-bond return correlation turned from +ve to -ve since around 2000
  - ▶ Monetary policy went through structural changes (Clarida Gali Gertler 2000)
  - ▶ Types and volatilities of shocks to the economy also vary over time (Sims 1980)
  - ▶ A combination of policy and shock changes might be behind the switching signs (Campbell Pflueger Viceira 2020, Chernov Lochstoer Song 2023, this paper)

# Big Picture and contributions of the paper

- ▶ Macro vs finance models
  - ▶ Structural macro models successful explaining macro dynamics (eg Smets Wouters 2007)
    - ▶ However, asset prices especially risk premiums are typically ignored.
  - ▶ Asset pricing models successful explaining asset price dynamics in endowment economies (Campbell Cochrane 1999; Bansal Yaron 2004)
    - ▶ However, less so if households can vary investment/labor to smooth consumption (Lettau Uhlig 2000; Rudebusch Swanson 2008)
  - ▶ Continued effort to bridge the gap between the two (Uhlig 2007; Rudebusch Swanson 2021; this paper)
- ▶ Contributions of this paper
  - ▶ Propose a structural model to match both macro dynamics and equity and bond risk premiums.
  - ▶ Use the model to interpret shift in equity beta of Treasury bond around 2000.

# Summary of paper

- ▶ The model
  - ▶ Generalized habit preference a la Campbell Pflueger Viceira (2020)
    - ▶ Real rate depends on leads and lags of output gap, as in log-linearized Euler equation in standard macro models
  - ▶ Add habit in utility from leisure to dampen labor market adjustment
  - ▶ Three shocks: risk premium shock, Phillips curve shock, monetary policy shock
- ▶ Calibrate to two subsamples: 1979-2001 and 2001-2019
  - ▶ Break date based on inflation-output gap correlation
- ▶ Findings
  - ▶ Pre-2001: Volatile *supply and MP* shocks; Monetary policy puts *more* weight on inflation and *little inertia*; inflation expectations *adaptive*
  - ▶ Post-2001: Volatile *demand* shocks; Monetary policy puts *less* weight on inf and *more inertia*; inflation expectations *forward looking*
  - ▶ Changing policy rules and changing shocks are both important in explaining changing sign of bond beta

# #1: Use of asset price information in model calibration

- ▶ Asset prices are under-used in calibration/estimation
  - ▶ Many parameters taken from studies relying heavily on the pre-2000 sample
  - ▶ Sub-period policy parameters and shock vols: calibrated only using macro moments (exception: annual change in FFR)
  - ▶ Bond excess return predictability: used to calibrate adaptiveness of inflation expectations
  - ▶ Vol of equity returns: used to calibrate the leverage parameter

# #1: Use of asset price information in model calibration

- ▶ Asset price moments not fit very well in the post-2001 sample
  - ▶ Bond spread turned negative; bond return vol too low.

Table 2: Model and Data Moments

Stocks	1979.Q4-2001.Q1		2001.Q2-2019.Q4	
	Model	Data	Model	Data
Equity Premium	7.33	7.96	9.15	7.64
Equity Vol	14.95	16.42	19.29	16.80
Equity SR	0.49	0.48	0.47	0.45
AR(1) pd	0.96	1.00	0.93	0.84
1 YR Excess Returns on pd	-0.38	-0.01	-0.38	-0.50
1 YR Excess Returns on pd ( $R^2$ )	0.06	0.00	0.14	0.28
Bonds				
Yield Spread	2.28	1.53	-0.58	2.06
Return Vol.	15.82	14.81	2.12	9.28
Nominal Bond-Stock Beta	0.86	0.24	-0.09	-0.31
Real Bond-Stock Beta	0.05	0.08	-0.08	-0.06
1 YR Excess Return on slope*	1.26	2.55	-0.31	0.86
1 YR Excess Return on slope ( $R^2$ )	0.01	0.07	0.01	0.02
Macroeconomic Volatilities				
Std. Annual Cons. Growth*	0.76	1.15	1.59	1.15
Std Annual Change Fed Funds Rate*	1.64	2.26	0.65	1.40
Std. Annual Change 10-Year Subj. Infl. Forecast*	0.62	0.47	0.12	0.12

## #1: Use of asset price information in model calibration

- ▶ Asset price moments not fit very well in the post-2001 sample
  - ▶ Equity premium rises in the model unlike in the data:
    - ▶ One might expect dovish monetary policy to lead to lower risk premiums (Bianchi Lettau Ludvigsson 2022)

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## #1: Use of asset price information in model calibration

- ▶ Asset prices are under-used in calibration/estimation
- ▶ Asset price moments not fit very well in the post-2001 sample
- ▶ *Suggestion: calibrate the model using more information from asset prices*

## #2: How important is the shift in monetary policy reaction function?

- ▶ Paper argues that shift in monetary policy is important in addition to shifting shocks
- ▶ However, policy rule coefficients not very different across subsamples

Table 1: Calibration Parameters

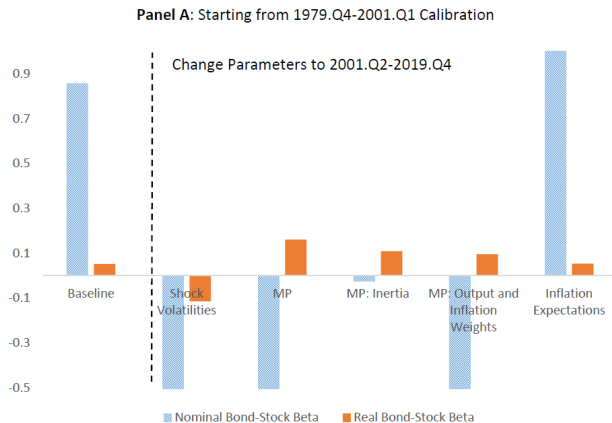
		1979.Q4-2001.Q1	2001.Q2-2022.Q2
MP inflation coefficient	$\gamma^\pi$	1.35 (0.22)	1.10 (0.05)
MP output coefficient	$\gamma^x$	0.50 (0.32)	1.00 (0.19)
MP persistence	$\rho^i$	0.54 (0.13)	0.80 (0.03)

- ▶ Post-2001 MP rule estimates likely attenuated by the ELB (Kim Pruitt 2017)
  - ▶ ELB also likely bias post-2001 regression coefs using ffr in Figures 2 and A1.
  - ▶ Could use surveys or a shadow rate estimate.

## #2: How important is the shift in monetary policy reaction function?

- ▶ Pre-2001: changing MP rule or shock vols flips the sign of correlation; both essential.

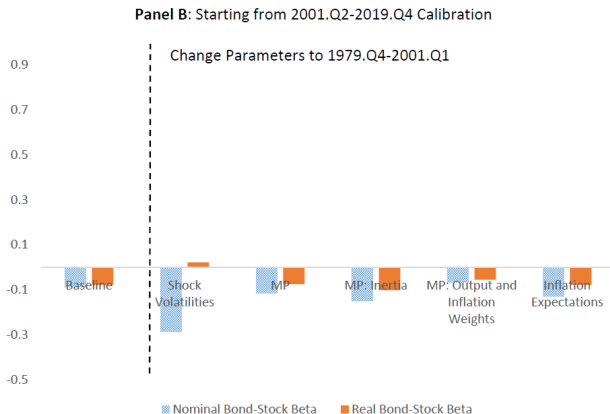
Figure 7: Counterfactuals for Nominal and Real Bond-Stock Betas



## #2: How important is the shift in monetary policy reaction function?

- ▶ However, post-2001: neither MP rule or shock vols seems essential; could be consistent with pre-2001 monetary policy rule

Figure 7: Counterfactuals for Nominal and Real Bond-Stock Betas



## #2: How important is the shift in monetary policy reaction function?

- ▶ Policy rule coefficients not very different across regimes
- ▶ Post-2001 bond beta could be consistent with pre-2001 monetary policy rule
- ▶ Timing of the monetary policy structural break.
  - ▶ Paper uses inflation-output gap correlation break point
  - ▶ But literature estimating MP rule typically found other break points: eg pre and post Volcker
    - ▶ Though Bianchi Ludvigson Ma (2023) find a break at 2001Q3
  - ▶ Useful to show more direct evidence on shift in MP rule, taking account of ELB

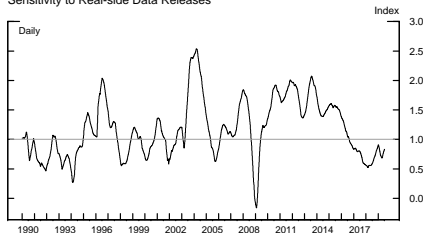
## #2.5: Lessons for the current episode

- ▶ Affected by answer to previous question
- ▶ Some factors not in the model might be important for the current episode
  - ▶ Persistence of the shocks
    - ▶ Could affect inflation-output correlation (Keating Valcarcel 2015)
    - ▶ Could also affect sign of term premiums (Campbell 1986)
  - ▶ Steepening of the Phillips curve despite stable long-run expected inflation
  - ▶ Real time data and learning (Orphanides 2003)
- ▶ Changing stock-bond correlation not necessarily a sign of shifting monetary policy reaction function

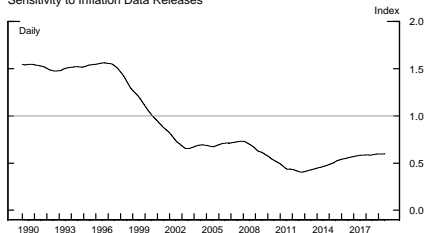
### #3: Other dimensions of model/data

- ▶ Model implies that in the earlier period, term premiums would rise in response to a negative demand shock
  - ▶ Risk aversion rises as consumption falls closer to habit, amplifying positive term premium
- ▶ Could examine this prediction by looking at how term premiums respond to economic data surprises
  - ▶ Here I only looked at yield changes

Sensitivity to Real-side Data Releases



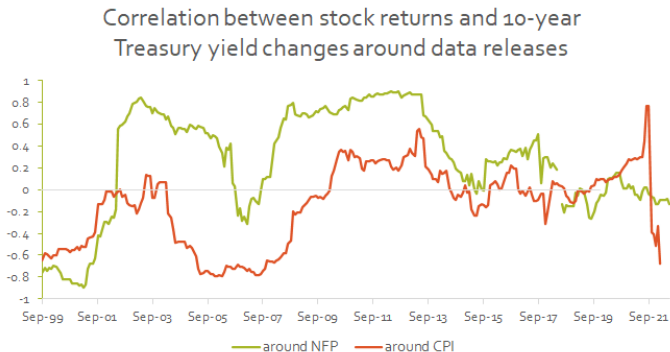
Sensitivity to Inflation Data Releases



Note: based on regressions of daily changes in 10-year yield on the surprise components of fourteen major data releases. A value of one indicates that market reaction is close to its sample average.

### #3: Other dimensions of model/data

- ▶ Could compare model predictions on stock-bond correlation conditional on the shock to what's in the data

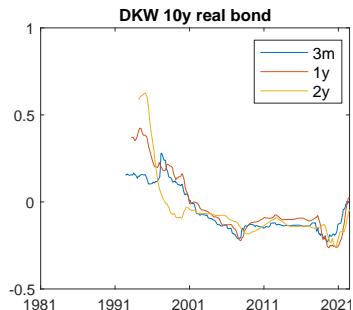
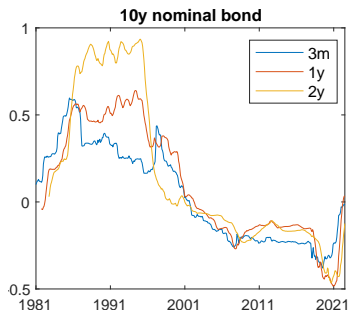


Note: 2-year rolling correlation of intraday changes from 5 minutes before to 25 minutes after releases.



### #3: Other dimensions of model/data

- ▶ Paper observed that TIPS beta changed sign but by much less, suggesting mostly an inflation phenomenon.
  - ▶ Extended the sample using DKW real yield: shifts comparable to nominal.
- ▶ Term structure of correlations can also speak to the persistence of shocks



Note: 10-year rolling correlations of monthly observations of 3-month, 1-year and 2-year holding period returns. Real bond yields from D'Amico Kim Wei 2018.

## #4: Miscellaneous

- ▶ Some modeling assumptions seem strong or needs more justifications
  - ▶ Output gap assumed to be an exponential average of past consumption
  - ▶ The Phillips curve shock added to the equation but only loosely motivated.
  - ▶ Role of adaptive inflation expectations needs more explanation. Should it also affect the IS equation?
- ▶ Some other model implications are worth exploring
  - ▶ What are the properties of hours worked with habit in leisure utility?
  - ▶ How do model-implied real term premiums look like?
- ▶ Could extend the sample back to pre-Volcker period with more significant shift in monetary policy reaction function

# Summary

- ▶ Important question; unites various strands of literature.
- ▶ Part of impressive research agenda
- ▶ Suggestions
  - ▶ Use more asset price information in calibrating the model
  - ▶ Reassess the importance of a shift in the monetary policy rule
  - ▶ Explore other dimensions of the model and the data