Present-Biased Households and Monetary Policy

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Overview

- We study the link between present-biased households and monetary policy by endogenizing the present bias in a baseline New Keynesian (NK) model.
- Theoretically, we show that
  - **Higher (lower) present bias induces higher (lower) natural interest rate.**
  - **In its endogeneized form, present bias depends on the relative risk aversion, the cognitive cost, and shock volatility.**
  - **Present bias introduces a new channel through which monetary policy stance could change abruptly following some disturbance.**
- Empirically, we find that
  - **Data support a present-biased economy.**
  - From the Great Moderation (GM) to the Global Financial Crisis (GFC), **the present bias function shifted its behavior**, becoming more responsive to economic dynamics (Tables 2 and 3).
  - This shift implies that, following a shock, the degree of present bias tends to decrease (i.e., the associated parameter tends to increase), implying a decrease in the natural interest rate. **This provides a behavioral explanation of the decline in natural rates, which turns out to drive the ZLB.**

Model

Households maximize their lifetime utility

$$U_t = u_t + m \sum_{k=1}^{\infty} \beta^k \mathbb{E}_t \left[u_{t+k} \right]$$

where $\beta \in [0, 1[$ is the static discount factor, $m \in [0, 1]$ is the present bias parameter.

Exogenous present bias in a linear world.

Solving and linearizing around the steady state, the natural interest rate is

$$r_t^n = -\ln(\beta m) + \sigma \mathbb{E}_t \left[y_{t+1}^n - y_t^n \right]$$

- Thus, $\frac{\partial r_t^n}{\partial m} = -\frac{1}{m} < 0$: *higher (lower) present-bias yields to higher (lower) natural interest rate in the economy.*

Endogenous present bias

Following Gabaix (2014), we derive the endogenous present bias function

$$m_t = \left(1 + \frac{\chi}{\Lambda_t} \right)^{-1}$$

where χ is a cognition cost parameter ($\chi = 0$ corresponds to the rational case), and Λ_t is a function of model parameters and state vector variances (see the paper for more details).

- The rest of the model is the usual Phillips Curve, and the Euler Equation is modified such as:

$$1 = \beta m_t R_t \mathbb{E}_t \left[\frac{u_{c,t+1}}{u_{c,t}} \frac{P_t}{P_{t+1}} \right]$$

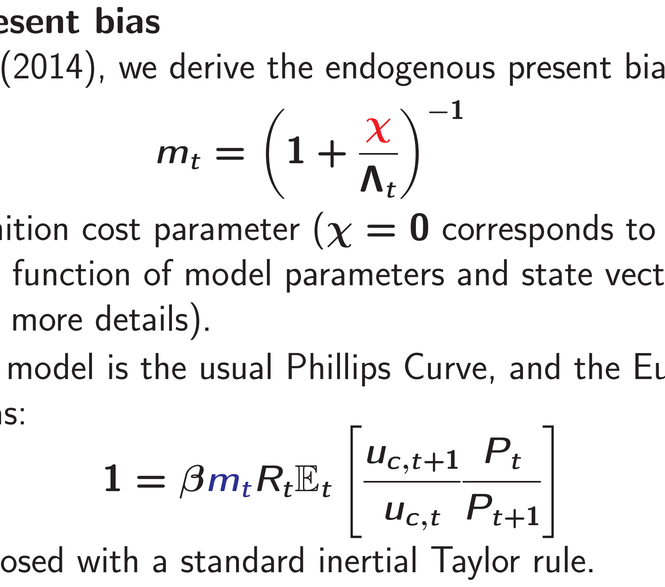
- The model is closed with a standard inertial Taylor rule.

Optimal Monetary Policy

- Commitment policy requires the policymaker to maximize the welfare of the economy defined as the lifetime utility of the representative agent such that

$$W_t = u(C_t, N_t) + \beta W_{t+1}$$

Figure 1: Cost-push shock under commitment (standard calibration)



- Due to the endogeneity of the present bias function m, households become more *aware* following a price markup shock.
- Under commitment, the central bank reacts quickly and aggressively to counteract the tightening stance, as implied by the change in the present bias.

Bayesian Estimation

- Data confirm that $\chi > 0$ (significantly) for all samples.

Table 1: Estimates - Full Sample 1975-2019

	Prior mean	Post. mean	Interval		Distribution	Prior std.
ρ_r	0.8	0.720	0.694	0.743	beta	0.1
ϕ_π	2.5	2.584	2.554	2.613	norm	0.5
ϕ_y	0.125	0.057	0.050	0.064	norm	0.1
χ	**0**	**0.427**	0.393	0.463	unif	1

Table 2: Estimates - GM (1975-2006)

	Prior mean	Post. mean	Interval		Distribution	Prior Std.
ρ_r	0.8	0.704	0.668	0.736	beta	0.1
ϕ_{pi}	2.5	2.529	2.454	2.598	norm	0.5
ϕ_y	0.125	0.060	0.050	0.072	norm	0.1
χ	**0**	**0.446**	0.338	0.556	unif	1

Table 3: Estimates - Post GFC (2007-2019)

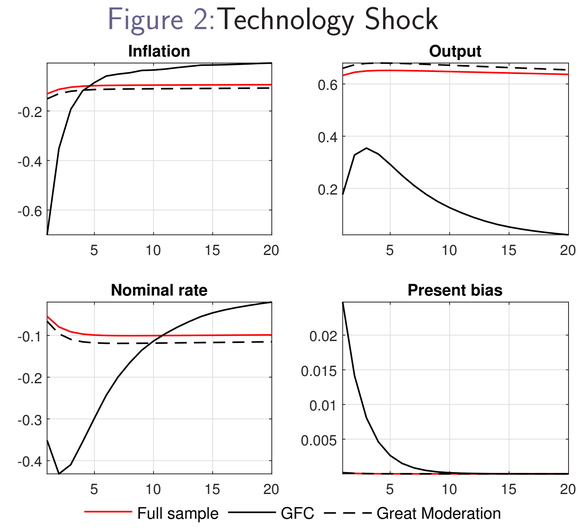
	Prior mean	Post. mean	Interval		Distribution	Prior Std.
ρ_r	0.8	0.789	0.785	0.793	beta	0.1
ϕ_π	2.5	2.492	2.466	2.515	norm	0.5
ϕ_y	0.125	0.109	0.105	0.113	norm	0.1
χ	**0**	**0.499**	0.499	0.500	unif	1

- The fact that $\chi^{GFC} > \chi^{GM}$ indicates that post-GFC's cognition cost has become higher.
- Λ_t's parameters have shifted after the GFC as well, pointing to more responsiveness of m to economic shocks.

The Estimated Impulse Response Functions

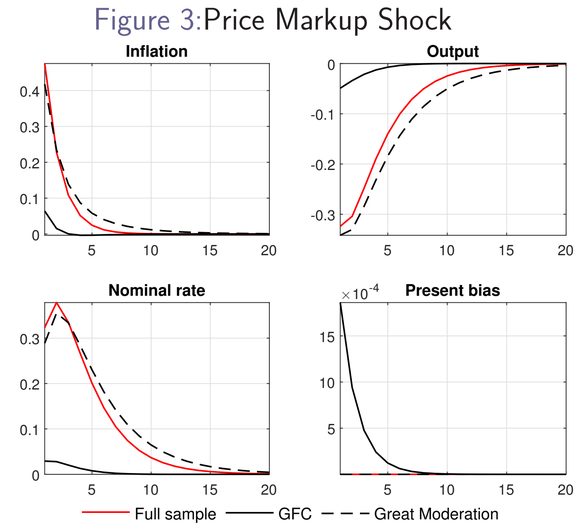
- A technology shock highlights how present bias became responsive to shocks in the aftermath of the GFC.

Figure 2: Technology Shock



- A price markup shock induces less pronounced dynamics for output and prices after the GFC, except for the present bias.

Figure 3: Price Markup Shock



- The present bias has been stable during the GM period, slightly responsive to shocks. The change in this behavior after the GFC has contributed to the decline in the natural interest rate.

Discussion and Conclusion

- We construct a nonlinear NK model with an *endogenized* present bias.
- We estimate the model and the present bias microfoundations in a DSGE set up in contrast to the empirical literature using partial equilibrium or experimental approaches.
- We show that data confirm that households are present biased, and that the model is not observationally equivalent to the standard model (Barro, 1999).
- We provide a *behavioral explanation* of the observed decline in natural interest rates, accelerated since the GFC.