Falling Natural Rates, Rising Housing Volatility and the Optimal Inflation Target

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Introduction

- Four unfavorable macro trends in advanced economies:

  (1) secular decline in growth rates (Summers (2014))

  (2) secular decline in natural interest rates (Holston et al. (2017))

  (3) upward trend in the volatility of housing prices (NEW)

  (4) upward trend in the *volatility* of natural rates (NEW)

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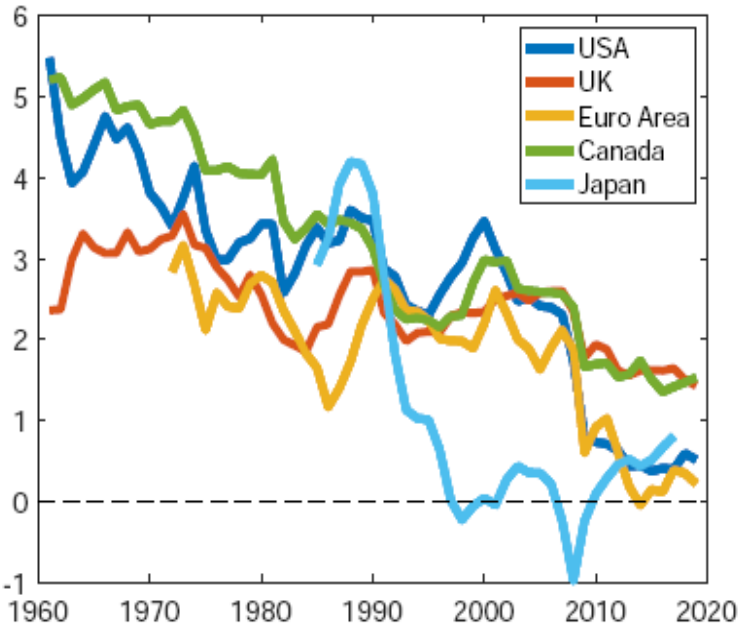
- MP implications for the optimal inflation target?

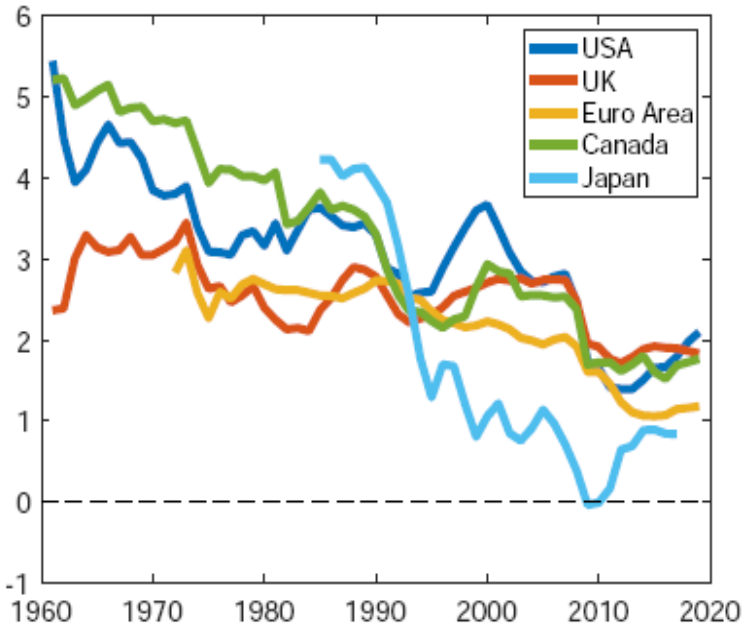
  Optimal target: average inflation with optimal MP

Known trends: lower growth & natural rates

(a) Natural Rates of Interest



(b) Long-Term Growth Rates

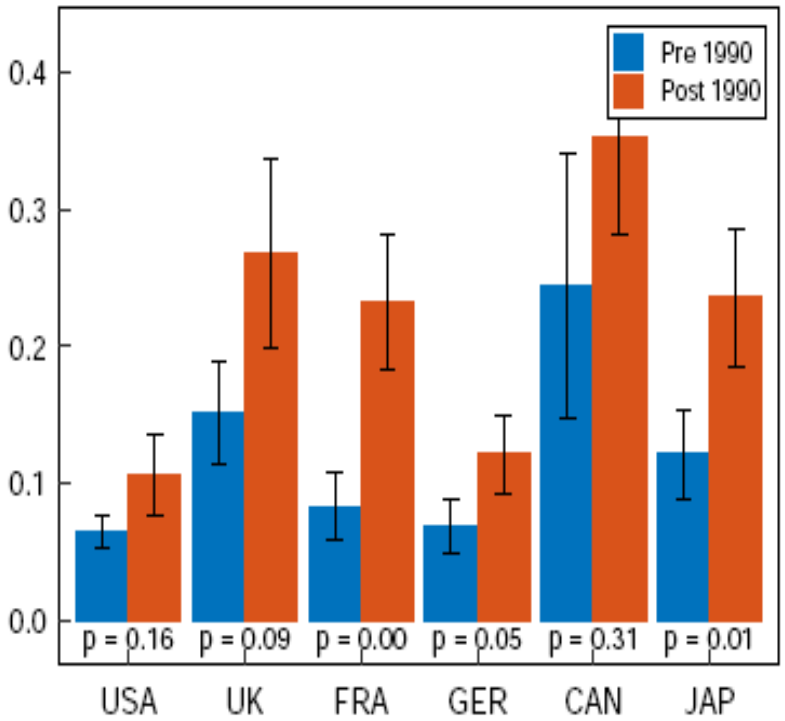


Source: Holston et al. (2017) and Fujiwara et al. (2016)

Rising housing volatility & natural rate volatility

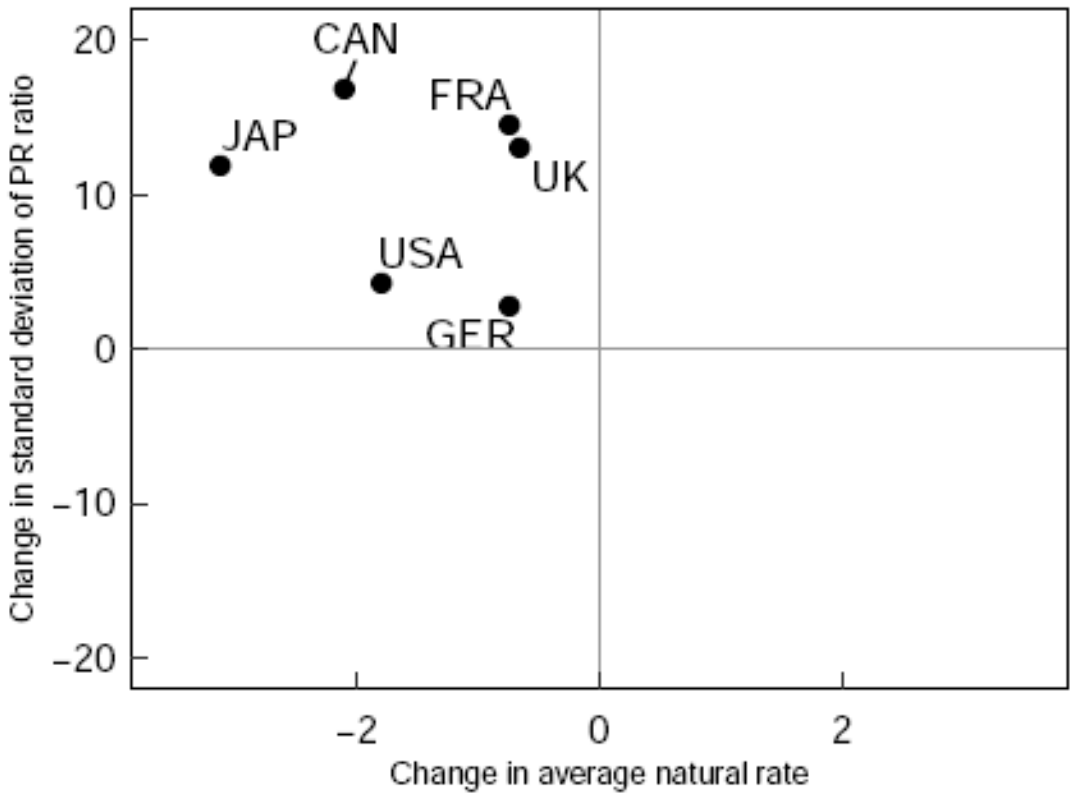
- *Changes* in macro volatility difficult to measure
- Variables very persistent (price-to-rent ratio, natural rate)
  $=>$ few independent observations:
- Compare volatility changes over long time periods
  $\sim$1960-1990 versus 1990-2020

Rising Std. Deviation of the Price-to-Rent Ratio



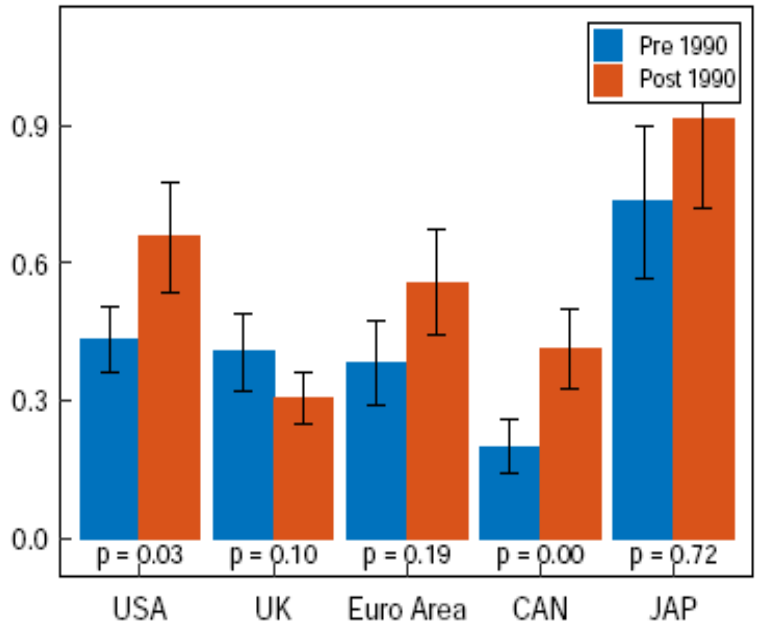
Source: OECD database. The black lines denote the 90%-confidence bands. The p-values are for the null hypothesis the standard deviation has not changed pre to post 1990.

Δ PR Vola vs. Δ Natural Rate (Pre-/Post-1990)



Rising Std. Deviation of the Natural Rate

Figure 2: Volatility of Natural Rates



Source: Holston et al. (2017) and Fujiwara et al. (2016) (natural rate estimates). The black lines denote the 90%-confidence bands. The reported p-values are for the null hypothesis that volatility has not changed from pre to post 1990.

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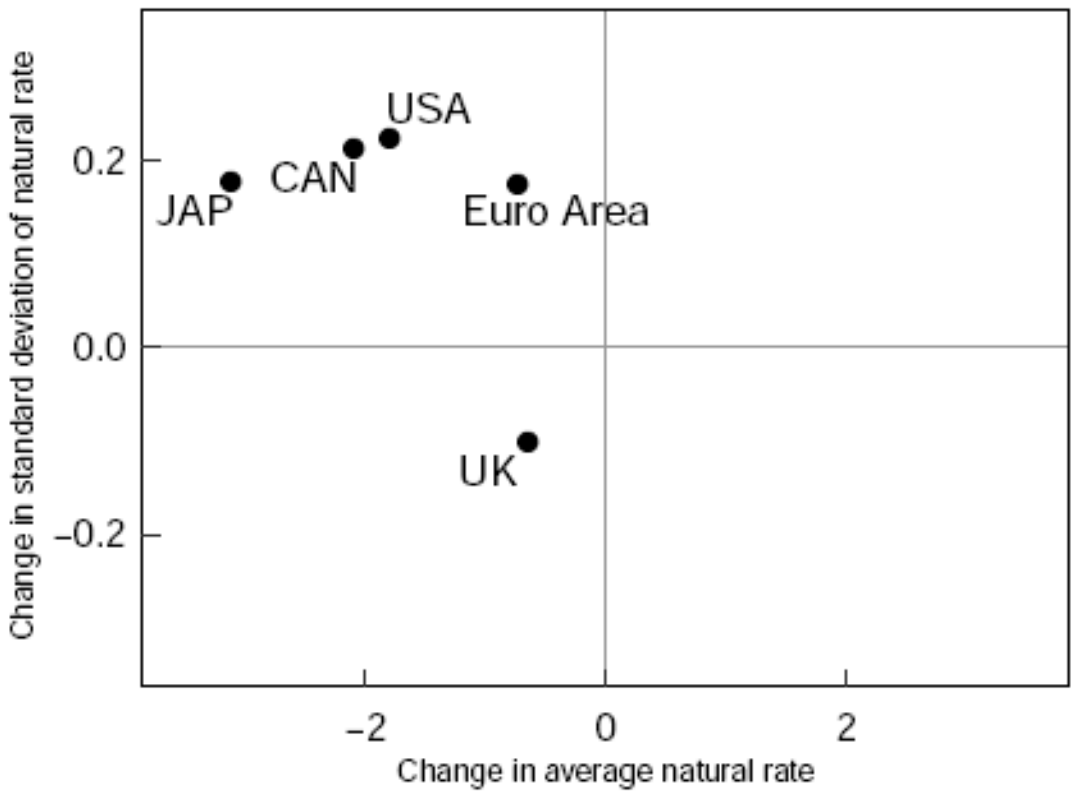

Contributions of the paper

- Present a simple macro model linking these trends:
  - lower growth rates $=>$ lower average natural rates
  - lower natural rates $=>$ vola of housing prices & natural rates $\Uparrow$
  - complicates monetary stabilization: lower bound on nominal rates
- Determine
  - optimal MP with lower bound constraint on nominal rates

Setup & Main Findings

- New Keynesian model with housing sector, lower bound, subjective housing price beliefs (other beliefs rational)

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- Subjective beliefs s.t. they cannot be manipulated by MP
- Achieved by belief setup in Adam, Marcet & Nicolini (JoF, 2016) Investors (weakly) extrapolate past housing price increases

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  $=>$ more volatile (subjective) plans for non-housing consumption
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- Level of natural rate $\Downarrow$ $=>$ volatility of natural $\Uparrow$:

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- Level of natural rate $\Downarrow$ $=>$ volatility of natural $\Uparrow$:
- Lower bound constraint more stringent
  $=>$ average inflation higher under optimal MP

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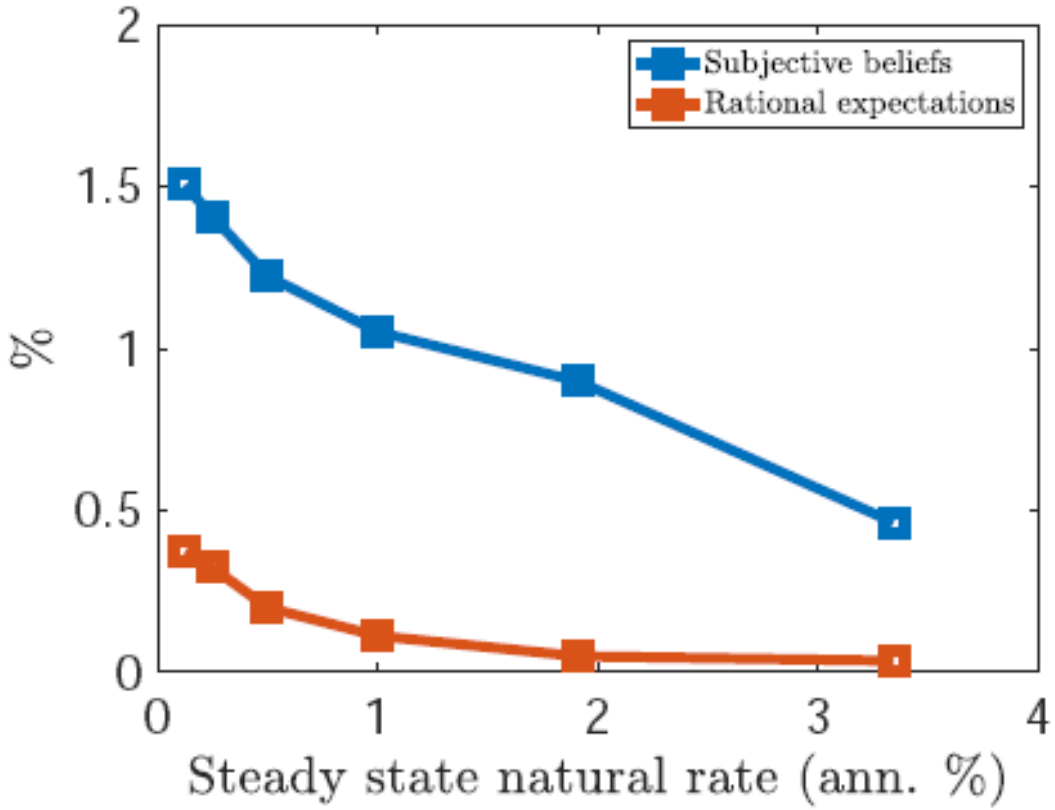
- Only effect of lower trend growth: level of natural rate $\Downarrow$
  With optimal MP average inflation only weakly affected

The Optimal InflationTarget



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- RE results differ from Andrade, Gali, LeBihan, Matheron (2019&21):
  - we look at *optimal* monetary policies
  - they look at Taylor rules with an *optimized intercept*

- Insights from Adam and Billi (2006) survive:
  With optimal monetary policy & RE:
  Lower-bound constraint => only small effects on average inflation

Optimal Policy with Lower Bound Constraint

$$\max_{\{\pi_t, y_t^{gap}, i_t \geq \underline{i}\}} -E_0 \sum_{t=0}^{\infty} \beta^t \frac{1}{2} \left(\Lambda_\pi \pi_t^2 + \Lambda_y \left(y_t^{gap}\right)^2 + \Lambda_q \left(\widehat{q}_t^u - \widehat{q}_t^{u*}\right)^2 \right)$$

$s.t.:$

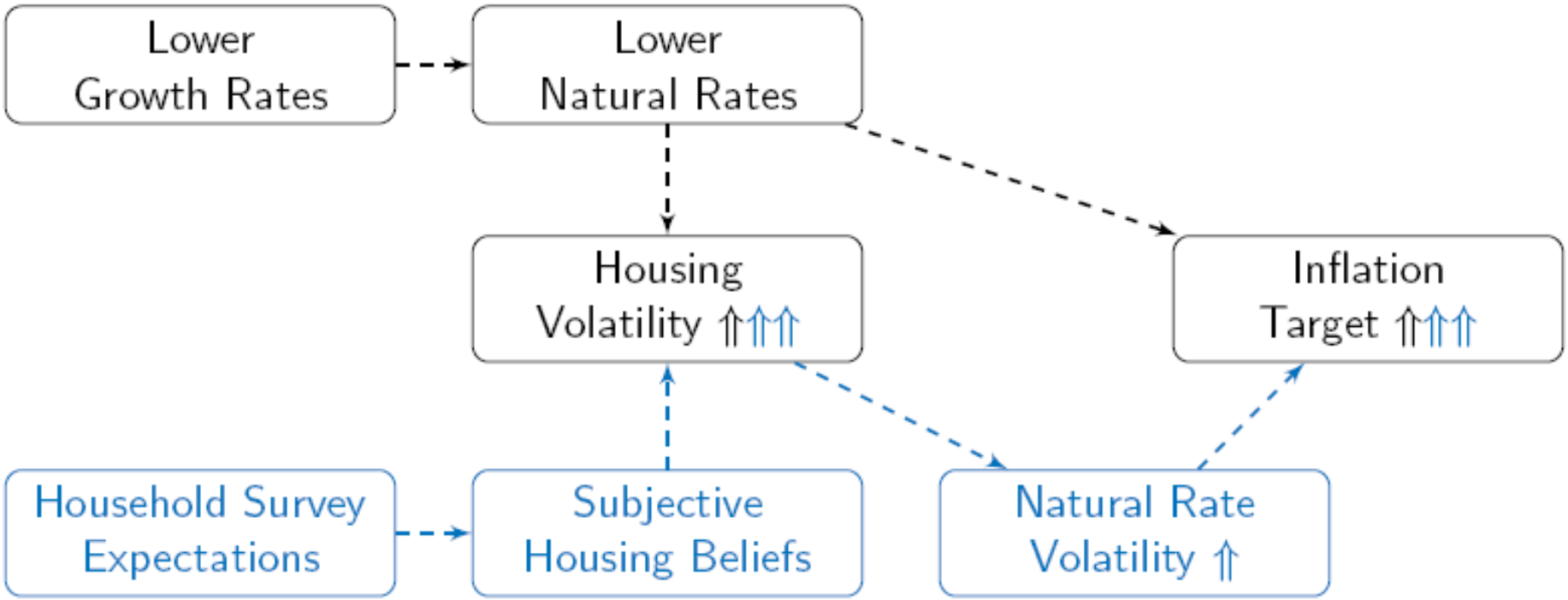
$$\pi_t = \beta E_t \pi_{t+1} + \kappa_y y_t^{gap} + \kappa_q \left(\widehat{q}_t^u - \widehat{q}_t^{u*}\right) + u_t$$

$$y_t^{gap} = \lim_T E_t y_T^{gap} - \varphi E_t \sum_{k=0}^{\infty} \left(i_{t+k} - \pi_{t+1+k} - r_{t+k}^{n,RE} \right)$$

$$- \frac{C_q}{C_Y} \left(\widehat{q}_t^u - \widehat{q}_t^{u*}\right)$$

$$\widehat{q}_t^u = \left(1 - \beta(1-\delta)\right) \widehat{\xi}_t^d + \beta(1-\delta) E_t^{\mathcal{P}} \widehat{q}_{t+1}^u$$

Conclusions



New trends: housing volatility & natural rate volatility

(a) Standard Deviation of the Price-to-Rent Ratios for Different Sample Splits.