

THE ECB AND ITS (A)SYMMETRICAL INFLATION AIM

Falk Mazelis, Roberto Motto, Annukka Ristiniemi¹

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ECB'S (A)SYMMETRICAL INFLATION FRAMEWORK

MOTIVATION

The ECB has defined price stability as positive inflation rates below 2%. Within this range, the Governing Council has clarified that "in the pursuit of price stability, it aims to maintain inflation rates below, but close to, 2% over the medium term."

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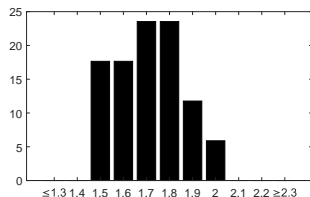


Figure: Distribution of inflation expectations in the Survey of Professional Forecasters (26 July 2019)

- Inflation expectations skewed - perception of asymmetry
- Price stability range and inflation aim close to the ceiling
— > risk of asymmetry (Rostagno et al., 2019)

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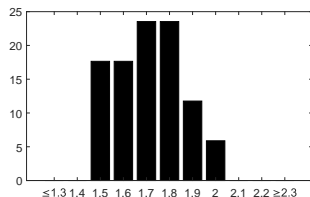


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Question: Is there evidence of asymmetry, and what are the consequences of asymmetric reaction to the euro area economy?

MARKOV-SWITCHING DSGE

MODEL

Smets and Wouters (2007) with euro area data

- Fully estimated, including regime-switching parameters
- Data: 1999Q1-2014Q2, SW07 variables and AMECO output gap

Added a permanent technology shock to get a trend output gap

$$Y_t = \varepsilon_t^a (K_t^s(i))^\alpha (Z_t L_t(i))^{1-\alpha} - Z_t \Phi$$

with $Z_t/Z_{t-1} = g_{z,t} = \rho_{g_z} g_{z,t-1} + \eta_t^{g_z}$

Monetary policy is allowed to react more strongly when inflation is above 2%

$$i_t = \rho i_{t-1} + (1 - \rho) [\theta_\pi(S_t)(\pi - \bar{\pi}) + \theta_y(S_t)(y_t - \bar{y})]$$

where $S_t = f(\pi_t^4)$

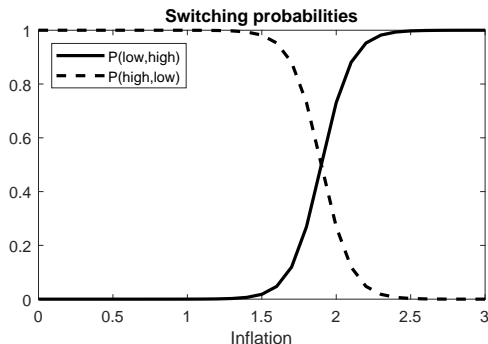
ENDOGENOUS SWITCHING

MODEL

Probability of switching between regimes is endogenous

$$P(\text{low}, \text{high}) = \left(1 - \frac{1}{1 + e^{c(\pi_t - \bar{\pi})}} \right)$$

$$P(\text{high}, \text{low}) = \frac{1}{1 + e^{c(\pi_t - \bar{\pi})}}$$



RESULTS

Results:

- ECB's monetary policy is found to have been asymmetrical until 2014
- Since 2014Q2, evidence of symmetry
- If the ECB would have continued to behave asymmetrically, inflation would have been lower and output gap more negative

INFLATION AND OUTPUT GAP RESPONSES HIGHER WITH HIGH INFLATION

- Estimation of 20 structural parameters and 16 parameters governing shock processes in RISE (Maih, 2015)
- Two of the estimated structural parameters are allowed to take on different values in the two regimes. At the mode, the estimation finds:

	coef on π	coef on ygap
Low regime	1.57	0.001
High regime	1.69	0.15

IRFs TO RISK PREMIUM SHOCK SHOWS HIGHER MP RESPONSE WHEN INFLATION HIGH

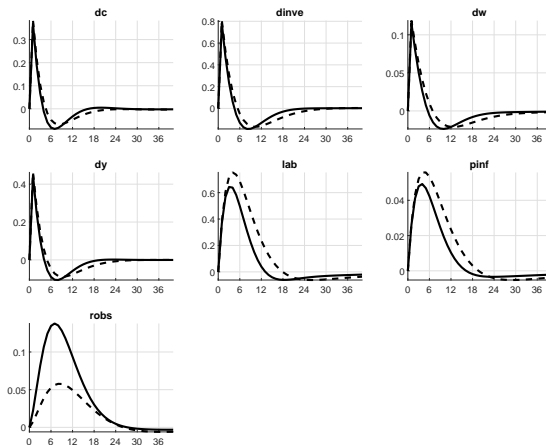


Figure: IRF risk premium shock (deviation from regime specific ss). High inflation regime (solid), low inflation regime (dashed)

MODEL SWITCHES PREDICTABLY BETWEEN REGIMES

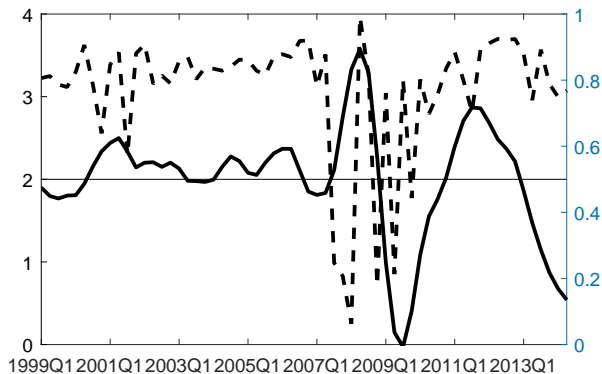
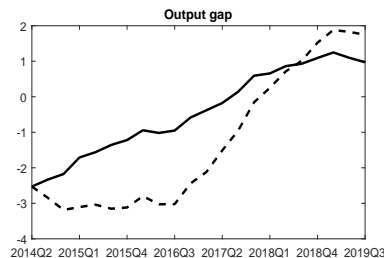
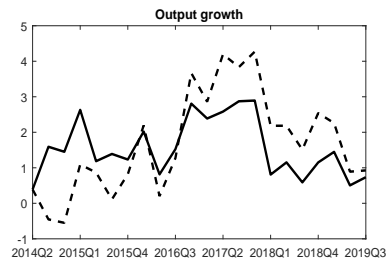
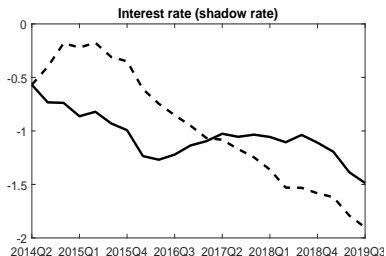
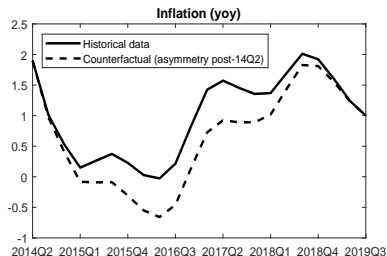


Figure: Annual inflation (solid), probability of high regime (dashed, RHS axis)

COUNTERFACTUAL

SYMMETRIC REACTION SINCE MID-2014

- Likelihood of symmetric regime is higher post-2014Q2



WITH ELB, AN INVERSELY ASYMMETRIC REACTION LEADS TO LESS VOLATILE INFLATION AND OUTPUT GAP SIMULATIONS

Add an effective lower bound as a third endogenously switching regime

$$i_t^{taylor} = \rho i_{t-1}^{taylor} + (1 - \rho) [\theta_\pi(S_t)(\pi - \bar{\pi}) + \theta_y(S_t)(y_t - \bar{y})]$$

$$i_t = \max(-0.5, i_t^{taylor})$$

Simulate three models:

	avg. inflation	avg. ygap	avg. rate
Asymmetric	1.65	-0.23	3.41
Symmetric	1.69	-0.03	3.14
Inversely asymmetric	1.74	0.06	3.05

5000 simulations of 200 periods, first 100 removed as burn-in, all models use same seeds.

CONCLUSION

- ECB's monetary policy is found to have been asymmetrical until 2014
- Since mid-2014 it seems that the reaction function has become symmetric
- Inflation would have been lower and output gap more negative, had the ECB not turned symmetric
- In the presence of a lower bound, inflation is closer to the target, and output gap higher when central bank reacts either symmetrically, inversely asymmetrically.

BIBLIOGRAPHY I

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