Adverse Effects of Monetary Policy Signalling

Jan FILÁČEK and Jakub MATĚJŮ

Monetary Department
Czech National Bank

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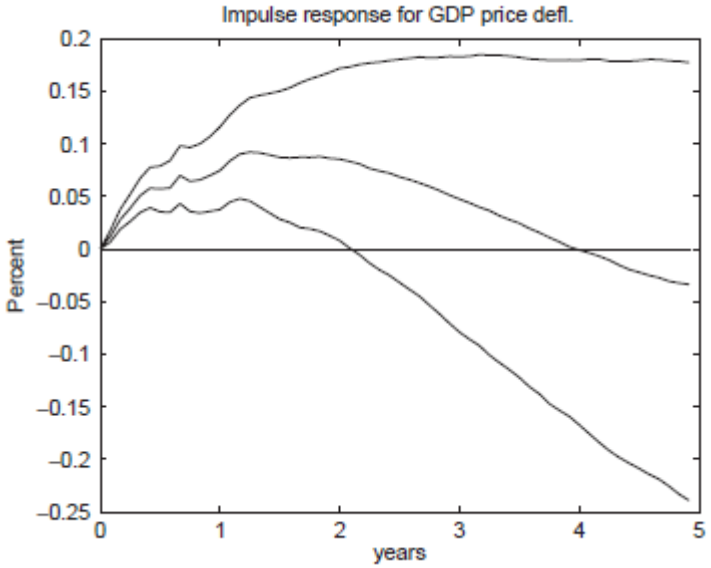
Outline

- What do we mean by adverse effects of monetary policy signalling?
  - Motivation
- Why it may happen?
  - Simple theoretical model
- How large is it?
  - Empirical testing

What do we mean by AEMPS?

- Melosi (2013), Rousakis (2012) and others suggest that in the case of imperfect information among private agents, transmission of monetary policy (shocks) may be weaker or even reversed

- Reversed transmission empirically observed in some VAR models, Sims (1992), Eichenbaum (1992), Uhlig 2005) – „price puzzle“



- Similar concerns have arisen in practical policymaking close to ZLB
  - IR cuts close to the ZLB are typically small in magnitude, but have large signalling potential
  - But does this type of signalling achieve the desired targets?

Why it may happen?

- Framework: simple NK model with two types of agents – fully and partially rational
  - Specific type of bounded rationality, where agents behave optimally according to their respective FOCs, but are not able to form rational expectiations according to the general equilibrium model structure (do not „know“ the model)
  - Similar structure used by Massaro (2013, JEDC)

Fully rational
-observe fundamentals
-optimize given expectations
-form rational expectations
(know the model)

Partially rational
-observe fundamentals
-optimize given expectations
-unable to form rational expectations
(do not know the model)
-update expectations based on observations

Simple two-sector NK model

IS curves of the fully and partially rational sectors:

- $y_t^i = E^i\{y_{t+1}^i\} - \frac{1}{\sigma}\left(i_t - E^i\{\pi_{t+1}^i\} - r_t^n\right) + \varepsilon_t^D \qquad \forall i \in F, P$

Phillips curves of the fully and partially rational sectors:

- $\pi_t^i = E^i\{\pi_{t+1}^i\} + \kappa y_t^{AG} + \varepsilon_t^{CP} \qquad \forall i \in F, P$

Aggregation of the two sectors:

- $y_t^{AG} = \Omega y_t^F + (1-\Omega) y_t^P$
- $\pi_t^{AG} = \Omega \pi_t^F + (1-\Omega) \pi_t^P$

Shocks

- $\varepsilon_t^j = \rho^j \varepsilon_{t-1}^j + \nu_t^j \qquad \forall i \in D, CP, MP$

MP rule and expectations formation

Monetary policy rule is forward-looking and known to all agents :

- $i_t = \rho + \phi^{\pi} E^F \{\pi_{t+1}^{AG}\} + \phi^{y} E^F \{y_{t+1}^{AG}\} + \varepsilon_t^{MP}$

Expectations of partially rational agents are updated using inverted MP rule

- $E^P\{\pi_{t+1}^P\} = \gamma^{\pi} \frac{i_t - \rho - \phi^y E^P\{y_{t+1}^{AG}\}}{\phi^{\pi}} + (1-\gamma^{\pi})\, \pi_t^P$
- $E^P\{y_{t+1}^P\} = \gamma^{y} \frac{i_t - \rho - \phi^{\pi} E^P\{\pi_{t+1}^{AG}\}}{\phi^{y}} + (1-\gamma^{y})\, y_t^P$

Expectations of fully rational agents are fully rational:

- $E^F\{X\} = E\{X\}$

Adding habit persistence

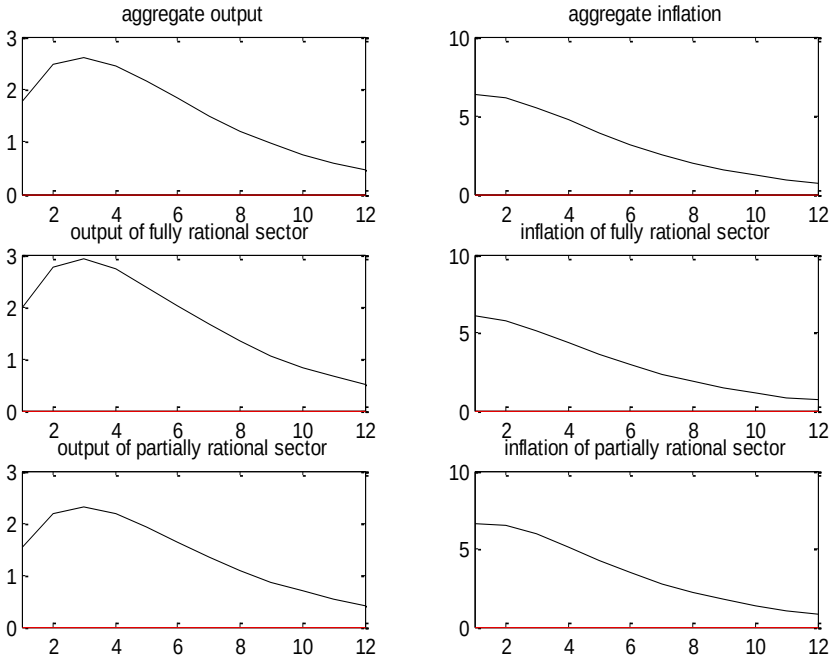
Under habit persistence, the IS curves change to

- $y_t^F = \frac{1}{1+\chi} E^F\{y_{t+1}^F\} + \frac{\chi}{1+\chi} y_{t-1}^F - \frac{1-\chi}{\sigma(1+\chi)}(i_t - E^F\{\pi_{t+1}^F\} - r_t^n) + \varepsilon_t^D$

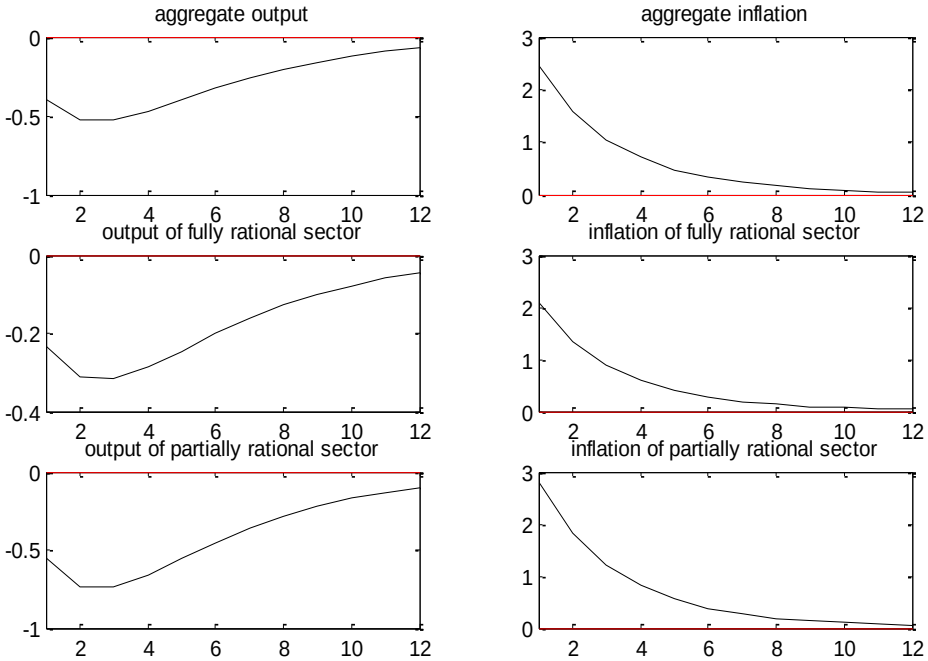
- $y_t^P = \frac{1}{1+\chi} E^P\{y_{t+1}^P\} + \frac{\chi}{1+\chi} y_{t-1}^P - \frac{1-\chi}{\sigma(1+\chi)}(i_t - E^P\{\pi_{t+1}^P\} - r_t^n) + \varepsilon_t^D$

Responses to D and CP shocks

Demand shock (ν_t^D)

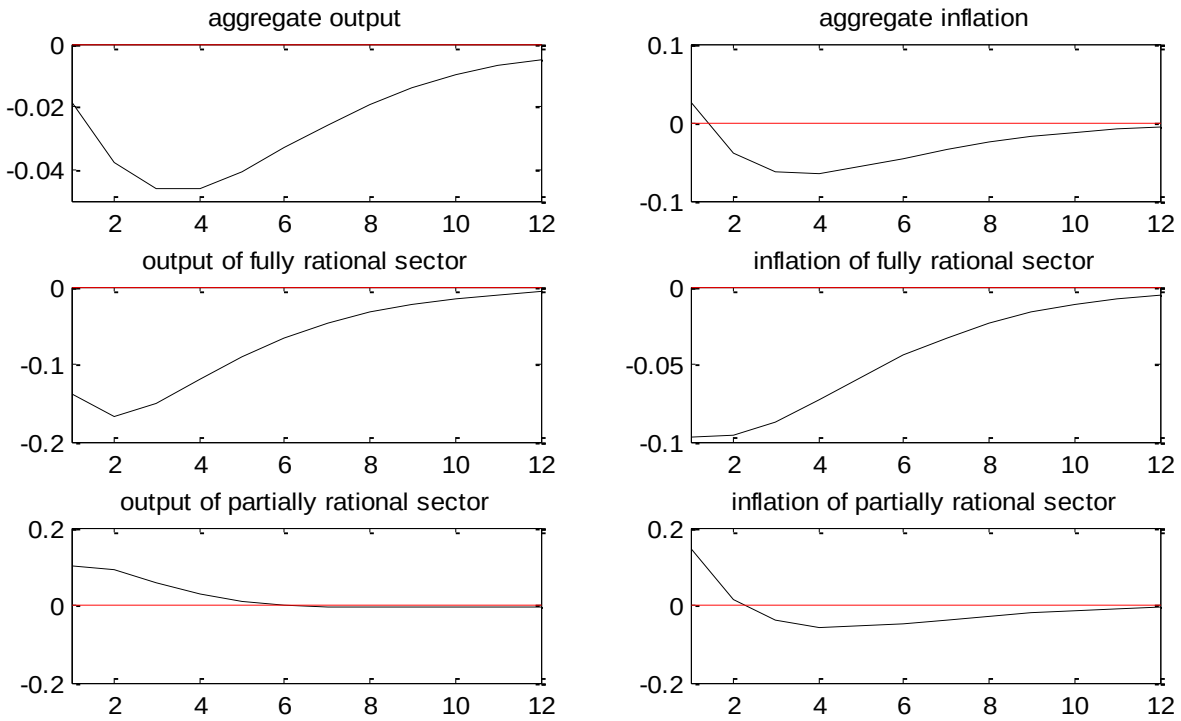


Cost-push shock (ν_t^{CP})

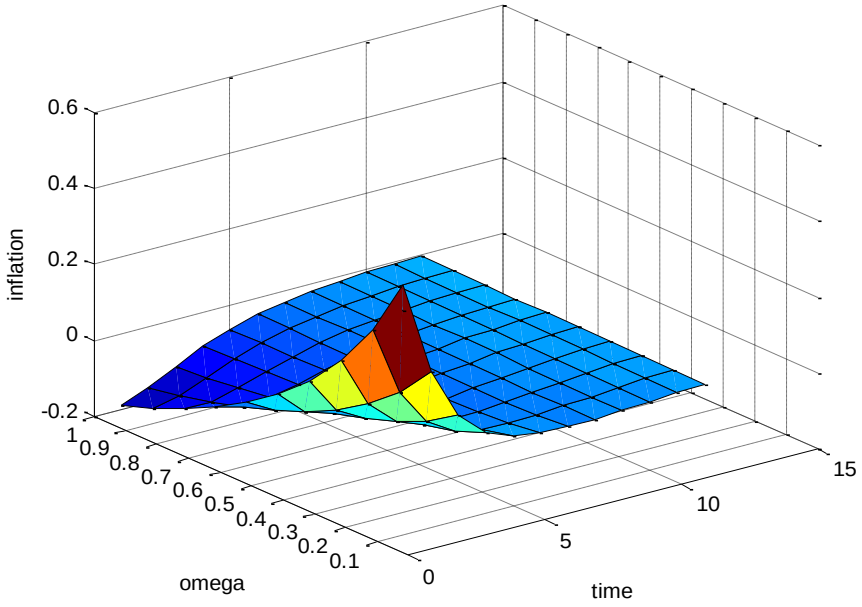


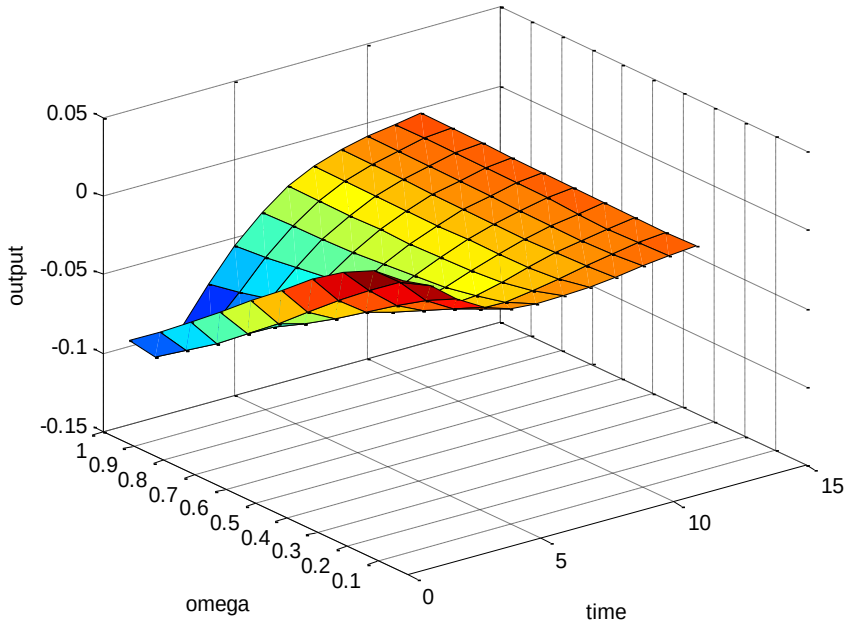
Reponses to MP shock

Monetary policy shock (ν_t^{MP})

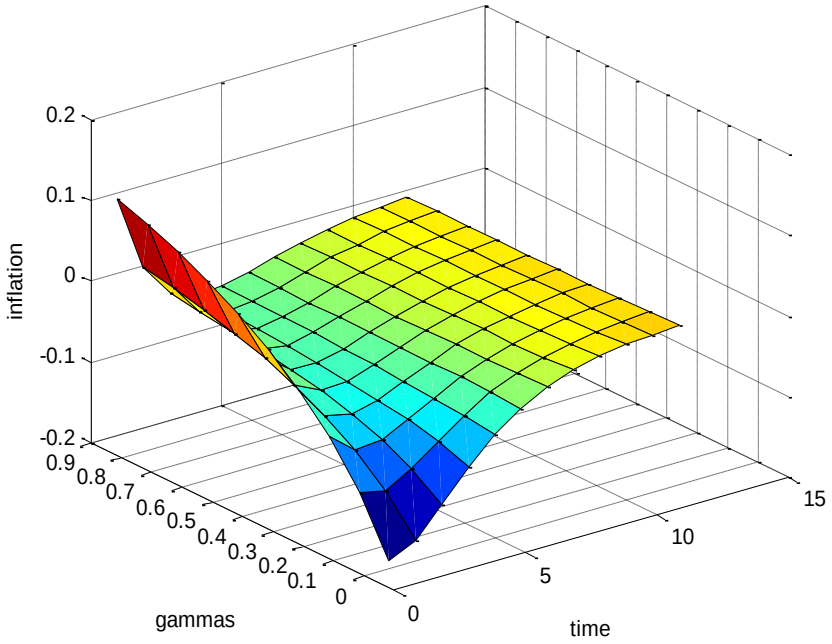


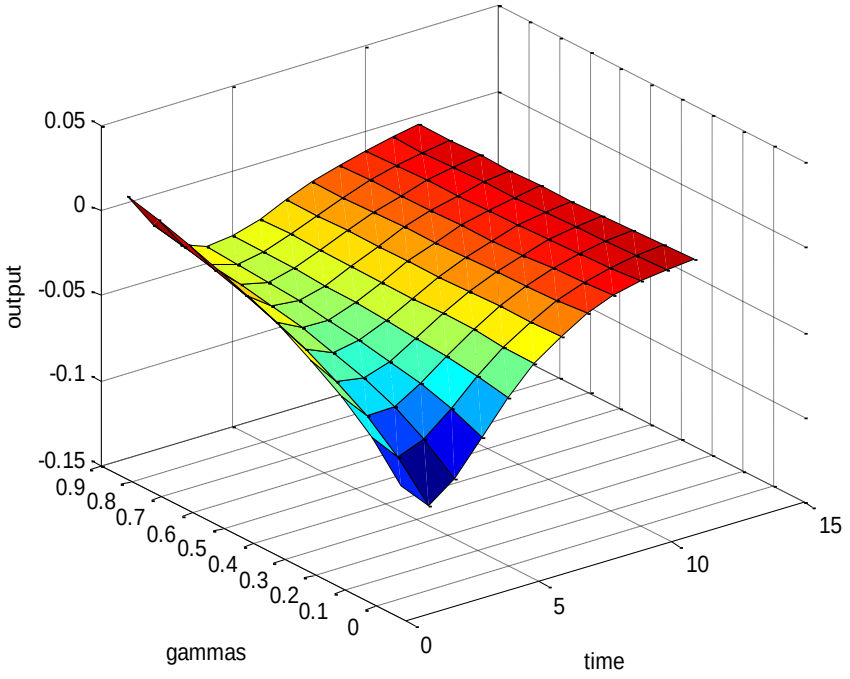
MP shock, sensitivity to share of rational agents Ω





MP shock, sensitivity to learning parameters γ





How large is it?

Estimated equation:

$$\Delta E_{t,i}^{PUB}[\pi_{t+h}] = \delta_i + \lambda^{PUB}\Delta E_{t-1,i}^{PUB}[\pi_{t+h,i}] + \lambda^{CB}\Delta E_{t-1,i}^{CB}[\pi_{t+h,i}] + \varphi r_{t-1,i}^{SURP} + \tau^r TI_t r_{t-1,i}^{SURP} + \tau^E TI_t \Delta E_{t-1,i}^{CB}[\pi_{t+h,i}] + \tau TI_t + \beta \Delta X_{t,i} + \nu_{t,i}$$

- Control variables X for contemporaneous macro news (ER, inflation, GDP)
- If updating channel in place, φ should be signicantly positive
- If transparency mitigates the updating channel, τ^r should be significantly negative

- similar equation for GDP expectations

- FE regression on panel data of 12 IT countries (Canada, Czech Rep., Euro area, Hungary, Japan, Norway, Poland, Sweden, Switzerland, Turkey, UK and US)
- Private expectations from Consensus Forecasts Survey, covering time period 2001-2013, calendar years
- Central bank transparency calculated according to Eijfinger, Geraats(2004)
- Approx. 1100 observations
- Three alternative definitions of interest rate surprise:

$$r_t^{SURP} = r_t - r_{t-1} - E_{t-1}(r_t - r_{t-1})$$

$$r_t^{SURP} = r_t - r^{TAYLOR}{}_t$$

where $r^{TAYLOR}{}_t$ stands for backward-looking and forward-looking estimates of the Taylor rule

Results: expected inflation

Effects of central bank decisions and forecasts on expected inflation

	Consensus F. Surprise	Taylor BW Surprise	Taylor FW Surprise
L.Change of CPI forecast, CF	0.110*** (6.07)	0.0929*** (5.02)	0.157*** (7.26)
L.Change of CPI forecast, CB	0.0972*** (5.17)	0.0922*** (4.93)	0.110*** (5.45)
L.Policy rate surprise	0.0432*** (3.09)	0.101*** (4.99)	0.0902*** (3.93)
Transparency	0.000836 (0.13)	0.000318 (0.06)	0.000351 (0.15)
Transp. # L.Policy rate surprise	0.00614 (0.78)	0.0111 (0.92)	0.00347 (0.29)
Transp. # L.Change of CPI forecast, CB	0.00274 (0.28)	0.00124 (0.12)	0.00456 (0.46)
LD.CPI Inflation	0.0837*** (9.21)	0.0800*** (8.86)	0.0727*** (7.26)
D.NEER	0.00254 (1.07)	0.00216 (0.91)	0.000725 (0.31)
D.GDP growth vintage	-0.265 (-0.56)	-0.656 (-1.39)	-0.159 (-0.30)
Constant	0.0105 (0.85)	0.00868 (0.92)	-0.00164 (-0.35)
Observations	1107	1110	939
R^2	0.1597	0.1637	0.1823

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Results: expected GDP growth

Effects of central bank decisions and forecasts on expected GDP growth

	Basic Surprise	Taylor BW Surprise	Taylor FW Surprise
L.Change of GDP forecast, CF	0.409*** (13.04)	0.439*** (14.21)	0.432*** (13.93)
L.Change of GDP forecast, CB	0.0776*** (3.63)	0.0810*** (3.83)	0.0728*** (3.41)
L.Policy rate surprise	-0.0734*** (-3.51)	-0.172*** (-5.33)	-0.179*** (-5.54)
Transp.	-0.00284 (-0.86)	-0.00285 (-0.87)	-0.00250 (-0.76)
Transp. # L.Policy rate surprise	-0.00162 (-0.16)	0.0319** (1.97)	0.0254 (1.53)
Transp. # L.Change of GDP forecast, CB	-0.0108 (-0.92)	-0.0117 (-1.00)	-0.00883 (-0.75)
LD.CPI Inflation	0.0253* (1.83)	0.0245* (1.78)	0.0234* (1.68)
D.NEER	0.0137*** (4.24)	0.0140*** (4.37)	0.0141*** (4.37)
D.GDP growth vintage	0.907 (1.20)	1.376* (1.83)	1.133 (1.51)
Constant	-0.0358*** (-5.32)	-0.0296*** (-4.44)	-0.0314*** (-4.66)
Observations	954	957	941
R^2	0.1597	0.2702	0.2730

t statistics in parentheses * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

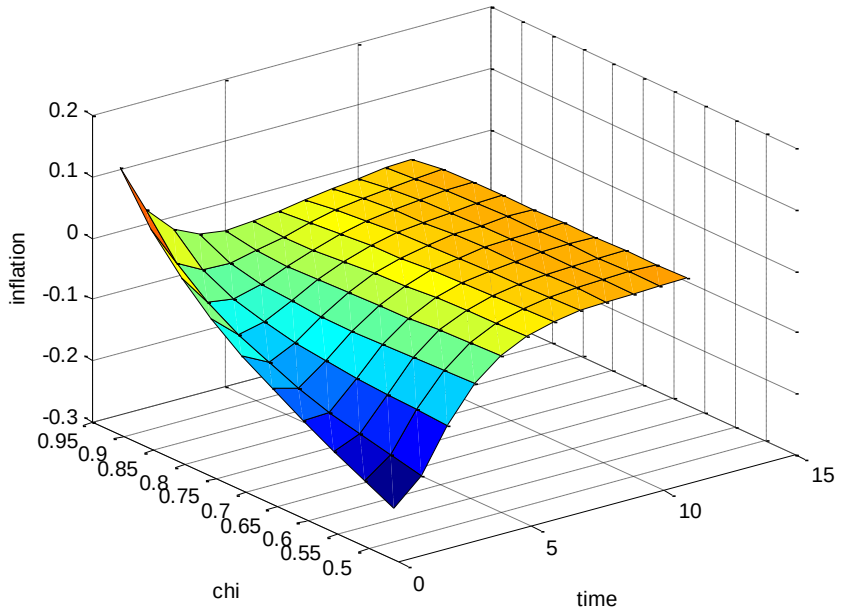
Conclusions

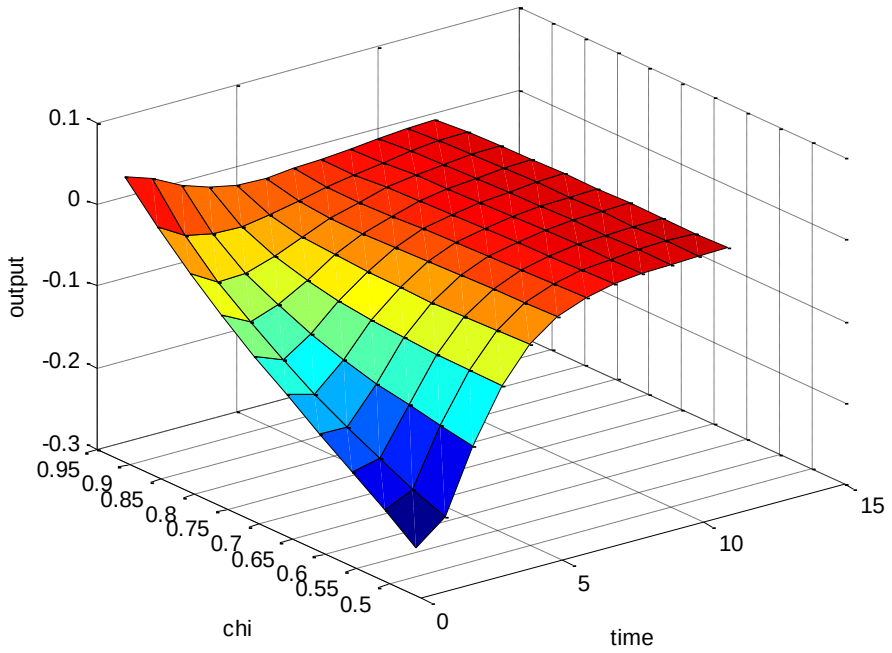
- Adverse effects of monetary policy signalling (updating channel) can be established on both theoretical and empirical grounds
- Strength of updating channel depends on key model parameters (share of partially rational agents in the economy, their learning parameters)
- Empirical estimations suggest the presence of updating channel - inflation expectations tend to rise after interest rate hike
- GDP expectations react in opposite way – corresponds to model and economic intuition

Thank you for your attention!

jakub.mateju@cnb.cz

- Monetary policy shock, sensitivity to habit persistence parameter χ





Summary statistics of key variables

	Mean	sd	min	max
Change of CPI forecast, CF	-.0092975	.302191	-3.1	2.5
Change of CPI forecast, CB	.0027563	.3507938	-1.8	3.7
Policy rate surprise, CF	.0174932	.54146	-2.8	9.9
Policy rate surprise, Taylor BW	-1.67e-09	.3828077	-3.666882	5.534725
Policy rate surprise, Taylor FW	2.95e-09	.2434574	-2.052365	3.05042