

# Confidence Cycles and Liquidity Hoarding

Volha Audzei <sup>1</sup>

Second Annual Workshop of the ESCB Research Cluster 1 on Monetary Economics  
Rome,

October 12, 2018

---

<sup>1</sup>Czech National Bank and CERGE-EI, The views expressed herein are those of the authors and do not necessarily reflect the view of the Czech National Bank

- Credit crunch and central banks unconventional policies
- Liquidity hoarding
- Change in sentiment
- No agreement about policy effects in the literature:
  - Curdia and Woodford (2011) and Taylor and Williams (2009): policies were not efficient or irrelevant
  - Del Negro et al. (2011) and Christensen et al. (2014), Gertler and Karadi (2011): policies helped avoid more severe recession

Q: How does the banks' confidence affect the transmission of unconventional monetary policies?

- A tractable DSGE model with the interbank market
- Imperfect information, the banks are:
  - learning about shock realization
  - observing heterogeneous signals: ex post heterogeneous beliefs.
- Liquidity hoarding
- Policy exercises:
  - liquidity provision, targeted liquidity provision, policy rate decline, collateral constraints relax

- Simple model of the interbank market
- Policy insights
- DSGE model
- Crisis simulations and policy effects

- Two types of assets:
  - safe (reserves), pays  $R_t^{res}$
  - risky, pays  $R_{t+1}^k$
- Banks differ by their beliefs about risky asset return,  $\hat{E}_t^i R_{t+1}^k \sim U$
- Continuum of banks, indexed by  $i$ , lend to each other and invest into the real sector
- Banks are risk neutral: corner solutions.

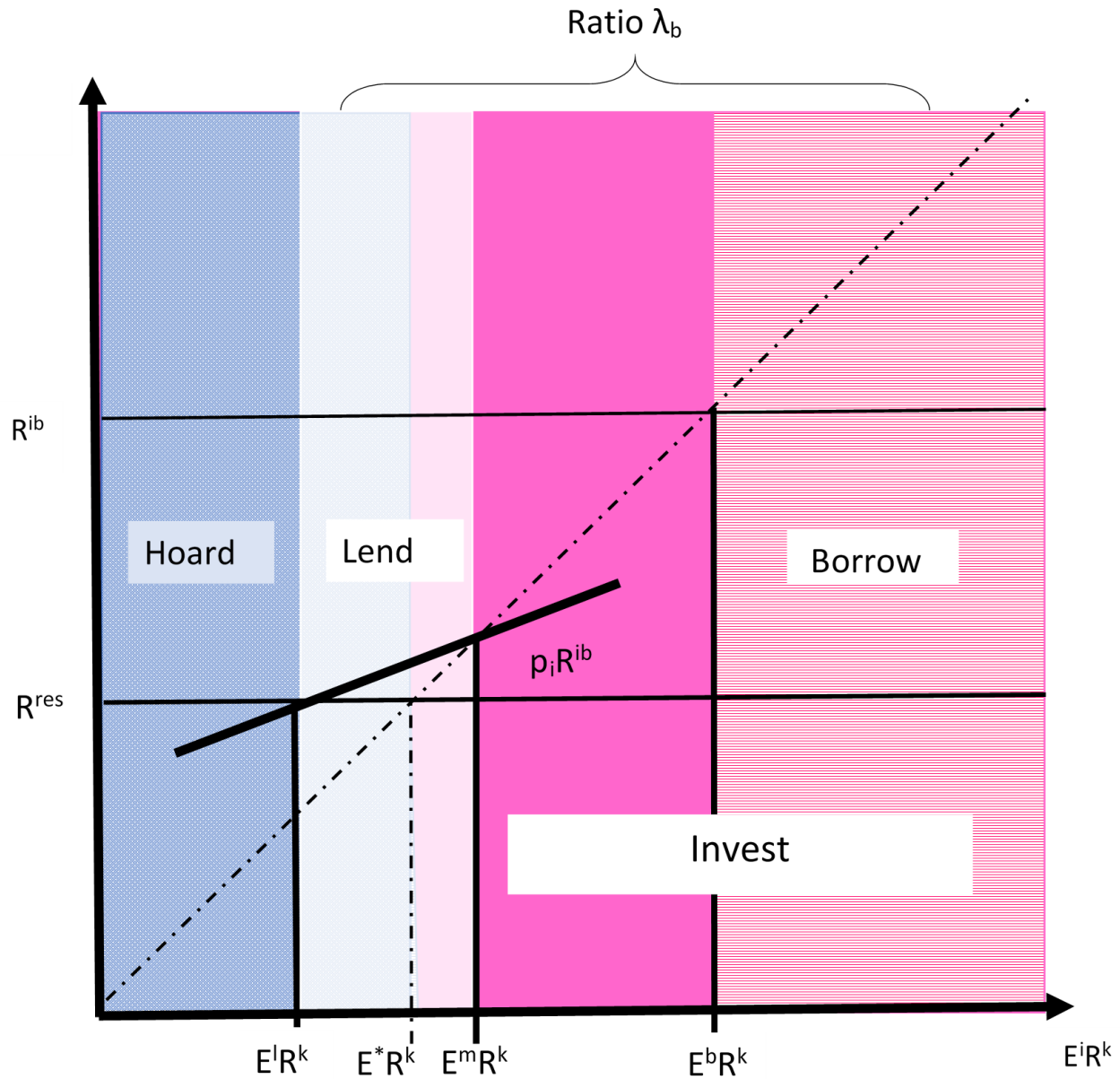
Assets	Liabilities
Risky Asset (Manufacturer claims)	Deposits
Reserves	Interbank borrowing
Interbank lending	Net worth

- I treat the bankers as the members of one family  $N_t^i = N_t$ ,  $D_t^i = D_t$ .
- Borrowing is limited  $L_t^i = \lambda_b * N_t$ .
- Interbank lending is risky
- Probability that the loan will be repayed (lender's perspective): full repayment only:

$$\begin{aligned} p_t^i &= \text{Prob}(\text{Return} > \text{Liabilities}) \\ &= \text{Prob}\left(\hat{E}_t^i R_{t+1}^k (1 + \lambda_b) > R_t d_t + \lambda_b R_t^{ib}\right). \end{aligned}$$

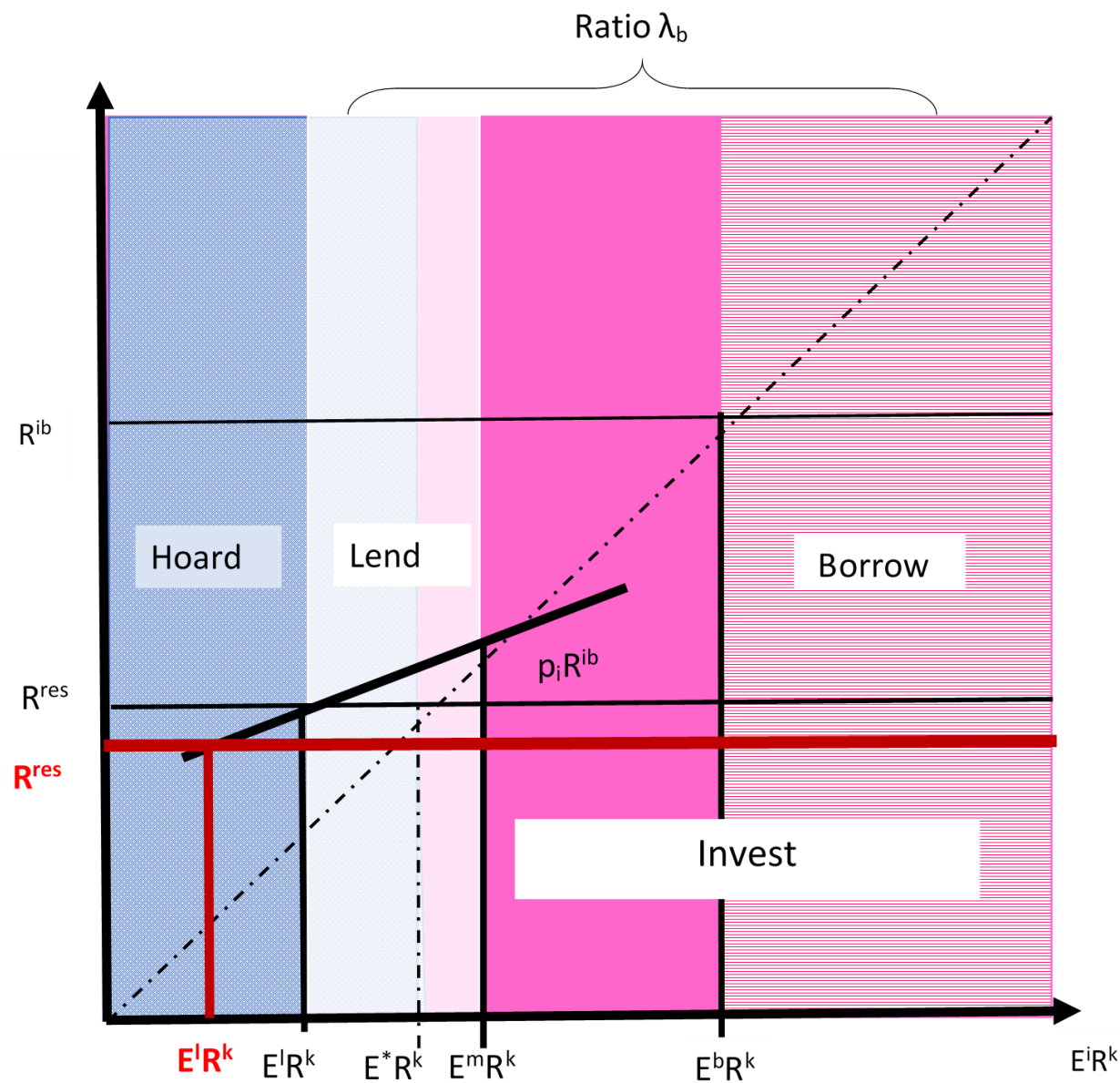
- Expected interbank market return  $p_t^i R_t^{ib}$ .

# Bank Expectations and Investment Decisions

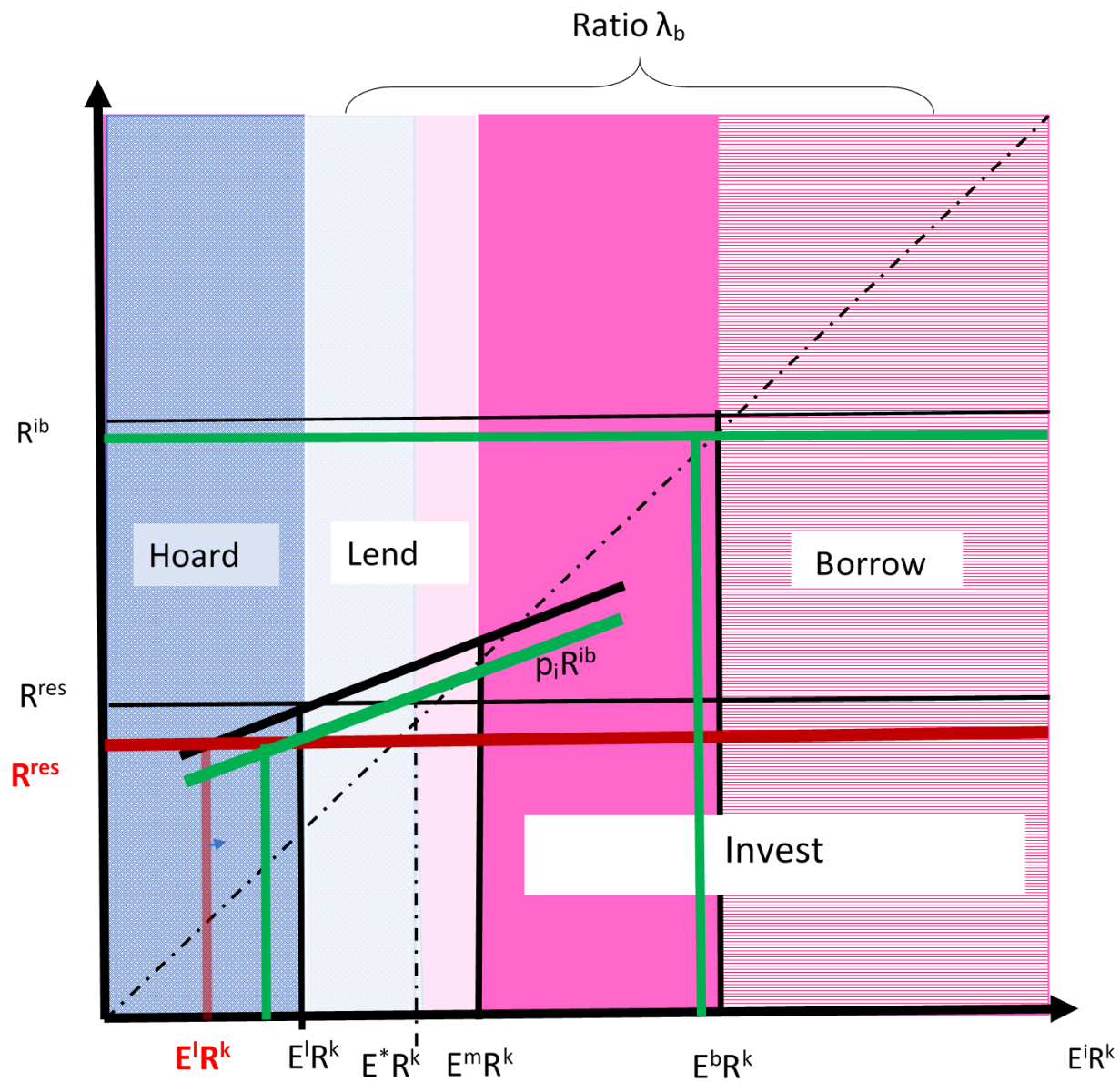




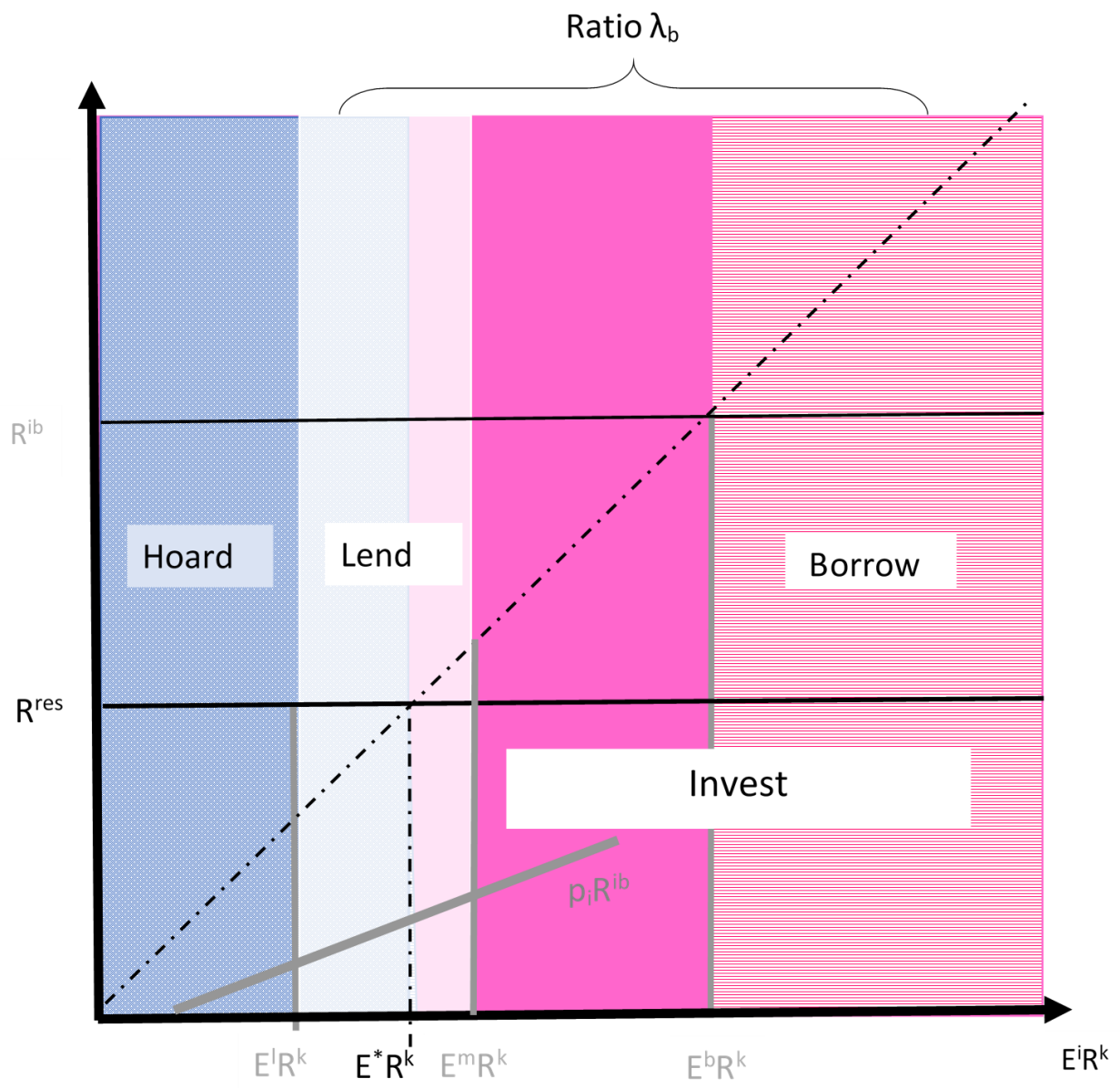
# Some Policy Insights



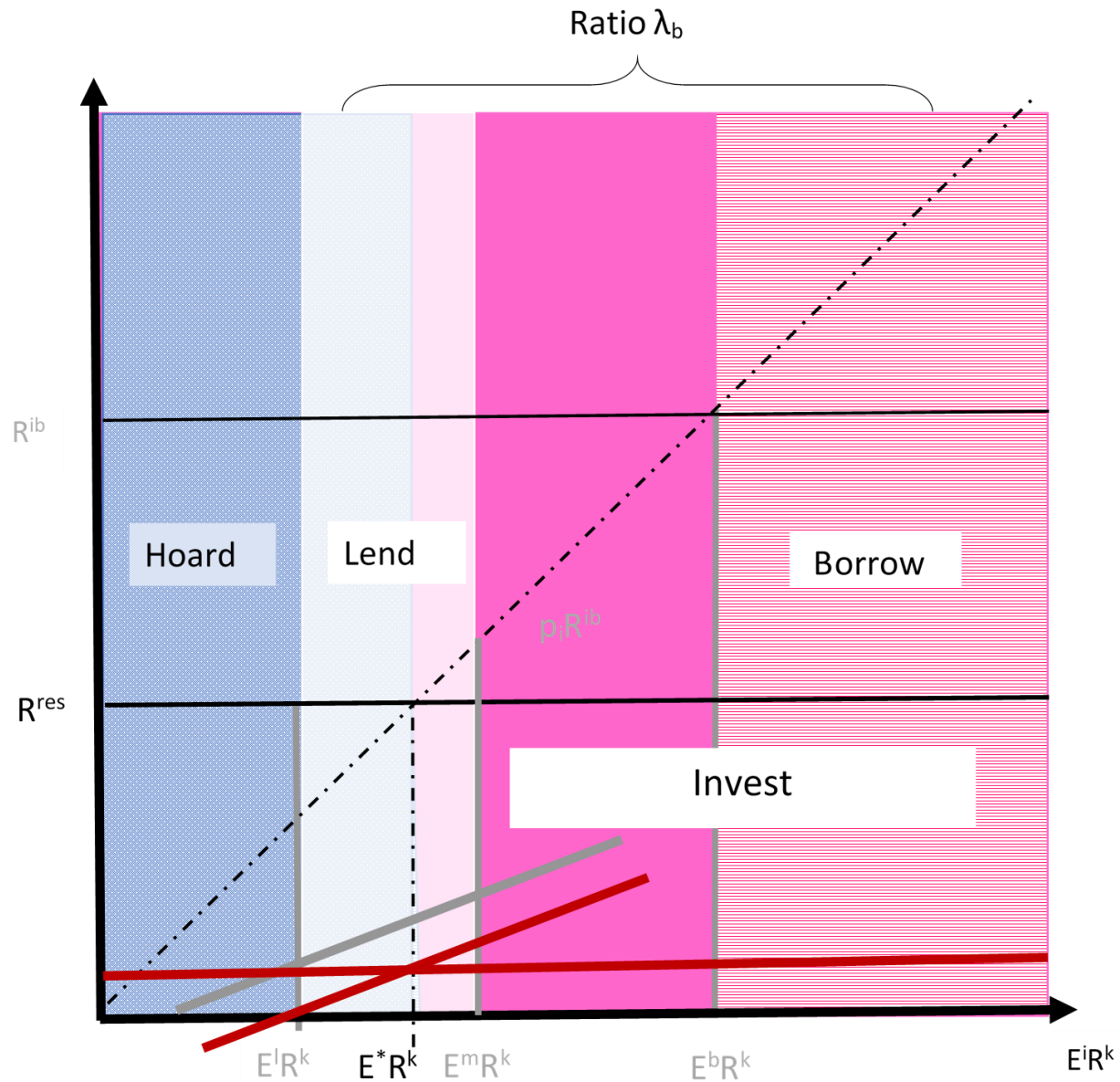
# Some Policy Insights



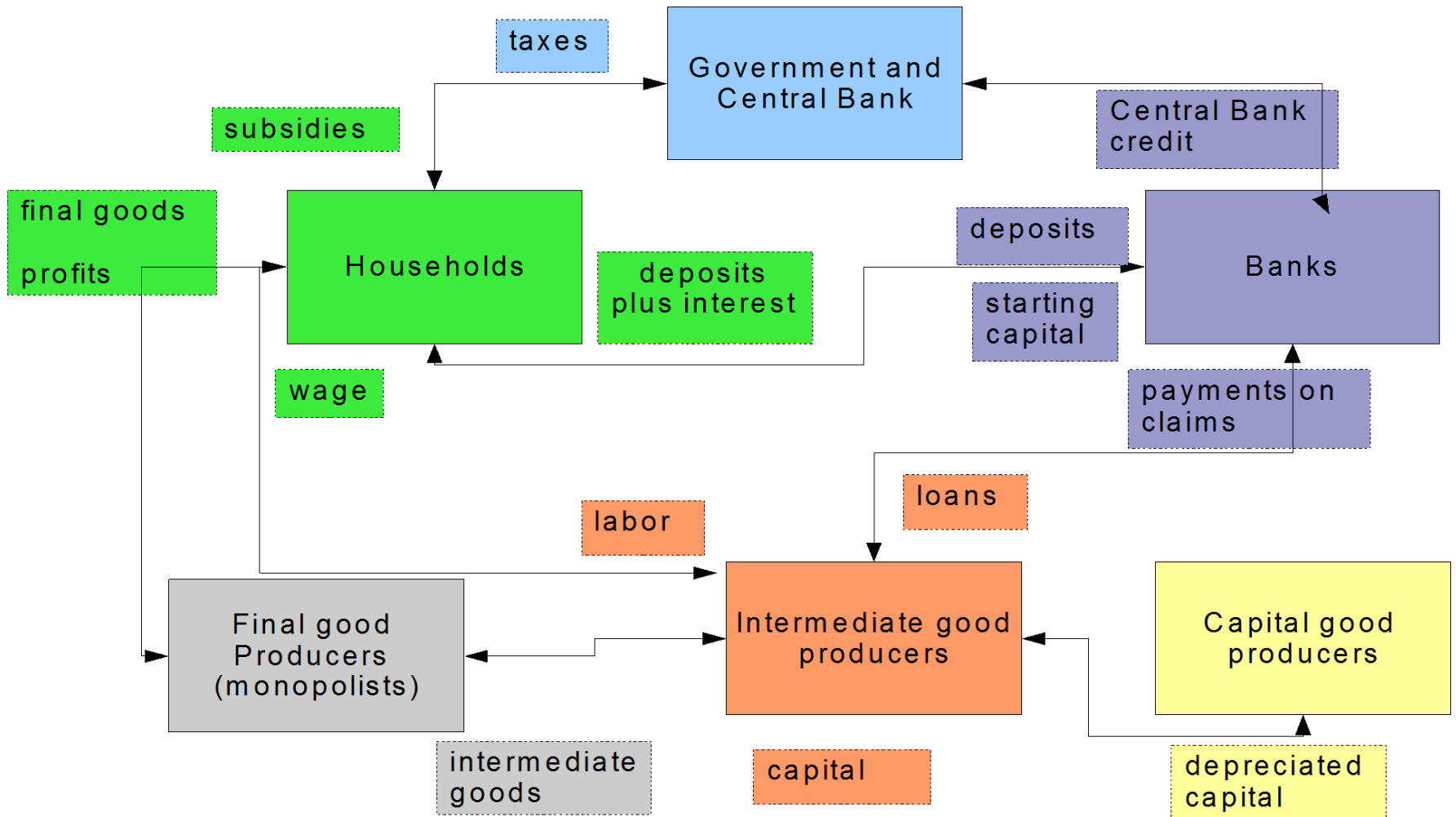
# Some Policy Insights: IBM collapse



# Some Policy Insights: IBM collapse



- Interbank market allocations and interest rate depend on the moments of the beliefs distribution
- With very low average belief IBM collapses
- When the market beliefs are too low (IBM collapses):
  - Liquidity provision effect is conditional on market optimism
  - Effect of policy rate decline is limited
  - Collateral constraint relaxation has no effect



- Assumption 1:

$$R_t^k = \frac{(\alpha \frac{P_t Y_t}{K_t} + Q_t - \delta) \zeta_t}{Q_{t-1}}$$

- Assumption 2:

$$\zeta_t = \rho_\zeta \zeta_{t-1} + \mu_t + \varepsilon_{\zeta,t} \quad (1)$$

- $\mu_t$  is a persistent shock

$$\mu_t = \rho_\mu \mu_{t-1} + v_t$$

The capital quality shock

$$\zeta_t = \rho_\zeta \zeta_{t-1} + \mu_t + \varepsilon_{\zeta,t} \quad (2)$$

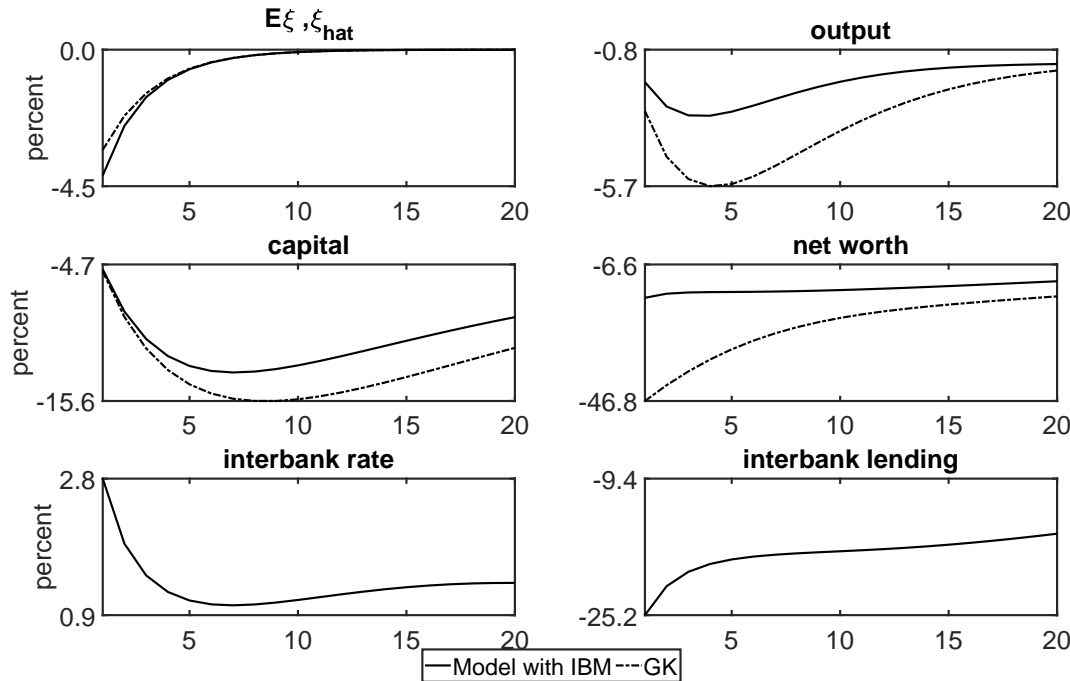
To forecast  $\zeta_t$  every banker combines (using Kalman filter):

- past observations on  $\zeta_t$ ,
- heterogeneous signal about  $\mu_t$ .

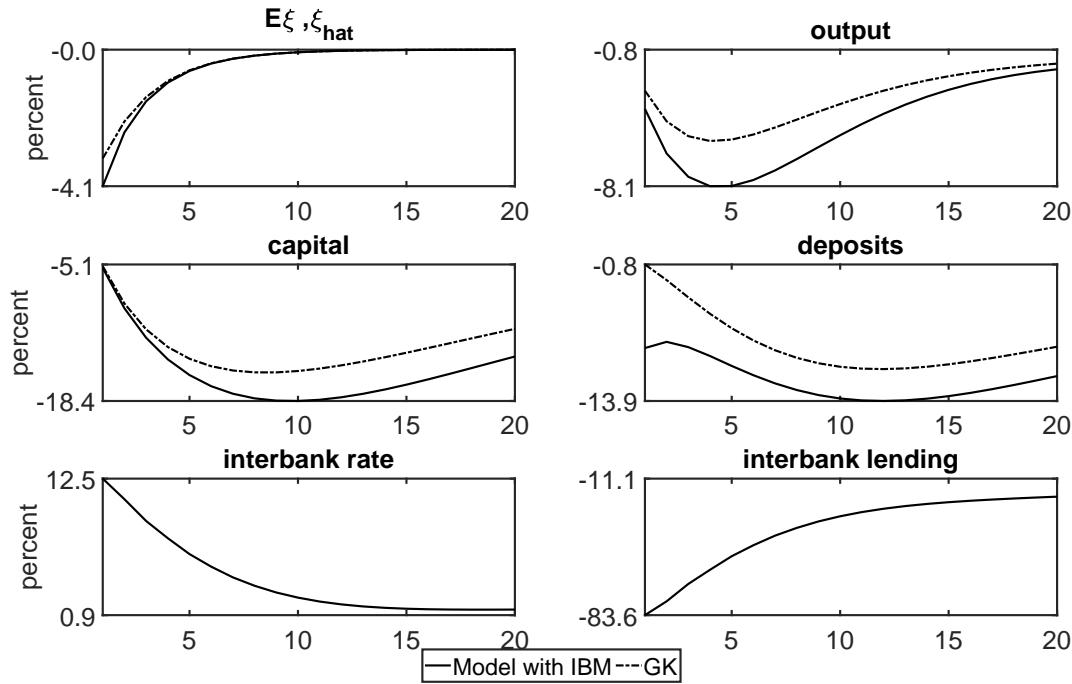
$$\mu_t^i = \mu_t + \theta_t^i \quad (3)$$



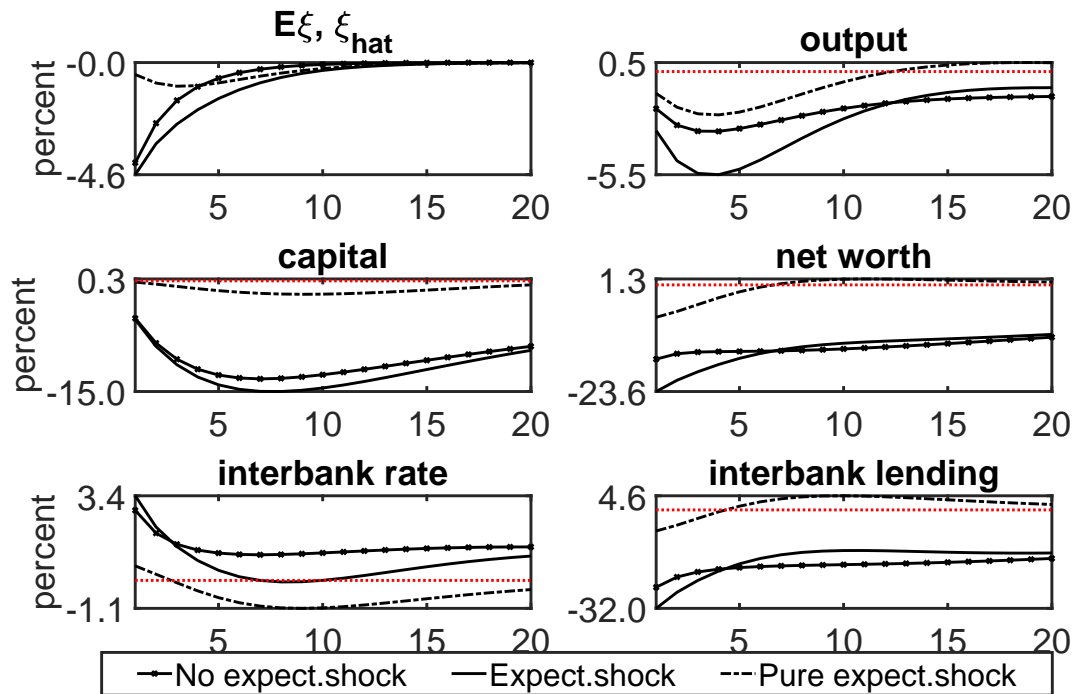
- "Fundamental" shock:  $\zeta_t = \rho_\zeta \zeta_{t-1} + \mu_t + \varepsilon_{\zeta,t}$
- Sentiment shock:  $\hat{\mu}_t^i = \mu_t + \eta_t^i$
- Policy:  $\nabla_t^p = \kappa^p \left( R_{t+1}^k - R_t - (\overline{Rk - R}) \right)$ 
  - untargeted  $\nabla_t^{unt}(\text{Risky Asset} + \text{Reserves})$
  - targeted:  $\nabla_t^{targ}(\text{Risky Asset})$
  - interest rate  $R_t^{res} - \nabla_t^r$
- Policy costs:  $\tau \nabla_t^{unt}(\text{Risky Asset} + \text{Reserves})$  or  $\tau \nabla_t^{targ}(\text{Risky Asset})$



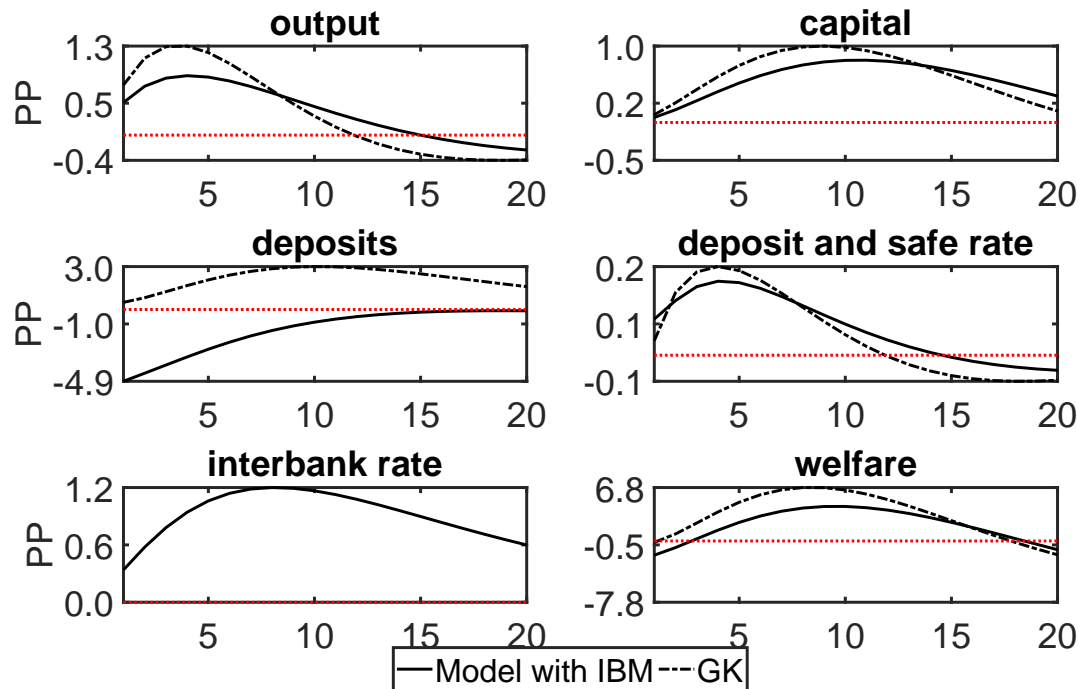
- agents overestimate crisis,  $\xi$
- model results in a smaller drop in net wealth (diversification) data
- lending falls and IBM rate rises



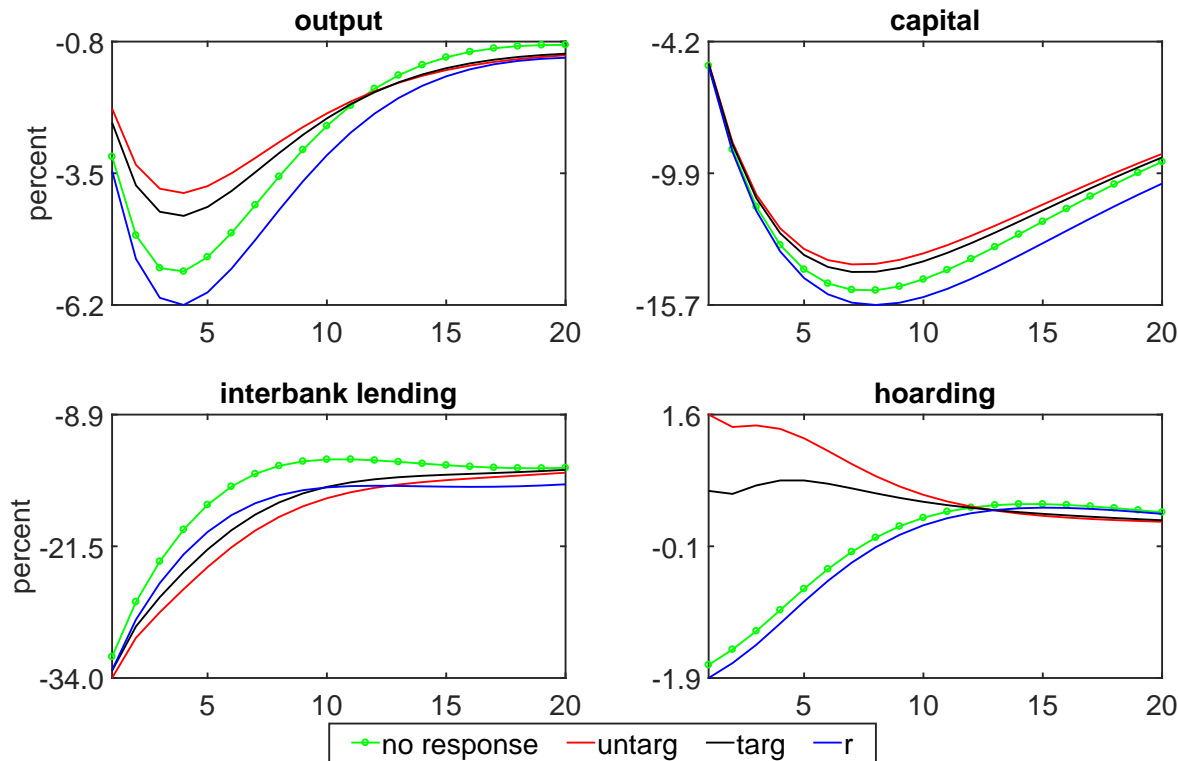
- when controlling for net worth differences, there is a larger recession
- set of lenders declines



- with sentiment shock, the recession is comparable to the baseline
- pure expectational shock generates a significant recession



- $x^p - x^{np}$
- when controlling for expectations, policy effects are less pronounced and delayed
- crowding out of private lending and deposits



Under targeted policy:

- smaller safe asset holdings
  - smaller share of hoarders
  - lower price of capital
  - slightly larger drop in capital and output
- Low reserve rate worsens bank balance sheets

- The model of interbank market to capture counterparty risk and liquidity hoarding
- Investors' expectations are shown to generate long and large responses in model variables
- With low sentiment, policy effects are smaller and delayed
  - Liquidity provision effects are limited by banks sentiment
  - Low interest rate worsens bank's balance sheet
- The importance of other factors for liquidity hoarding is acknowledged

	Our Model	Baseline	Data
Output, Y	0.109	0.17	0.034
Consumption, C	0.222	0.28	0.041
Net Worth, N	0.783	1.54	0.817

For output we use GDP per capita, for consumption - final consumption per capita, for net worth - net financial assets of financial corporations. All data are from Eurostat and for the Euro area. The standard deviations are calculated for the log differences of the series [back](#)