Efficiency of Central Bank Policy During the Crisis: Role of Expectations in Reinforcing Hoarding Behavior

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Motivation

- Credit crunch and policy response by central banks
- Academic literature on policy analysis:

  -frictionless transfer of funds between real and financial sector

  -crisis as a decline in creditors' balance sheet

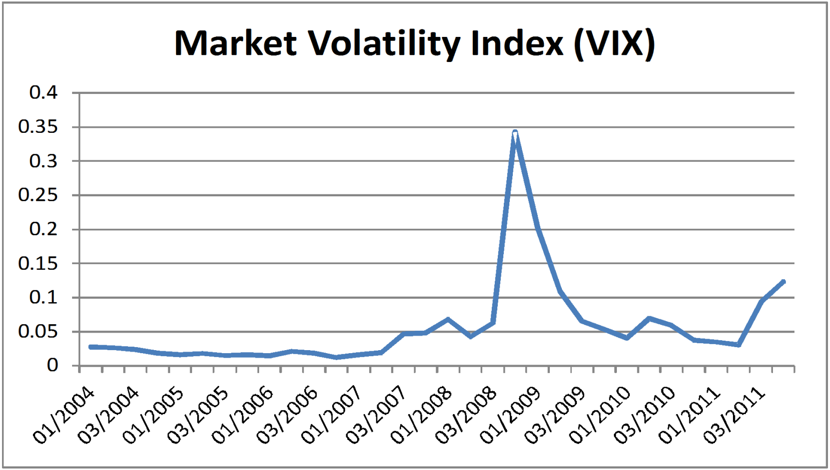
- Liquidity hoarding
- Taylor and Williams (2009):

  -counter-party risk was important factor in reducing availability of credit

- Change in investor sentiment

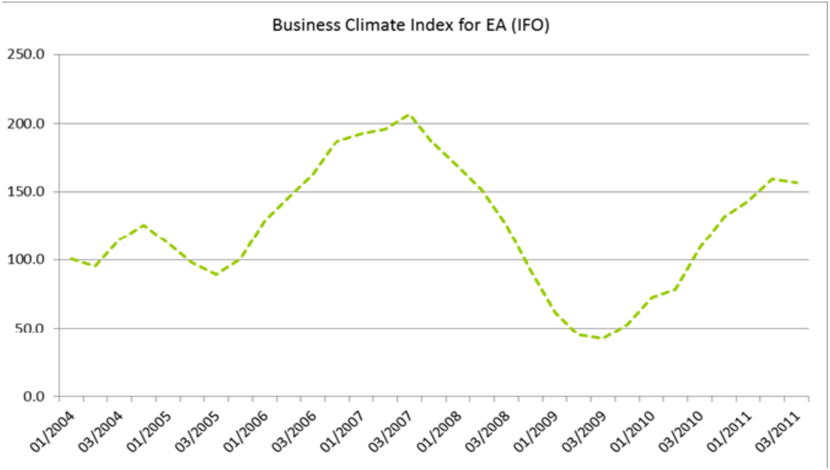
Motivation

Investor Sentiment



Motivation

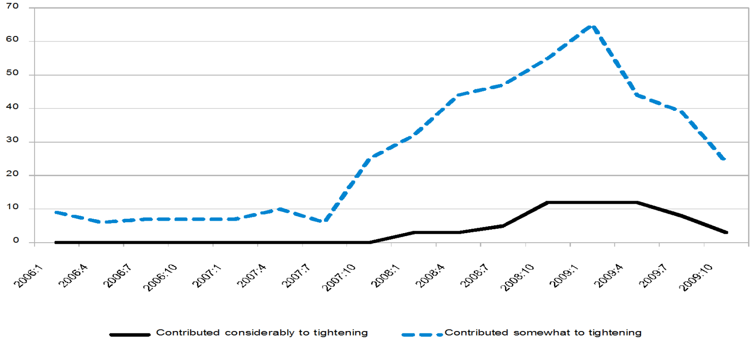
Investor Sentiment



Motivation

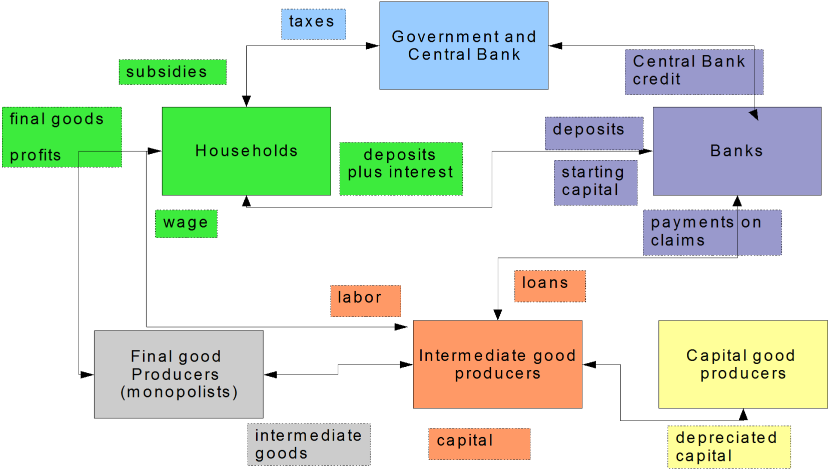
Investor Sentiment

Over the past three months, how have the following factors affected your bank's credit standards as applied to the approval of loans or credit lines to enterprises? <u>Factor=expectations regarding general economic activity</u>



Model

Overview



Model

Overview

- Assumption 1:

$$\text{Return on capital} = R_{kt} = \frac{\alpha \frac{P_t Y_t}{K_t} + (1-\delta)\, Q_t \zeta_t}{Q_{t-1}}$$

- Assumption 2:

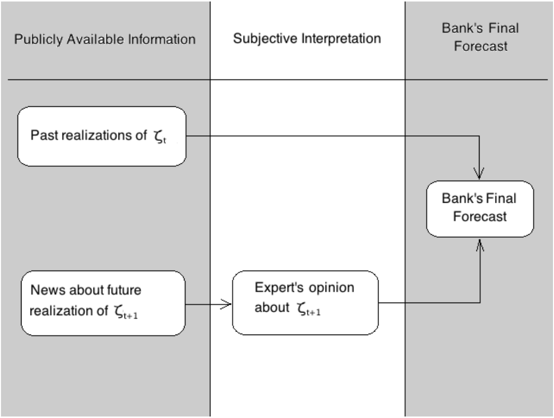
$$\zeta_t = \rho_\zeta \zeta_{t-1} + \mu_t + \varepsilon_{\zeta,t} \tag{1}$$

μ_t is a persistent shock

$$\mu_t = \rho_\mu \mu_{t-1} + v_t \tag{2}$$

Model

Beliefs



Model

Beliefs

Banks form their priors about ζ_{t+1} based on past data and then add the expert adjustment θ_t^h.

$$\zeta_t = \hat{\rho}_{\zeta,t}\zeta_{t-1} + \nu_t \tag{3}$$

When the new observation on ζ_t, arrives the priors about $\hat{\rho}_{\zeta,t}$ and σ_ν^2 are updated using Bayes' rule.
Adopting the adjustment procedure from (Bullard,2010) but for heterogeneous agents, we let expert opinion be formed as:

$$\theta_t^h = \rho_\theta \theta_{t-1}^h + (1-\rho_\theta)\,\eta_t^h \tag{4}$$

$$\eta_t^h = \zeta_{t+1} + \varepsilon_{\eta,t}^h$$

The prior of the future value of capital quality is then updated by the bank as a weighted average of the signal and estimation from the past data:

$$E_t\hat{\tilde{\zeta}}_{t+1}^h = sE_t\left(\tilde{\zeta}_{t+1}|\zeta^t\right) + (1-s)\theta_t^h \tag{5}$$

Model

Bank's problem

$$\max_{\gamma_t^h, \omega_t^h} E_t \Omega_{t,t+1} \left(\widehat{E}_t \left(\Pi_{t+1}^h \right) - \frac{\rho \widehat{Var_t} (\Pi_{t+1}^h)}{2} \right) \quad (6)$$

subject to budget constraint:

$$\omega_t^h \leq 1, \ |\gamma_t^h| \leq 1$$

and collateral constraint for a borrower on the interbank market:

- $$B_t^{i,h} <= \frac{Collateral}{R_t^i} \times S_t^h \quad (7)$$

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- $$Collateral_t \times \omega_t^h\left(1+\gamma_t^h\right) \geq \gamma_t^h R_{t+1}^i$$

Results

Role of banks' sentiment

- credit market clears:

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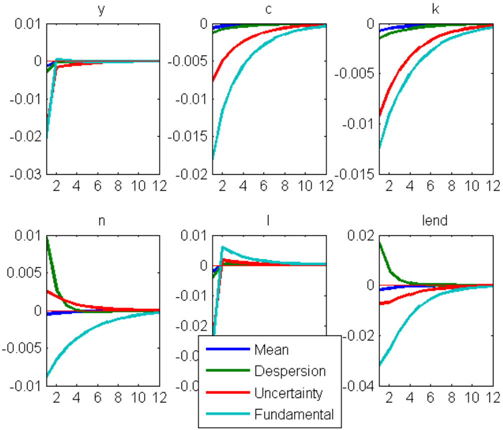
- $$X_t = F\left(X_{t-1}, \bar{\zeta}, \sigma_\zeta, \sigma_R\right)$$

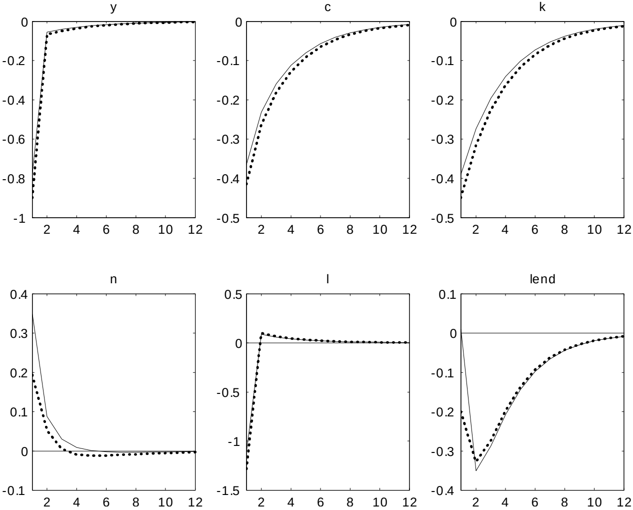
Results

Impulse Responses to Sentiment and Fundamental Shocks (0.01)



Results

Response to Crisis with and without Policy



Conclusion

- Investors' expectations generate long and large responses in model variables
- Banks hoard some liquidity provided by central bank due to their low sentiment
- Liquidity provision mitigates crisis slightly, but does not stop it, nor decreases its duration

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-
$$\int_{R^N_t} \omega^h_t (1+\gamma^h_t) \left(\Pi^h_t + D^h_t\right) f\left(x\right) dx$$

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- $$\int^{R^N_t} \left(\Pi^h_t + D^h_t\right) f(x)\, dx = \int_{R^N_t} \gamma^h_t \left(\Pi^h_t + D^h_t\right) f(x)\, dx$$

Solution:

with $x \sim U(a, b)$

$$
\begin{aligned}
a &= \bar{x} - \sqrt{3}\sigma_x, \;\; b = \sqrt{3}\sigma_x + \bar{x} \\
f(x) &= \frac{1}{2\sqrt{3}\sigma_x}
\end{aligned}
$$