Interest rate policies, banking and the macro-economy

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HOW DOES MONETARY POLICY AFFECT THE MACRO-ECONOMY?

TYPICAL CHANNELS: increase in money supply and low interest rates affect the macro-economy by

- lowering the cost of investment and production (cost channel);

- increasing the financing of investment and production (credit channel);

- increasing aggregate demand (demand channel).

HOW DOES MONETARY POLICY AFFECT THE MACRO-ECONOMY?

- But low interest rates discourage private savings in liquid assets;

 – This may have negative macroeconomic effects.

- They also encourage financial intermediaries to increase leverage;

  – This may cause greater macroeconomic instability.

THIS PAPER

- I show the negative effects of low interest rates in a model where:

  - Financial intermediaries play a central role in the allocation of funds between sectors (from savers to borrowers).

  - Private holdings of bank liabilities have positive effects on production.

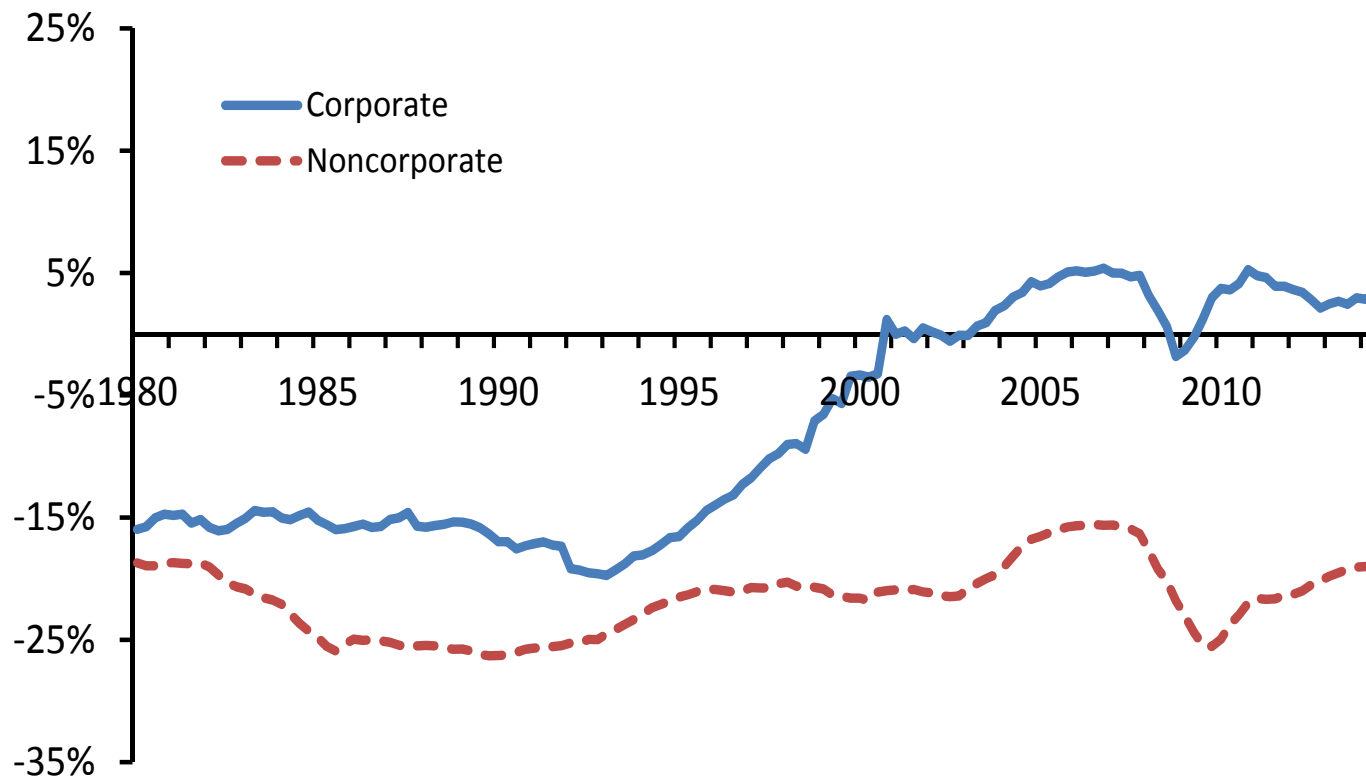 - Leverage in financial intermediation impacts macroeconomic stability.

Schematic overview of the economy
Firms: net lenders; Households: net borrowers.
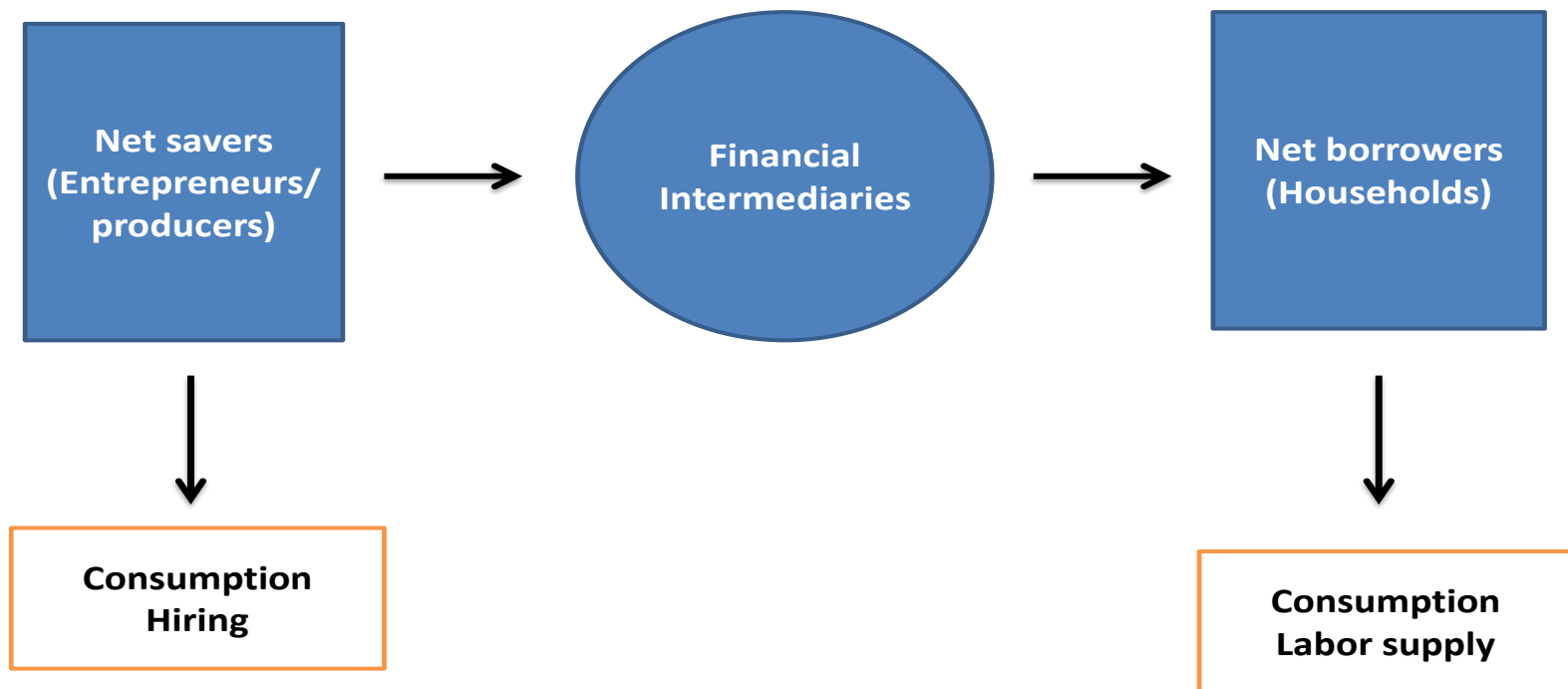
Net financial assets
(In percent of nonfinancial assets)

1. Entrepreneurial sector

- Continuum of entrepreneurs with utility $E_0 \sum_{t=0}^{\infty} \beta^t \ln(c_t)$

- Technology $F(z_t, h_t) = z_t h_t$

  $h_t = $ Input of labor
  $z_t = $ Idiosyncratic shock observed **after** choosing h_t.

- They can buy bonds b_{t+1}. The budget constraint is

$$c_t + \frac{b_{t+1}}{R_t^l} = (z_t - w_t)h_t + b_t \equiv a_t$$

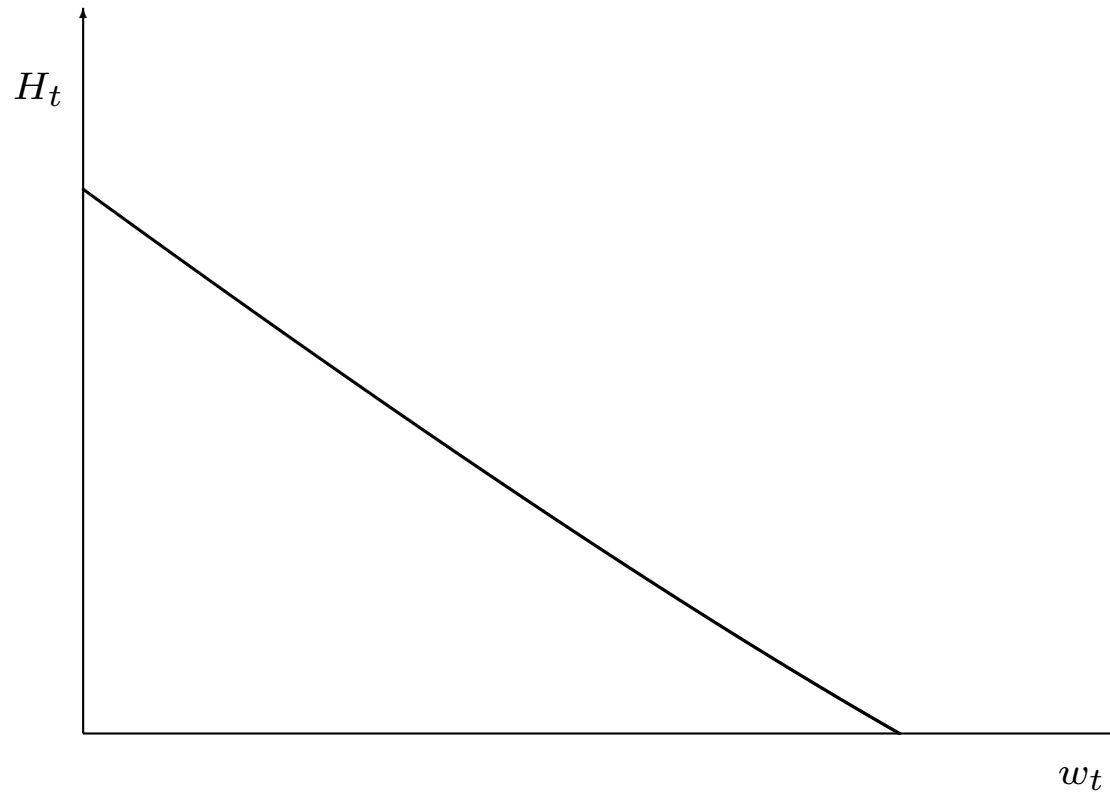# Optimal entrepreneur's policy

$$h_t = \phi(w_t)b_t$$

$$c_t = (1-\beta)a_t$$

$$\frac{b_{t+1}}{R_t^l} = \beta a_t$$

Where ϕ_t satisfies $\mathbb{E}_z \left\{ \frac{z - w_t}{1 + (z - w_t)\phi_t} \right\} = 0.$

Aggregate demand of labor

$$H_t = \phi(w_t) \underbrace{\int b_t}_{\text{Financial wealth}}$$

2. Households sector

- Utility $\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t \left(c_t - \alpha \frac{h_t^{1+\nu}}{1+\nu} \right)$

- Hold a non-reproducible asset $\overline{K}$ (Houses). It produces χ units of consumption goods and it is traded at price p_t.

- Borrow subject to the collateral constraint

$$\frac{d_{t+1}}{R_t^i} \leq \eta \mathbb{E}_t p_{t+1} k_{t+1}$$

- Budget constraint

$$c_t + d_t + (k_{t+1} - k_t) p_t = \frac{d_{t+1}}{R_t^i} + w_t h_t + \chi k_t + T_t$$
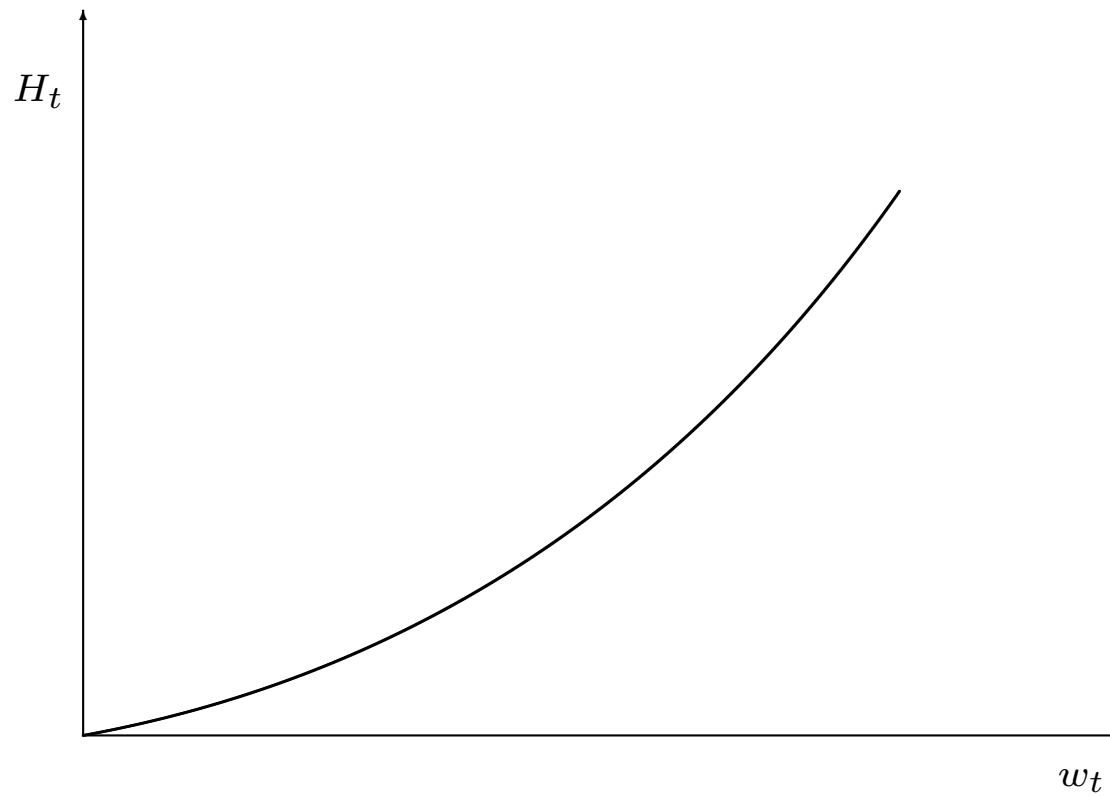
First order conditions for households

$$\alpha h_t^{\nu} = w_t$$

$$1 = \beta R_t^i (1 + \mu_t)$$

$$p_t = \beta \mathbb{E}_t \Big[\chi + (1 + \eta \mu_t) p_{t+1} \Big]$$
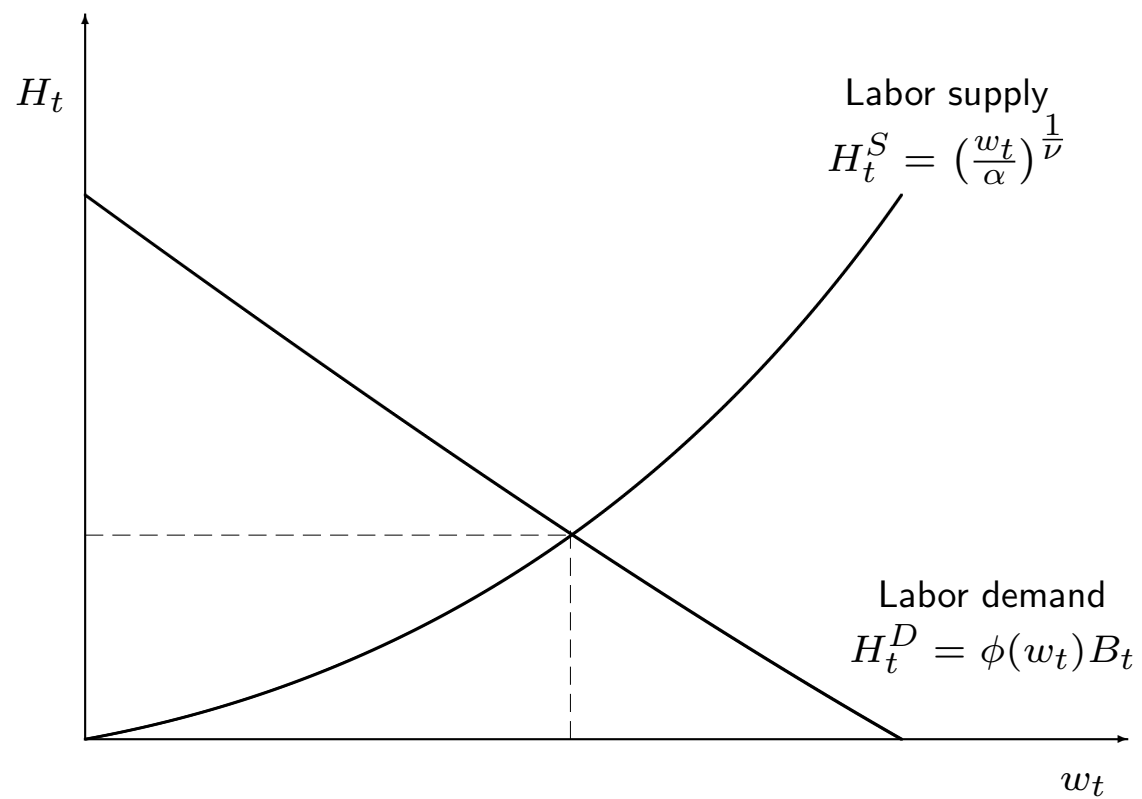
Aggregate supply of labor

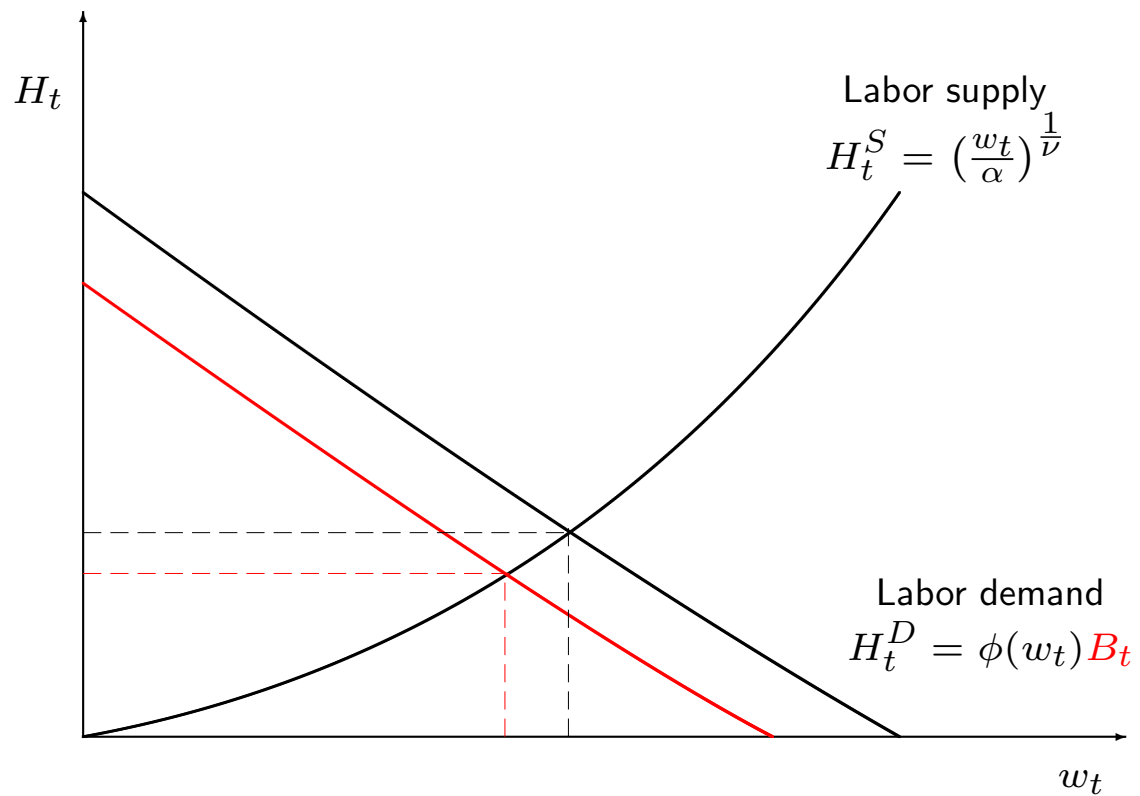$$H_t = \left(\frac{w_t}{\alpha}\right)^{\frac{1}{\nu}}$$

EQUILIBRIUM

WITHOUT INTERMEDIATION

(Borrowing and lending is direct)

LABOR MARKET EQUILIBRIUM

Labor supply
$$H_t^S = \left(\frac{w_t}{\alpha}\right)^{\frac{1}{\nu}}$$

Labor demand
$$H_t^D = \phi(w_t)B_t$$

LABOR MARKET EQUILIBRIUM
(Lower stock of bank liabilities)

H_t

Labor supply
$H_t^S = \left(\frac{w_t}{\alpha}\right)^{\frac{1}{\nu}}$

Labor demand
$H_t^D = \phi(w_t)B_t$

w_t

INTRODUCING

THE INTERMEDIATION SECTOR

3. Intermediation sector

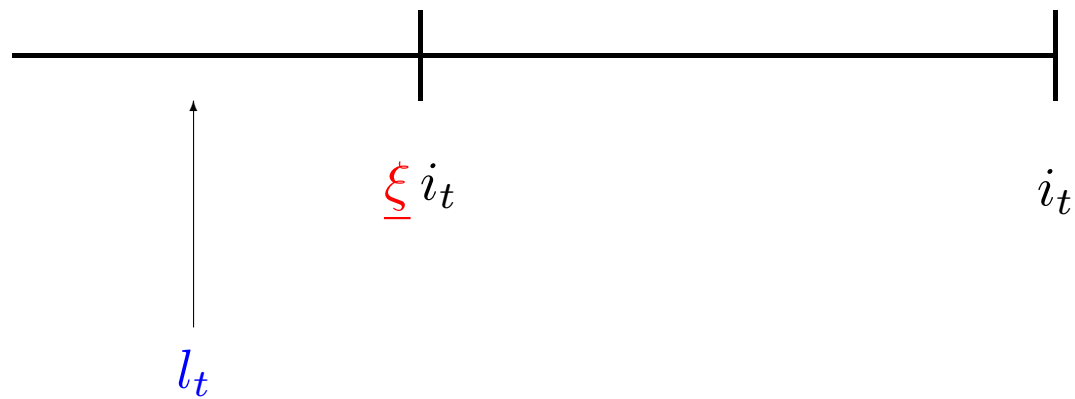- Banks start with liabilities l_t and assets i_t.

- The liquidation value of assets is $\xi_t i_t$, with $\xi_t \in \left\{ \underline{\xi}, 1 \right\}$.

- Banks renegotiate if liabilities exceed the liquidation value of assets,

$$
\tilde{l}_t(l_t, i_t) = \begin{cases} l_t, & \text{if } l_t \leq \xi_t i_t \\[2em] \xi_t i_t & \text{if } l_t > \xi_t i_t \end{cases}
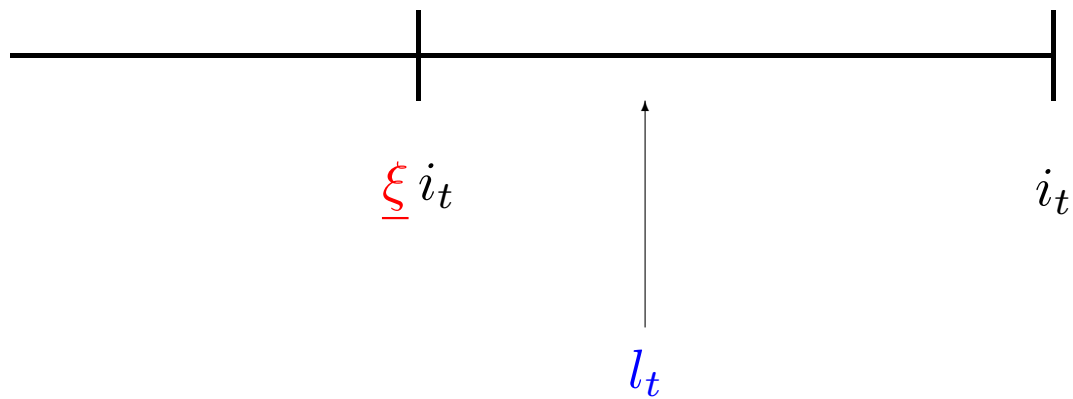$$

- There is an intermediation cost that rises with leverage.

$$
\varphi \left(\frac{l_{t+1}}{i_{t+1}} \right) l_{t+1}
$$

LOW LEVERAGE (No default)

HIGH LEVERAGE (Possibility of default)

Monetary/fiscal authority

- Policy interventions are in the form of asset purchases.

- It purchases bank liabilities with taxes paid by households.

- Budget constraint:

$$M_t = \frac{M_{t+1}}{R_t^l} + T_t.$$

Market equilibrium for bank liabilities

$$B_{t+1} + M_{t+1} = L_{t+1}$$

SIMULATION EXERCISE

- Asset purchases by the monetary/fiscal authority is $M_{t+1} = 0$ for the initial period.

- Then M_{t+1} increases permanently to 10% the value of bank liabilities.

- I simulate the model in response to a random sequence of ξ_t.

- I then repeat the simulation 1,000 times with each simulation induced by a new sequence of ξ_t draws.
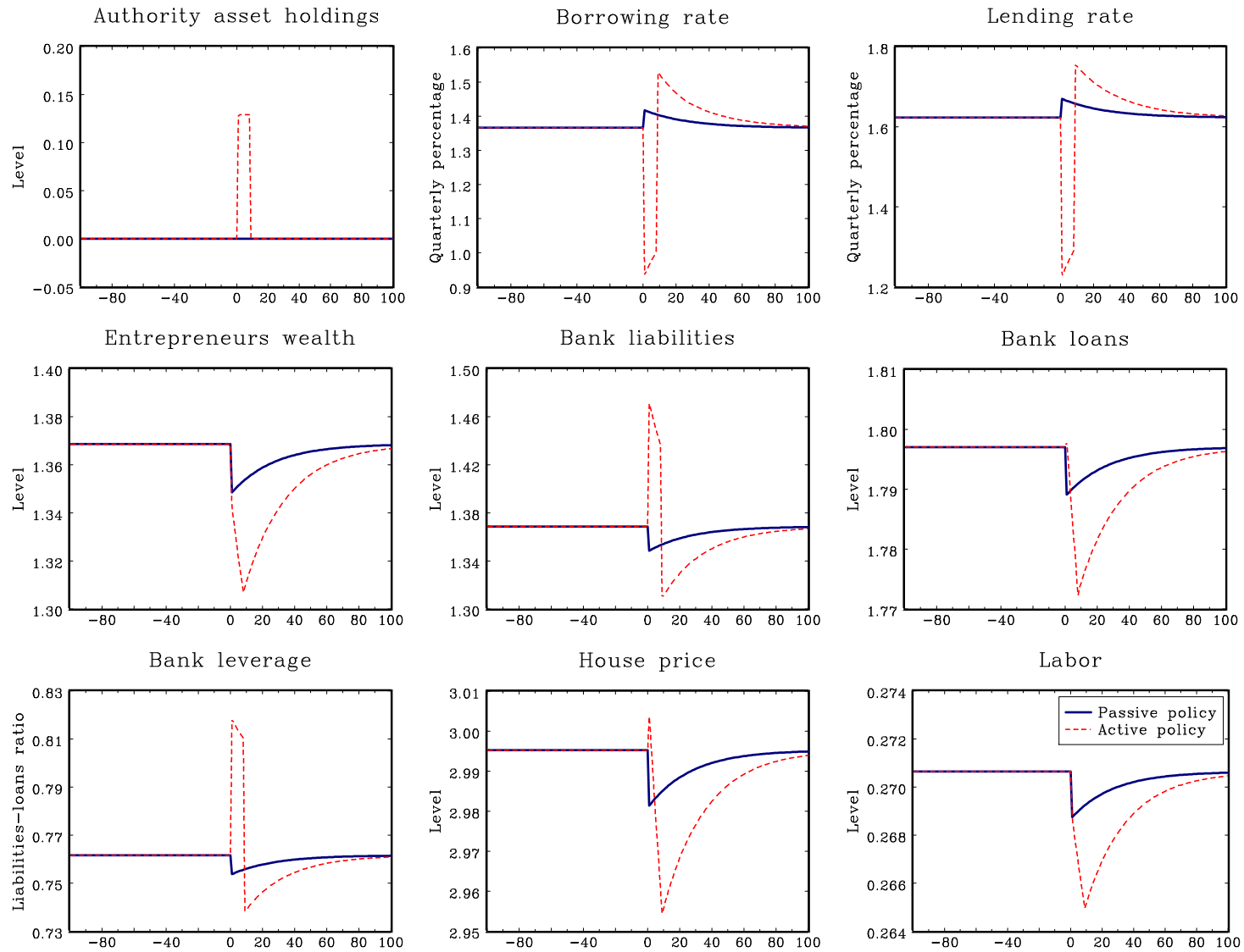
Repeated simulations
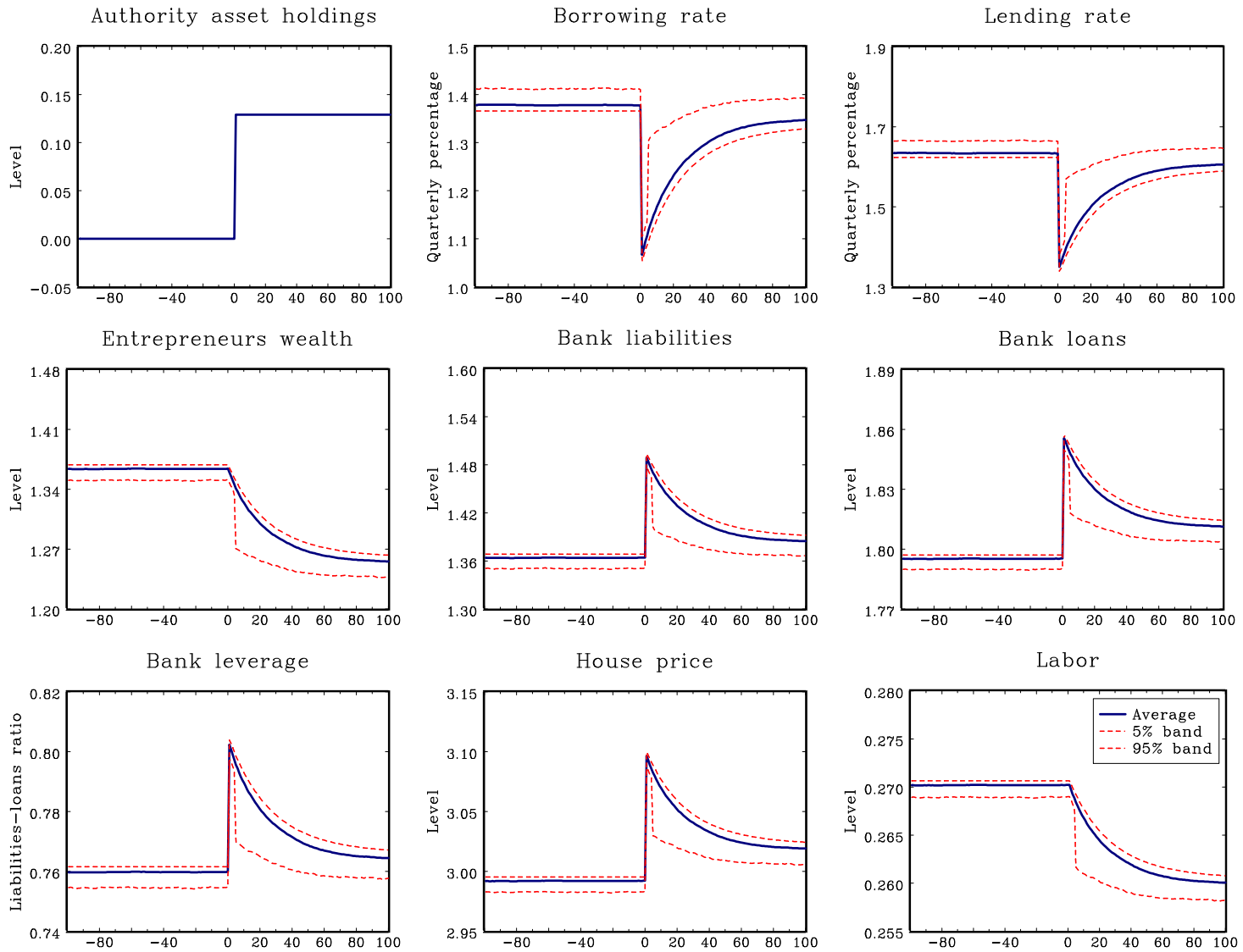
For a particular sequence of shocks

- The shock $\xi_t = 1$ except for one quarter.

- Two policies:

  1. **Passive**: $M_{t+1} = 0$ and does not respond to the shock.

  2. **Active**: M_{t+1} increase for eight quarters in response to the shock.

Simulation with only one negative shock

CONCLUSION

- Low interest rates induced by monetary policy may encourage lending but they also discourage savings.

- To the extent that savers make production and investment decisions, lower savings may have negative macroeconomic effects.

- Low interest rates also encourage leverage in financial intermediation which increases financial and macroeconomic instability.