ECON 815

Financial Shocks II

Winter 2014

Aggregate Economy

Aggregate supply/demand functions for new capital:

- interest rate for debt contract
- leverage
- price of new capital q

Optimal decisions by households and entrepreneurs:

- Euler equations

Law of motion on (aggregate) state variables:

- capital
- net worth of entrepreneurs

Market Clearing conditions

Households

Households $(1-\eta)$ sell/purchase capital through intermediaries (diversification).

$$c_t + q_{t+1}k_{t+1} \leq w_t n_t + r_t k_t + q_t(1-\delta)k_t$$

FOC:

$$q_t c_t^{-\sigma} = E_t\left[\beta c_{t+1}^{-\sigma}(r_{t+1} + (1-\delta)q_{t+1})\right]$$

Labour decision:

$$\chi \frac{c_t^{\sigma}}{(1-n_t)^{\eta}} = w_t$$

Entrepreneurs

Risk-neutral entrepreneurs (γ of them) inelastically supply one unit of labour and invest all their net worth into new capital.

$$\begin{aligned} n_t &= w_t^e + r_t k_t^e + q_t(1-\delta)k_t^e \\ c_t^e + q_t k_{t+1}^e &\leq n_t \alpha_\ell(\bar{\omega}) \left(\frac{q_t}{1 - q_t \alpha_b(\bar{\omega})} \right) \end{aligned}$$

FOC:

$$q_t = E_t \left[\beta^e (r_{t+1} + (1-\delta) q_{t+1}) \alpha_\ell(\bar{\omega}) \left(\frac{q_{t+1}}{1 - q_{t+1} \alpha_b(\bar{\omega})} \right) \right]$$

Again: both leverage and net worth matters!

Entrepreneurs have a higher incentive to invest due to a higher return.

Law of Motions

Aggregate Capital:

$$K_{t+1} = (1-\delta)K_t + \gamma I_t (1 - \Phi(\bar{\omega})\mu)$$

Aggregate Entrepreneurial Net Worth

$$N_{t+1} = \gamma w_{t+1}^e + (q_{t+1}(1-\delta) + r_{t+1}) \left(N_t \alpha_\ell(\bar{\omega}) \left(\frac{1}{1 - q_t \alpha_b(\bar{\omega})} \right) - \frac{\gamma c_t^e}{q_t} \right)$$

Market Clearing

$$(1-\gamma)C_t + \gamma C_t^e + \eta I_t = Y_t$$

Financial contract gives $\bar{\omega}, i_t$.

Experiment I: Negative Productivity Shock

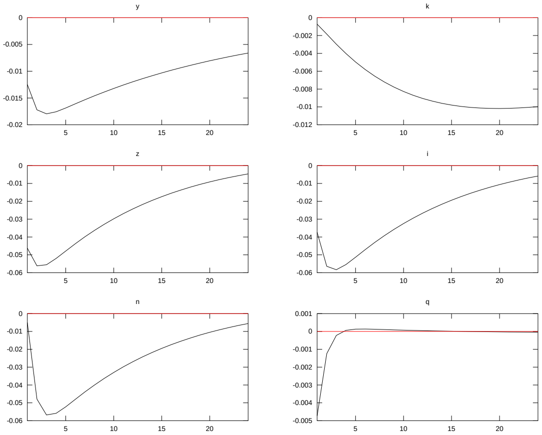

Figure: 1% Decrease in Productivity

Experiment II: Negative Net Worth Shock

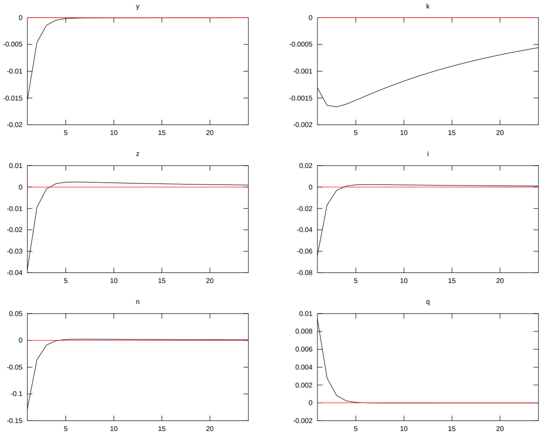

Figure: Redistribute 1% in Total Capital

Experiment III: Increase in Risk

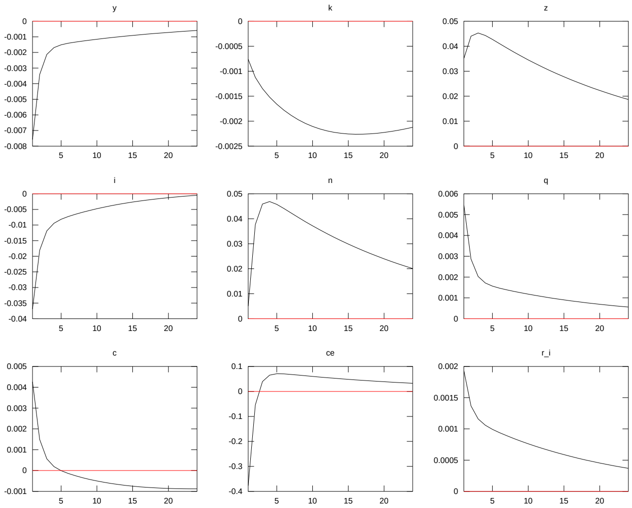

Figure: 10% Increase in Standard Deviation