

PHBS

Macroeconomic Effects of Financial Shocks

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Overview

- 1 Facts
- 2 Setup
- 3 Equilibrium
- 4 simulate
- 5 mechanism

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Cyclical pattern

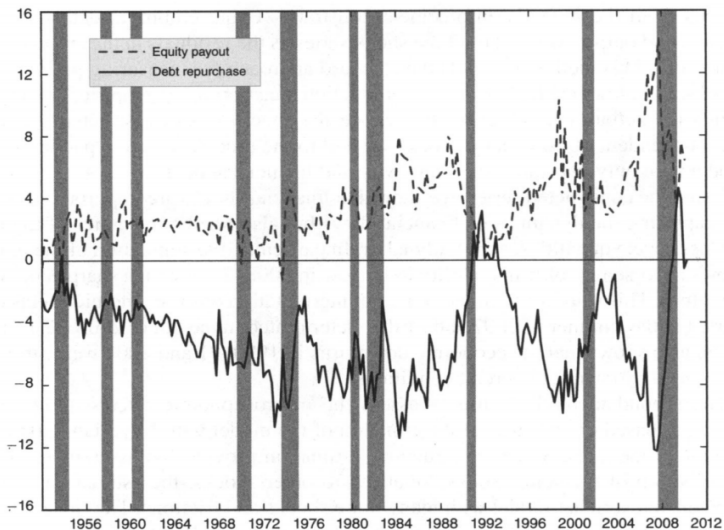


FIGURE 1. FINANCIAL FLOWS IN THE NONFINANCIAL BUSINESS SECTOR (*Corporate and Noncorporate*), 1952:I–2010:II

Cyclical pattern

TABLE 1—BUSINESS CYCLES PROPERTIES OF MACROECONOMIC AND FINANCIAL VARIABLES,
1984:I–2010:II

	Standard deviation(Variable)	Corr(Variable, GDP)
EquPay/GDP	1.13	0.45
DebtRep/GDP	1.46	−0.70

- Equity payout is procyclical
- Debt payout is countercyclical

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Household

- Objective function

$$\max_{c_t, n_t, s_{t+1}} E_0 \sum_0^{\infty} \beta^t \{ \log c_t + \alpha \log (1 - n_t) \} \quad (1)$$

- Budget constraint

$$w_t n_t + b_t + s_t (d_t + p_t) = \frac{b_{t+1}}{(1 + \tau) R_t} + s_{t+1} p_t + c_t + T_t \quad (2)$$

Firm

- Bellman equation

$$V(s_t; k_t, b_t) = \max_{d_t, n_t, k_{t+1}, b_{t+1}} d_t + E_t m_{t+1} V(s_{t+1}; k_{t+1}, b_{t+1}) \quad (3)$$

- Budget constraint

$$(1 - \delta)k_t + y_t - w_t n_t + \frac{b_{t+1}}{R_t} = b_t + \varphi(d_t) + k_{t+1} \quad (4)$$

- Enforcement constraint

$$\xi_t \left(k_{t+1} - \frac{b_{t+1}}{R_t} \right) \geq y_t \quad (5)$$

Firm

$$\begin{aligned} V(s; k, b) = \max_d &+ Em' V(s'; k', b') + \\ E(\lambda((1 - \delta)k + F(z, k, n) - wn + \frac{b'}{R} - b + \phi(d) + k') & \quad (6) \\ + \mu((k' - \frac{b'}{R}) - F(z, k, n))) & \end{aligned}$$

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Equilibrium conditions

$$w_t \frac{1}{c_t} = \frac{\alpha}{1 - n_t} \quad (7)$$

$$\frac{1}{c_t} = \beta(1 + \tau)R_t E \frac{1}{c_{t+1}} \quad (8)$$

$$w_t n_t + b_t + d_t = \frac{b_{t+1}}{R_t} + c_t \quad (9)$$

$$[1 - \varphi_d(d_t) \mu_t] F_n(z_t, k_t, n_t) = w_t \quad (10)$$

$$m_{t+1} = \beta \frac{c_t}{c_{t+1}} \quad (11)$$

$$E m_{t+1} \left\{ \frac{1}{\varphi_d(d_{t+1})} [1 - \delta + F_k(z_{t+1}, k_{t+1}, n_{t+1})] \right. \\ \left. - \mu_{t+1} F_k(z_{t+1}, k_{t+1, t+1}) \right\} = \frac{1}{\varphi_d(d_t)} - \mu_t \xi_t \quad (12)$$

Equilibrium conditions

$$y_t = c_t + \kappa (d_t - \bar{d})^2 + k_{t+1} - (1 - \delta)k_t \quad (13)$$

$$\xi_t \left(k_{t+1} - \frac{b_{t+1}}{R_t} \right) = F(z_t, k_t, n_t) \quad (14)$$

$$y_t = F(z_t, k_t, n_t) \quad (15)$$

steady state

$$m = \beta \quad (16)$$

$$R = \frac{1}{(1 + \tau)\beta} \quad (17)$$

$$\mu = \frac{\tau}{(1 + \tau)\xi} \quad (18)$$

$$\frac{y}{k} = \frac{R - 1 + \delta}{(1 - \mu)\theta} \quad (19)$$

$$m_{t+1} = \beta \frac{c_t}{c_{t+1}} \quad (20)$$

$$y(w) = \left(\frac{w}{(1 - \mu)(1 - \theta)} \right)^n \quad (21)$$

$$k(w) = \frac{y(w)}{y/k} \quad (22)$$

steady state

$$y(w) = zk(w)^\theta n^{1-\theta} \quad (23)$$

$$c = y - \delta k \quad (24)$$

$$b = \left(k - \frac{F(z, k, n)}{\xi} \right) R \quad (25)$$

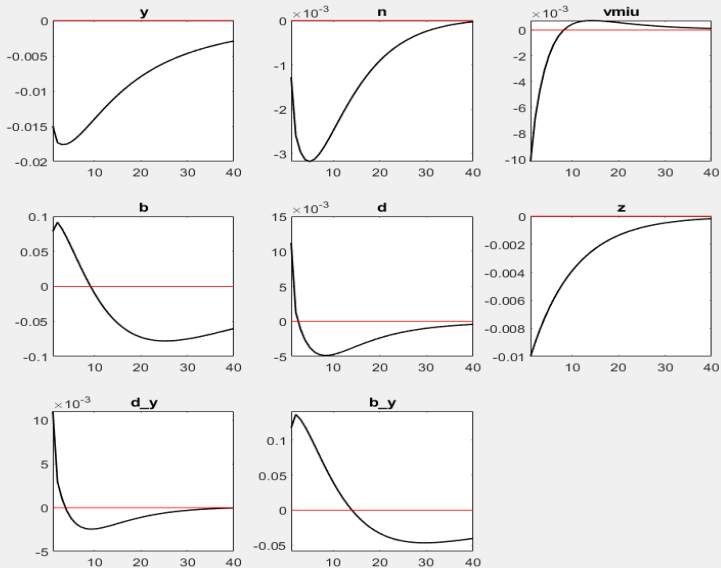
$$d = \frac{b}{R} + c - wn - b \quad (26)$$

$$\alpha = \left(w \frac{1}{c} \right) (1 - n) \quad (27)$$

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productivity shock



financial shock

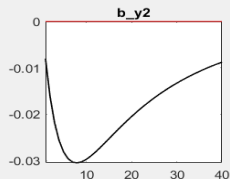
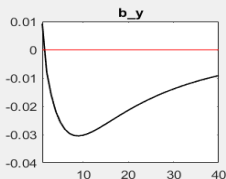
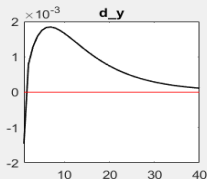
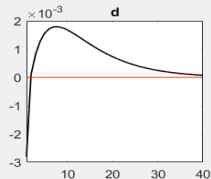
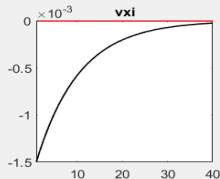
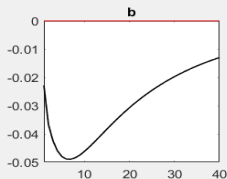
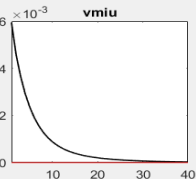
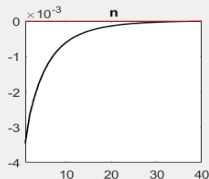
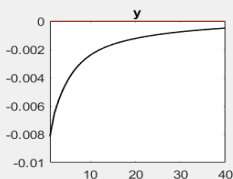


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mechanism

- Cyclical pattern: financial shock \rightarrow pledgeability $\downarrow \rightarrow b \downarrow, d \uparrow$
- Aggregate pattern: financial shock $\rightarrow \mu \uparrow, n \downarrow \rightarrow y \downarrow$