Financial Intermediation and Credit Policy in Business Cycle Analysis

Mark Gertler and Nobuhiro Kiyotaki
NYU and Princeton
Motivation

Present a canonical framework to think about the current financial crisis and the financial accelerator

Disruption of Financial Intermediation

More about financing constraint of financial intermediaries than non-financial businesses and households

Unconventional Monetary Policy

Direct lending to non-financial firms

Liquidity facilities to financial intermediaries

Equity injections to financial intermediaries
Model

Goods producers dispersed across islands with perfectly mobile labor:

$$Y_t = A_t K_t^\alpha L_t^{1-\alpha}, \quad 0 < \alpha < 1$$

Investment opportunity arrives to each island with prob $\pi^i = \pi$ - i.i.d. across island and time:

$$K_{t+1} = \psi_{t+1}[I_t + \pi(1 - \delta)K_t] + \psi_{t+1}(1 - \pi)(1 - \delta)K_t$$

$$= \psi_{t+1}[I_t + (1 - \delta)K_t]$$

Shocks to the quality of capital $\psi_{t+1}$ and productivity $A_t$ follow AR(1)

Resource constraint

$$Y_t = C_t + \left[ 1 + f \left( \frac{I_t}{I_{t-1}} \right) \right] I_t + G_t$$
Each household consists of many members, $1 - f$ workers, $f$ bankers

Workers supply labor and bring wages back to the household

Each banker manages a bank, retains some earning and brings back the rest to the household

Perfect consumption insurance within the household

Each period, bankers exit to become workers and bring back the retained earning with prob $1 - \sigma$

$(1 - \sigma) f$ workers become bankers with $\xi$ fraction of total asset of the household as the start-up fund
The household chooses \((C_t, L_t, D_{t+1})\) to maximize

\[
E_t \sum_{\tau=t}^{\infty} \beta^{\tau-t} \left[ \ln \left( C_\tau - \gamma C_{\tau-1} \right) - \frac{\chi}{1 + \varepsilon} L_\tau^{1+\varepsilon} \right]
\]

subject to \(C_t = W_t L_t + \Pi_t - T_t + R_t D_t - D_{t+1}\)

The goods producer hires workers to produce \(\rightarrow\) profit per unit of capital: \(Z_t = \frac{Y_t - W_t L_t}{K_t} = \alpha A \left( \frac{L_t}{K_t} \right)^{1-\alpha}\)

Goods producer sells security (equity) to banks of the same island in order to finance new investment. Each security pays dividend: \(\psi_{t+1} Z_{t+1}, (1-\delta) \psi_{t+1} \psi_{t+2} Z_{t+2}, (1-\delta)^2 \psi_{t+1} \psi_{t+2} \psi_{t+3} Z_{t+3}\)

... Capital goods producer chooses investment goods supply in order to maximize the profit
Before the arrival of investment opportunity, each bank chooses an island to operate and raises funds from households by offering non-contingent deposit contract $d_t$.

After the arrival of the investment opportunity, the bank borrows (or lends) $b_t^h$ in the interbank market in order to purchase the security of the goods producers of the same island:

$$Q_t^h s_t^h = n_t^h + b_t^h + d_t, \text{ where } h = i, n$$

The net worth of the bank is

$$n_t^h = [Z_t + (1 - \delta)Q_t^h] \psi_t s_{t-1} - R_{bt} b_{t-1} - R_t d_{t-1}$$
Beginning of the period

Households → Retail financial market → Deposit → Banks
During the period

- **Bank with fund shortage**
  - New and old loans
  - Investing regions
  - Interbank market

- **Banks with surplus fund**
  - Old loans
  - Non-investing regions

- **Firms with new investment opportunity**
  - Firms without new investment opportunities