Discussion of "Financial Intermediation and Credit Policy in Business Cycle Analysis"

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CFSP Workshop, October 2010

1 Objective

- a workhorse model to incorporate banks in general equilibrium models

- incorporate two crucial features:
  - transformation of deposits into risky loans
  - cash-in-the-market pricing with segmented markets

- the first feature captured by a standard agency problem between the bank and its lenders

- the second feature captured by two types of segmentation:
  - consumers cannot directly buy assets
  - bank A cannot buy assets that are bank's B specialty
  - but bank B can borrow from bank A: role for interbank market
- core amplification mechanism similar to Kiyotaki-Moore: feedback between asset prices and balance sheets
- various government policies analyzed

2 Intermediation with a representative agent

- Household is both shareholder and depositor

  ...but of different banks

- Banks are robots that work in the household best interest

  ...but can only get equity injections occasionally

- Household with preferences

$$\mathsf{E}\sum \beta^t U\left(C_t\right)$$

receives labor income W_t

- shareholder: has many bankers out there, receives flow N_t^r from retiring bankers, gives fresh funds N_t^y to young bankers

- depositor: lends A_t to banks, receives $R_{t+1}A_t$ tomorrow

$$C_t + N_t^y + A_t = W_t + N_t^r + R_t A_{t-1}.$$

2.1 Shareholder model

$$C_t + N_t^y + A_t = W_t + N_t^r + R_t A_{t-1}.$$

- Crucial constraint on young bankers

$$N_t^y \leq \xi N_t^r$$

- Flow from retiring bankers

$$N_t^r = \sum_{j=1}^{\infty} (1-\sigma)^{j-1} \sigma P_{t,t-j} N_{t-j}^y$$

where $P_{t,t-j}$ are rates of return which depend on portfolio strategy of the bankers (to be determined)

- Optimality conditions

$$
\begin{aligned}
U'(C_t) &= \lambda_t \\
\lambda_t + \mu_t &= E_t \sum_{j=1}^{\infty} (1-\sigma)^{j-1} \sigma P_{t+j,t} \beta^j \left(\lambda_{t+j} + \xi \mu_{t+j}\right)
\end{aligned}
$$

- To write portfolio problem recursively define

$$
\Lambda_{t+j|t} = \beta^j \frac{\lambda_{t+j} + \xi \mu_{t+j}}{\lambda_t + \xi \mu_t}
$$

2.2 Portfolio problem

- The consumers wants each banker to maximize

$$E_t \sum_{j=1}^{\infty} (1-\sigma)^{j-1} \sigma \Lambda_{t+j|t} P_{t+j,t}$$

(both young and continuing bankers)

- Dynamics of banker net worth

$$\begin{aligned} n_t &= \tilde{R}_t s_{t-1} - R_t d_t \\ n_t &= s_t - d_t \end{aligned}$$

- Recursive problem

$$\begin{aligned}\mathcal{V}_t(n_t) &= \max_{s_t,d_t} V_t(s_t,d_t)\\ \text{s.t.} \quad & s_t = n_t + d_t\\ & s_t \leq \ell_t n_t\end{aligned}$$

where $\ell_t > 1$ leverage ratio

$$\begin{aligned}V_t(s_t,d_t) = {} & E_t \Lambda_{t+1|t}[\sigma\left(\tilde{R}_{t+1}s_t - R_{t+1}d_t\right) + \\ & (1-\sigma)\,\mathcal{V}_{t+1}\left(\tilde{R}_{t+1}s_t - R_{t+1}d_t\right)]\end{aligned}$$

- $\mathcal{V}_t$ and V_t are linear

- Endogenous borrowing constraint: market sets the largest ℓ_t such that

$$V_t(s,d) \geq \theta s \iff s \leq \ell_t n$$

- Microfoundation: banker can steal fraction θ of assets and give them to consumer right away

- Then leverage ratio is

$$\begin{aligned} \ell_t &= \frac{V_{d,t}}{V_{d,t} - V_{s,t} + \theta} \text{ if } V_{d,t} - V_{s,t} + \theta > 0 \\ \ell_t &= \infty \text{ otherwise} \end{aligned}$$

- Result: if $V_{s,t} > V_{d,t}$ and $V_{s,t} - V_{d,t} < \theta$ the leverage constraint is binding

- In steady state sufficient conditions are

$$\begin{aligned} \beta \tilde{R} &> 1 \\ \beta \tilde{R} - 1 &< \theta \end{aligned}$$

3 Steady state(s) and not

- In steady state

$$V_s = \beta \tilde{R} V_d$$

and V_d satisfies

$$V_d = \sigma + (1-\sigma)\frac{\theta}{\theta - \left(\beta \tilde{R} - 1\right) V_d} V_d$$

(Need to check

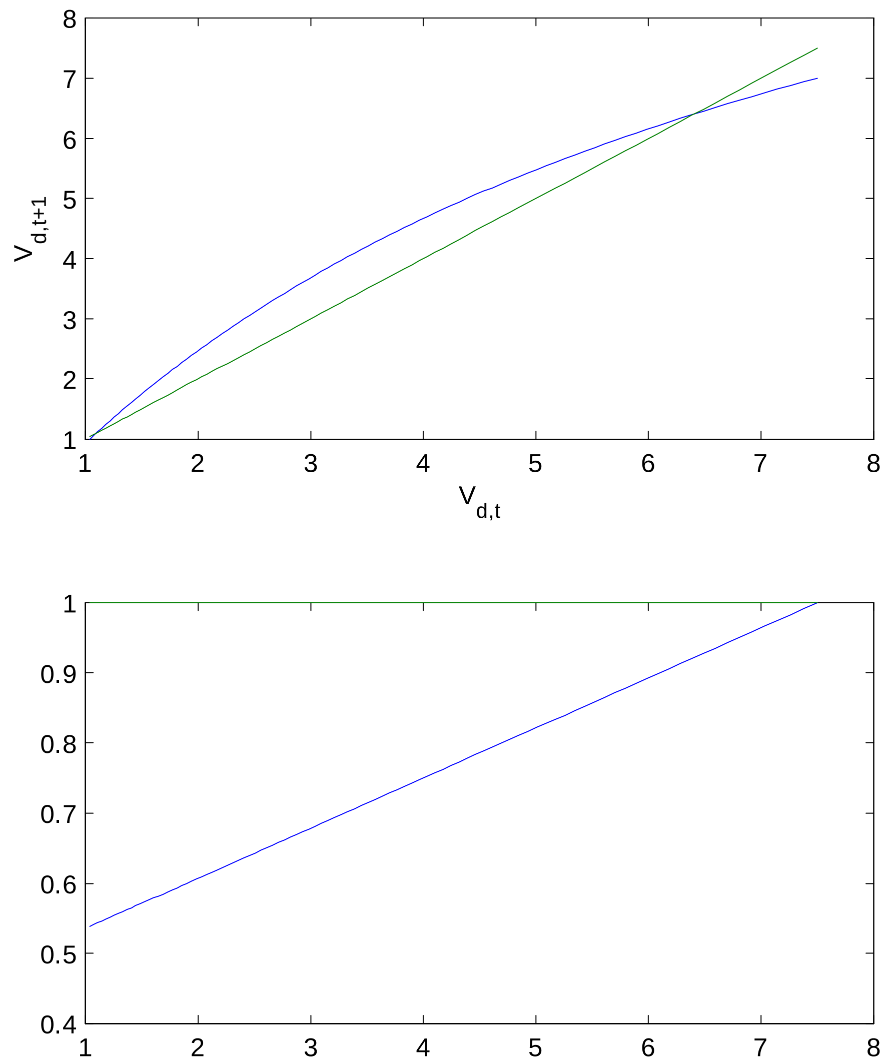
$$(1-\sigma)\frac{\theta}{\theta - \left(\beta \tilde{R} - 1\right) V_d} < 1 \qquad (*)$$

- Suppose $\tilde{R}$ given (AK model) and satisfies conditions above

- **Result**: either there is no steady state or there are two

- **Result**: if there are two ss and both satisfy (*), then there is a continuum of equilibria!

- Changing assumption about stealing can eliminate multiplicity. E.g. after stealing banker remains in business with fraction θ of assets.



8
7
6
5
4
3
2
1
$V_{d,t+1}$
1
2
3
4
5
6
7
8
$V_{d,t}$
1
0.9
0.8
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0.6
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8