A Model of Moral-Hazard Credit Cycles

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Question 1: How robust are the results?

Model

$$\sum_{s=0}^{n-1} r_{t+s+1}(I_{t+s}) = \text{pdv of bribe} + \text{opportunity cost (per unit)}$$

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Not

$$\sum_{s=0}^{n-1} \gamma^s r_{t+s+1}(I_{t+s}) = X$$

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Model

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Comes from

$$\sum_{s=0}^{n-1} \left(\frac{\alpha}{1+\rho_I}\right)^s r_{t+s+1} h_s$$

$$h_s = \left(\frac{1+\rho_b}{\alpha}\right)^s$$

Question 1: How robust are the results?

Model

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Requires:

- Investors and bankers have same discount factor
- All bribe payments come at the end of bankers' careers.

Question 1: How robust are the results?

Can the model be closed without losing the multiplicity of equilibria?

- Does smoothing elsewhere (labor market, optimal intertemporal consumption, investment) eliminate the cyclical paths?

Question 2: What causes cycles?

Statement: When trusted bankers become scarce aggregate investment must decline.

- But bankers in elastic supply in this model

- Rather recessions caused by expectations of booms

$$\sum_{s=0}^{n-1} r_{t+s+1}(I_{t+s}) = X$$

- What the cohort structure gives you is a reason to expect a future boom.

Question 3: What are the empirical implications?

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Central point is that parameters place few restrictions on the interest rate process and hence investment.

- This makes the model very flexible.

- How do we test it?

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Possibilities:

- Relationship between cohort structure of financial sector and investment.

- Relationship between bribe and variance of gross returns.

  ▷ measure bribe by gap between marginal product of capital and gross return to investors.

- Most fruitful comparisons may be across countries.

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Questions:

1. Observable implications – BG look at net worth or credit spreads; what is the equivalent here? The net worth of the financial sector?

2. Welfare – example where workers willing to pay taxes to subsidize financial sector – depends on concave $r(I)$ funciton. $r(I)$ just as easily convex: Cobb-Douglas production, full deprecitaion, fixed labor supply – now workers want cycles – application of insight of Walter Oi that marginal revenue products of a fixed factor are convex.

3. How close model? Where do banker's come from? Assumes elstic supply of bankers, but bankers get bonus' and everyone can't be a banker. What

happens when supply of banker's inelastic or reward pinned down by cost of education. Effect of curvature? lots of multiple equilibria. Which survive additional curvature in utiltiy, production, etc.

4. Interpretation

   - Firms or individuals?

5. Positive or normative?

Questions:

1. where do bankers come from?

2. Welfare

- investors do not care

- bankers and workers depends on properties of I

Complements from the Chef

Look at menu

reason for recession – high r – is that expect such a boom in the future that investing more today will lower average r below X

Techer cohorts and government spending.

Blanchard Yaari

inada conditions

risk

smoothing motives from the production side of the economy – the consumption euler equation

Overview

- Partial equilibrium model of investment cycles due to moral hazard

- Starting point: observation that long-term relationships and backloading of incentives efficient responses to moral hazard problems in dynamic settings.

  ▷ Introduces into problem

- Shows that optimal contract and optimal investment do very little to restrict the path of interest rates.

  ▷ Pin down average over n periods.

  ▷ Lower bound on level, upper bound on growth rate.

Elements of simple model

- Risk neutrality
- Relationships of length n.
- Outside option with return $1 - \rho$
- Return to sucessful project $r(I_t)$
- Well managed project suceeds with probability α

- Cost of project E (per unit)

- An amount B, the minimum payment (per unit) to the banker that promotes good behavior.

Excess return to invetors

$$\sum_{s=0}^{n-1}\left(\frac{\alpha}{1+\rho}\right)^{s+1} h_s\left[r_{t+s+1}-E-\frac{1+\rho}{\alpha}\right]-\frac{\alpha^n b_n}{(1+\rho)^n}$$

Choose h_s to maintain incentive

$$h_s B = b_n\left(\frac{\alpha}{1+\rho}\right)^{n-(s+1)}$$

$h_0 = 1$ pins down b_n

$$b_n = B\left(\frac{1+\rho}{\alpha}\right)^{n-1}$$

it follows that

$$h_s = \left(\frac{1+\rho}{\alpha}\right)^{s}$$

so that the size of the resources managed by agent multplied by $\frac{1+\rho}{\alpha}$ after each sucess

Excess return to investors

Substituting

$$\sum_{s=0}^{n-1} \frac{\alpha}{1+\rho} \left[r_{t+s+1} - E - \frac{1+\rho}{\alpha} \right] - \frac{\alpha B}{1+\rho}$$

in equilibrium r must satisfy

$$\sum_{s=0}^{n-1} \left[r_{t+s+1} - E - \frac{1+\rho}{\alpha} \right] = B$$

Model places restrictions on r process

- n period average constant

$$\frac{1}{n}\sum_{s=0}^{n-1} r_{t+s+1} = X = \frac{B}{n} + E + \frac{1+\rho}{\alpha}$$

  - n period cylce

- r not too low

$$r > E + \frac{1+\rho}{\alpha}$$

- r does not grow too fast

$$
\begin{aligned}
I_t &= \sum_{a=0}^{n-1} J_{t-a}(1+\rho)^a \\
J_t &= \frac{(1+\rho)I_{t-1} - I_t}{(1+\rho)^n - 1} \\
I_t &\leq (1+\rho)I_{t-1}
\end{aligned}
$$

Model first step along a path. Lots of work to be done, before can quantify it.

Like original Bernanke Gertler model