ECON 4335 Economics of Banking, Fall 2017
Problem Set 7

October 17, 2017

Financial intermediation, credit supply and monetary policy

Consider an economy in which there are many risky projects to be financed. Each project needs 1 initial input and yields verifiable gross return y if it's successful, 0 if it's unsuccessful. There are two types of projects

- Good projects (type G) with probability of success being p_G;

- Bad projects (type B) with probability of success being $p_B < P_G$, but a bad project gives private benefit $B > 0$ to the entrepreneur. Assume that $p_G y > R > p_B + B$ ($R > 1$ is the risk-free rate, defined by the gross return of government bonds), i.e., bad projects are not socially desirable.

There are many risk-neutral entrepreneurs in the economy, each owns wealth $0 < A < 1$ which is publicly observable. Each A is a random variable, uniformly distributed over $(0, 1)$. Entrepreneurs are the only agents in the economy who have the expertise to run either type of the projects, but their choices of projects are not publicly observable.

There are many risk-neutral investors in the economy who are endowed with money. They can invest the money on government bonds which yield safe gross return $R > 1$. They can also lend to entrepreneurs or banks.

There are intermediaries in this economy called banks, who have a special monitoring technology: after spending a non-observable amount of resource C, entrepreneurs' private benefit falls to $b < B$ if they operate bad projects. Banks start with initial wealth L_B^B, called bank capital which is owned by shareholders. They borrow from investors and lend to entrepreneurs. Share holders of banks demand gross return-on-equity at least as high as $\beta >> R$.

(A) Separation of market and the role of financial intermediation

1. If entrepreneurs borrow directly from investors and investors have the market power to charge highest lending rate as possible, what is the highest lending rate investors can actually charge? What is the highest lending rate investors can actually charge, should entrepreneurs' choices on projects be observable? Interpret the difference between these two rates;

2. Show that there exists a threshold $\overline{A}$ such that all entrepreneurs whose initial wealth $A > \overline{A}$ are able to borrow directly from investors;

3. If entrepreneurs borrow from banks, given that they are monitored by banks, what is the highest lending rate banks can actually charge? To make sure that banks do exert the effort to monitor, how much profit is needed to be retained by the banks? How much capital do banks need to hold? Explain, in words, why do banks need to hold capital;

4. Show that there exists a threshold $\underline{A}$ such that all entrepreneurs whose initial wealth $\underline{A} \leq A \leq \overline{A}$ are able to borrow from banks, and entrepreneurs whose initial wealth $A \leq \underline{A}$ are not able to get any funding.

(B) Credit supply

1. Suppose banks' shareholders are willing to accept a lower return on equity. What is the impact on banks' aggregate credit supply to entrepreneurs?

2. Suppose the good projects' probability of success p_G falls, and the other assumptions remain unchanged. What is the impact on banks' aggregate credit supply to entrepreneurs?

3. Suppose banks become more efficient in monitoring: monitoring cost C falls, and entrepreneurs' private benefit b — if they operate bad projects and get monitored — also falls. What is the impact on banks' aggregate credit supply to entrepreneurs?

4. It is known that central bank is able to shift the risk-free rate, i.e., R in this model through monetary policy implementation. If central bank decides to loosen monetary policy and cut R, what is the impact on aggregate funding (funding through both direct borrowing and bank lending) in the economy?

☞ Holmström, B. and Tirole, J. (1997), Financial intermediation, loanable funds and the real sector, *Quarterly Journal of Economics* 112, 663-691.