Lecture 16

Money and Banking, Econ 345

Oleksiy Kryvtsov

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Summary so far

- Another reason to hold money is that it is more *liquid* than other assets
- Example last time: capital and money in 3-period OLG model
- Both assets are held despite different rates of return
  - capital is *illiquid* because it cannot be turned into consumption in the middle period, but money can
  - velocity of money is 1, velocity of capital is $1/2$
- Rate-of-return equality still applies: only money is held because it provides higher return over short term, only capital is help because it provides higher return over long term

Exercise 7.1 from CF

- real rate of return $x = 1.44$
- population growth $n = 1.1$
- money growth $\mu = 1.$

- Find:
  - real rate of interest: $r = \sqrt{x} = 1.2$
  - inflation rate: $\pi = \mu / n = 1/1.1 = 0.9$
  - nominal rate of interest: $R = r\pi = 1.2 \cdot 0.9 = 1.1$
  - real rate of return on money: $1/\pi = 1/0.9 = 1.1$

Incentives for private banking

- Rate-of-return differences due to difference in liquidities of money and capital assets:

$$x = 1.44 > 1/\pi^2 = 1.21$$

- Assume a "bank" (infinitely lived) can issue IOUs and be enforced to pay it off (cannot hide from creditors)

- Let us see how this bank makes profits through rate-of-return differences (arbitrage) by issuing private money (IOUs or "inside money")

Arbitrage plan

- In period t borrow 1 good from current young and invest it in capital
- Without IOUs this young person accepted money because she can use it to buy consumption next period (when she is middle-aged)
  - why now she would accept an IOU?
- IOUs must offer a rate of return equal or higher the real return on money - n

Arbitrage plan

- In $t+1$ the bank owes n goods to current middle-aged but it has no payoff from capital - what should it do?
- Borrow again from the period t young, n goods to be paid off to current middle-aged
  - will owe next-period middle-aged the real return of n^2
- In $t+2$, obtain payoff from capital x and pay off n^2 to middle-aged
- Profits:

$$x - n^2 = 1.44 - 1.21 = 0.23 > 0$$

- Such activity of arbitrage represents *financial intermediation*, or *banking*

Banking in competitive equilibrium

- Suppose many banks are competing with each other
  - each can costlessly issue IOUs and invest in capital
  - what is the rate of return r^* on IOUs in competitive equilibrium?
- From previous example we know that return on IOU must be at least equal to return on money $n = 1.1$
- But a competitor can charge a slightly higher rate of return, say $r = 1.11$ and attract all investors
  - still makes positive profits: $x - r^2 = 1.44 - 1.23 = 0.21 > 0$
- But then another bank can offer yet higher rate of return, say $r = 1.12$ and still make profits, etc....
- Equilibrium return on IOUs must be such that profits are zero: $x - r^{*2} = 0$
  - no further incentive to offer higher rate of return

Effect of intermediation

No intermediation:

- capital was used to acquire consumption in 3 period of life
- money was used to acquire consumption in 2 period of life

With intermediation (can enforce inside money):

- inside money replaces fiat money for acquisition of consumption in 2 period
- people invest in capital directly, and through intermediaries
- intermediation helps mobilizing savings for investment in capital
- more capital implies more output
- owners of fiat money (initial middle-aged) are worse off