

Lecture 18

Money and Banking, Econ 345

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Introduction

- Fiat money is not the only form of money
- Assets (nominal or real) can be created and used as money
 - Deposits, loans, IOUs, capital
- Why monetary authority (central bank) would want to control the total stock of money?
 - fiat money is a unit of account (prices expressed in dollars)
 - revenue from seignorage
- How can central bank control the total stock of money?
 - print fiat money
 - impose reserve requirements on financial intermediaries
 - loan to banks

Reserve requirements

- One way to create demand for fiat money is to require that it is held
- Reserve requirements - banks are required by law to hold fiat money balances as a certain fraction of deposits
 - Banks also may be prohibited from holding certain types of assets (e.g., bank notes)
- Canada: no reserve requirements since summer 1994
- US: 3% for first \$46.5 million, 10% for excess of \$46.5 million

Model with reserve requirements

- 3-period OLG model with money and capital
 - capital pays return X two period after its creation
 - n - population growth rate, μ - money growth rate
 - $X > \left(\frac{n}{\mu}\right)^2$
 - initial middle-aged own stock of fiat money
 - costless competitive intermediation
- Reserve requirement: for each unit of good deposited, the bank is required to hold fiat money worth γ of goods. The rest can be invested in capital

A Bank's Balance Sheet

Assets		Liabilities	
Reserves	γH	Deposits	H
Interest-bearing assets	$(1 - \gamma) H$	Net worth	0
Total assets	H	Total liabilities	H

Price level

- Remember that we determine price level from the money market clearing condition
- Total (real) money supply = $\frac{M_t}{P_t}$
- Money demand comes from the banks who need cash to satisfy reserve requirements
 - individuals do not hold fiat money
- Let h_t denote per capital deposits
- Total real money demand = $\gamma N_t h_t$
- Money market clearing condition:

$$\frac{M_t}{P_t} = \gamma N_t h_t$$

or

$$P_t = \frac{M_t}{\gamma N_t h_t}$$

- Price is lower (value of money higher) if γ is higher

Seignorage

- Recall that seignorage is a revenue from printing money

$$\text{Seignorage}_t = \frac{M_t - M_{t-1}}{P_t} = \frac{M_t}{P_t} \left(1 - \frac{1}{\mu}\right)$$

where $\mu = \frac{M_t}{M_{t-1}}$ is the growth rate of money supply

- Use money market clearing condition to write this as

$$\text{Seignorage}_t = \gamma N_t h_t \left(1 - \frac{1}{\mu}\right)$$

- Hence, seignorage is higher is
 - money growth μ is higher (we learned this earlier)
 - reserve requirement γ is higher
 - total stock of deposits, $N_t h_t$, is larger

Rate of return on deposits

- What rate of return on deposits should banks offer?
- Competition will force banks to offer depositors the rate of return they earn on the assets
- Each good-unit of deposit is split between reserves and investment, earning
- $\frac{n}{\mu}$ from reserves
- \sqrt{X} from investing in capital
- The return on deposit equals then to

$$\begin{aligned}r^* &= \gamma \frac{n}{\mu} + (1 - \gamma) \sqrt{X} \\ &= \sqrt{X} - \gamma \left(\sqrt{X} - \frac{n}{\mu} \right)\end{aligned}$$

- Hence return on deposits is higher if
 - reserve requirement γ is higher
 - return on fiat money n/μ is higher
 - return on capital \sqrt{X} is higher