Lecture 6

Money and Banking, Econ 345

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Summary from Lecture 5

- Government can generate growth in money supply by giving newly printed money to (old) consumers as lump-sum transfers
- In economy with money growth inflation equals the rate of money growth
- Inflation makes young want to consume more and old want to consume less than in the optimal allocation

Today: Financing government purchases

- Let G_t total amount of goods that government needs to finance
  - for example, military, education, roads
  - do not affect people's preferences
- G_t can be financed by printing new money (*seignorage*)

Monetary equilibrium

Since there is no subsidy to individuals, lifetime budget constraint takes familiar form:

- Young face constraint in period t

$$c_1 + \frac{m_t}{p_t} \leq y$$

- Old face constraint in period t

$$c_2 \leq \frac{m_{t-1}}{p_t}$$

- Lifetime budget constraint then is

$$c_1 + \frac{p_{t+1}}{p_t} c_2 \leq y$$

Finding the rate of inflation

As usual to find the rate of inflation $\frac{p_{t+1}}{p_t}$, we need to write down money market clearing condition:

- Total money demand in period t is $N_t p_t c_2$
- Total money supply in period t is M_t
- Money market clearing is $N_t p_t c_2 = M_t$
- Prices then grow at a rate

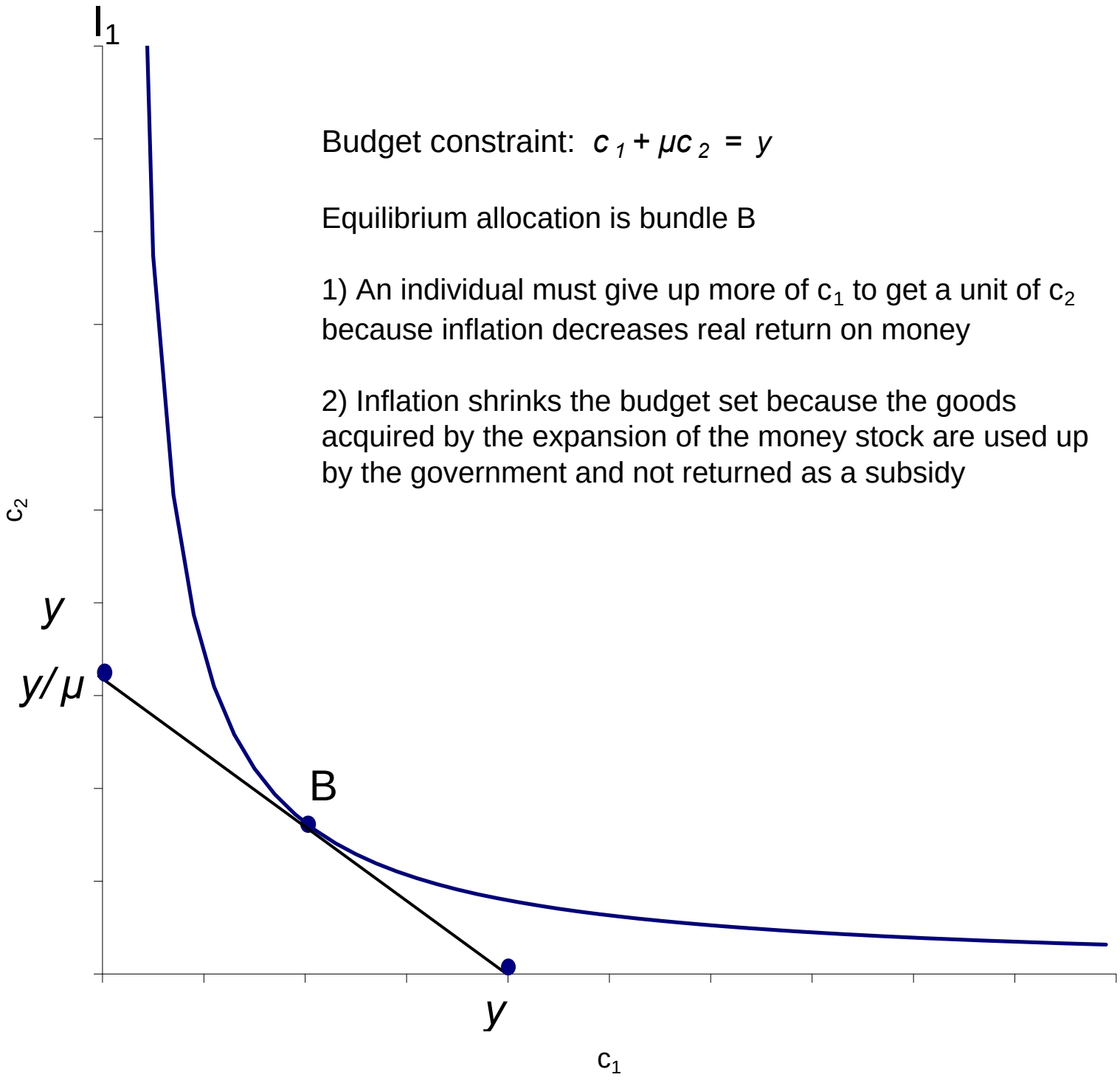
$$\frac{p_{t+1}}{p_t} = \frac{M_{t+1}}{M_t} \frac{N_t}{N_{t+1}}$$

  i.e., inflation equals money growth (if population is constant)

- Hence lifetime budget constraint is

$$c_1 + \mu c_2 \leq y$$

Equilibrium with seignorage



Budget constraint: $c_1 + \mu c_2 = y$

Equilibrium allocation is bundle B

1) An individual must give up more of c_1 to get a unit of c_2 because inflation decreases real return on money

2) Inflation shrinks the budget set because the goods acquired by the expansion of the money stock are used up by the government and not returned as a subsidy

Is equilibrium optimal?

Resource constraint should take into account goods purchased by the government, G_t

- Total goods available: $N_t y$
- Total goods used by young: $N_t c_1$
- Total goods used by old: $N_{t-1} c_2$
- Total goods used by government: G_t
- Hence society resource constraint is

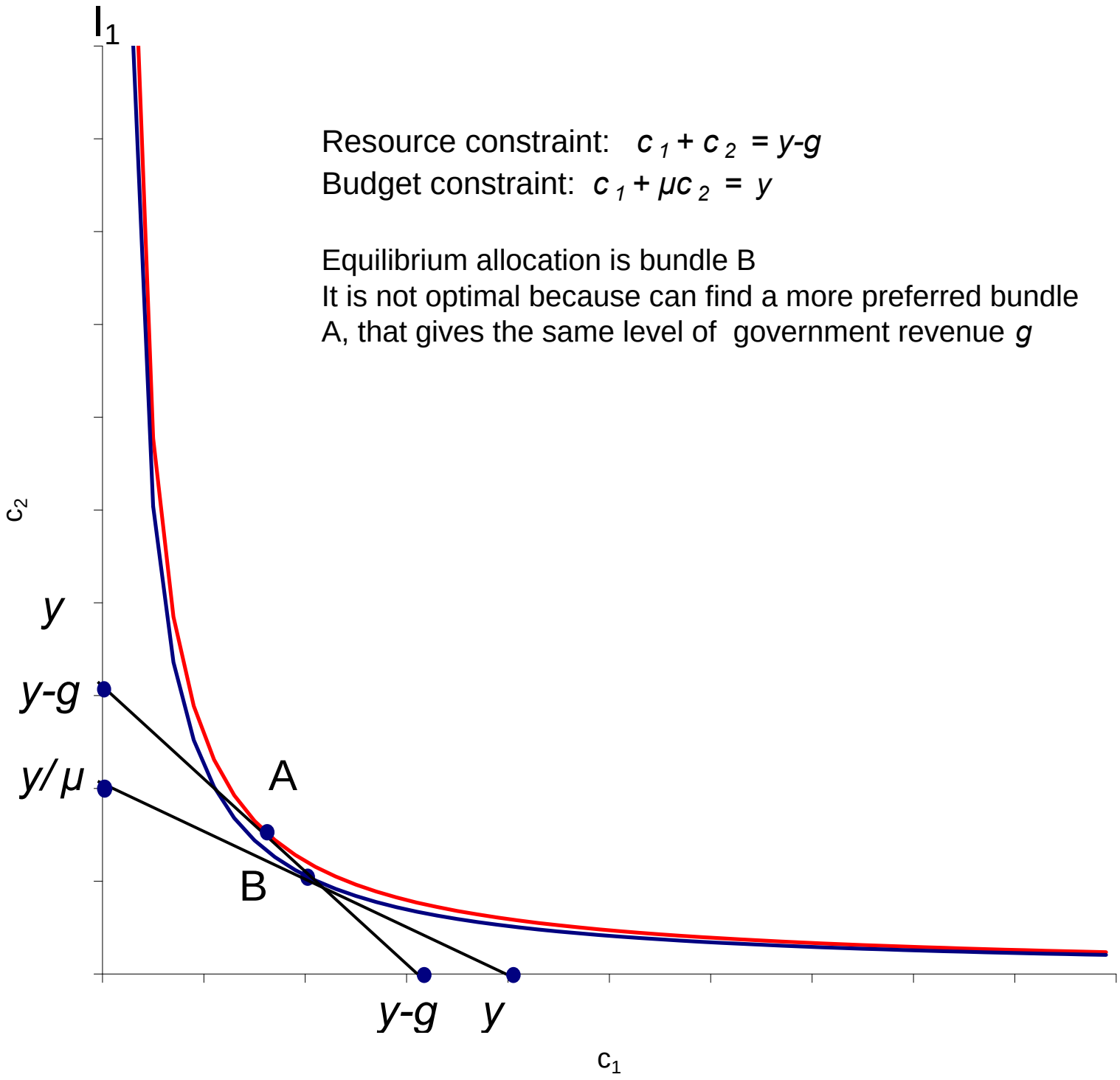
$$N_t c_1 + N_{t-1} c_2 + G_t \leq N_t y$$

- For constant population, the resource constraint is

$$c_1 + c_2 + g \leq y$$

where g is per capital government expenditures

Is seignorage optimal?



Resource constraint: $c_1 + c_2 = y-g$

Budget constraint: $c_1 + \mu c_2 = y$

Equilibrium allocation is bundle B

It is not optimal because can find a more preferred bundle A, that gives the same level of government revenue g

Inflation acts as a distortionary consumption tax

- Because it affects individuals' consumption profiles
- To see this better consider nondistortionary *lump-sum tax*

Equilibrium with lump-sum tax

- Consider a fixed tax of τ goods collected from each old person
- Lump-sum tax finances government purchases

$$\tau = g$$

- Young face constraint in period t

$$c_1 + \frac{m_t}{p_t} \leq y$$

- Old face constraint in period t

$$c_2 \leq \frac{m_{t-1}}{p_t} - \tau$$

- Lifetime budget constraint then is

$$c_1 + \frac{p_{t+1}}{p_t} c_2 \leq y - \tau$$

- Keep money supply constant (no reason to print money to finance G_t), so that $\frac{p_{t+1}}{p_t} = 1$ and lifetime budget constraint is

$$c_1 + c_2 \leq y - \tau$$

Inflation acts as a distortionary consumption tax

- With lump-sum tax the budget constraint coincides with resource constraint
- So with lump-sum tax government raises revenue without distorting the budget set relative to feasible set of allocations
  - Inflation (seignorage) tax - distorionary because old pay tax $c_2(\mu - 1)$ which increases with c_2
  - Lump-sum tax - non-distortionary, old pay tax τ independently of c_2
- Governments prefer not to use lump-sum taxes