Handout Week 11
Econ 102, Spring 2014

Economic Growth. In year t, technology is given by A = 1 + t, and output by, Y = AL. Labor demand and supply are given by:

Labor Demand: L = 10 – W + t
Labor Supply: L = W

a) How much does output change by between years (t-1) and t?

Clearing the labor market gives, W = (10+t) / 2. So L = (10+t) / 2 at any year t. Then AL = (1+t) (10+t) / 2 = (10 + 11t + t*t) / 2 = 5 + (11/2)t + (1/2)*t*t. So the change between (t-1) and t is:

11/2 + (1/2)*(t*t – (t-1)*(t-1)) = 11/2 + (1/2)*(2t-1) = 5 + t

b) If a minimum wage of 10 is imposed, what is the change in output between (t-1) and t for t less than or equal to ten?

A minimum wage of 10 is binding for t less than or equal to ten, so quantity of labor is set by the demand for labor: L = 10 – 10 + t = t.

So output is Y = (1+t)*t = t + t*t. So the change is: t + t*t – (t-1) – t*t + 2t – 1 = 2t.

c) Is the change in output larger in the minimum wage case or in the unregulated case?

For t less than or equal to 5, the change in output is larger without the minimum wage and for t greater than 5 the change in output is larger in the minimum wage case.

d) Does this minimum wage encourage long-run economic growth?

No, it is important to distinguish between levels and differences. While the change in output for the minimum wage is eventually greater than for the non-minimum wage case, the total output is always larger in the unregulated case.

Investment.

In a certain economy there is only one consumption good and the opportunity to save.

Expense on consumption is: 12 – P, where P is the price of consumption.

a) If total income in the economy is 60, what is savings as a function of P, the price for the consumption good?

Income = Consumption + Savings. So: 60 = 12 – P + Savings => Savings = 48 + P.

b) Are consumption and savings complements or substitutes?
Substitutes. Savings go up when the price of the consumption good goes up; they go down when the price of the consumption good goes down.

c) With this in mind, what sorts of policies will increase savings? What must a policy do in order to increase savings?

The sorts of policies that increase savings or those that make consumption relatively less attractive. For example, taxing consumption would increase savings.

d) Say we tax consumption by T = 4, making the price of consumption (P+T), what is the level of savings? If we do not tax consumption, what is the level of savings? What is the difference in savings between these two scenarios? Should we tax consumption for the purpose of increasing economic growth?

If we tax by T = 4, the level of consumption is 8 - P, so savings is 52 + P. If we do not tax consumption, the level of consumption is 12 - P, so savings is 48 + P..

Taxing consumption so that individuals save more than they otherwise would, does increase economic growth. However, we are usually not interested in growth for growth's sake, and if individuals do not want to save more, it's not clear that the government should encourage them to.

e) If there were increased depreciation, would people save more or less?

Less! Depreciation is, in effect, a tax.

Loanable Funds

This question will examine the loanable funds model discussed in class more closely. Say the private supply and demand of loanable funds are given by:

Demand: Q = 10 – P
Supply: Q = P

a) What is the equilibrium interest rate if the government is borrowing no money?

Clear the loanable funds market like you would any other market. So, P = 5. P is the interest rate, the price of money.

b) Say the government needs to borrow 2 dollars. To represent this change, shift the demand for loanable funds as discussed in class. What is the new interest rate and the quantity of private investment?

We shift the demand curve by 2 horizontally to represent the change. Since the demand function is written in "Q = " form, we can just add 2 to the right hand side. Equating demand and supply then gives: 12 – P = P => P = 6. So, the new interest rate is 6.

To answer the second part of the question, we plug P = 6 into the original demand curve and get Q = 4 is the amount of private loanable funds exchanged.

c) In the standard loanable funds model we discussed, when the government wants to borrow money, what is the elasticity of its demand for loanable funds?

When we shifted the curve to the right by 2 units above, we implicitly assumed that the government has a perfectly inelastic demand for loanable funds. In the short run, this is probably roughly true. The government has to borrow money to pay for the programs congress has authorized. However, this is not really a short-run model. So it's a little inconsistent, but a nice simplification.

d) What if instead of the government needing to purchase a fixed amount of loanable funds, the government would decide to borrow different amounts when faced with different interest rates? Say Congress will vote to run a deficit of (2-P) where P is the interest rate. What is the new equilibrium quantity of funds exchanged and the new interest rate?

The procedure is the same as before! Except this time we need to more carefully add the two demand functions and there will be a kink point where P = 2. Notice, however, that P = 2 is less than the original interest rate of 5 and for interest rates above 2, the demand curve is just the private demand curve. This implies that the equilibrium is that the government decides to not borrow anything! If the government takes the interest rate into account it will decide to borrow less for larger interest rates.