Economics 222
Exercise B
due Friday 15 October

1. An economist writes: "A reduction in marginal tax rates will lead to an increase in employment. This increase will be greater the more flexible are real wages." Comment on these opinions.

2. According to the labour force survey, in June 2004 there were 17.2861 million people in the labour force. The participation rate was 67.5% while the unemployment rate was 7.3%.

(a) What was the employment ratio?

(b) How many people were unemployed?

(c) How many people were not in the labour force?

3. This question studies the present-value budgeting introduced in appendix 4A. Suppose that life is divided into two blocks of time, for simplicity. The lifetime budget constraint is:
$$c + \frac{c^f}{1+r} = y + \frac{y^f}{1+r}.$$

Each person tries to smooth consumption over time, so that $c = c^f$. The real interest rate is 4 percent.

(a) Sook-wan, a singer of popular music, has $y = 100$ and $y^f = 20$ (due to ageism). Find her optimal consumption and savings.

(b) Larysa, a medical student, has $y = 20$ and $y^f = 100$ (due to her time-consuming investment in skills). Find her optimal consumption and savings.

(c) Which person will change their plans by more if the real interest rate instead is 6 percent?

4. According to economic theory what happens to S, S_{pvt}, S_{govt} and r under these scenarios:

(a) G falls, and current taxes fall by the same amount;

(b) G falls, but the tax cut is deferred to the future.

5. This question studies how technological change can lead to increased investment in capital. Imagine that a firm's production function is:

$$Y = AK^{0.5}.$$

The price of capital is 1. The real interest rate is 3% and the depreciation rate is 7%.

(a) Use calculus to find the marginal product of capital.

(b) Find an expression for the firm's target capital stock, K^*, as a function of the level of technology, A.

(c) If A follows this pattern over time: 1 1 1 1.5 1.5 1.5 ... find the path of investment over time.

6. Next, we shall use this same description of investment – combined with a simple model of saving – to describe an entire closed economy. Again suppose that at time t:

$$Y_t = AK_t^{0.5},$$

but now suppose this applies to the entire economy. Also, suppose that saving is given simply by:

$$S_t = 0.3Y_t,$$

which does not depend on the interest rate.

(a) What will the saving-investment diagram look like, roughly speaking?

(b) We know that in equilibrium $S_t = I_t$, so that

$$K_{t+1} = (1 - d)K_t + I_t = 0.97K_t + 0.3(AK_t^{0.5}).$$

Set $A = 1$. Start at some arbitrary value of K, then use this equation to track the aggregate capital stock over time. Does it go to a constant value? (Hint: You are looking for a number to substitute for K_t that then yields the same number for K_{t+1} from the equation. Start by experimenting with integers.)

1. First, the tax cut will raise labour supply and employment, if the substitution effect is greater than the income effect. Second, though, the effect on employment will be greater under a Keynesian than under a classical scenario.

2. (a) $er = 62.57$

(b) $U = 1.2618$

(c) The number not in the labour force was 8.32 million.

3. (a) This plan gives $c = 60.78$ and $s = 39.22$.

(b) This plan gives $c = 59.22$ and $s = -39.22$.

(c) Larysa is a borrower, so the substitution and income effects work together to make her poorer. She increases her saving by .38. Sookwan is a lender; the income effect dominates and she decreases her savings by .39 at the higher interest rate.

4. (a) There is no change in S_{govt}, S_{pvt} and S rise and so r falls.

(b) Under Ricardian equivalence, the result is exactly the same as in part (a). If instead people are myopic, then the effects are smaller.

5. a) $MPK = 0.5AK^{-0.5}$.

(b) Equating the MPK and the user cost gives:

$$K^* = 25A^2.$$

(c) If A follows this pattern over time: 1 1 1 1.5 1.5 1.5 ... then K^* follows 25 25 25 56.25 56.25 .... Thus investment initially is 1.75 each period, to offset depreciation, then it is 33 for one period, then it is 3.9375 thereafter.

6. (a) The desired investment curve will slope down. The saving curve will be a vertical line.

(b) The capital stock settles at a steady-state vale of 100. [There was a small inconsistency in this question. If the depreciation rate is 7% then the equation for the capital stock should have read $K_{t+1} = 0.93K_t + I_t$ rather than having a coefficient of 0.97. Full marks were given for correct answers either to the equation given in the assignment or to those who corrected it for us.]