ECON 222
Macroeconomic Theory I
Winter Term 2011
Assignment 2
Due: Drop Box 2nd Floor Dunning Hall by noon Friday, February 11th 2011
No late submissions will be accepted
No group submissions will be accepted
No "Photocopy" answers will be accepted

Question 1 (**20 points**): Labour markets

This question will test your knowledge of the demand and supply of labour.

The following production function describes the economy:

$Y = A[K^{\alpha} + N^{1-\alpha}]$

Where Y = output; A = total factor productivity; K = capital; N = labour; and α ($1-\alpha$) shows the response of Y to a change in K (N).

(a) If the real wage rate is w, derive an expression for the demand for labour (N^d). Be sure to show and explain the steps you took to arrive at your results. (**5 marks**)
(b) Let A = 4 and α = 0.5. Suppose that supply of labour (N^s) is given by $N^s = 0.25w^2$, what is the level of the wage rate (w) that clears the market for labour? At that wage rate, how many workers (N) would be employed? (**5 marks**)
(c) Suppose now that the government decides to introduce a minimum wage that is 10% higher than the market wage you derived in (b) above. What are the new levels of labour demanded and supplied? Use your results to calculate an unemployment rate. (**5 marks**)
(d) Use a graph to compare and discuss the results you get in (b) and (c). (**5 marks**)

Question 2 (**25 points**): Consumption

This question will test your knowledge of the determinants of consumption. You will need to be familiar with the material presented in Appendix 4.A from the 4th edition, which was covered in class and which you can obtain from the course website.

The following describes what we know about a representative consumer in the economy. They each have current income (y) of 100 and future income (y^f) of 120. The real interest rate (r) that they face is 20 per cent. In addition, the slope of the utility curve facing each consumer is $-(11/9)c^f/c$, where c^f is future consumption and c is present consumption.

(a) Derive an expression for the inter-temporal budget constraint and graph it. How would you interpret this expression? (**4 points**)

(b) Given the values of income in the two periods, the real rate of interest and the slope of the utility curve, what are the levels of present and future consumption? Verify your results by ensuring that the inter-temporal budget constraint is satisfied. (**7 points**)
(c) In section (b), were consumers in this economy savers or borrowers? What would be the level of present consumption if the real interest were to fall to 10 per cent? In this case, what can you say about the relative strengths of the substitution and income affects. (**7 points**)
(d) Start with the assumption that the real rate of interest is 20 per cent. Suppose that the government wishes to stimulate consumption today by giving everyone a lump sum payment of 10 in the current period. It finances this expenditure by borrowing. Worried about its budgetary position, the government plans to claw back the 10 (plus interest) in the future by imposing a lump sum tax on each individual. Discuss whether or not this policy would be effective. Be sure to support your arguments analytically. (**7 points**)

Question 3 (**25 points**): Investment in a closed economy

This question is designed to test your understanding of the behaviour of investment in a closed economy. You should be familiar with Chapter 4, in particular how to derive desired investment.

The economy has the following, Cobb-Douglas type production function:

$Y = AK^{\alpha}N^{(1-\alpha)}$, where Y = output; A = total factor productivity; K = capital; and N = labour.

(a) Use the production function to derive an analytical expression for the demand for capital and its relation to the user cost of capital. Explain how you derive your results. (**5 points**)
(b) You are given the following information about this economy: α=0.25; A=2; N=16. As well the price of capital (P_k) is 2.5; the real rate of interest (r) is 5 per cent; the rate of depreciation (d) is 10 per cent; and the corporate tax rate (τ) is 25 per cent. Find the level of capital that will be demanded? (**5 points**)
(c) Suppose now that there is a negative productivity shock; in particular, A falls from a value of 2 to 1.75. Calculate the effect of this shock on the desired demand for capital and show your results on a graph. (**5 points**)
(d) Starting with the effect of the shock on the demand for capital, calculate what the price of capital would have to be to restore the demand for capital back to the level you found in part (b). (**5 points**)
(e) Describe, using the net investment identity (equation 4.5 in the text) how you would derive an investment function starting from the desired demand for capital. (**5 points**)

Question 4 (**30 points**): Saving and investment in a closed and open economy.

This question is designed to test your knowledge of Chapters 4 and 5.

The following represent the desired demands for investment (I^d) and consumption (C^d):

$I^d = 27.5 - 300r$

$C^d = 40 - 150r + 0.4Y$

Y is real GDP and r is the real rate of interest.

(a) You are given the following information on this economy, Y = 100 (and is fixed) and G = T = 15. Find the real interest rate that clears the market for goods and services. What are the values of S^d and I^d. Verify your results by showing that the values of C^d, I^d that you derived, along with the given value of G add up to Y. What is the level of private saving in the economy? Be sure to explain the steps that you took to get your results. (**7 points**)

(b) Suppose now that government purchases of goods and services rises to 20, while taxes remain unchanged at 15. What is the effect on the rate of interest, as well as desired consumption and investment? What has been the effect of the increase in government spending on investment? What has been the effect on private and government saving? (**8 points**)

The following three questions assume that the economy is open to trade. Assume that the exchange rate is fixed and that the economy is small in the sense that it takes the world rate of interest (r^W) as given. For simplicity, net factor payments (NFP) are assumed to be zero.

(c) What implications follow from the fact that the economy is open to trade and that it takes the world rate of interest rate as given? Use a diagram to make your points. (**5 points**)

(d) Given the same investment and consumption functions at the start of this question, suppose that the world rate of interest is 5½ per cent. Find the level of net exports in this economy as well as desired investment and consumption and verify that the components of GDP add up to 100. What is the level of absorption in this economy? (**5 points**)

(e) Suppose now that the economy experiences a positive productivity shock. This can be represented as an increase in the constant term in the investment function from 27.5 to 30. What are the implications for this economy? Illustrate your results in a diagram. (**5 points**)