ECON 222

Winter 2005 – Assignment 2

ANSWER KEY

1. Technical Change and Wage Inequality – 30 marks

(a) $w = 10$ in both sectors.

(b) w rises to 20 in sector 1.

(c) For w to be equal in both sectors,

$$\frac{200}{N_1^{0.5}} = \frac{100}{N_2^{0.5}}$$

This implies that $\frac{N_1}{N_2} = 4$ so that $N_1 = 160$ and $N_2 = 40$. The wage in both sectors is equal to $w = 15.81$.

(d) If only 50 workers can be employed in sector 1 then $N_1 = 50$ and $N_2 = 150$ where

$$w_1 = \frac{200}{50^{0.5}} = 28.28$$

$$w_2 = \frac{100}{150^{0.5}} = 8.16$$

2. Employment in Japan – 20 marks

(a) $0.6008 = \frac{L}{110.03}$ gives $L = 66.11$. The unemployment rate is then $\frac{2.9}{66.11} = 4.39\%$

(b) $E = L - U = 63.21$. The employment ratio is then $\frac{63.21}{110.03} = 57.45\%$

(c) Let P denote the 2003 adult population. Then

$$0.6058 = \frac{66.11 + 0.43}{P}$$

Rearranging gives $P = 109.84$. So the population change was
$110.03 - 109.84 = 0.19$. Therefore the population rose by 0.19 million over the year.

(d) The population not in the labour force in 2004 was $110.03 - 66.11 = 43.92$. The population not in the labour force in 2003 was $109.84 - 66.54 = 43.3$. Hence the number of people not in the labour force rose by 0.62 million.

3. Consumption, Saving and Government Expenditure – 30 marks

(a) From the government's budget constraint, $T_2 = 220$. Consumption in both periods is $C_1 = C_2 = 1790.48$ and after tax savings in period 1 is $S_1 = 1800 - 1790.48 = 9.52$.

(b) From the government's budget constraint, $T_2 = 330$. Consumption in both periods is $C_1 = C_2 = 1790.48$ and after tax savings in period 1 is $S_1 = 1900 - 1790.48 = 109.52$.

(c) From the government's budget constraint, $T_2 = 220$. Consumption in both periods is $C_1 = C_2 = 1842.86$.

(d) In this case individuals make decisions in period 1 as in part **(b)**. Hence $C_1 = 1790.48$ and $S_1 = 109.52$. By the second period, individuals now know that T_2 is only 220 instead of 330. This means that $C_2 = 2000 - 220 + 109.52(1 + 0.1) = 1899.53$.

(e) Individuals are better off in **(c)**. Because of the delayed announcement in **(d)**, they are not able to smooth consumption over the two periods.

4. Capital Investment and Taxation – 20 marks

(a) Since MPK $= K^{-0.5}$, equating to the user cost of capital 0.125 gives $K^* = 64$.

(b) Without the capital tax, the user cost of capital is 0.1, which gives $K^* = 100$.

(c) $I_t = K_{t+1} - K_t + dK_t = 100 - 64 + 0.06(64) = 39.84$.

(d) When $A = 2.4$, the capital level is 92.16 with the 20% capital tax and 144 without it. The difference in optimal capital levels is larger when A is higher.