Econ 222 Assignment 1
Answers to non-excel questions
Spring 2011

May 22, 2011

Question 2: Nuclear power, Donuts and Financial Services.*(20 Marks)*
    Citizens of Oceania produced $12 million worth of nuclear power in 2010. They consumed $10 millions domestically, exported $1 million to the country of Banana Republic and $1 million was left unsold in inventories (assume nuclear power can be stored). Citizens of Oceania also provided financial services totalling $4 million in Oceania and $1 million in Banana Republic. They also purchased $4 million worth of donuts from Banana Republic. Finally, the government paid workers from Banana Republic $2 million to clean up nuclear waste in Oceania and did not collect any taxes in 2010. Calculate the following for the Oceanian economy:
    Answer:

1. $GDP = C + I + G + NX$

   $C = 10 + 4 + 4 = 18$

   $I = 1$

   $G = 2$

   $NX = 1 - 4 = -3$

   $GDP = 18 + 1 + 2 - 3 = 18$

2. $NFP = 1 - 2 = -1$

   $GNP = GDP + NFP = 17$

3. $CA = NX + NFP = -3 - 1 = -4$

4. $S_p = Y + NFP - C - T = 18 - 1 - 18 - 0 = -1.$

5. $S_g = T - G = 0 - 2 = -2.$

Question 3: Labour Productivity, Labour Demand.*(25 Marks)*

1. For This part, we consider the following production function:

$$Y = AK^\alpha N^{1-\alpha}$$

(a) Derive an expression for the marginal product of labour (MPN). (2 marks)

(b) Assume $A = 1$ and $\alpha = 0.3$, redo the previous part. (1 mark)

Answer:

(a) $MPN = A(1 - \alpha)K^\alpha N^{-\alpha}$

(b) $MPN = 0.7K^{0.3}N^{-0.3}$

Question 4: Saving for Retirement *(25 Marks)*

Suppose you divide your life into two periods-working age and retirement age. When you work, you earn labour income Y; when retired, you earn no labour income, but must live off your savings and the interest it earns. You save the amount S while working, earning interest at rate r, so you have $(1 + r)S$ to live on when retired. Because you don't need to consume as much when retired, you want to set consumption when working twice as high as consumption when retired.

1. Suppose you earn $1 million over your working life and the real interest rate for retirement saving is 50%. How much will you save and how much will you consume in each part of your life?(6 Marks)

2. Suppose your current income went up to $2 million when working. Now what will you save and how much will you consume each period? (6 Marks)

3. Suppose a social security system will pay you 25% of your working income when you are retired. Now (with Y = $1 million, as in part 1) how much will you save and how much will you consume each period? (7 Marks)

4. Suppose the interest rate rises (starting from the situation in part 1). Will you save more or less? (6 Marks)

Answer:

1. $C_W = Y - S \times C_R = (1 + r)S,$

   $C_W = 2C_R$. So $Y - S = 2(1 + r)S$, or $(3 + 2r)S = Y$.

   With $r = 0.5$, $3 + 2r = 4$. Setting $4S = 1 million, we get $S = $250,000$, so $C_R = $375,000$, and $C_W = $750,000$.

2. Now $4S = 2 million, so $S = $500,000$, $C_R = $750,000$, and $C_W = $1,500,000$. Higher current income yields higher saving and consumption in both the present and the future.

3. Now $C_R = (1 + r)S + pY$, where $p = .25$. So $Y - S = 2(1 + r)S + 2pY$, or $(3 + 2r)S = (1 - 2p)Y$. With $r = 0.5$ and $p = .25$, we get $4S = 0.5Y$, and with $Y = $1 million$, this gives $S = $125,000$, $C_W = $875,000$, and $C_R = $437,500$. The social security system reduces saving and increases consumption in both periods.

4. The basic equation is $(3 + 2r)S = Y$. so as r rises, S declines, with Y helf fixed.

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