ECON3510 Tutorial 3 Answers

2019

Exercise 1

1.1   Question 1

From the Wage Formula: $w_1 = \frac{P_1}{a_1}$

$$P_{tv} = a_{tv} w_{tv}$$
$$P_{tv} = 0.5 * 12$$
$$P_{tv} = 6$$

From the Autarky Equilibrium: $\frac{p_1}{p_2} = \frac{a_1}{a_2}$

$$\frac{P_{TV}}{P_c} = \frac{a_{TV}}{a_c}$$
$$\frac{6}{4} = \frac{0.5}{a_c}$$
$$6a_c = 0.5 * 4$$
$$a_c = \frac{1}{3}$$

From the Wage Formula:

$$w_c = \frac{P_c}{a_c} = 12$$

1.2 Question 2

From Wage Formula: $w_1 = \frac{P_1}{a_1}$

$$P_c* = w_c^* a_c^*$$

$$\therefore P_c = 6$$

From the Autarky Equilibrium: $\frac{P_1}{P_2} = \frac{a_1}{a_2}$

$$\frac{P_c^*}{P_{tv}^*} - \frac{a_c^*}{a_{TV}^*}$$

$$\frac{6}{3} = \frac{1}{a_{TV}^*}$$

$$\therefore a_{tv}^* = 1/2$$

1.3 Question 3

So we have:

$$\frac{P_{tv}}{P_c} = 1, \frac{a_{tv}}{a_c} = \frac{1/2}{1/3} = 1.5, \frac{a_{tv}^*}{a_c^*} = 0.5$$

Therefore:

$$\frac{a_{tv}^*}{a_c^*} < \frac{P_{tv}}{P_c} < \frac{a_{tv}}{a_c}$$

From the three scenarios of specialization, case 3 holds from the formula sheet holds. So home specializes in cars and foreign specializes in TVs

1.4 Question 4

<u>With Trade</u>:

Home produces cars, so its real wage in terms of cars is:

$$w_1^{r1} = \frac{w_1}{P_1} = \frac{1}{a_1} w_1^{rc} = \frac{1}{a_c} = 3$$

Home's real wage in terms of TVs is:

$$w_c^{rtv} = \frac{1}{a_c} \cdot \frac{P_c^w}{P_{tv}^w} = 3 * 1 = 3$$

Without Trade:

$$w_c^r = \frac{1}{a_c} = 3$$

$$w_{tv}^r = \frac{1}{a_{tv}} = 2$$

1.5 Question 5

With Trade:

Foreign produces cars, so its real wage in terms of TVs is:

$$w_{tv}^{rtv*} = \frac{1}{a_{tv}^*} = 2$$

Foreign's real wage in terms of cars is:

$$w_{TV}^{rc*} = \frac{1}{a_c^*} \cdot \frac{P_{tv}^{w*}}{P_c^{w*}} = 3 * 1 = 3$$

Without Trade:

$$w_c^{r*} = \frac{1}{a_c^*} = 1$$

$$w_{tv}^{r*} = \frac{1}{a_{tv}^*} = 2$$

1.6 Question 6

Home earns more in terms of cars and TVs

$$W_c^{RC} = 3 > w_{TV}^{rc*} = 2$$

$$W_c^{RTV} = 3 > w_{TV}^{rTV*} = 2$$

Exercise 2

2.1 Question 1

Production is $a_1Q_1 + a_2Q_2 = L$. We know in this case everything but Q so we must find it. We are told that $MRS = \frac{Q_c}{Q_e}$

We use our Autarky Equilibrium Conidtions:

$$\frac{P_1}{P_2} = \frac{a_1}{a_2} = MRS = Q_c/Q_e$$

For Japan:

$$\frac{a_e^*}{a_c^*} = 16/1 = \frac{P_e^*}{P_c^*} = Q_c^*/Q_e^*$$

$$\therefore 16 = Q_c^*/Q_e^* \Rightarrow Q_c^* = 16Q_e^*, \ Q_e^* = \frac{1}{16}Q_c$$

Plugging in Q_c into the production function we have:

$$a_c^* Q_c^* + a_e^* Q_E^* = L^*$$

$$1(16Q_e^*) + 16Q_e = 320$$

$$32Q_e^* = 320$$

$$\therefore Q_E = 10$$

$$1Q_c^* + 16(\frac{1}{16}Q_c^*) = 320$$

$$2Q_c^* = 320$$

$$\therefore Q_c = 160$$

For Australia:

$$\frac{a_e}{a_c} = 4/4 = \frac{P_e}{P_c} = \frac{Q_c}{Q_e}$$

$$\therefore 1 = \frac{Q_c}{Q_E} \Rightarrow Q_E = Q_c$$

Plugging in Q_c we have:

$$4Q_e + 4Q_e = 160$$

$$\therefore Q_e = 20$$

Since $Q_c = Q_E$ it must be that $Q_c = 20$

2.2 Question 2

We need to first find specialization:

Computers:

$$\frac{a_c}{a_e} = 1$$
$$\frac{a_c^*}{a_e^*} = 1/16$$

Since $\frac{a_c^*}{a_e^*} = 1/16 < 1 = a_c a_e$ Japan specializes in computers

Education:

$$\frac{a_e}{a_c} = 1$$
$$\frac{a_e^*}{a_c^*} = 16$$

Since $\frac{a_e}{a_c} = 1 < 16 = \frac{a_e^*}{a_c^*}$ Australia specializes in education

Now we can find production, where countries only produce their specialized goods:

Japan: $Q_c^* = 320/1 = 320$, $Q_e^* = 0$

Australia: $Q_c = 0$. $Q_e = 160/4 = 40$

Using the relative price formula we have:

$$\frac{P_e}{P_c} = \frac{Total\ Q_c}{Total\ Q_e} = 8$$

Since MRS is the same in both countries they will have an equal share of goods consumed:

Japan: $(Q_e^*, Q_c^*) = (20, 160)$

Australia: $(Q_e, Q_c) = (20, 160)$

Notice that this consumption matches the relative price where:

$$8 = \frac{P_e}{P_c} = MRS = \frac{Q_c}{Q_e} = \frac{160}{20} = 8$$

Since we know consumption we know that Japan exports 160 computers and imports 20 education while Australia imports 160 computers and exports 20 education