Economics 2 Professor Emmanuel Saez
Fall 2024

PROBLEM SET 4 SOLUTION

DUE ON GRADESCOPE BY 11:59PM ON MONDAY, NOVEMBER 25

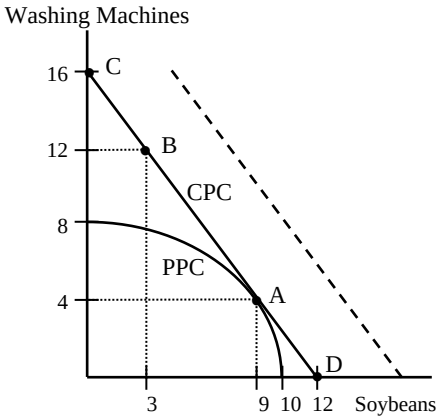
Student name:

Student ID:

You may work together on the problems, but your answers must be ***in your own words*** and ***handwritten***. You also must ***list the other students with whom you worked*** here:

For all questions be sure to explain your answers and to use graphs whenever asked to. Write your answers in the spaces below.

1. Consider the example from lecture where the U.S. produces two goods, soybeans and washing machines; where U.S. workers differ in their opportunity costs of producing the two goods; and where the prices in world markets are $300 for a washing machine and $400 for a ton of soybeans. The diagram to the right is a PPC-CPC diagram depicting such a case.



a. What is the total value (at world prices) of what the U.S. produces if it produces at Point A?

At point A, the country produces 9 tons of soybeans and 4 washing machines. At the world prices of $400 per ton of soybeans and $300 per washing machine, that combination would sell for 9•$400+4•$300, or $4800.

b. What is the total value of what the U.S. consumes if it consumes at Point A? Point B? Point C? Point D?

If the country chose to consume at point A, it would consume 9 tons of soybeans and 4 washing machines. At the world prices, that combination would cost $4800. If the country chose to consume at point B, it would have to pay 3•$400+12•$300 = $4800. If the country chose to consume at point C, it would have to pay 0•$400+16•$300 = $4800. If the country chose to consume at point D, it would have to pay 12•$400+0•$300 = $4800. This numerical example should help you see that every combination along the CPC does indeed cost the same amount. The more conceptual way to see this is to realize that wherever we start on the CPC, if the country decides to consume 1 fewer ton of soybeans it will be able to purchase 1⅓ washing machines. Its spending will not change along the line.

c. What is the total value of what the U.S. produces if it only produces soybeans? Why would the U.S. not want to do this?

If the U.S. only produces soybeans, it will grow 10 tons of soybeans and make no washing machines. On the world market, those 10 tons of soybeans will sell for $4000. This is obviously less than the U.S. could earn on the world market if it produced at point A. The combinations of soybeans and washing machines that the country could have with trade will all be less good if it specialized completely than if it produced at point A. With rising opportunity cost, at some point what the country gives up in terms of washing machines to produce a ton of soybeans is more than 1⅓ washing machines. At that point it would be better off making some washing machines instead of specializing more thoroughly in soybeans.

d. Why can't the U.S. consume a combination of soybeans and washing machines that is on the dashed line?

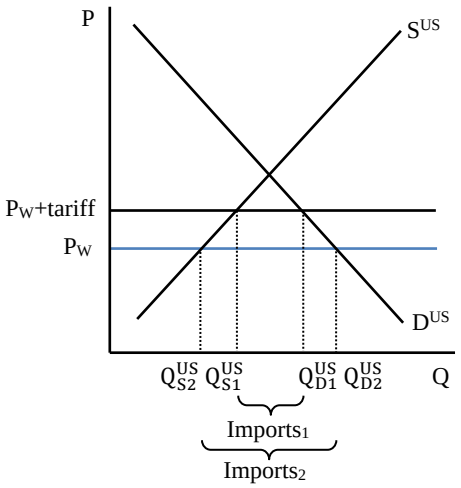
The dashed line again reflects the terms of trade (that is, its slope is −1⅓). However, every combination along this line costs more than along the line marked CPC. The country cannot produce a combination of goods that generates the amount of revenue corresponding to the dashed line. That is why it is not the CPC—it is not a possible level of consumption for the country.

e. In the absence of trade, could the U.S. consume at point B?

In the absence of trade, the country could not consume at point B. This is true because without trade, the country is limited to the combinations of washing machines and soybeans along the PPC, and point B is not on the PPC. Even if the country produced only washing machines, the most washing machines it could make is 8, not the 12 it can consume at point B. This analysis drives home the notion that trade is like technological change—it increases the consumption possibilities for a country.

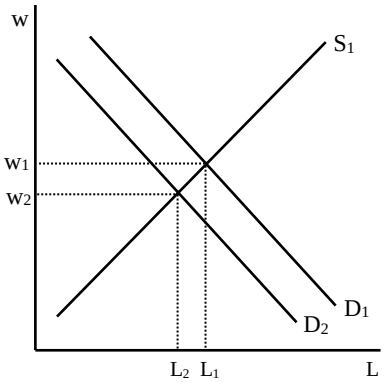
2. The first Trump administration imposed a tariff on imports of aluminum. (Aluminum is a good where the world price is below the level where the quantity demanded and the quantity supplied in the U.S. are equal. The tariffs were not large enough to completely eliminate our imports of aluminum.) This problem asks you to analyze the effects of ending the tariff.

The tariff on aluminum would show up in the supply and demand diagram with trade as an upward shift in the world price line, from P_W to P_W+tariff. The way to understand this is that, for a good we import, that world price line shows that there is a perfectly elastic world supply of aluminum at the going world price. If we put a tariff on aluminum imports, foreign suppliers will only be willing to supply if the price they receive is higher by the amount of the tariff. Because the prevailing price becomes P_W+tariff, American producers will choose to produce a larger amount (where the U.S. supply curve intersects the world price line).



a. If the aluminum tariff is eliminated, the perfectly elastic world supply curve shifts back down to P_W. P_W once again becomes the prevailing price of aluminum in both the world and domestic markets. At this lower price, American firms will produce less (the quantity of aluminum produced in the U.S. will fall from Q^{US}_{S1} to Q^{US}_{S2}). American consumers will demand more at the lower price (the quantity of aluminum bought by American consumers rises from Q^{US}_{D1} to Q^{US}_{D2}). Our imports will rise from $Imports_1$ to $Imports_2$.

b. The fall in the effective world price from P_W+tariff to P_W will cause the marginal revenue product of workers in the aluminum industry to fall. (Recall that $MRP_L = MP_L \bullet MR$; if the industry is competitive, MR is just the price of the good, and in this case the price has fallen.) Thus, removing the tariff will cause the labor demand curve for aluminum workers to shift back (from D_1 to D_2). This will cause the wages and employment of workers in the aluminum industry to fall (from w_1 to w_2 and from L_1 to L_2, respectively).



3. Answer the following short questions about macroeconomic data.

a. The average price of a gallon of gasoline in the United States today is $3.10. In 1981, the average price of a gallon of gasoline was $1.31. The consumer price index was 91 in 1981 and is 315.3 now. What is the 1981 price of a gallon of gasoline expressed in today's dollars? How does the 1981 price of gasoline in today's dollars compare with the price of gasoline today?

1981 price of a gallon of gasoline expressed in today's dollars is 1.31*315.3/91=$4.54 which is higher than today's price of $3.10. Gasoline in 1981 was very expensive due to the recent oil price shocks engineered by OPEC countries.

b. If inflation is falling but still positive, does this imply: (i) that prices are on average falling; (ii) that prices are on average rising but at a slower rate than before; or (iii) because this is only information about inflation and not prices, it does not tell us anything about the behavior of prices? (As always, be sure to explain your answer.)

(ii) is the correct answer.

c. The Consumer Price Index was 307.8 a year ago and is now 315.3. To within rounding, 315.3/307.8 equals 1.024. Which of the following possible newspaper headlines is correct: "Inflation Rose by 2.4% over the Past Year", "Inflation over Past Year was 2.4%", "Inflation Accelerated by 2.4% over the Past Year"?

Correct answer is "Inflation over Past Year was 2.4%"

4. Suppose that the components of planned aggregate expenditure (PAE) take the following specification:

$$C = 600 + 0.6Y$$
$$I^P = 600$$
$$G = 600$$
$$NX = 200$$

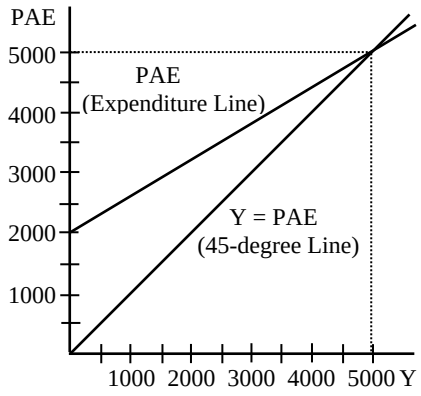
a. Graph the expenditure line corresponding to this specification, the 45-degree line, and the equilibrium level of total output in the short run and solve the example algebraically to determine the equilibrium level of total output in the short run.

Adding up the components of planned expenditure in this numerical example yields:

$$PAE = 600 + 600 + 600 + 200 + 0.6Y.$$

Therefore, the equation for the expenditure line is:

$$PAE = 2000 + 0.6Y.$$



The expenditure line has an intercept of 2000 and a slope of 0.6. The coefficient on output in the equation reflects the sensitivity of consumption to output. This coefficient is called the marginal propensity to consume (MPC). In this example, the MPC is 0.6, which means that if consumers get another dollar, they will spend 60 cents of it and save 40 cents. If you draw the expenditure line and the 45-degree line carefully, equilibrium output in the short run appears to be around 5000.

b. Suppose that government purchases (G) decrease to 200. Show what will happen to total output in the short run both graphically and algebraically.

The two equations that determine equilibrium output are Y = PAE and PAE = 2000 + 0.6Y. Therefore, to solve for equilibrium output algebraically, all one does is substitute the second equation into the first. This yields:

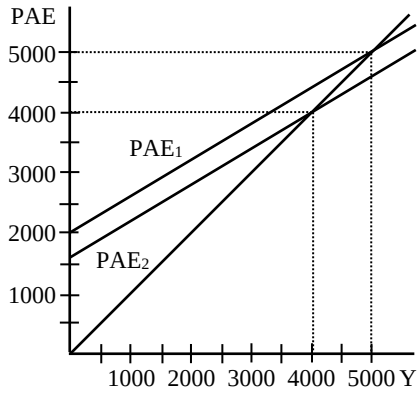
$$Y = 2000 + 0.6Y$$
$$(1 - 0.6)Y = 2000$$
$$Y = 2000/0.4$$
$$Y = 5000$$

If government purchases decrease to 200, this changes the equation for the planned expenditure line to:

$$PAE = 1600 + 0.6Y.$$

Graphically, this is a shift down in the expenditure line by 400 at each level of Y (from PAE_1 to PAE_2). The new level of equilibrium output looks to be about 4000. Algebraically, the new level of equilibrium output is determined by calculating:

$$\begin{aligned} Y &= 1600 + 0.6Y \\ (1 - 0.6)Y &= 1600 \\ Y &= 1600/0.4 \\ Y &= 4000 \end{aligned}$$



5. Read the following recent article in the WaPo on the consequences of the proposed Trump tariffs:

https://www.washingtonpost.com/business/2024/10/16/trump-tariffs-impact-economy/

Article also posted at https://eml.berkeley.edu/~saez/econ2/trump-tariffs2024.pdf

Are the statements consistent with the trade and tariffs model of supply and demand model we saw in class? Discuss also whether the textbook model misses key relevant factors to judge the proposed tariffs. Write your answer clearly and concisely in 10-15 lines below.

Yes, the statements are consistent with the basic model that prices of imported goods will increase and hence imports would shrink but the article goes in various other consequences some of which we discussed in class but without providing a formal model.

Note that the discussion in "Higher interest rates, slower growth, higher inflation" is something you will understand better after the last lectures in the class.