

**ECONOMICS 2**

**FINAL EXAMINATION  
SOLUTIONS**

1. Put your name, your SID number, and your GSI's name or your section number in the blanks provided on the front of the exam. ***Please do not put your name or your GSI's name anywhere else on the exam.***
2. The exam is written on ***both sides of the page***. Be sure to answer all the questions.
3. Write all of your answers directly on the exam in the spaces provided. **Use a dark enough pen so that answers remain legible** after electronic scanning.
4. Use blank pages at the back for scratch paper NOT your own paper.
5. There are **30 points** in total.
6. Turn off and put away all cellphones and other electronics.
7. We collect the exams at exactly 2:30 p.m.

**PLEASE DO NOT OPEN THE EXAM UNTIL INSTRUCTED TO DO SO.**

Name \_\_\_\_\_

SID Number \_\_\_\_\_

GSI or Section Number \_\_\_\_\_

***During the exam, I will NOT obtain help from anyone, provide help to anyone else, or use any notes or other resources. Sign below:***

\_\_\_\_\_

**PAGE FOR GRADING ONLY (STUDENTS SHOULD SKIP IT)**

PROBLEM 1a: \_\_\_\_\_

PROBLEM 1b: \_\_\_\_\_

PROBLEM 1c: \_\_\_\_\_

PROBLEM 1d: \_\_\_\_\_

PROBLEM 1e: \_\_\_\_\_

PROBLEM 1f: \_\_\_\_\_

PROBLEM 1g: \_\_\_\_\_

QUESTION 2: \_\_\_\_\_

QUESTION 3: \_\_\_\_\_

PROBLEM 4a: \_\_\_\_\_

PROBLEM 4b: \_\_\_\_\_

PROBLEM 5a: \_\_\_\_\_

PROBLEM 5b: \_\_\_\_\_

MULTIPLE CHOICE: \_\_\_\_\_

**TOTAL:**\_\_\_\_\_

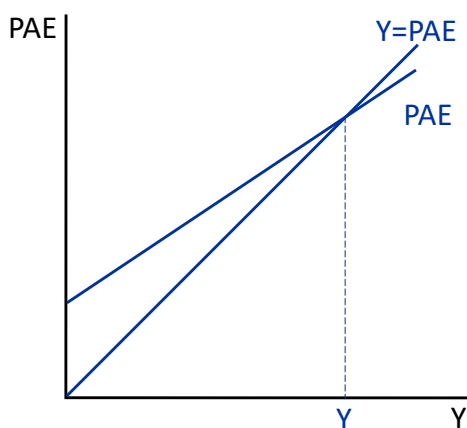
**PART I: MATERIAL SINCE THE 2<sup>ND</sup> MIDTERM****[10 POINTS TOTAL]****1. Problem**

Answer all parts of the question. Be sure to explain your answers and to draw diagrams where they are appropriate. Your explanation and analysis determine your grade. This part uses the Keynesian cross framework to study the impact of Trump's election and policies on short run economic outcomes.

- a. We denote by  $c$  the slope of the Planned Aggregate Expenditure (PAE) line. Explain what  $c$  is and why it is between 0 and 1. Explain how output is determined in the short-run in the Keynesian cross framework. Draw a graph to explain to answer. **[1 point]**

$PAE = C + I + G$  with  $C = C_0 + c \cdot (Y - T)$  with  $c$  being the marginal propensity to consume. When households get \$1 extra, they spend  $\$c > 0$  and save  $\$(1 - c) > 0$  on average so that  $0 < c < 1$ .  $C_0$  is the autonomous consumption (which does not vary with  $Y$ ).  $I$  is planned investment and  $G$  is government spending. The equilibrium is  $Y = PAE$ .

Output  $Y$  equilibrium in Keynesian cross model

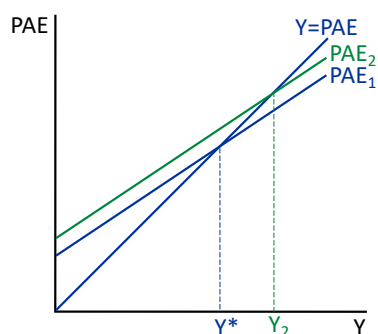


$PAE = C + I + G + NX$  with  $C = C_0 + c \cdot (Y - T)$  so PAE has slope  $c$  with  $0 < c < 1$ .  $c$  is the marginal propensity to consume. Equilibrium is  $Y = PAE$

- b. Suppose businesses become more bullish about the economy after Trump's election and decide to increase planned investment by \$1 trillion. What will this do to total output  $Y$  and consumption  $C$  in the short run? Use a diagram and the equations discussed in class to explain your answer. **[2 points]**

If  $I$  increases by 1, this shifts up the PAE by 1. Output  $Y$  increases by  $1/(1-c)$  and consumption increases by  $c/(1-c)$ .

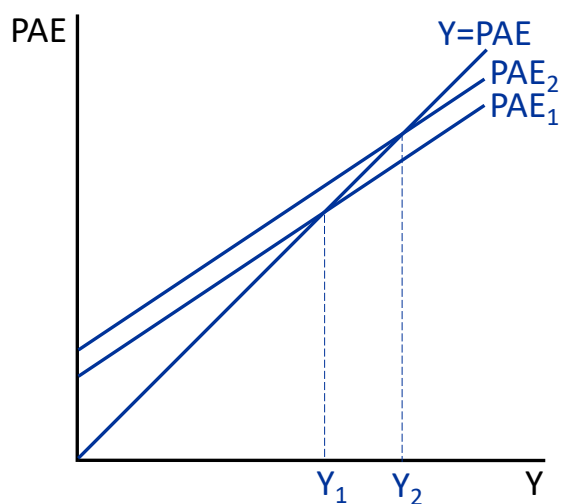
A Rise in Animal Spirits = increase in planned investment  $I$



PAE=C+I+G+NX. Increasing  $I$  shifts up the PAE which increases output above  $Y^*$

- c. The new Trump administration decides to lower net taxes  $T$  by \$1 trillion. How will the decrease in taxes  $T$  affect output  $Y$  and consumption  $C$  in the short run? Use a diagram and the equations discussed in class to explain your answer. **[1.5 points]**

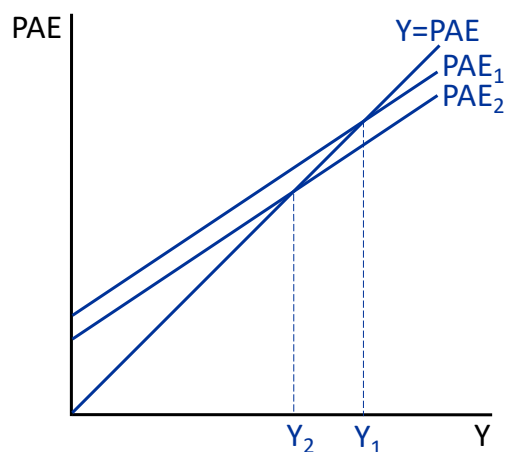
### Short-Run Effects of a Tax Decrease



$PAE = C_0 + c \cdot (Y - T) + I + G$  so decreasing  $T$  by 1 shifts the PAE up by  $c$  which increases output by  $c/(1-c)$  and consumption by  $c^2/(1-c)$ .

- d. The new Trump administration decides to reduce government consumption  $G$  by \$.5 trillion (that's the DOGE commission headed by Musk). How will the decrease in government consumption  $G$  affect output  $Y$  and consumption  $C$  in the short run? **[1.5 point]**

### Short-Run Effects of a decrease in govt spending



$PAE = C + I + G + NX$  so decreasing  $G$  by .5 shifts down the PAE by .5 which lowers output  $Y$  by  $.5/(1-c)$  and consumption  $C$  by  $.5*c/(1-c)$

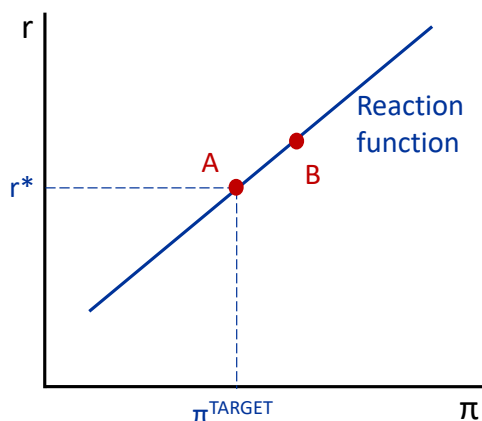
- e. Combine the effects of b. and c.: -\$1 trillion in taxes and +\$.5 trillion on government spending. What is the net effect on output  $Y$  and consumption  $C$ ? Is the net effect positive, negative, or zero? **[1.5 point]**

The net effect on  $Y$  is  $(c-.5)/(1-c)$  and net effect on  $C$  is  $c^*(c-.5)/(1-c)$  so net effect is positive if marginal propensity to consume  $c$  is above .5, negative if below .5, and zero is  $c=.5$ .

- f. Suppose the economy starts with  $Y$  equal to normal output  $Y^*$  before the election and also with inflation back to its target value of 2%. Suppose the net effect of a., b., and c., is to actually stimulate output  $Y$  in the short-run so that  $Y$  becomes higher than  $Y^*$ . What will happen to inflation and why? Using the concept of the Fed's reaction function, explain how the Fed is going to change the real interest rate and how this will affect the path output and inflation **[2 points]**.

As  $Y$  goes above  $Y^*$ , inflation will start increasing and become higher than the target value  $\pi=2\%$  through a demand-pull inflation effect: businesses have too much demand which leads them to increase their prices and the wages they pay their workers above normal inflation. In this case, the Fed increases the interest rate through its reaction function  $r(\pi)$  where  $r$  increases with  $\pi$ . The increase in the interest rate lowers the PAE which reduces output  $Y$ . Eventually, output returns to  $Y^*$  and  $\pi$  returns to its 2% target.

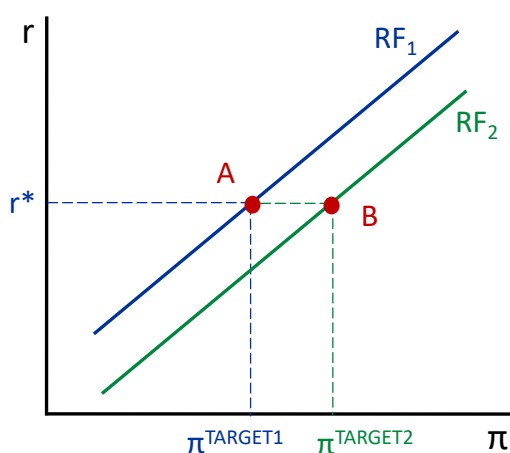
### The Fed Reaction Function



Starting from A, higher inflation due to  $Y > Y^*$  makes the Fed increase  $r$  (point B) which then reduces output and eventually brings down inflation so that the economy eventually returns to point A with  $Y = Y^*$  and  $\pi = \pi^{\text{TARGET}}$

- g. Suppose Trump is upset by what the Fed would do in e. and hence replaces the Fed chair by another Fed chair who adopts a new reaction function which is below the one used by the previous Fed chair. Draw the old and new reaction functions of the Fed and explain what is going to happen to output and inflation in the long-run with this new reaction function in place **[1.5 points]**

A Shift in the Reaction Function amount to changing the Fed's Inflation Target



The shift in the reaction function increases inflation in the long run from  $\pi^{\text{TARGET1}}$  to  $\pi^{\text{TARGET2}}$  with no change in interest  $r^*$  and output  $Y^*$  (point B)



**PART II: SHORT ANSWER****[3 POINTS TOTAL]**

Answer all questions. Be sure to explain your answers and to draw diagrams where they are appropriate.

- 2.** A large fraction of agricultural workers in the US are currently undocumented immigrants. Suppose the new Trump administration successfully deports undocumented immigrants. How would this affect the labor market for agricultural workers in the US? What would be the impact on the price of agricultural products in the US? **[1.5 points]**

This is a negative supply shift in the labor market, which lowers employment and increases wages in the agricultural labor market. The increase in wages means that agricultural production is now more expensive which will lead to an increase in price and a decrease in production of US agricultural products.

3. Suppose a household learns that many exciting new products will be introduced in a few years. How, if at all, will this affect its saving this year? **[1.5 points]**

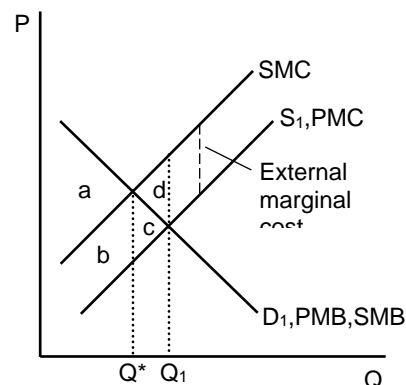
This makes consumption in the future more attractive. If the marginal utility of future consumption increases, the consumer will increase future consumption and decrease current consumption (so that the rational spending rule between current and future consumption still holds). If the household is consuming less today, it is saving more. Thus, information about interesting new products in the future will lead to more saving today.

**PART III: PROBLEM****[7 POINTS TOTAL]**

Answer all parts of each question. Be sure to explain your answers and to draw diagrams where they are appropriate. Your explanation and analysis determine your grade.

4. Consider the market for coal powered electricity, which has a negative production externality. It is reasonable to think of this market as competitive.
- a. How does the quantity of coal powered electricity produced in a free market compare with the quantity that would maximize the total social surplus? Using a diagram, identify the total private surplus, external costs, and total social surplus at the level of production that occurs in a free market and at the level of production that maximizes the total social surplus. What is the deadweight loss associated with the free-market outcome? **[2 points]**

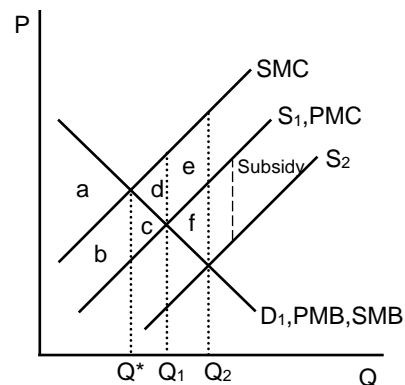
- With a negative externality, SMC is above PMC, but PMB and SMB are equal.
- A free market will produce where  $PMC = PMB$  (equivalently, where quantity supplied = quantity demanded). This is  $Q_1$ .
- Total social surplus is maximized where  $SMC = SMB$  (where  $Q = Q^*$ ). For units up to  $Q^*$ ,  $SMB > SMC$ , and so producing those units raises total social surplus. For units beyond  $Q^*$ ,  $SMC > SMB$ , so producing them lowers total social surplus.
- With a negative externality,  $Q_1 > Q^*$ .
- Total private surplus = area between PMB and PMC (up to whatever quantity is produced).
- Total social surplus = area between SMB and SMC (up to whatever quantity is produced).
- External costs = area between SMC and SMB (up to whatever quantity is produced).
- Here's the welfare accounting that follows from this discussion:



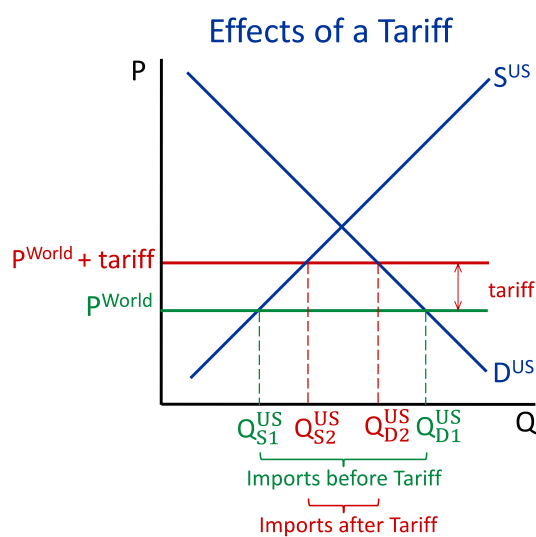
	<u>At <math>Q_1</math></u>	<u>At <math>Q^*</math></u>
TPS	$a+b+c$	$a+b$
External costs	$b+c+d$	$b$
TSS	$a - d$	$a$
DWL	$d$	

- b. Suppose that the new Trump administration decides to subsidize the coal powered electricity. The subsidy is a per unit subsidy that is physically paid to producers. Show in a diagram what is the new quantity produced and the deadweight loss in this case. **[1.5 points]**

- The subsidy shifts the supply curve down by the per-unit subsidy.
- The quantity is now the amount at the intersection of the new supply curve ( $S_2$ ) and the old demand curve ( $D_1$ ). This is  $Q_2$  in the diagram.
- The SMC, PMC, PMB, and SMB curves are unaffected.
- The deadweight loss comes from the production of units where  $SMC > PMC$ . Thus, it's the area between the SMC and SMB curves from  $Q_1$  to  $Q^*$ , which is area  $d+e+f$ .



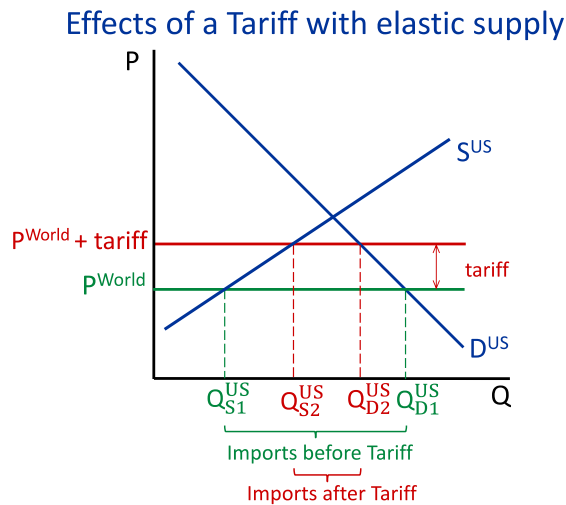
5. Gasoline is a good that the U.S. both produces domestically and imports. Suppose the new Trump administration decides to put a tariff on imported gasoline.
- a. What would the imposition of the tariff do to the price of gasoline paid by American consumers, the amount of gasoline bought by American consumers, and U.S. imports of gasoline? Use a diagram to explain your answer **[2 points]**



The tariff on gasoline imports increases the price paid by US consumers. It decreases the amount consumed by US consumers and US imports.

- b. If the American supply for gasoline is highly elastic, will the impact of the tariff on gasoline domestic production and imports be larger or smaller than if the supply were less elastic? Use a diagram to explain your answer. **[1.5 points]**

If US supply is very elastic, the supply curve is relatively flat. Both the increase in domestic production and the decrease in imports triggered by the tariff are going to be larger as illustrated below.



With elastic supply, the effect of the tariff on domestic production is larger.

**PART IV: MULTIPLE CHOICE****[10 POINTS TOTAL]**

Each question is worth 1 point. Please write the letter of the **best** answer for each multiple choice questions below, like so:

1.   E  

2.   F  

...

1.   D  

2.   B  

3.   B  

4.   F  

5.   B  

6.   E  

7.   C  

8.   A  

9.   C  

10.  D  

1. In a competitive market with no government intervention, if the price is below the equilibrium level:
  - A. the quantity demanded is greater than the quantity supplied.
  - B. consumers who want to buy the good at the current price but are unable to get the good have an incentive to offer a higher price to firms.
  - C. firms have an incentive to charge more than the current price of the good.
  - D. all of the above.
  - E. none of the above.
2. If the demand for a good is perfectly inelastic with respect to price and the supply is not, a per-unit tax on the good that is physically collected from sellers:
  - A. will be borne by both buyers and sellers.
  - B. will be borne only by buyers.
  - C. will be borne only by sellers.
  - D. will cause the market for the good to shut down completely.

3. At the equilibrium of a perfectly competitive market for a good that has no externalities, **all** of the following are equal **except**:
- A. price.
  - B. quantity.
  - C. private marginal benefit.
  - D. social marginal benefit.
  - E. private marginal cost.
  - F. social marginal cost.
4. If the government introduces a per unit **subsidy** to a good that has a **negative** externality and that is bought and sold in a competitive market:
- A. producer surplus will rise.
  - B. producer surplus will fall.
  - C. total social surplus will rise.
  - D. total social surplus will fall.
  - E. it is not possible to determine the effect on total social surplus.
  - F. (A) and (D).
  - G. (A) and (E).
  - H. (B) and (C).
  - I. (B) and (D).
5. If the interest rate is 10%, the present value of \$110 to be received a year from now is:
- a. \$10.
  - b. \$100.
  - c. \$110.
  - d. \$121.
  - e. \$1100.
6. If a typical worker in France can produce 5 croissants or 10 chocolates in an hour, and a typical worker in Belgium can produce 4 croissants or 12 chocolates in an hour, each country will want to specialize in the good in which it has a comparative advantage and trade with the other if the terms of trade are between:
- A.  $4/5$  and  $12/10$  chocolates per croissant.
  - B.  $10/12$  and  $5/4$  chocolates per croissant.
  - C.  $1/2$  and 1 chocolates per croissant.
  - D. 1 and 2 chocolates per croissant.
  - E. 2 and 3 chocolates per croissant.
  - F. 4 and 5 chocolates per croissants.
  - G. 10 and 12 chocolates per croissants.
7. The imposition of a tariff on a good that the U.S. imports will:
- A. hurt both U.S. consumers of the good and U.S. producers of the good.
  - B. hurt U.S. consumers of the good and not affect U.S. producers of the good.
  - C. hurt U.S. consumers of the good and help U.S. producers of the good.



- D. not affect U.S. consumers of the good and hurt U.S. producers of the good.
  - E. not affect U.S. consumers of the good and help U.S. producers of the good.
  - F. not affect either U.S. consumers of the good or U.S. producers of the good.
8. The Federal hourly minimum wage was \$1.60 in 1968 and is \$7.25 today. The Consumer Price Index was 35 in 1968 and 300 today. These figures imply that the inflation-adjusted minimum wage was greater in 1968 than it is today if:
- A.  $\$1.60/35 > \$7.25/300$ .
  - B.  $\$1.60/300 > \$7.25/35$ .
  - C.  $\$1.60 \cdot (35/300) > \$7.25 \cdot (300/35)$ .
  - D.  $\$1.60 \cdot (300/35) > \$7.25 \cdot (35/300)$ .
9. Consider the PPC-CPC diagram (with computers on the horizontal axis) for a country that produces two goods, computers and food. If the world relative price of computers falls, the country's CPC will:
- A. shift in parallel to the old CPC.
  - B. shift out parallel to the old CPC.
  - C. become flatter.
  - D. become steeper.
  - E. not change.
10. If increases in national pride cause American tastes to shift toward domestically produced goods rather than foreign-made ones:
- A. the supply curve of dollars in the foreign exchange market will shift to the left.
  - B. the demand curve for dollars in the foreign exchange market will shift to the right.
  - C. the dollar will appreciate.
  - D. (A) and (B).
  - E. (A) and (C).
  - F. (B) and (C).
  - G. all of the above.

**SCRATCH PAPER**

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