Johns Hopkins University
Department of Economics
Econ 180.101.11

Name: _____

Due Date: June 19
Summer 2019

Problem Set 3

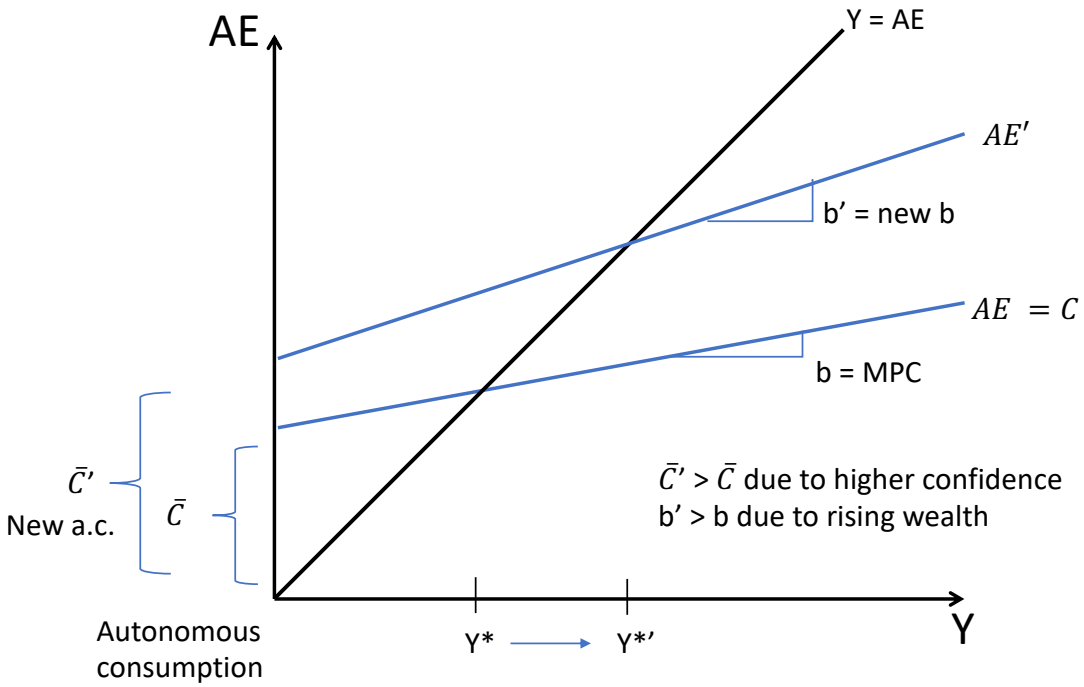
Problem sets submitted after 9 am will not be graded.

Section I: AE Model (25 points)

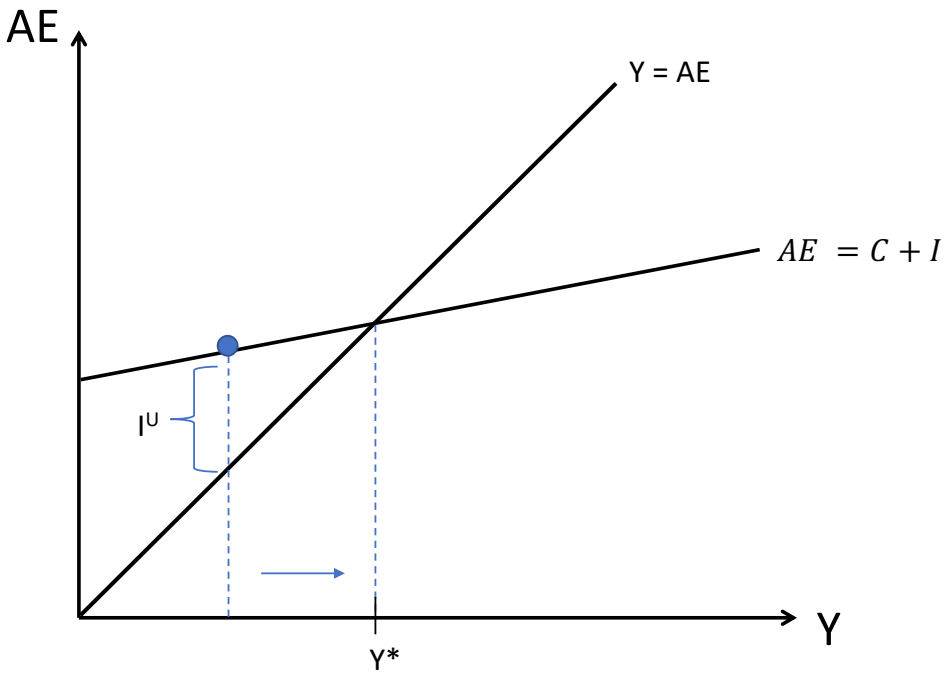
1) **(2 points)** On the graph below, the 45-degree line shows the point where:
   a. Real income equals real GDP
   b. Real aggregate expenditure equals real C+I
   c. Real aggregate expenditure equals real GDP
   d. Real aggregate output equals the quantity produced

2) **(3 points)** An increase in aggregate expenditure has what result on equilibrium GDP?
   a. Equilibrium GDP rises
   b. Equilibrium GDP is not affected
   c. Equilibrium GDP falls
   d. Equilibrium GDP may rise, fall or stay the same

3) **(10 points)** In the graph below label the AE line, assuming total AE = C. Identify autonomous consumption and b (the marginal propensity to consume).
Assume: (1) Google announces a cure for cancer, (2) the stock market soars and (3) confidence soars. Show the way in which the AE line will change. Given this new AE line, what happens to total expenditures for a given amount of income?



4) **(10 points)** Now consider the graph below. Assume AE = C + I. Indicate a value for income/output that will result in an unintended inventory drawdown. Trace out the value for AE for that level of income and identify I^u in the diagram.
What does the negative value for I^u imply for output and employment in the next period?



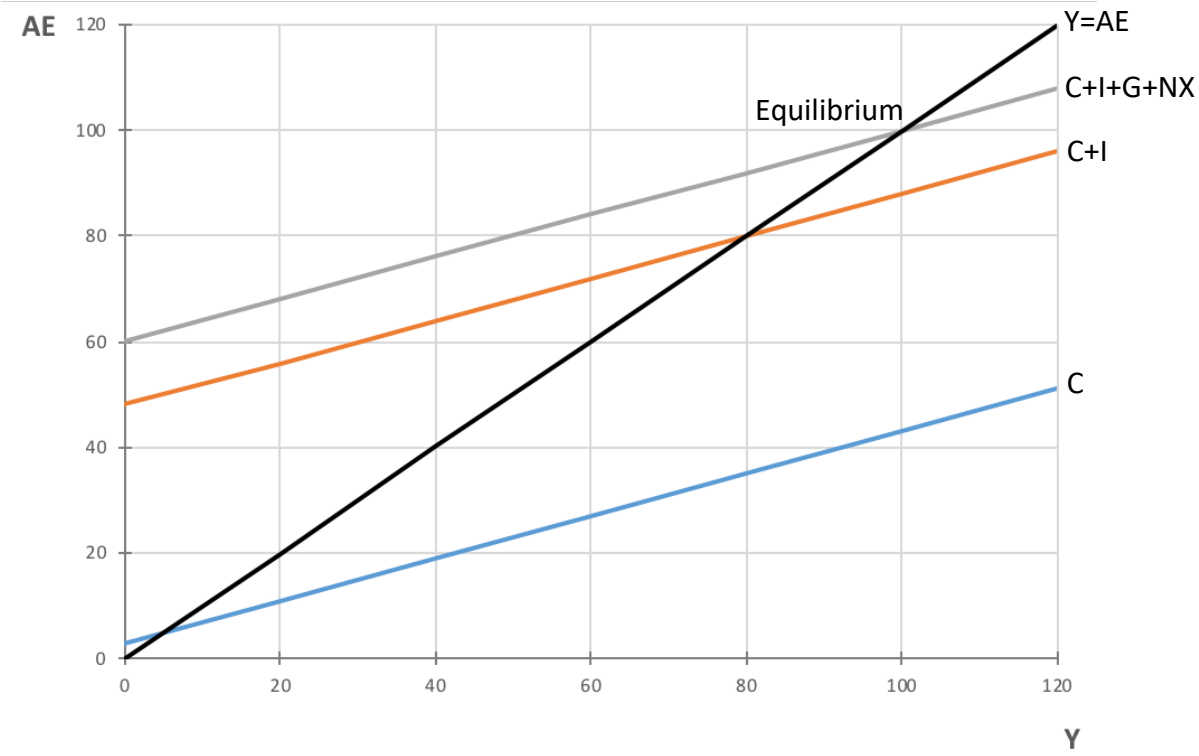
The unplanned decrease in inventories leads to an increase in production and employment next period.

Section II: AE for China in 2018 (45 points)

$C = \bar{C} + bY$ $I = \bar{I} = 45$ $G = \bar{G} = 7$ $NX = \overline{NX} = 5$ (trillions of yuan)

Autonomous consumption is equal to 3, MPC = 0.4, unemployment rate = U = 5%. Suppose that the natural rate of unemployment is 5%.

1. **(10 points)** Use the graph below to do the following.
   a) Label axes
   b) Draw the line that identifies equilibrium levels
   c) Draw the consumption line
   d) Draw consumption plus investment line
   e) Draw the aggregate expenditure line
   f) Indicate the equilibrium level of output



C = 3 + 0.4Y
C + I = 48 + 0.4Y
AE = C + I + G + NX = 48 + 0.4Y + 7 + 5 = 60 + 0.4Y

2. **(5 points)** Derive the equilibrium level of Y algebraically. Show your work.

In equilibrium, $Y = AE$
$Y^e = 60 + 0.4\ Y^e$
$0.6\ Y^e = 60$
$Y^e = 100$

3. Suppose the Chinese government officials determine that investment in China is now grossly excessive. Suppose officials tell banks to halt lending to real estate developers and investment falls dramatically. Suppose that by 2020, China is in a new equilibrium, where investment now equals 35 trillion yuan.

a) (5 points) Derive the new value for Y in equilibrium. Show your work.

$AE = 3 + 0.4Y + 35 + 7 + 5 = 50 + 0.4Y$
In equilibrium, $Y = AE$
$Y^e = 50 + 0.4\ Y^e$
$0.6\ Y^e = 50$ so $Y^e = 250/3 = 83.33$

b) **(5 points)** Is the level of consumption when equilibrium is reached in 2020 higher or lower? By how much? Show your work.

Original C = 3 + 0.4 Y^e = 3 + 40 = 43
New C = 3 + 0.4 Y^e_{New} = 3 + 0.4 (250/3) = 109/3 = 36.33
Difference = 43 – 36.33 = 6.67
The level of consumption in 2020 is lower by 6.67 trillion yuan.

c) **(3 points)** What happened to unemployment in China? Up a little? Up a lot?

Unemployment went up a lot

d) Suppose you are a Chinese economist reporting to the Politburo, the governing body in China. You recognize, ex-ante, that a big drop for investment will have brutal effects on China, IF NOTHING ELSE IS DONE. You know that the rest of the world will protest, and trade wars will intensify if you try and drive NX sharply higher. You know the government has already built many roads and bridges and bullet trains. You decide that stronger consumption is key.
You explain to your bosses that China's consumers have an extremely high MPS relative to the world. You note that this reflects the teeny social safety net that exists in China. You point out that in the USA and Europe, old people collect social security payments and get free medical care, and this gives them confidence to spend much of what they earn as young people. You propose the creation of similar old age promises to China's workers. You argue that China's young workers, if they come to believe they will be cared for in their old age, will feel more confident about spending their current income. You go on further. You assert that your programs will cause the MPC to rise precisely to a level needed to keep the economy at the 2018 equilibrium.

i. **(7 points)** What's the new MPC that will keep the economy at the 2018 equilibrium level, despite the fall for investment described above? Show your work.

We know I = 35, G =7, NX = 5, $\bar{C}$ = 3. We also know that in 2018 Y = 100. We want to know the value of b (the MPC) for which those values hold.

100 = 3 + b*100 + 35 + 7 + 5
100 = 50 + b*100
50 = 100*b
b = 0.5

ii. **(10 points)** Fill in the table below to show Politburo members why your idea makes good sense:

In trillions of yuan	**Eqm. Values**	**Y**	**C**	**I**	**G**	**NX**
Before any changes	**2018**	100	43	45	7	5
I changes	**2020**	83	36	35	7	5
MPC and I change	**2020**	100	53	35	7	5

Section III (10 Points)

Suppose you estimate that the long-term sustainable growth rate for Wakanda is 4% per year. Unemployment decreased from 7% to 5% in two years.

1. **(3 points)** What could you use to estimate the growth rate of the economy over the 2 years?

Okun's law

2. **(7 points)** Calculate the growth rate for real GDP per year. Show your work.

Since the LTSG of the economy is 4% per year, in two years it will grow 8.2% (from $1.04^{\wedge 2}$). Using Okun's law

$$\%\Delta Y = LTSG - 2(\Delta U)$$
$$\%\Delta Y = 8.2\% - 2(5\% - 7\%)$$
$$\%\Delta Y = 8.2\% + 4\%$$
$$\%\Delta Y = 12.2\% \text{ over two years}$$
$$\%\Delta Y = 5.9\% \text{ per year (from } 1.122^{\wedge(1/2)})$$

Section IV: AD-AS (40 Points)

The Brexit decision is followed in 2019 by Departugal, Czechout, Oustria, Italeave and Byegium leaving the European Union (EU) with only a few members remaining. Barriers to trade and immigration within the EU are increased.

1. **(7 points)** What will happen to the LRAS curve for the EU? Briefly explain.

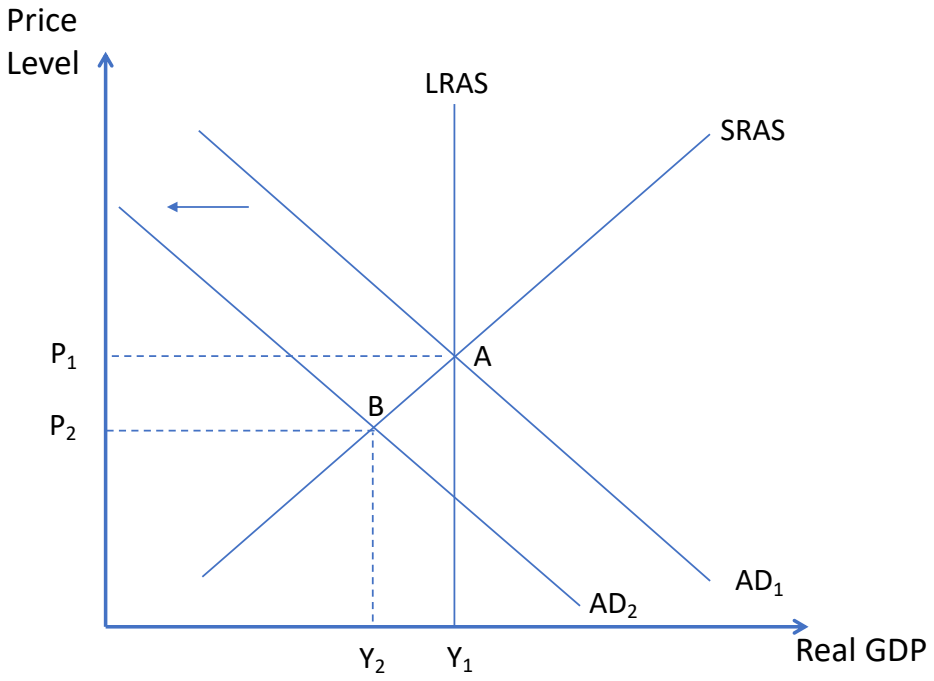
LRAS will shift left (decrease in the level of the labor force due to decrease in number of immigrants)

2. **(7 points)** How will AD be affected in the U.S.? Give two reasons for this change.

AD will shift to the left

1) Growth rate of US GDP will be greater than the growth rate of EU GDP -> NX decrease
2) Value of the dollar relative to the euro increases -> NX decrease

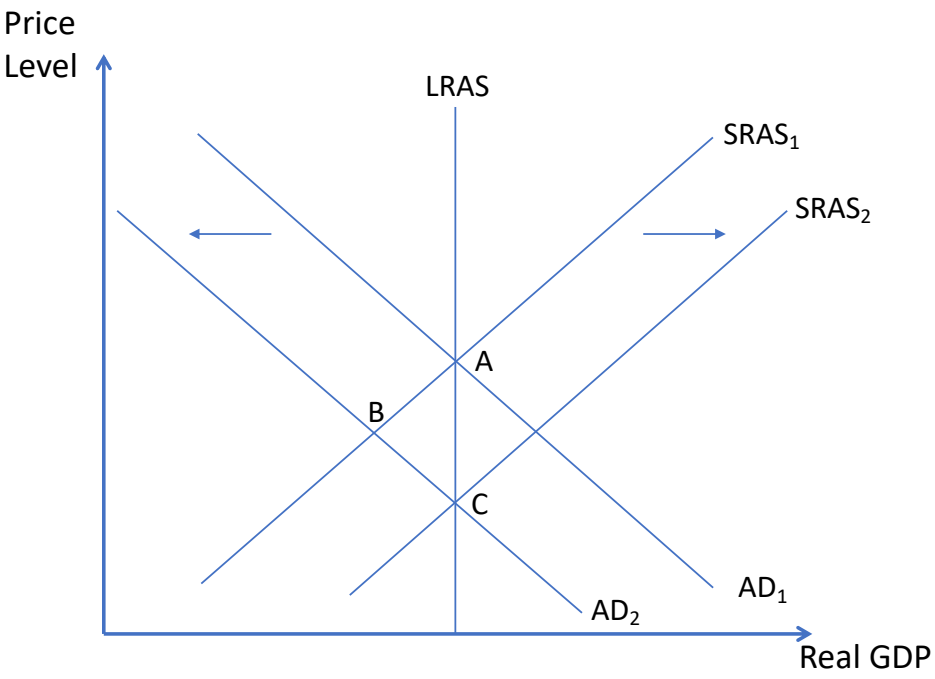
3. **(7 points)** Suppose in 2018, before the EU break up, U.S. GDP was at its LRAS level. Draw an AS-AD diagram for the U.S. in 2018 showing LRAS, SRAS and AD.



4. **(5 points)** Add to your diagram the AD curve for 2019 you described in Question 2.

5. **(7 points)** If the U.S. government does not take any action to help the economy going back to its potential, describe how the economy can move back to its LRAS level over time. Make a verbal and graphical description.

With the lower price level (P_2), input prices will fall over time. This will shift SRAS to the right and the economy will move back to LRAS level over time.



6. **(7 points)** Suppose instead the government forgives all student loan debt. Which curve would you expect to shift in response to this policy and in what direction? Why?

AD shifts to the right. Student purchasing power increases (wealth effect) which causes C and I to increase and so output increases.