

Name:
Section:
T.A. Name

180.101 ELEMENTS OF MACROECONOMICS

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Problem Set #2

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Answer Key

INSTRUCTIONS: Above, write your name, section number and T. A. name. Answer each question in the space provided, or on the back of the same sheet.

1. Consider the following data on an economy:

<u>Output</u>	<u>Consumption</u>	<u>Investment</u>
2000	1600	600
2500	2000	600
3000	2400	600
3500	2800	600
4000	3200	600

- a. What is the equilibrium level of output for this economy? Show your calculations and explain your answer.

The equilibrium level of output = 3000. At this level of output,

$$Y = \text{Output} = 3000$$

$$\begin{aligned} E &= \text{Aggregate Planned Expenditure} = \text{Consumption} + \text{Investment} \\ &= 2400 + 600 = 3000 \end{aligned}$$

Since $Y = E$, there is an equilibrium.

- b. What is the equilibrium level of income for this economy? Do you have enough information to calculate it? If so, do so. If not, what additional information do you need? Carefully explain your answer.

The equilibrium level of income is also 3000. At the equilibrium level of output, business firms produce a level of output of 3000 and thereby pay out an equivalent level of income in the form of wages and salaries, profits, rent and interest. No additional information is needed to calculate it.

- c. What is the marginal propensity to consume in the above economy? Show your calculations and explain your answer.

$$b = MPC = \frac{\Delta C}{\Delta Y} = \frac{400}{500} = \frac{4}{5} = .8$$

The MPC is the ratio of the change in consumption to the change in income. In the above example, between any two levels of income, income changes by 500 and consumption changes by 400. Hence, the MPC is .8.

- d. At a level of output of 4000, inventories are being depleted. True, false, uncertain. Explain carefully. Show your work.

False. At the level of output of 4000, aggregate planned expenditure is $3800 = 3200 + 600$. Hence, output exceeds planned expenditure and thus business firms are producing too much output. As a result, inventories are increasing (not being depleted) in an unintended fashion.

2. Consider the following model of the economy:

$$Y = E$$

$$E = C + I$$

$$C = 300 + (2/3)Y$$

$$I = 400$$

where Y is real income or output, E is aggregate real expenditure, C is real consumption expenditure, and I is real investment expenditure.

a. Provide a brief explanation of each of the relationships of the model.

$Y = E$ is the equilibrium condition in the market for aggregate goods and services. It requires output = income = planned aggregate expenditure.

$E = C + I$ is a definition of aggregate planned expenditure, which in this simple model is just aggregate planned consumption expenditures plus aggregate planned investment expenditures.

$C = 300 + (2/3)Y$ is the consumption function. It relates aggregate planned consumption expenditures to aggregate real income. Autonomous consumption expenditure is 300, and the marginal propensity to consume is $(2/3)$.

$I = 400$ is autonomous aggregate planned investment expenditure.

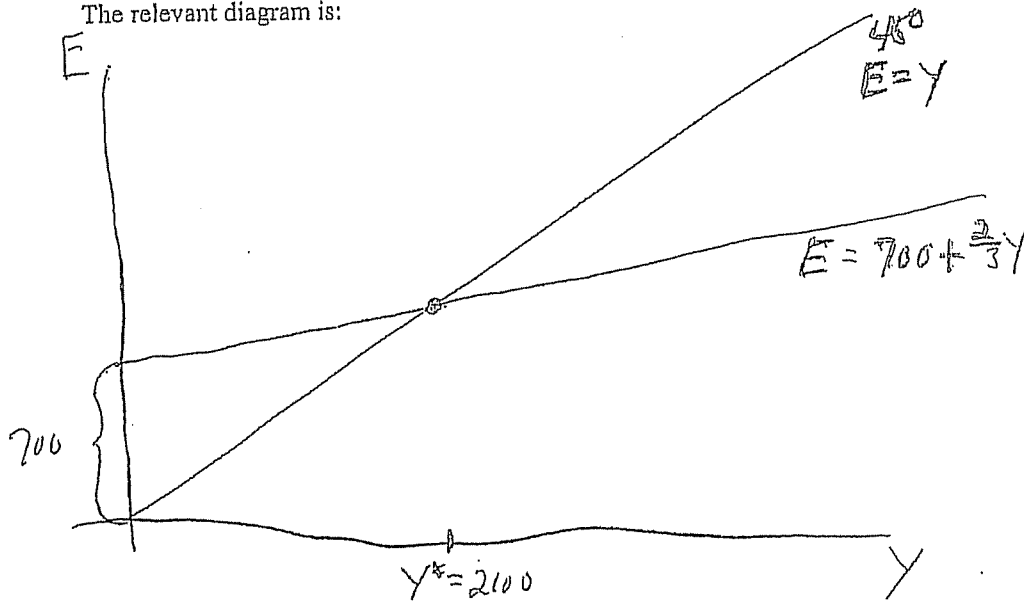
b. Calculate the equilibrium level of income. Show your work, explain why it is an equilibrium, and draw a graph that describes the equilibrium. Be sure to label properly the relevant axes and curves.

The solution for the equilibrium level of income is:

$$Y^* = \frac{1}{1-b} [\bar{C} + \bar{I}] = \frac{1}{1-\frac{2}{3}} [300 + 400]$$

$$= \frac{1}{\frac{1}{3}} [700] = 3[700] = 2100$$

The relevant diagram is:



At the level of income of 2100, aggregate planned expenditure = output = income.

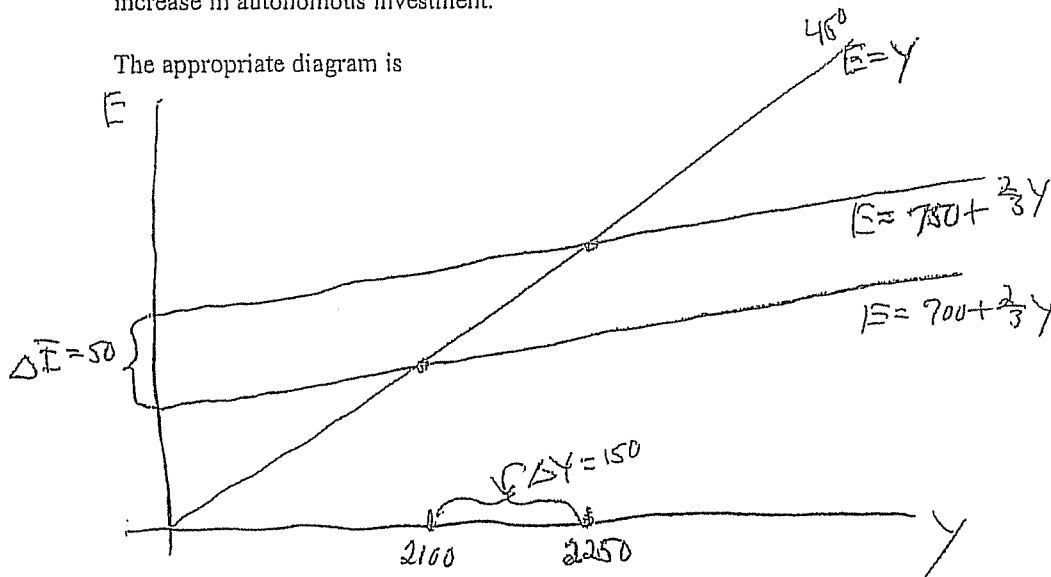
- c. Suppose now that the level of investment expenditures rises to a new level of 450. What will be the effect on real income? Will the effect on real income be larger, smaller or the same as the increase investment? For each question, defend your answer with appropriate calculations and graphs, use a "stages" analysis to illustrate your answer, and explain intuitively what is going on.

The Multiplier for this model is

$$\frac{\Delta Y}{\Delta \bar{I}} = \frac{1}{1-b} = \frac{1}{1-\frac{2}{3}} = 3$$

Since the increase in autonomous investment expenditures is 50, or $\Delta \bar{I} = 50$, the change in income (ΔY) is 150. Hence the increase in income is larger than the increase in autonomous investment.

The appropriate diagram is



In the primary stage, the increase in autonomous investment by 50 raises output by 50 as business firms increase output to satisfy the higher level of investment expenditures. They also increase income by 50 by paying higher wages and salaries, profits, etc. Higher income in the primary stage leads to induced consumption expenditures in the secondary stages as consumers use the additional income to make consumption expenditures. This leads business firms to further increase output to meet the higher level of consumption expenditures, pay out more income, etc. Hence, real income ultimately rises by more than the increase in autonomous investment expenditures.