Economics 104
Spring 2018

Take home Problem Set # 2 M. Bahmani

Direction: Please return your answers to the following problems to your own TA in your discussion section during the week of **April 2nd.** Your TA is instructed to provide the answers during the same week. Please keep a copy of your homework for your record.

Important Note: **This set worth 10 points.**

Review questions to be answered.	Page # from the book.
2, 4, 6 (Test yourself questions)	Page 187
1, 2 and 4 (Test yourself Questions)	Page 189
1, 2, and 3 (Test yourself Questions)	Page 192

Questions are also attached.

Test Yourself

1. From the following data, construct an expenditure schedule on a piece of graph paper. Then use the income-expenditure (45° line) diagram to determine the equilibrium level of GDP.

Income	Consumption	Investment	Government Purchases	Net Exports
$3,600	$3,220	$240	$120	$40
3,700	3,310	240	120	40
3,800	3,400	240	120	40
3,900	3,490	240	120	40
4,000	3,580	240	120	40

Now suppose investment spending rises to $260, and the price level is fixed. By how much will equilibrium GDP increase? Derive the answer both numerically and graphically.

2. From the following data, construct an expenditure schedule on a piece of graph paper. Then use the income-expenditure (45° line) diagram to determine the equilibrium level of GDP. Compare your answer with your answer to the previous question.

Income	Consumption	Investment	Government Purchases	Net Exports
$3,600	$3,280	$180	$120	$40
3,700	3,340	210	120	40
3,800	3,400	240	120	40
3,900	3,460	270	120	40
4,000	3,520	300	120	40

3. Suppose that investment spending is always $250, government purchases are $100, net exports are always $50, and consumer spending depends on the price level in the following way:

Price Level	Consumer Spending
90	$740
95	720
100	700
105	680
110	660

On a piece of graph paper, use these data to construct an aggregate demand curve. Why do you think this example supposes that consumption declines as the price level rises?

4. **(More difficult)**[9] Consider an economy in which the consumption function takes the following simple algebraic form:

$$C = 300 + 0.75DI$$

and in which investment (I) is always $900 and net exports are always –$100. Government purchases are fixed at $1,300 and taxes are fixed at $1,200. Find the equilibrium level of GDP, and then compare your answer to Table 1 and Figure 2. (*Hint:* Remember that disposable income is GDP minus taxes: $DI = Y - T = Y - 1{,}200$.)

5. **(More difficult)** Keep everything the same as in Test Yourself Question 4 *except* change investment to $I = \$1{,}100$. Use the equilibrium condition $Y = C + I + G + (X - IM)$ to find the equilibrium level of GDP on the demand side. (In working out the answer, assume the price level is fixed.) Compare your answer to Table 3 and Figure 10. Now compare your answer to the answer to Test Yourself Question 4. What do you learn about the multiplier?

6. **(More difficult)** An economy has the following consumption function:

$$C = 200 + 0.8DI$$

The government budget is balanced, with government purchases and taxes both fixed at $1,000. Net exports are $100. Investment is $600. Find equilibrium GDP. What is the multiplier for this economy? If G rises by $100, what happens to Y? What happens to Y if both G and T rise by $100 at the same time?

7. Use both numerical and graphical methods to find the multiplier effect of the following shift in the consumption function in an economy in which investment is always $220, government purchases are always $100, and net exports are always –$40. (*Hint:* What is the marginal propensity to consume?)

Income	Consumption before Shift	Consumption after Shift
$1,080	$ 880	$ 920
1,140	920	960
1,200	960	1,000
1,260	1,000	1,040
1,320	1,040	1,080
1,380	1,080	1,120
1,440	1,120	1,160
1,500	1,160	1,200
1,560	1,200	1,240

[9] The answer to this question is provided in Appendix A to this chapter.

From this formula, it is easy to derive the oversimplified multiplier formula algebraically and to show that it applies equally well to a change in investment, autonomous consumer spending, government purchases, or net exports. To do so, suppose that *any* of the symbols in the numerator of the multiplier formula increases by one unit. Then GDP would rise from the previous formula to

$$Y = \frac{a - bT + I + G + (X - IM) + 1}{1 - b}$$

By comparing this expression with the previous expression for Y, we see that a one-unit change in any component of spending changes equilibrium GDP by

$$\text{Change in } Y = \frac{a - bT + I + G + (X - IM) + 1}{1 - b} - \frac{a - bT + I + G + (X - IM)}{1 - b}$$

or

$$\text{Change in } Y = \frac{1}{1 - b}$$

Recalling that b is the marginal propensity to consume, we see that this is precisely the oversimplified multiplier formula.

Test Yourself

1. Find the equilibrium level of GDP demanded in an economy in which investment is always \$300, net exports are always –\$50, the government budget is balanced with purchases and taxes both equal to \$400, and the consumption function is described by the following algebraic equation:

$$C = 150 + 0.75DI$$

(*Hint:* Remember that $DI = Y - T$.)

2. Referring to Test Yourself Question 1, do the same for an economy in which investment is \$250, net exports are zero, government purchases and taxes are both \$400, and the consumption function is as follows:

$$C = 250 + 0.5DI$$

3. In each of these cases, how much saving is there in equilibrium? (*Hint:* Income not consumed must be saved.) Is saving equal to investment?

4. Imagine an economy in which consumer expenditure is represented by the following equation:

$$C = 50 + 0.75DI$$

Imagine also that investors want to spend \$500 at every level of income ($I = \$500$), net exports are zero ($X - IM = 0$), government purchases are \$300, and taxes are \$200.

a. What is the equilibrium level of GDP?

b. If potential GDP is \$3,000, is there a recessionary or inflationary gap? If so, how much?

c. What will happen to the equilibrium level of GDP if investors become optimistic about the country's future and raise their investment to \$600?

d. After investment has increased to \$600, is there a recessionary or inflationary gap? How much?

5. Fredonia has the following consumption function:

$$C = 100 + 0.8DI$$

Firms in Fredonia always invest \$700 and net exports are zero, initially. The government budget is balanced with spending and taxes both equal to \$500.

a. Find the equilibrium level of GDP.

b. How much is saved? Is saving equal to investment?

c. Now suppose that an export-promotion drive succeeds in raising net exports to \$100. Answer (a) and (b) under these new circumstances.

Discussion Questions

1. Explain the basic logic behind the multiplier in words. Why does it require b, the marginal propensity to consume, to be between 0 and 1?

2. **(More difficult)** What would happen to the multiplier analysis if $b = 0$? If $b = 1$?

Table 7

Equilibrium Income after a $160 Billion Increase in Exports

(1) Gross Domestic Product (*Y*)	(2) Consumer Expenditures (*C*)	(3) Investment (*I*)	(4) Government Purchases (*G*)	(5) Exports (*X*)	(6) Imports (*IM*)	(7) Net Exports (*X* − *IM*)	(8) Total Expenditure [*C* + *I* = *G* + (*X* − *IM*)]
4,800	3,000	900	1,300	810	570	+240	5,440
5,200	3,300	900	1,300	810	630	+180	5,680
5,600	3,600	900	1,300	810	690	+120	5,920
6,000	3,900	900	1,300	810	750	+60	6,160
6,400	**4,200**	**900**	**1,300**	**810**	**810**	**0**	6,400
6,800	4,500	900	1,300	810	870	−60	6,640
7,200	4,800	900	1,300	810	930	−120	6,880

NOTE: Figures are in billions of dollars per year.

Summary

1. Because imports rise as GDP rises, while exports are insensitive to (domestic) GDP, net exports decline as GDP rises.
2. If imports depend on GDP, international trade reduces the value of the multiplier.

Test Yourself

1. Suppose exports and imports of a country are given by the following:

GDP	Exports	Imports
$2,500	$400	$250
3,000	400	300
3,500	400	350
4,000	400	400
4,500	400	450
5,000	400	500

Calculate net exports at each level of GDP

2. If domestic expenditure (the sum of $C + I + G$ in the economy described in Test Yourself Question 1) is as shown in the following table, construct a 45° line diagram and locate the equilibrium level of GDP.

GDP	Domestic Expenditures
$2,500	$3,100
3,000	3,400
3,500	3,700
4,000	4,000
4,500	4,300
5,000	4,600

3. Now raise exports to $650 and find the equilibrium again. How large is the multiplier?