Keynesian Equilibrium

This activity is designed to give you practice with manipulations of the aggregate expenditure model. It shows you how the expenditure schedule is derived and how it helps to determine the equilibrium level of income. This activity assumes that the price level is constant with the consumer price index or price level having a value of 100. All numbers in Figure 19.1 are in billions of constant dollars.

Figure 19.1
Income-Expenditure Schedule

Income (Output)	Consumption Spending	Investment Spending	Government Spending	Total Spending (Aggregate Expenditure)
$2,400	$2,500	$300	$100	
2,600	2,600	300	100	
2,800	2,700	300	100	
3,000	2,800	300	100	
3,200	2,900	300	100	
3,400	3,000	300	100	
3,600	3,100	300	100	
3,800	3,200	300	100	

1. Use the data on consumption spending and income to draw the consumption function on the graph in Figure 19.2. Label the function C.

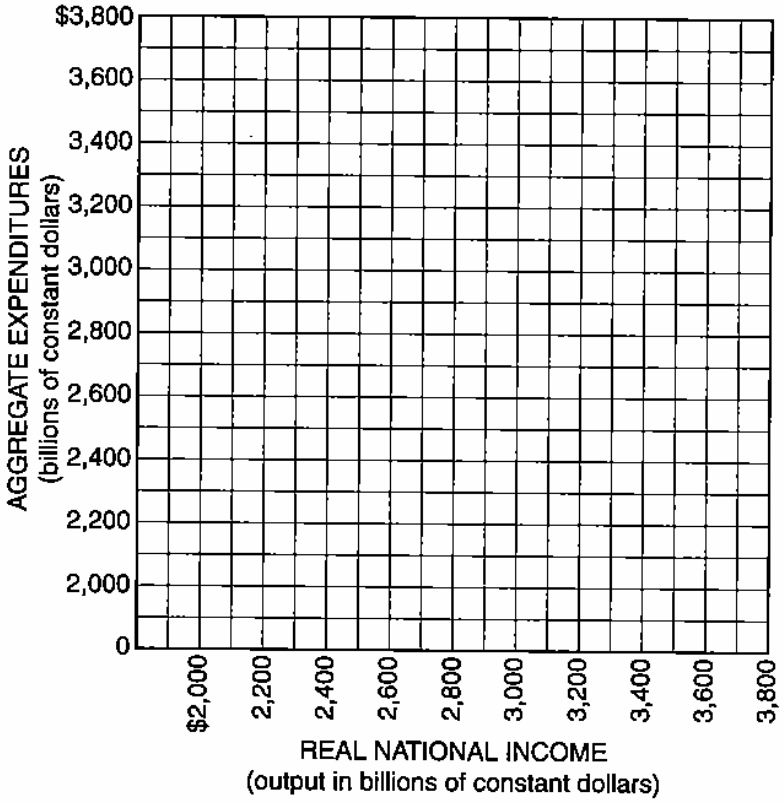
2. Using the consumption function you have just drawn and the data on investment and government spending, draw the aggregate expenditure schedule on the same graph. Label it AE (C + I + G). What is the difference between the aggregate expenditure schedule and the consumption function?

3. Now draw a line representing all the points at which total spending and income could be equal. Label this the 45° line.

4. The 45° line represents all the points that *could be* the equilibrium level of total spending. Now circle the one point that *is* the equilibrium level of total spending. What is the equilibrium level of total spending on your graph? _____

Adapted from William J. Baumol and Alan S. Blinder, *Economics, Principles and Policy*, 3rd ed. (New York: Harcourt Brace & Company, 1985), p. 55. James Chasey, Homewood-Flossmoor High School, Flossmoor, Ill., contributed to this activity.

Figure 19.2
Aggregate Expenditure Model



5. Based on the data in Figure 19.1, and assuming that the full-employment level of total spending is $3,600 billion, what conclusions can you draw about the equilibrium level of total spending?

6. Based on the data in Figure 19.1, and assuming that the full-employment level of total spending is $3,200 billion, what conclusions can you draw about the equilibrium level of total spending?

7. If government spending increased by $100 billion, what would be the new equilibrium level of total spending? _____ For the increase of $100 billion in government spending, total spending increased by _____. Explain why this occurs.

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Practice with APC, APS, MPC and MPS

Part A
Average Propensities

The *average propensity to consume* (APC) is the ratio of consumption expenditures (C) to disposable income (DI), or APC = C / DI.

The *average propensity to save* (APS) is the ratio of savings (S) to disposable income, or APS = S / DI.

1. Using the data in Figure 20.1, calculate the APC and APS at each level of disposable income given. The first calculation is completed as an example.

Figure 20.1
Average Propensities to Consume and to Save

Disposable Income	Consumption	Saving	APC	APS
$0	$2,000	–$2,000	—	—
2,000	3,600	–1,600	1.8	–0.8
4,000	5,200	–1,200		
6,000	6,800	–800		
8,000	8,400	–400		
10,000	10,000	0		
12,000	11,600	400		

2. How can savings be negative? Explain.

Part B
Marginal Propensities

The *marginal propensity to consume* (MPC) is the change in consumption divided by the change in disposable income. It is a fraction of any change in DI that is spent on consumer goods: MPC = ΔC / ΔDI.

The *marginal propensity to save* (MPS) is the fraction saved of any change in disposable income. The MPS is equal to the change in saving divided by the change in DI: MPS = ΔS / ΔDI.

3. Using the data in Figure 20.2, calculate the MPC and MPS at each level of disposable income. The first calculation is completed as an example. (This is not a typical consumption function. Its purpose is to provide practice in calculating MPC and MPS.)

Activity written by John Morton, National Council on Economic Education, New York, N.Y., and James Spellicy, Lowell High School, San Francisco, Calif.

Figure 20.2

Marginal Propensities to Consume and to Save

Disposable Income	Consumption	Saving	MPC	MPS
$12,000	$12,100	–$100	—	—
13,000	13,000	0	0.90	0.10
14,000	13,800	200		
15,000	14,500	500		
16,000	15,100	900		
17,000	15,600	1,400		

4. Why must the sum of MPC and MPS always equal 1?

Part C

Figure 20.3

Changes in APC and MPC as DI Increases

Disposable Income	Consumption	Savings	APC	APS	MPC	MPS
$10,000	$12,000	–$2,000			—	—
20,000	21,000	–1,000				
30,000	30,000	0				
40,000	39,000	1,000				
50,000	48,000	2,000				
60,000	57,000	3,000				
70,000	66,000					

5. Complete Figure 20.3, and answer the questions based on the completed table.

6. What is the APC at a DI level of $10,000? _____ At $20,000? _____

7. What happens to the APC as DI rises? _____

8. What is the MPC as DI goes from $50,000 to $60,000? _____ From $60,000 to $70,000? _____

9. What happens to MPC as income rises? _____ What happens to MPS as income rises? _____

10. What is the conceptual difference between APC and MPC?

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The Magic of the Multiplier

The people in Econoland live on an isolated island. One year a stranger arrived and built a factory to make seashell charms. The factory is considered an investment on Econoland. If the marginal propensity to consume on the island were 75 percent, or 0.75, this would mean that Econoland residents would consume or spend 75 percent of any change in income and save 25 percent of any change in income. The additional spending would generate additional income and eventually a multiple increase in income. This is called the *multiplier effect.* When they heard about this multiplier effect, the islanders were thrilled about the new factory because they liked the idea of additional income.

The residents of Econoland wanted to know what would eventually happen to the levels of GDP, consumption and saving on the island as the new spending worked its way through the economy. Luckily there was a retired university economist who had settled on Econoland who offered a brief statement of the multiplier. "It's simple," he said: **"One person's spending becomes another person's income."** The economist began a numerical example. "This shows the process," he said. The rounds refer to the new spending moving from resident to resident. He stopped his example at four rounds and added the rest of the rounds to cover all Econoland's citizens.

Figure 21.1
Changes in Econoland's GDP, Consumption and Saving

Round	Income (GDP)	Consumption Spending	Saving
Round 1	$1,000	0.75 of $1,000 = $750	0.25 of $1,000 = $250
Round 2	One person's spending becoming another person's income: $750	0.75 of $750 = $562.50	0.25 of $750 = $187.50
Round 3	The next person's spending becoming another person's income: $562.50	0.75 of $562.50 = $421.88	0.25 of $562.50 = $140.62
Round 4	The next person's spending becoming another person's income: $421.87	0.75 of $421.88 = $316.41	0.25 of $421.87 = $105.47
Rounds continue	. . .	. . .	. . .
All rounds	**Final outcome for income (GDP) 1 / (1 – 0.75) x $1,000 = 4 x $1,000 = $4,000**	**Final outcome for consumption spending 0.75 of $4,000 = $3,000**	**Final outcome for saving 0.25 of $4,000 = $1,000**

Activity written by Charles Bennett, Gannon University, Erie, Pa.

The retired economist then summarized the multiplier effect for the assembled crowd of Econolanders. "This shows us that the factory is an investment that has a multiplied effect on our GDP. In this case, the multiplier is 4." He added, "It appears to be magic, but it is simply that *one person's spending becomes another person's income.*" There were some nods of agreement but also many puzzled looks, so the old professor asked the citizens a series of questions. Answer these questions as if you were an Econolander.

1. Would the multiplier be larger or smaller if you saved more of your additional income? _____

2. What do you think would happen if all Econolanders saved all of the change in their incomes?

3. What would happen if you spent *all* of the change in your income?

The professor broke out into a smile as the answers all came out correct.

The economist reminded the islanders about the multiplied effect on GDP that a new road around the island would have. That new bridge built by the island government over the lagoon would also have a multiplied effect on GDP. This time there were many more nods of approval and understanding.

The economist also indicated that if the government of Econoland lowered taxes, the citizens would have more income to spend, which would cause a multiplier effect. He said there was another side to this: If the taxes were raised, there would be a multiplier effect, which would decrease income and GDP by a multiple amount.

The King of Econoland commissioned the old economist to write a simple explanation about multipliers so all the citizens of Econoland would understand. He told the old economist: "If you succeed in helping all citizens understand the multiplier in simple terms, you will be rewarded. If not, you will be banished from the island."

The economist started banging away on an old rusting typewriter since he did not want to be banished from this island paradise. The result follows:

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The Professor's Treatise on Multipliers

MULTIPLIER FORMULAS AND TERMS

Marginal propensity to consume (MPC) = change in consumption divided by change in income

Marginal propensity to save (MPS) = change in saving divided by change in income

Investment Multiplier = 1 /(1 – MPC) or simply 1 /MPS

How to use the investment multiplier: change in GDP = change in investment times investment multiplier

When to use the investment multiplier: when there is a change in investment such as a new factory or new equipment

Government Spending Multiplier = 1 /(1 – MPC) or simply 1 /MPS

How to use the government spending multiplier: change in GDP = change in government spending times government spending multiplier

When to use the government spending multiplier: when there is a change in government spending such as a new road or bridge

Tax Multiplier = – MPC /(1 – MPC) = – MPC /MPS

How to use the tax multiplier: change in GDP = change in taxes times tax multiplier

When to use the tax multiplier: when there is a change in lump-sum taxes. Remember that the tax multiplier has a negative sign.

Figure 21.2
Multiplier Table
(Derived from using the formulas above)

MPC	Investment Multiplier	Government Spending Multiplier	Tax Multiplier
0.90	10.0	10.0	–9.0
0.80	5.0	5.0	–4.0
0.75	4.0	4.0	–3.0
0.60	2.5	2.5	–1.5
0.50	2.0	2.0	–1.0

"ALWAYS" RULES (A surefire way to remember multipliers)

- The investment multiplier is *always* equal to the same value as the government spending multiplier.
- The investment and government spending multipliers are *always* positive.
- The tax multiplier is *always* negative.

The King took the treatise and had it printed for every islander. He then ordered the old professor to make up a series of questions to see if the subjects understood the multiplier.

Answer the questions on the professor's test.

The Econoland Test

1. What is the value of the tax multiplier if the MPC is 0.80? _____

2. What is the value of the government spending multiplier if the MPC is 0.67? _____

3. What is the tax multiplier if the MPS is 0.25? _____

4. How could the multiplier be used to explain wide swings in income (which could be called business cycles) in Econoland?

5. The numerical value for the investment and government spending multiplier increases as the
   (A) value of the marginal propensity to save decreases.
   (B) value of the average propensity to consume increases.
   (C) value of the marginal propensity to consume decreases.
   (D) value of the marginal propensity to save increases.
   (E) value of the average propensity to consume decreases.

6. If the government spending multiplier is 5 in Econoland, the value of the tax multiplier must be
   (A) 5
   (B) 4
   (C) 1
   (D) – 4
   (E) – 5

Econoland has the following values for income and consumption. Use this data to answer questions 7, 8 and 9.

Income	Consumption
100	150
200	225
300	300
400	375
500	450
600	525

7. The government spending multiplier in Econoland is
   (A) 3
   (B) 4
   (C) 5
   (D) 10
   (E) 30

8. If there is an increase in taxes of $200 in Econoland, the decrease in GDP will be
   (A) $100
   (B) $200
   (C) $400
   (D) $600
   (E) $800

9. If there is an increase in government spending of $100 and an increase in taxes of $100 in Econoland, then the change in GDP will be
   (A) $50
   (B) $100
   (C) $200
   (D) –$100
   (E) –$200

10. Why do the people of Econoland need to understand multipliers?