

SUMMARY

THE KEYNESIAN THEORY OF CONSUMPTION *p. 148*

1. Aggregate consumption is assumed to be a function of aggregate income.
2. The *marginal propensity to consume (MPC)* is the fraction of a change in income that is consumed, or spent. The *marginal propensity to save (MPS)* is the fraction of a change in income that is saved. Because all income must be saved or spent, $MPS + MPC \equiv 1$.

PLANNED INVESTMENT *p. 152*

3. Planned investment is assumed to be fixed. Planned investment may differ from actual investment because of unanticipated changes in inventories.

THE DETERMINATION OF EQUILIBRIUM OUTPUT (INCOME) *p. 153*

4. *Planned aggregate expenditure (AE)* equals consumption plus planned investment: $AE \equiv C + I$. *Equilibrium* in the goods market is achieved when planned aggregate expenditure equals aggregate output: $C + I = Y$. This holds if and only if planned investment and actual investment are equal.
5. Because aggregate income must be saved or spent, the equilibrium condition $Y = C + I$ can be rewritten as $C + S = C + I$, or $S = I$. Only when planned investment equals saving will

there be equilibrium. This approach to equilibrium is the *saving/ investment approach* to equilibrium.

6. When planned aggregate expenditure exceeds aggregate output (*income*), there is an unplanned fall in inventories. Firms will increase output. This increased output leads to increased income and even more consumption. This process will continue as long as output (*income*) is below planned aggregate expenditure. If firms react to unplanned inventory reductions by increasing output, an economy with planned spending greater than output will adjust to a new equilibrium, with Y higher than before.

THE MULTIPLIER *p. 157*

7. Equilibrium output changes by a multiple of the change in planned investment or any other *exogenous variable*. The *multiplier* is $1/MPS$.
8. When households increase their planned saving, income decreases and saving does not change. Saving does not increase because in equilibrium, saving must equal planned investment and planned investment is fixed. If planned investment also increased, this *paradox of thrift* could be averted and a new equilibrium could be achieved at a higher level of saving and income. This result depends on the existence of a channel through which additional household saving finances additional investment.

REVIEW TERMS AND CONCEPTS

actual investment, *p. 153*aggregate income, *p. 147*aggregate output, *p. 147*aggregate output (*income*) (Y), *p. 147*aggregate saving (S), *p. 149*consumption function, *p. 148*equilibrium, *p. 153*exogenous variable, *p. 157*identity, *p. 149*marginal propensity to consume (MPC), *p. 149*

$$1. S \equiv Y - C$$

$$2. MPC \equiv \text{slope of consumption function} = \frac{\Delta C}{\Delta Y}$$

$$3. MPC + MPS \equiv 1$$

$$4. AE \equiv C + I$$

$$5. \text{Equilibrium condition: } Y = AE \text{ or } Y = C + I$$

$$6. \text{Saving/investment approach to equilibrium: } S = I$$

$$7. \text{Multiplier} \equiv \frac{1}{MPS} = \frac{1}{1 - MPC}$$

marginal propensity to save (MPS), *p. 149*multiplier, *p. 157*planned aggregate expenditure (AE), *p. 153*planned investment (I), *p. 153*

PROBLEMS

All problems are available on www.myeconlab.com

1. Briefly define the following terms and explain the relationship between them:

MPC Multiplier
 Actual investment Planned investment
 Aggregate expenditure Real GDP
 Aggregate output Aggregate income

2. Expert econometricians in the Republic of Yuck estimate the following:

Real GNP (Y) 200 billion Yuck dollars
 Planned investment spending 75 billion Yuck dollars
 Yuck is a simple economy with no government, no taxes, and no imports or exports. Yuckers (citizens of Yuck) are creatures of

habit. They have a rule that everyone saves exactly 25 percent of income. Assume that planned investment is fixed and remains at 75 billion Yuck dollars.

You are asked by the business editor of the *Weird Herald*, the local newspaper, to predict the economic events of the next few months. By using the data given, can you make a forecast? What is likely to happen to inventories? What is likely to happen to the level of real GDP? Is the economy at an equilibrium? When will things stop changing?

3. Go to www.commerce.gov. Click on “Bureau of Economic Analysis.” Click next on “National” and then on the latest GDP release. Look through the report. Which of the components of aggregate expenditure appear to be growing or falling the fastest? What story can you tell about the current economic events from the data?
4. The following questions refer to this table:

AGGREGATE OUTPUT/INCOME	CONSUMPTION	PLANNED INVESTMENT
2,000	2,100	300
2,500	2,500	300
3,000	2,900	300
3,500	3,300	300
4,000	3,700	300
4,500	4,100	300
5,000	4,500	300
5,500	4,900	300

- a. At each level of output, calculate saving. At each level of output, calculate unplanned investment (inventory change). What is likely to happen to aggregate output if the economy produces at each of the levels indicated? What is the equilibrium level of output?
- b. Over each range of income (2,000 to 2,500, 2,500 to 3,000, and so on), calculate the marginal propensity to consume. Calculate the marginal propensity to save. What is the multiplier?
- c. By assuming there is no change in the level of the MPC and the MPS and planned investment jumps by 200 and is sustained at that higher level, recompute the table. What is the new equilibrium level of Y ? Is this consistent with what you compute using the multiplier?
5. Explain the multiplier intuitively. Why is it that an increase in planned investment of \$100 raises equilibrium output by more than \$100? Why is the effect on equilibrium output finite? How do we know that the multiplier is $1/MPS$?
6. You are given the following data concerning Freedonia, a legendary country:
 - (1) Consumption function: $C = 200 + 0.8Y$
 - (2) Investment function: $I = 100$
 - (3) $AE \equiv C + I$
 - (4) $AE = Y$
 - a. What is the marginal propensity to consume in Freedonia, and what is the marginal propensity to save?
 - b. Graph equations (3) and (4) and solve for equilibrium income.
 - c. Suppose equation (2) is changed to (2') $I = 110$. What is the new equilibrium level of income? By how much does the \$10 increase in planned investment change equilibrium income? What is the value of the multiplier?
- d. Calculate the saving function for Freedonia. Plot this saving function on a graph with equation (2). Explain why the equilibrium income in this graph must be the same as in part b.
7. This chapter argued that saving and spending behavior depended in part on wealth (accumulated savings and inheritance), but our simple model does not incorporate this effect. Consider the following model of a very simple economy:

$$C = 10 + .75Y + .04W$$

$$I = 100$$

$$W = 1,000$$

$$Y = C + I$$

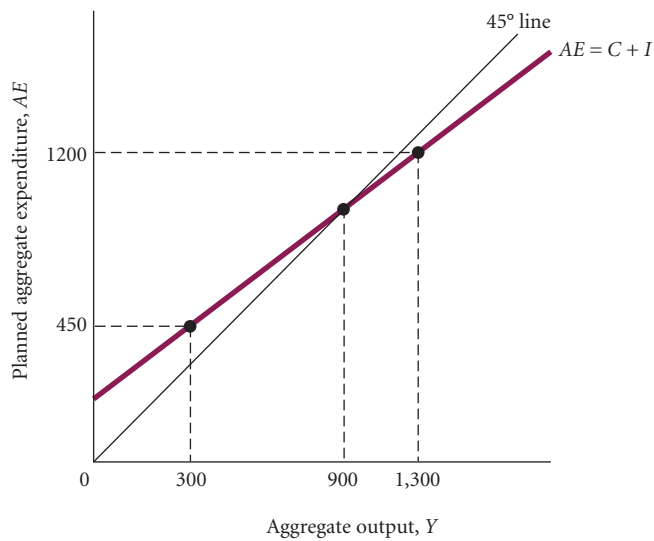
$$S = Y - C$$

If you assume that wealth (W) and investment (I) remain constant (we are ignoring the fact that saving adds to the stock of wealth), what are the equilibrium levels of GDP (Y), consumption (C), and saving (S)? Now suppose that wealth increases by 50 percent to 1,500. Recalculate the equilibrium levels of Y , C , and S . What impact does wealth accumulation have on GDP? Many were concerned with the very large increase in stock values in the late 1990s. Does this present a problem for the economy? Explain.
8. You learned earlier that expenditures and income should always be equal. In this chapter, you learned that AE and aggregate output (income) can be different. Is there an inconsistency here? Explain.
9. [Related to the *Economics in Practice* on p. 152] The *Economics in Practice* describes some of the difficulties that households have with regard to decisions involving trade-offs between the present and the future. Explain briefly how the problem of global warming and the problem of adequate household saving are similar. Describe ways in which the concept of opportunity costs can be used to frame these two problems. What barriers might prevent households or societies from achieving satisfactory outcomes?
10. [Related to the *Economics in Practice* on p. 160] If households decide to save more, saving in the aggregate may fall. Explain this in words.
11. Suppose that in the year 2010, Celestial Electronics planned to produce 950,000 units of its portable GPS devices. Of the 950,000 it planned to produce, a total of 25,000 units would be added to the inventory at its new plant in Florida. Also assume that these units have been selling at a price of \$100 each and that the price has been constant over time. Suppose further that this year the firm built a new plant for \$5 million and acquired \$2.5 million worth of equipment. It had no other investment projects, and to avoid complications, assume no depreciation.

Now suppose that at the end of the year, Celestial had produced 950,000 units but had only sold 900,000 units and that inventories now contained 50,000 units more than they had at the beginning of the year. At \$100 each, that means that the firm added \$5,000,000 in new inventory.

 - a. How much did Celestial actually invest this year?
 - b. How much did it plan to invest?
 - c. Would Celestial produce more or fewer units next year? Why?

12. Use the graph to answer the questions that follow.



- What is the value of the *MPC*?
- What is the value of the *MPS*?
- What is the value of the multiplier?
- What is the amount of unplanned investment at aggregate output of 300, 900, and 1,300?

13. According to the Bureau of Economic Analysis, during the recession of 2007–2009, household saving as a fraction of disposable personal income increased from a low of just over 1 percent in the first quarter of 2008 to 5 percent in the second quarter of 2009. All else equal, what impact would this change in saving have on the *MPC*, *MPS*, and multiplier? How would this change affect equilibrium output when planned investment changes?
14. Assume in a simple economy that the level of saving is –500 when aggregate output equals zero and that the marginal propensity to save is 0.2. Derive the saving function and the consumption function, and draw a graph showing these functions. At what level of aggregate output does the consumption curve cross the 45° line? Explain your answer and show this on the graph.

CHAPTER 8 APPENDIX

Deriving the Multiplier Algebraically

In addition to deriving the multiplier using the simple substitution we used in the chapter, we can also derive the formula for the multiplier by using simple algebra.

Recall that our consumption function is:

$$C = a + bY$$

where b is the marginal propensity to consume. In equilibrium:

$$Y = C + I$$

Now we solve these two equations for Y in terms of I . By substituting the first equation into the second, we get:

$$Y = \underbrace{a + bY}_C + I$$

This equation can be rearranged to yield:

$$\begin{aligned} Y - bY &= a + I \\ Y(1 - b) &= a + I \end{aligned}$$

We can then solve for Y in terms of I by dividing through by $(1 - b)$:

$$Y = (a + I) \left(\frac{1}{1 - b} \right)$$

Now look carefully at this expression and think about increasing I by some amount, ΔI , with a held constant. If I increases by ΔI , income will increase by

$$\Delta Y = \Delta I \times \frac{1}{1 - b}$$

Because $b \equiv MPC$, the expression becomes

$$\Delta Y = \Delta I \times \frac{1}{1 - MPC}$$

The multiplier is

$$\frac{1}{1 - MPC}$$

Finally, because $MPS + MPC \equiv 1$, MPS is equal to $1 - MPC$, making the alternative expression for the multiplier $1/MPS$, just as we saw in this chapter.