9 [24]

The Government and Fiscal Policy

Chapter objectives:

1. Identify the tools of fiscal policy.
2. Describe how the inclusion of the government sector affects the aggregate expenditure model.
3. Derive and explain the difference between the government spending multiplier and the tax multiplier. Explain how the balanced-budget multiplier result occurs.
4. Analyze the effects on output and unemployment of a change in government spending and/or a change in taxes.
5. Define the deficit (surplus) and explain how it relates to and differs from the federal debt. Describe how the federal government's expenditures and revenues move with the economy. Distinguish between and explain the effects of fiscal drag and automatic stabilizers.
6. Define the full-employment budget, the structural deficit, and the cyclical deficit.
7. Explain how the incorporation of tax rates will influence the spending multiplier.

The basic logic in this chapter is the same as in Chapter 8 (23). Even the Appendices contain little that is very new. If you're confused in this chapter, it's a sure sign that you need to go back *now* and work on Chapter 8 (23) some more.

BRAIN TEASER: In our current model, we assume that net taxes are lump-sum, that is, that they don't change as the level of economic activity changes. However, automatic stabilizers (such as the federal income tax system) do, in fact, change with the level of economic activity. How do automatic stabilizers affect the size of the expenditure multiplier and why?

OBJECTIVE 1:
Identify the tools of fiscal policy.

Fiscal policy has three basic tools: government purchases (*G*), taxation, and transfer payments. To simplify matters, our model uses *lump-sum taxes* (which are not related to income). Collectively, taxes and transfers are termed net taxes (*T*). For simplification, the text (except in Appendix 9B (24B)) assumes that net taxes are unrelated to income. (page 159 [471])

Practice

1. Each of the following might be a specific fiscal policy action EXCEPT
   (a) reducing interest rates to stimulate consumer demand.
   (b) increasing government spending on military hardware.
   (c) easing the eligibility requirements for welfare recipients.
   (d) imposing a national sales tax.

   ANSWER: (a) Interest rate changes come under the category of monetary policy. ■

OBJECTIVE 2:
Describe how the inclusion of the government sector affects the aggregate expenditure model.

When the government sector is added to the aggregate expenditure model, government spending is included in aggregate expenditure alongside consumption and investment. Consumption and saving are based on disposable (after-tax) personal income and the equilibrium condition is:

$$Y = C + I + G$$

or

$$S + T = I + G \quad \text{(page 161 [473])}$$

Increasing government spending or reducing net taxes increases aggregate expenditure and the equilibrium level of production.

Note: When taxes are "lump-sum," the marginal propensity to consume is not affected. If a tax rate is included in the model, as in Appendix B of this chapter, the *MPC* value must be modified.

Practice

2. Disposable income is total income
   (a) plus transfer payments.
   (b) plus net taxes.
   (c) minus net taxes.
   (d) minus taxes.

   ANSWER: (c) Be careful with the concept of net taxes. This term includes taxes and transfer payments. Refer to p. 160 [472].

3. When taxes are lump-sum, tax revenues _____ as income increases.
   (a) will increase
   (b) will decrease
   (c) may either increase or decrease depending on the tax rate
   (d) will not change

   ANSWER: (d) Lump-sum taxes are not related to income. Refer to p. 160 [472].

4. When taxes are lump-sum, disposable income _____ as income increases by $100.
   (a) will increase by $100
   (b) will increase, but by less than $100
   (c) may increase but by how much depends on the tax rate
   (d) will not change

   ANSWER: (a) If taxes are lump-sum, no additional taxes will be collected from the additional income. All of the additional income will be disposable income.

5. When the government sector is added to the model, the consumption function formula is
   (a) $C = a + b(Y + T)$.
   (b) $C = a + b(Y - T)$.
   (c) $C = a - b(Y + T)$.
   (d) $C = a - b(Y - T)$.

   ANSWER: (b) Refer to p. 162 [474]. $(Y - T)$ is disposable income.

6. When the government sector is added to the model, it must be true that in equilibrium
   (a) $G = T$.
   (b) $S = I$.
   (c) $S + I = G + T$.
   (d) $S + T = I + G$.

   ANSWER: (d) Saving and net taxes are drains on spending (i.e., leakages). Investment and government spending add to spending. In equilibrium, the two forces are equal. Note that "$S = I$" is no longer an equilibrium condition in this expanded model. Refer to p. 164 [476].

Use the following table to answer the next four questions. The abbreviations are those used in the textbook.

Y	***T***	***Y_d***	***C***	***S***	***I***	***G***	***AE***
1,000	200	_____	1,060	_____	340	400	1,800
2,000	200	_____	1,860	_____	340	_____	_____
3,000	200	_____	2,660	_____	_____	_____	_____
4,000	_____	_____	_____	_____	_____	_____	_____
5,000	_____	_____	_____	_____	_____	_____	_____
6,000	_____	5,800	5,060	_____	340	400	5,800

7. Complete the table.

   ANSWER: Refer to the following table.

Y	***T***	***Y_d***	***C***	***S***	***I***	***G***	***AE***
1,000	200	800	1,060	–260	340	400	1,800
2,000	200	1,800	1,860	–60	340	400	2,600
3,000	200	2,800	2,660	140	340	400	3,400
4,000	200	3,800	3,460	340	340	400	4,200
5,000	200	4,800	4,260	540	340	400	5,000
6,000	200	5,800	5,060	740	340	400	5,800

8. The marginal propensity to consume is
   (a) 0.6.
   (b) 0.75.
   (c) 0.8.
   (d) 0.85.

   ANSWER: (c) As disposable income changes by 1,000 (e.g., from 1,800 to 2,800), consumption changes by 800 (from 1,860 to 2,660).

9. Equilibrium income level is
   (a) 3,000.
   (b) 4,000.
   (c) 5,000.
   (d) 6,000.

   ANSWER: (c) This is where $AE = Y$, and where $S + T = I + G = 740$.

10. In equilibrium, the government has a
   (a) deficit of 200.
   (b) deficit of 240.
   (c) surplus of 200.
   (d) surplus of 240.

   ANSWER: (a) The government's deficit is 200 because net tax revenues (T) are 200 and government expenditure (G) is 400. ■

OBJECTIVE 3:
Derive and explain the difference between the government spending multiplier and the tax multiplier. Explain how the balanced-budget multiplier result occurs.

The *government spending multiplier* is identical to the expenditure multiplier developed in the previous chapter—if *MPC* is 0.75, a one dollar increase in government spending will cause the equilibrium income level to expand by $4. The multiplier is 4. The formula is 1/*MPS*. (page 164 [476])

The *tax multiplier* is absolutely smaller than the government spending multiplier because, with a tax cut, not all of the resulting increase in disposable income will be spent—some will leak away into saving. The tax multiplier is always negative—an *increase* in taxes will *decrease* in production. If *MPC* is 0.75, a one dollar increase in tax collections will cause the equilibrium income level to decrease by $3. The tax multiplier is –3. The formula is *–MPC/MPS*. (page 167 [479])

The value of the *balanced-budget multiplier* is *always* equal to one in our model. An equal increase in government spending and net taxes will have a dollar-for-dollar expansionary effect on equilibrium income. The formula is *MPS/MPS*. (page 168 [480])

◗◗◗ LEARNING TIP: In our model, with lump-sum taxes, the (government) spending multiplier and the tax multiplier have a simple numerical relationship. Here are a few common values.

MPC	*MPS*	Spending Multiplier	Tax Multiplier
0.50	0.50	2.0	–1.0
0.60	0.40	2.5	–1.5
0.75	0.25	4.0	–3.0
0.80	0.20	5.0	–4.0
0.90	0.10	10.0	–9.0

Given *MPC* or *MPS*, if you can work out the regular multiplier, subtract one to get the (negative) tax multiplier. If the spending multiplier is 3, then the tax multiplier is –2. Confirm these results using the tax multiplier formula.◖

Practice

Use the table you completed for Practice Question 7 to answer the next question.

11. In the table, the government spending multiplier is _____ and the tax multiplier is _____ .
    (a) 4; –3
    (b) 4; 3
    (c) 5; –4
    (d) 5; 4

    ANSWER: (c) As disposable income changes by 1,000 (e.g., from 1,700 to 2,700), saving changes by 200 (from –60 to 140). *MPS* is 0.2. The formula for the government spending multiplier is 1/*MPS*, and the formula for the tax multiplier is –*MPC/MPS*.

12. In the nation of Arbez, which has a government sector, an increase in investment spending of 100 will cause equilibrium income level to increase by 1,000. The government spending multiplier is _____ and the tax multiplier is _____ .
    (a) 5; –5
    (b) 5; –4
    (c) 10; –10
    (d) 10; –9

    ANSWER: (d) If an increase in investment can be "multiplied" tenfold, then the multiplier must be 10. If so, *MPC* is 0.9 and *MPS* is 0.1. Note that, with taxes that do not depend on income, the *MPC* formulas in Chapter 8 (23) and Chapter 9 (24) are equivalent. The formula for the government spending multiplier is 1/*MPS*, so, in this case, the multiplier is 10. The formula for the tax multiplier is –*MPC/MPS*; the tax multiplier in this case is –9 (–0.9/0.1). ■

OBJECTIVE 4:
Analyze the effects on output and unemployment of a change in government spending and/or a change in taxes.

An increase (decrease) in government spending will increase (decrease) planned aggregate expenditure, dollar for dollar. A decrease (increase) in net taxes will also increase (decrease) planned aggregate expenditure—but *not* dollar for dollar. The impacts of the two policy actions are different—the "tax multiplier" is smaller. (page 164 [476])

In a Congressional "deficit reduction" debate, Republicans called for substantial reductions in government spending programs. Democrats favored hiking taxes. The Republican option would have had the more powerful (negative) economic effect because the government spending multiplier is more powerful.

Caution: When working out the effects of policy actions, make sure the result looks sensible. It's easy to forget a negative sign or mess up the arithmetic. Have confidence in your intuition. If your results don't look right, they probably aren't!

Practice

Use the table you completed for Practice Question 7 to answer the next four questions.

13. The equilibrium income level would be 6,000 if government spending
    (a) increased by 200.
    (b) increased by 1,000.
    (c) decreased by 200.
    (d) decreased by 1,000.

    ANSWER: (a) The multiplier is 5. The increase in equilibrium income (ΔY) = 1,000 = $\Delta G \times 1/MPS$ = 200 × 5. Refer to p. 165 [477].

14. The equilibrium income level would be 4,000 if net taxes
    (a) increased by 200.
    (b) increased by 250.
    (c) decreased by 200.
    (d) decreased by 250.

    ANSWER: (b) The tax multiplier is –4. Decrease in equilibrium income (ΔY) = 1,000 = $\Delta T \times -MPC/MPS$ = 250 × –4. Refer to p. 165 [477].

15. If government purchases increased by 100 and taxes decreased by 100, equilibrium income level would
    (a) increase by 100.
    (b) increase by 900.
    (c) decrease by 100.
    (d) not change.

    ANSWER: (b) Split this question into two parts—the effect of the spending change and the effect of the tax change.

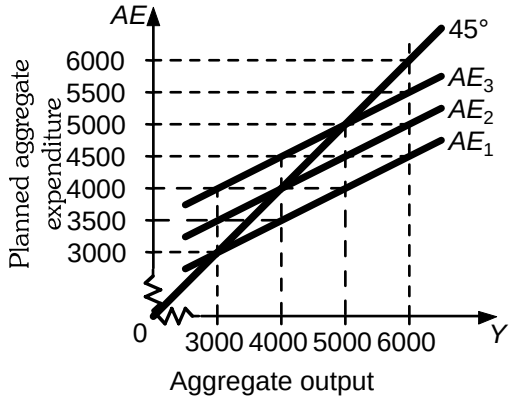
    Spending change: $\Delta Y = \Delta G \times 1/MPS = 100 \times 5 = +500$.

    Tax change: $\Delta Y = \Delta T \times (-MPC/MPS) = -100 \times -4 = +400$.

16. If government purchases decreased by 100 and taxes decreased by 100, equilibrium income level would
    (a) increase by 100.
    (b) decrease by 900.
    (c) decrease by 100.
    (d) not change.

    ANSWER: (c) This is a "balanced-budget" change (i.e., $\Delta G = \Delta T$).

Refer to the following diagram to answer the next five questions.



17. If expenditures are as shown by AE_2, the equilibrium income level is
    (a) 3,000.
    (b) 4,000.
    (c) 5,000.
    (d) 6,000.

    ANSWER: (b) AE_2 crosses the 45° line at this income level.

18. Given AE_2, if the income level is at 3,000, we know that
    (a) government spending is greater than net taxes.
    (b) government spending is less than net taxes.
    (c) unplanned inventory investment is positive.
    (d) unplanned inventory investment is negative.

    ANSWER: (d) Expenditure exceeds production; inventory level will be decreasing.

19. The government spending multiplier is _____ and the tax multiplier is _____ .
    (a) 2; –1
    (b) 2; –3
    (c) 4; –3
    (d) 4; –5

    ANSWER: (a) As income level rises by 1,000 (from 3,000 to 4,000), planned expenditure rises by 500 (from 3,500 to 4,000). *MPC* is 0.5 and *MPS* is 0.5.

20. To shift the *AE* curve from AE_2 to AE_3, we could
    (a) increase government spending by 500.
    (b) increase government spending by 1,000.
    (c) increase net taxes by 500.
    (d) increase net taxes by 1,000.

    ANSWER: (a) Increasing taxes will reduce aggregate expenditure—consumers would have less after-tax income to spend. Increasing government spending by 500 will work. Note that the vertical distance between AE_2 and AE_3 is 500.

21. Given AE_2, each of the following policies except _____ would reduce the equilibrium output level to 3,000.
    (a) decreasing government spending by 1,000 and decreasing taxes by 1,000

(b) decreasing government spending by 1,000
(c) increasing government spending by 500 and increasing taxes by 2,000
(d) increasing taxes by 1,000

ANSWER: (b) The government spending multiplier is 2. $\Delta G \times 1/MPS = -1{,}000 \times 2 = 2{,}000$. Option (a) is the balanced-budget case. Option (c) is quite complex but works as follows:
Government spending change = $\Delta G \times 1/MPS = 500 \times 2 = 1{,}000$.
Tax change = $\Delta T \times -MPC/MPS = 2{,}000 \times -1 = -2{,}000$.

22. Given AE_3, when income is 4,000,
(a) injections exceed leakages by 500.
(b) injections exceed leakages by 1,000.
(c) leakages exceed injections by 500.
(d) leakages exceed injections by 1,000.

ANSWER: (a) Demand exceeds production. ■

OBJECTIVE 5:
Define the deficit (surplus) and explain how it relates to and differs from the federal debt. Describe how the federal government's expenditures and revenues move with the economy. Distinguish between and explain the effects of fiscal drag and automatic stabilizers.

This year's *deficit* (or surplus) is the difference between government receipts this year and outlays this year, i.e., $G - T$. If receipts are less than outlays there is a deficit. The *federal debt* is the total amount owed by the federal government to the public (because of this year's deficit, if any, and those of previous years). A surplus reduces the size of the debt. (page 169 [481])

The major sources of government income are personal and corporate income taxes and social security contributions; the major types of expenditures are transfer payments, government consumption expenditures, and grants-in-aid to state and local governments. As a percentage of GDP, transfers and consumption expenditures generally declined during the years of the Clinton Administration and increased during the years of the Bush Administration. Similarly, the deficit was steadily transformed into a surplus during the Clinton Administration through increasing tax rates and declining expenditures; the trend was reversed during the Bush Administration because of cut in the average tax rate and ongoing war-related expenses.

Automatic stabilizers (revenue or expenditure items in the federal budget that adjust in magnitude as the level of economic activity changes) reduce the change in GDP as the economy moves through the business cycle. During a recession, for instance, when incomes are low, transfer payments increase and partly replace the lost income—spending doesn't fall as much as it otherwise would have. Tax liabilities decrease, too, in such a situation. Automatic stabilizers reduce the severity of fluctuations in the business cycle. (page 175 [487])

Fiscal drag occurs because, as the economy expands, incomes rise, pushing taxpayers into higher tax brackets and increasing the average tax rate. Out of each dollar, less is available to spend or save than otherwise would have been the case. The tax structure slows the rate of economic expansion. (page 175 [489])

Practice

23. During the last ten years, the Arbocali federal budget deficit expanded sharply. Which of the following is not a likely cause of this expansion?

(a) Government spending (as a percentage of GDP) rose during the last ten years.
(b) Interest payments on the Arbocali federal debt (as a percentage of GDP) rose during the last ten years.
(c) Personal income tax rates were reduced eight years ago.
(d) Transfer payments (as a percentage of GDP) fell during the last ten years.

ANSWER: (d) A reduction in transfer payments reduces the size of the deficit.

24. In general, the average tax rate _____ during the Clinton Administration and _____ during the Bush Administration.
(a) increased; increased
(b) increased; decreased
(c) decreased; increased
(d) decreased; decreased

ANSWER: (b) Refer to p. 171 [483] for details.

25. In general, as a percentage of GDP, government consumption expenditures _____ during the Clinton Administration and _____ during the Bush Administration.
(a) increased; increased
(b) increased; decreased
(c) decreased; increased
(d) decreased; decreased

ANSWER: (c) Refer to Figure 9.5 (22.5) for details.

26. Automatic stabilizers make the federal deficit _____ during recessions and _____ during expansions.
(a) larger; larger
(b) larger; smaller
(c) smaller; larger
(d) smaller; smaller

ANSWER: (b) Refer to p. 175 [487] to review the effects of automatic stabilizers. ■

OBJECTIVE 6:
Define the full-employment budget, the structural deficit, and the cyclical deficit.

Some components of the government's budget depend on the state of the economy and beyond the government's direct control. A recession will reduce tax revenues and increase transfer payments. Inflation may drive up the expense of government purchases and, if interest rates increase, the cost of servicing the debt will increase. The *full-employment budget* calculates what the deficit would be, given the structure of current spending and tax programs, if the economy were at full employment. At full employment, the effects on the deficit of cyclical changes should be zero—any remaining deficit is called the *structural deficit*. The *cyclical deficit* is that part of the actual deficit that is caused by cyclical unemployment. At full employment, the actual deficit might be $50 million—this is the structural deficit. If, however, unemployment is currently running at 8%, this indicates the presence of some cyclical unemployment. The deficit is $200 million. The cyclical deficit is $150 million ($200 million – $50 million). (page 175 [487])

ECONOMICS IN PRACTICE: On page 174 [486], the textbook describes the fiscal stimulus package passed by Congress and signed by President Bush in 2008 as a response to an economic slowdown that many

feared would precede a recession. At the beginning of the Great Depression, the Hoover Administration chose a different path, adopting a "balanced budget" policy that attempted to equalize government outlays and receipts. What impact would this policy have had on the intensity of the Great Depression?

ANSWER: At the outset of the Depression, workers lost their jobs and profits declined, leading to a decrease in government receipts. Given the "balanced budget" policy and the prevailing "classical" school of thought, the Hoover Administration decided against using active fiscal policy to stimulate the economy. In fact, even in 1932, President Hoover was requesting broader taxes and a drastic reduction in government expenditures because "nothing is more necessary at this time than balancing the budget." The consensus of modern economists is that Hoover was mistaken! The balanced-budget policy cost millions of jobs and drove the economy even deeper into the doldrums.

ECONOMICS IN PRACTICE (CONTINUED): During the 1980s, there was a strong movement to "balance the budget" and, in 1995, a balanced-budget amendment to the Constitution was approved by the House of Representatives and failed in the Senate by only one vote. Had Congress forgotten the lessons of President Hoover and the Great Depression? Or had experience taught them caution in the application of the balanced-budget doctrine? Do some research to determine how Congress has approached this issue.

ANSWER: Congress did learn from history when crafting their balanced-budget amendment. Although requiring that the budget be balanced annually, exceptions were allowed during times of war or national emergency. Also, Congress could overrule the provision by voting it down. Presumably, the threat of a severe recession would foster such a vote. Balanced-budget proposals continue to surface.

Practice

27. Arboc's deficit this year is $300 million. If Arboc were fully employed, the deficit would be $60 million. Arboc's structural deficit is
    (a) $60 million
    (b) $240 million
    (c) $300 million
    (d) $360 million

    ANSWER: (a) The structural deficit is the deficit that remains when the economy is at full employment.

28. At full employment, the federal deficit would be $20 billion. Last year, unemployment was 6.5% and the deficit was $40 billion. This year, however, unemployment is 7.8% and the deficit is $82 billion. This year, the
    (a) structural deficit is $42 billion.
    (b) structural deficit is $62 billion.
    (c) cyclical deficit is $42 billion.
    (d) cyclical deficit is $62 billion.

    ANSWER: (d) The structural deficit is $20 billion. The remainder of this year's $82 billion deficit is cyclical. Refer to p. 175 [487]. ■

OBJECTIVE 7 (APPENDIX B):
Explain how the incorporation of tax rates will influence the spending multiplier.

When a tax rate is introduced into the model, the formula for the expenditure multiplier must be adjusted—the multiplier's value is reduced (because the leakage of additional spending power is greater than before). Graphically, the consumption function and the *AE* function become flatter. As income increases, consumption still increases, but at a slower rate, because less income is available as disposable income. (page 179 [491])

Practice

29. In Arboc, the income tax rate is 20% and the *MPC* is 0.75. The government spending multiplier is
    (a) 2.5.
    (b) 3.0.
    (c) 3.75.
    (d) 4.0.

    ANSWER: (a) The multiplier's formula is $1/(1 - b + bt)$, where b is *MPC* and t is the tax rate. In this case, the value is $1/(1 - 0.75 + 0.75(0.2))$, or $1/0.4$, which gives a value of 2.5.

30. In Arboc, the income tax rate is 20% and the *MPC* is 0.75. The tax multiplier is
    (a) –1.5.
    (b) –1.875.
    (c) –3.75.
    (d) –2.75.

    ANSWER: (b) The multiplier's formula is $-b/(1 - b + bt)$, where b is *MPC* and t is the tax rate. In this case, the value is $-0.75/(1 - 0.75 + 0.75(0.2))$, or $-0.75/0.4$, which gives a value of –1.875.

31. In Arboc, the income tax rate is 20% and the *MPC* is 0.75. An equal increase of 1,000 in government spending and taxes would cause equilibrium income to
    (a) increase by 625.
    (b) increase by 1,000.
    (c) decrease by 625.
    (d) increase by 1,000.

    ANSWER: (a) The government spending multiplier is 2.5 and the tax multiplier is –1.875. The balanced-budget multiplier is 0.625 (2.5 – 1.875).

32. In Arbez, the income tax rate is 50% and the *MPC* is 0.80. To increase equilibrium income by 400, taxes should be
    (a) increased by 80.
    (b) increased by 300.
    (c) decreased by 80.
    (d) decreased by 300.

    ANSWER: (d) The tax multiplier's formula is $-b/(1 - b + bt)$, where b is *MPC* and t is the tax rate. In this case, the value is $-0.80/[1 - 0.80 + 0.80(0.50)]$, or $-0.80/0.60$, which gives a value of –1.333. To increase output, taxes should decrease. $\Delta T \times 1.333 = 400$; $\Delta T = -300$. ■

BRAIN TEASER SOLUTION: Automatic stabilizers reduce the size of the expenditure multiplier. Considering the federal income tax system will show how. As the economy begins to expand, individuals move into higher tax brackets and pay a higher proportion of their income in taxes. This chokes off some of the consumption spending that would otherwise be taking place. If the economy is sliding into a recession and income levels are falling, tax liabilities decrease at a more rapid rate than the rate of decrease in income. Therefore, the fall in income is made less severe.

PRACTICE TEST

I. MULTIPLE-CHOICE QUESTIONS

Select the option that provides the single best answer.

_____ 1. *MPS* is 0.1. If, at each income level, taxes are increased by 100 this will
(a) shift the *AE* function up by 100.
(b) shift the *AE* function down by 100.
(c) shift the *AE* function down by 90.
(d) shift the *AE* curve up by 10.

_____ 2. If *MPS* is 0.2, a decrease in government spending of 100 will
(a) increase income by 500.
(b) increase output by 500.
(c) decrease saving by 100.
(d) decrease output by 400.

_____ 3. An increase in government spending of 100 causes the level of output to rise by 250. *MPS* is
(a) 0.25.
(b) 0.4.
(c) 0.6.
(d) 2.5.

_____ 4. The President wants output to increase by 300. Also, he wants the change in the deficit caused by any policy action to be minimized, and government spending to rise by no more than 75. *MPC* is 0.75. Of the following, you would recommend
(a) increasing government spending by 75.
(b) reducing net taxes by 100.
(c) a balanced-budget increase of 300.
(d) a balanced-budget increase of 75.

_____ 5. Government spending rises by a dollar. If taxes were _____ , equilibrium production level could remain unchanged.
(a) raised by more than a dollar
(b) raised by less than a dollar
(c) cut by more than a dollar
(d) cut by less than a dollar

_____ 6. Saving rises from $150 to $190 as income rises from $600 to $800. The marginal propensity to
(a) consume is 0.8 and the government spending multiplier is 5.
(b) save is 0.4 and the government spending multiplier is 2.5.
(c) save is 0.25 and the balanced-budget multiplier is 1.0.
(d) save is 0.2 and the tax multiplier is –6.

_____ 7. Automatic stabilizers stabilize
(a) government tax receipts.
(b) the government deficit.
(c) income.
(d) investment.

_____ 8. The economy is experiencing widespread unemployment. An economist might suggest that the government

(a) decrease taxes.
(b) decrease government spending.
(c) decrease the government deficit.
(d) increase investment spending.

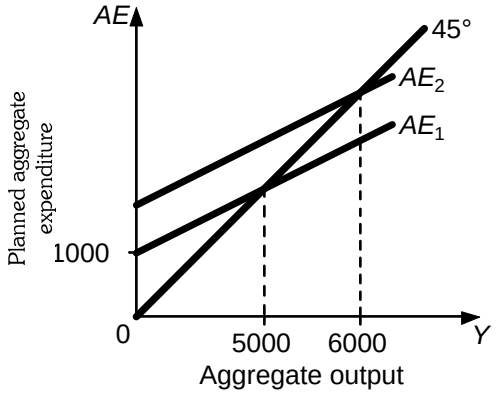
_____ 9. There is a sharp fall in investment spending. The administration could maintain the economy at its current output level by using any of the following measures except _____ government spending and _____ taxes.
(a) raising; lowering
(b) lowering; raising
(c) raising; raising
(d) lowering; lowering
(Be careful with this one! There is only one correct answer.)

_____ 10. *MPC* = 0.8. The Administration wants to raise output by $100 million. It could achieve that goal by doing any of the following EXCEPT
(a) simultaneously raising government spending by $40 million and cutting taxes by $50 million.
(b) cutting taxes by $25 million.
(c) simultaneously raising government spending by $100 million and raising taxes by $100 million.
(d) raising government spending by $20 million.

_____ 11. All of the following are true EXCEPT
(a) during a recession, there is a cyclical deficit.
(b) during a recession, there will be a structural deficit.
(c) at full employment, there may be a structural deficit.
(d) at full employment, there is no cyclical deficit.

_____ 12. A Federal budget deficit occurs when
(a) Federal tax receipts exceed Federal government expenditures.
(b) total Federal tax receipts exceed total government debt.
(c) Federal transfer payments exceed Federal government expenditures.
(d) Federal government expenditures exceed net Federal tax collections.

Use the following diagram for the next five questions. The economy is in initial equilibrium at an output level of 5,000. Government purchases are fixed at 500 and investment is fixed at 300. Net taxes are constant at 200.



_____ 13. Calculate the marginal propensity to consume.
(a) 0.60
(b) 0.75
(c) 0.80
(d) 0.85

_____ 14. Derive the formula for the saving function.
(a) $S = -360 + 0.20(Y - T)$
(b) $S = -360 - 0.20(Y - T)$
(c) $S = -200 + 0.20(Y - T)$
(d) $S = -200 - 0.20(Y - T)$

_____ 15. Calculate the tax multiplier.
(a) 4
(b) 5
(c) –4
(d) –5

_____ 16. The government wishes to shift the AE_1 function to AE_2 by changing the level of taxes. Taxes should
(a) increase by 200.
(b) increase by 250.
(c) decrease by 200.
(d) decrease by 250.

_____ 17. Given the tax change in the previous question, calculate how much consumption and saving, respectively, will change to attain the new equilibrium.
(a) Consumption increases by 800, saving increases by 200.
(b) Consumption increases by 1,000, saving increases by 250.
(c) Consumption increases by 1,000, saving increases by zero.
(d) Consumption increases by 1,200, saving decreases by 200.

_____ 18. A tax decrease of $15 billion results in a $60 billion increase in equilibrium income. The government spending multiplier is
(a) –5.
(b) –4.
(c) 4.
(d) 5.

_____ 19. When the government sector is added to the model, the economy can be in equilibrium only when
(a) the government balances its budget.
(b) saving equals investment.
(c) unplanned inventory change is zero.
(d) disposable income is equal to consumption plus saving.

_____ 20. Automatic stabilizers _____ income taxes and _____ government spending during a recession.
(a) increase; increase
(b) increase; decrease
(c) decrease; increase
(d) decrease; decrease

II. APPLICATION QUESTIONS

1. (a) Use the following information to fill in the gaps in the table. *MPC* is constant, and investment and government spending are determined autonomously. Net taxes are constant at a level of 200.

Real GDP Income	Consump-tion	Planned Invest-ment	Govern-ment Spending	Net Taxes	Aggregate Planned Expenditures
0					
1,000	1,200		500		
2,000	2,000				
3,000		300			3,600
4,000	3,600			200	
5,000	4,400				
6,000					
7,000		300			

(b) Calculate *MPC* and *MPS*.
(c) Determine the equilibrium income level for this economy.
(d) If real GDP is 3,000, is unplanned inventory investment positive or negative? Predict how businesses will respond.
(e) If real GDP is 7,000, is unplanned inventory investment positive or negative?
(f) At which output level is saving zero?
(g) At which output level is saving equal to investment?
(h) At which output level is saving equal to nonconsumption spending?
(i) Given your preceding answers, formulate a rule regarding the level of saving at the equilibrium output level.

(j) If government spending falls by 200, would the equilibrium output level fall by more than 200, by less than 200, or by exactly 200? Use the table to confirm your answer. Describe the pressure that would cause the equilibrium output level to change.

2. You have been called in by the Arbocali Minister of Finance. The full-employment level of output is 124,000 opeks. She tells you that an econometrician has provided the following model of the Arbocali economy. The currency is opeks.

Consumption function: $C = 6{,}000 + 0.75Y_d$

Investment function: $I = 11{,}000$

Government spending: $G = 20{,}000$

Net taxes: $T = 16{,}000$

Disposable income: $Y_d = Y - T$

Equilibrium: $Y = C + I + G$

(a) Calculate the current equilibrium income level.
(b) Determine the value of the government spending multiplier and the tax multiplier.

The Minister, who is extremely concerned about the level of the national debt, is considering two proposals.

Proposal I: Maintain the current level of government spending and increase taxes until the budget is balanced.
Proposal II: Maintain taxes at their present level and decrease federal spending until the budget is balanced.

(c) Both policies will be contractionary. Which proposal will have the smaller impact on output and employment?
(d) Write a brief to the Minister so that she can answer questions about the relative effects of the two proposals during Ministers' Question Time in Parliament.

Due to rising protests about the level of unemployment, the Minister scraps both of the proposals above and turns her attention to expansionary policies.

(e) She is presented with several possible courses of action, listed below, and asks you to evaluate them. In each case, does the proposal restore full employment?

Proposal III: Increase government spending on defense by 8,000 opeks.
Proposal IV: Increase welfare payments by 8,000 opeks.
Proposal V: Increase taxes by a lump-sum of 4,000 opeks and increase spending on defense by 9,000 opeks.
Proposal VI: Increase welfare payments by 6,000 opeks and reduce taxes by a lump-sum of 2,000 opeks.

(f) Of the proposals that achieve the goal of establishing output at the full-employment level, which is preferred in terms of helping to balance the budget?
(g) Of the proposals that achieve the goal of establishing output at the full-employment level, which is preferred in terms of boosting consumption?

3. Use the following information to calculate the multipliers. Assume that taxes are lump-sum.
(a) *MPS* = 0.20. The government spending multiplier is _____ .
(b) *MPC* = 0.95. The government spending multiplier is _____ .

(c) *MPS* = 0.40. The government spending multiplier is _____ .
(d) *MPC* = 0.90. The tax multiplier is _____ .
(e) *MPS* = 0.20. The tax multiplier is _____ .
(f) If the government spending multiplier is 8, then the tax multiplier is _____ .
(g) If the tax multiplier is –5, then the government spending multiplier is _____ .
(h) *MPS* = 0.20. The government spending multiplier is _____ and the tax multiplier is _____

Using the information from (h) we know that a simultaneous decrease in *G* and *T* of $200 each would cause the following total changes in:

(i) *Y* _____
(j) *C* _____
(k) *S* _____
(l) *G* _____
(m) *T* _____

4. Use the information in the table to answer the following questions.

Output (Income)	Saving	Planned Investment	Government Spending	Net Taxes	Consumption
1,300	150	200	100	50	
1,500	200	200	100	50	
1,700	250	200	100	50	
1,900	300	200	100	50	

(a) Fill in the "consumption" column.
(b) Calculate *MPC* _____ and equilibrium level of income _____ .
(c) Calculate the level of unplanned inventory investment when *Y* is 1,300.
(d) Will the equilibrium level of output (income) increase or decrease if the government were required to balance its budget?
(e) What action could the government have taken to achieve the full employment level of production (2,000)?
(f) Calculate the new equilibrium level of output (income) if *G* increases by 50 and *T* increases by 50.

5. At the equilibrium output (income) level of 720, the following values occur.

$C = 300$ $\quad MPC = 0.75$
$I = 120$
$G = 300$
$T = 250$

(a) Calculate the equilibrium value of saving. _____
(b) Calculate the marginal propensity to save. _____
(c) Calculate the value of the expenditure multiplier. _____

(d) The government surplus/deficit now has a value of _____ .
Pessimism occurs in the business community. Planned investment falls by 15. How much of an effect does this have on equilibrium GDP?

(e) GDP will _____ (rise/fall) by _____ .
(f) At the original GDP level, unplanned inventories are now _____ (rising/falling). The Administration attempts to restore the original production level by changing the tax level.
(g) Taxes should be _____ (raised/lowered) by _____ .
(h) When the economy reaches its final equilibrium, the surplus/deficit is _____ .
(i) The final value for consumption is _____ .

6. (a) Fill in the blanks in the table.

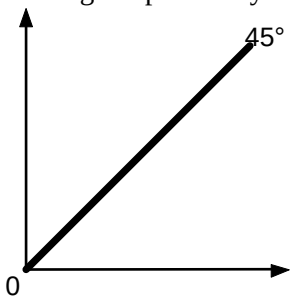
Y	*T*	Y_d	*C*	*S*	*I*	*G*	*AE*
0	20						
100	20				30	10	
200	20					10	
300	20			0		10	
400	20			20	30		

(b) Find *MPC* _____ , *MPS* _____ , the government spending multiplier _____ , and the tax multiplier _____ .
(c) Express the consumption function algebraically. _____
(d) What is the equilibrium income level? _____

7. Assume the following data for the economy, which is in equilibrium at an output level of 480. This example uses the information in the textbook's Appendix B.

$C = 280$ $\quad b = MPC = 5/7$
$S = 80$ $\quad MPS = 2/7$
$G = 150$ $\quad I = 50$
$T = 120$ $\quad t = 0.3$

(a) Calculate the value of the government spending multiplier. _____ Currently the economy is in a recession. You, as Chairperson of the Council of Economic Advisors, have been asked by how much government spending must be raised to increase equilibrium *Y* to 550.
(b) Calculate the change in output necessary to achieve equilibrium at 550.
(c) Use the multiplier to deduce the change in *G* needed to bring about the above change in equilibrium income.
(d) Draw a 45° line picture representing the problem you've just solved.



Now government spending has risen, as have taxes. The new level of government spending is the old level plus the policy recommendation you've calculated. The change in taxes can be derived using the tax rate.

(e) What was the surplus/deficit originally? _____

(f) How much have tax collections changed? _____

(g) The new surplus/deficit is _____ .

8. The economy has full employment and a balanced budget. Suddenly, because of a drop in planned investment, there is a recession.

(a) What will happen to the surplus/deficit? Explain why.

(b) Has the structural deficit changed, or has the cyclical deficit changed?

(c) Suppose the government responds by increasing government spending and taxes by an equal amount. What will happen to the structural deficit and to the full-employment budget?

(d) If the government is committed to balancing the budget, what will be the consequences of maintaining a balanced budget if automatic stabilizers are present in the economy?

PRACTICE TEST SOLUTIONS

I. Solutions to Multiple Choice Questions

1. (c) An increase in lump-sum taxes will decrease consumption and, therefore, shift the *AE* function downward. If taxes rise by 100, disposable income will fall by 100. If *MPC* is 0.9, consumption (and *AE*) will decrease by 90.

2. (c) If *MPS* is 0.2, the government spending multiplier is 5. Income will decrease by 500 (100 × 5). If income decreases by 500 and *MPS* is 0.2, saving will decrease by 100.

3. (b) For an increase in government spending to make output rise by 250, the multiplier must be 2.5. If *MPS* is 0.4, the government spending multiplier is 2.5.

4. (a) If *MPC* is 0.75, the government spending multiplier is 4 and the tax multiplier is –3. If government spending increases by 75, output would increase by 300. The deficit would rise by 75. Reducing taxes by 100 would achieve the required expansion in output, but the increase in the deficit is 100 (greater than with option (a)). Option (c) cannot be considered because the maximum increase in government spending allowable is 75. Option (d) will not work because output would expand by only 75.

5. (a) Expenditure rises by a dollar. To neutralize this change, taxes would have to be increased. If taxes are raised by a dollar, consumption would fall, but by less than a dollar. To neutralize the increase in expenditures, taxes will have to increase by more than a dollar.

6. (a) If saving increases by 40 as income increases by 200, *MPS* is 0.2. *MPC*, therefore, is 0.8. When *MPS* is 0.2, the government spending multiplier (1/*MP*S) is 5.

7. (c) Refer to p. 175 [487] for a discussion of automatic stabilizers.

8. (a) If expenditure increases, equilibrium output will increase. The government can increase government spending and/or cut taxes. Either action will increase the deficit. Investment decisions are made by the private sector.

9. (b) To neutralize the effect on *AE* of the investment decrease, the government wants an action that will make *AE* increase. Cutting government spending and increasing taxes will certainly not achieve this result. Note that Options (c) and (d) may make *AE* increase—it depends on the relative changes in *G* and *T*. Refer to the answer to Question 5 above.

10. (a) When *MPC* is 0.8, the government spending multiplier is 5 and the tax multiplier is –4. If government spending increases by 20, output will increase by 100 (20 × 5). If taxes are cut by 25, output will increase by 100 (–25 × 4). Similarly, the balanced-budget change will achieve the objective. Option (a) won't. The government spending increase will raise output by 200 (40 × 5), whereas the tax cut will raise output by a further 200 (–50 × 4).

11. (b) The presence or absence of a structural deficit depends on government policy.

12. (d) Refer to p. 169 [481] for a discussion of the federal deficit.

13. (c) As income rises by 5,000 (from zero to 5,000), spending rises by 4,000 (from 1,000 to 5,000).

14. (a) First, find the consumption function, which is in the form $C = a + bY_d$. From Question 13, $b = 0.80$. To find (autonomous) consumption, find consumption when $Y = 0$. Aggregate expenditures ($C + I + G$) are 1,000 when $Y = 0$, so $C = 200$ (1,000 – 300 – 500). $200 = a + 0.8(Y – 200)$, so $a = 360$. $C = 360 + 0.8\ Y_d$. $Y_d = C + S$, therefore $S = Y_d – C = Y_d – (360 – 0.8\ Y_d)$. The saving function is $S = –360 + 0.2\ Y_d$.

15. (c) If *MPC* = 0.80, the tax multiplier is –4.

16. (d) If *MPC* = 0.80, the tax multiplier is –4. The desired change in income is +1,000.

17. (b) The tax cut will hike consumption autonomously by 250 × 0.80, or 200. The tax multiplier is –4, so income will increase by 1,000. After income has risen by 1,000, consumption will increase by an additional 800 because *MPC* = 0.80. The tax cut will hike saving autonomously by 250 × 0.20, or 50. After income has risen by 1,000, saving will increase by an additional 200 because *MPS* = 0.20.

18. (d) If a tax decrease of $15 billion results in a $60 billion increase in equilibrium income, the tax multiplier is –4. The tax multiplier formula is *–MPC/MPS*. *MPC* = 0.80 and *MPS* = 0.20. The government multiplier formula is 1/*MPS*, so the value in this case is 5.

19. (c) Option (d) is not an equilibrium condition—this identity holds whether or not equilibrium is established. Option (b) was an equilibrium condition in the previous chapter, but is no longer. In equilibrium, leakages ($S + T$) must equal injections ($I + G$).

20. (c) Refer to p. 175 [487] for a discussion of automatic stabilizers.

II. Solutions to Application Questions

1. (a) Refer to the following table.

Real GDP Income	Consumption	Planned Investment	Government Spending	Net Taxes	Aggregate Planned Expenditures
0	400	300	500	200	1,200
1,000	1,200	300	500	200	2,000
2,000	2,000	300	500	200	2,800
3,000	2,800	300	500	200	3,600
4,000	3,600	300	500	200	4,400
5,000	4,400	300	500	200	5,200
6,000	5,200	300	500	200	6,000
7,000	6,000	300	500	200	6,800

(b) *MPC* = 0.8 and *MPS* = 0.2

(c) Aggregate planned expenditures equal real *GDP* at 6,000

(d) When real *GDP* = 3,000, aggregate planned expenditures exceed 3,000 (3,800), causing unplanned inventory decumulation. Businesses will respond by hiring more resources and increasing output.

(e) When real *GDP* = 7,000, aggregate planned expenditures are less than 7,000 (6,800), causing unplanned inventory accumulation.

(f) Saving is zero when income is 3,000. $C + S + T = 2{,}800 + 0 + 200 = 3{,}000$.

(g) Saving equals investment (which is constant at 300) when income is 4,500.

(h) Saving equals planned nonconsumption spending ($I + G$, which is constant at 800) when income equals 7,000.

(i) When saving (plus taxes) equals planned nonconsumption spending, output will be at its equilibrium level. Leakages must equal injections in equilibrium.

(j) Equilibrium output would fall by 1,000 to 5,000. At an income level of 5,000, $C + I + G$ equals 4,400 plus 600. The decrease in expenditures will result in unplanned inventory accumulation. Firms will cut production, forcing the equilibrium output level to fall.

2. (a) $Y = C + I + G = 6{,}000 + 0.75(Y - T) + 11{,}000 + 20{,}000 = 37{,}000 + 0.75Y - 0.75T$. But $T = 16{,}000$, therefore, $Y - 0.75Y = 37{,}000 - 0.75(16{,}000)$, therefore, $Y = 100{,}000$.

(b) *MPC* = 0.75, therefore the government spending multiplier is 4.0 and the tax multiplier is –3.0.

(c) Proposal I is less contractionary.

(d) Proposal I: The deficit is currently 16,000 – 20,000, or 4,000 opeks. A 4,000-opek increase in taxes will initially reduce consumption by 3,000 opeks. Spending will fall by 3,000 opeks.

Proposal II: A 4,000-opek decrease in government spending will reduce aggregate expenditures by 4,000 opeks—a larger initial spending reduction than in Proposal I.

Note: The economy will not contract by only 3,000 opeks. With Proposal I, the economy will contract by 3,000 × 4, or 12,000 opeks. With Proposal II, the economy will contract by 4,000 × 4, or 16,000 opeks.

(e) Proposal III is overkill! The multiplier is 4, therefore an autonomous increase in government spending of 8,000 will push the economy past the full-employment output level.

Proposal IV will work. The tax multiplier is –3 and an increase in welfare payments operates in the same way as a reduction in taxes.

Proposal V will work. $\Delta T(4{,}000) \times -3 = -12{,}000$. $\Delta G(9{,}000) \times 4 = 36{,}000$. The net change in income is +24,000, which is the amount required.

Proposal VI will work. Welfare is a form of negative tax. $\Delta T(-2{,}000) \times -3 = 6{,}000$. $\Delta\text{welfare}(-6{,}000) \times -3 = 18{,}000$. The total change in income is +24,000, which is the amount required.

(f) $G - T$ = a deficit of 4,000.

Proposal IV will reduce net taxes by 8,000 and widen the deficit to 12,000.

Proposal V will increase net taxes by 4,000 but increase government spending by 9,000. The deficit will increase by 5,000 opeks.

Proposal VI will reduce net taxes by 6,000 + 2,000, or 8,000 opeks. The deficit will increase by 8,000 opeks.

Proposal IV and VI are equivalent, but Proposal V is better than either.

(g) Proposal IV will reduce net taxes by 8,000 and increase consumption autonomously by 6,000 opeks. As income increases by 24,000, consumption will be induced to increase by an additional 18,000. Total increase in consumption is 24,000 opeks.

Proposal V will increase net taxes by 4,000 and reduce consumption autonomously by 3,000. As income increases by 24,000, consumption will be induced to increase by an additional 18,000. Total increase in consumption is 15,000 opeks.

Proposal VI will increase welfare payments by 6,000 opeks and increase consumption autonomously by 4,500 opeks. The reduction taxes by a lump-sum will increase consumption autonomously by 1,500 opeks. As income increases by 24,000, consumption will be induced to increase by an additional 18,000. Total increase in consumption is 24,000 opeks.

Proposal IV and VI have identical effects on consumption.

3. (a) 5. (b) 20. (c) 2.5. (d) –9.
(e) –4. (f) –7. (g) 6. (h) 5; –4.
(i) –200. (j) –160. (k) –40. (l) –200.
(m) –200.

4. (a) Refer to the following table.

Output (Income)	Saving	Planned Investment	Government Spending	Net Taxes	Consumption
1,300	150	200	100	50	1,100
1,500	200	200	100	50	1,250
1,700	250	200	100	50	1,400
1,900	300	200	100	50	1,550

(b) *MPS* is 0.25, so *MPC* is 0.75; $Y = C + I + G$ at an income level of 1,700.

(c) $AE = C + I + G$ = 1,400. If output is only 1,300, inventory is falling by 100.

(d) You can't give a precise numerical answer—it depends on the level at which *G* and *T* are equalized—although, in any case, output will decrease because either taxes must increase or government spending must decrease.

Suppose the budget is balanced at 50. *G* must fall by 50, and output will fall by 200.

If *G* and *T* are made equal at 100, taxes would have to rise by 50. Output would fall by 150.

(e) Increase government spending by 75 (with a multiplier of 4), decrease net taxes by 100 (with a tax multiplier of –3), or undertake a balanced-budget increase of 300.

(f) This is a balanced-budget change and the balanced-budget multiplier is 1. Income level will increase by 50 to 1,750.

5. (a) In equilibrium, $S + T = I + G$.
Substituting in numerical values, we get $S + 250 = 120 + 300$.
$S = 420 – 250 = 170$.

(b) $MPS = 1 – MPC = 1 – 0.75 = 0.25$.

(c) Multiplier = $1/MPS = 1/0.25 = 4$.

(d) $G – T = 300 – 250$ = deficit of 50.

(e) Spending change: $\Delta Y = \Delta I \times 1/MPS = –15 \times 4 = –60$.

(f) Unplanned inventories are rising. Expenditure has fallen, so unsold stock is accumulating.

(g) lowered by 20. We want income to rise by 60.
Tax change: $\Delta Y = 60 = \Delta T \times –MPC/MPS = –20 \times –3$.

(h) $G – T = 300 –230$ = deficit of 70. Taxes were 250, then they were cut by 20.

(i) The equilibrium income level is unchanged, but disposable income has risen by 20 because of the tax cut. As *MPC* is 0.75, consumption will increase by 15 (20×0.75) to 315.

6. (a) Refer to the following table.
Saving rises by 20 as income rises by 100. *MPS* = 0.2, *MPC* = 0.8. This is enough information to complete the saving and consumption columns. Investment is constant at 30, and government spending is constant at 10. Disposable income is $Y – T$.

Y	T	Y_d	C	S	I	G	AE
0	20	–20	40	–60	30	10	80
100	20	80	120	–40	30	10	160
200	20	180	200	–20	30	10	240
300	20	280	280	0	30	10	320
400	20	380	360	20	30	10	400

(b) *MPC* = 0.8; *MPS* = 0.2 (refer to Answer (a) above); the government spending multiplier is $1/MPS = 5$; the tax multiplier is $–MPC/MPS = –4$.

(c) $C = 40 + 0.8(Y – T)$.

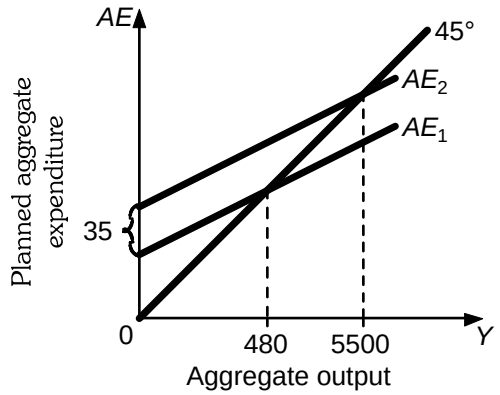
(d) Equilibrium occurs at 400, where $S + T = I + G$.

7. (a) The government spending multiplier is $1/(1 – b + bt)$, where $b = MPC = 5/7$ and $t = 0.3$. The multiplier value is 2.

(b) Given that the economy is in equilibrium at 480, the President wishes output to increase by 70 (550 – 480).

(c) Spending change: $\Delta Y = 70 = \Delta G \times 1/MPS = 35 \times 2.0$. G must increase by 35.

(d) Refer to the following diagram.



(e) Originally, $(G - T) = 150 - 120$ = a deficit of 30.

(f) Income has risen by 70. The tax rate is 0.3. Increase in tax collections = $0.3 \times 70 = 21$.

(g) Now, $(G - T) = (150 + 35) - (120 + 21) = 185 - 141$ = a deficit of 44.

8. (a) A decrease in investment or consumption will reduce aggregate expenditure and output. As output falls, transfer payments will increase and tax revenues will decrease, opening up a deficit without any explicit government action.

(b) This change has occurred because of the recession—it is a cyclical deficit.

(c) A balanced-budget increase will increase the government's role but leave the size of the structural deficit unchanged. (Note: In the presence of tax rates and other automatic stabilizers, the structural deficit will, in fact, decrease.)

(d) If the government wishes to balance the budget, taxes will have to increase (decrease) more (less) than government spending. Increasing taxes, for example, will depress the economy still further. In this case, there is an incompatibility between balancing the budget and fighting the recession.