Module 21: Fiscal Policy and the Multiplier

What you will learn in this Module:

- Why fiscal policy has a multiplier effect
- How the multiplier effect is influenced by automatic stabilizers
An expansionary fiscal policy, like the American Recovery and Reinvestment Act, pushes the aggregate demand curve to the right. A contractionary fiscal policy, like Lyndon Johnson’s tax surcharge, pushes the aggregate demand curve to the left. For policy makers, however, knowing the direction of the shift isn’t enough: they need estimates of how much the aggregate demand curve is shifted by a given policy. To get these estimates, they use the concept of the multiplier.
Multiplier Effects of an Increase in Government Purchases of Goods and Services

Suppose that a government decides to spend $50 billion building bridges and roads. The government’s purchases of goods and services will directly increase total spending on final goods and services by $50 billion. But there will also be an indirect effect because the government’s purchases will start a chain reaction throughout the economy. The firms producing the goods and services purchased by the government will earn revenues that flow to households in the form of wages, profit, interest, and rent. This increase in disposable income will lead to a rise in consumer spending. The rise in consumer spending, in turn, will induce firms to increase output, leading to a further rise in disposable income, which will lead to another round of consumer spending increases, and so on.

In Module 16 we learned about the concept of the multiplier: the ratio of the change in real GDP caused by an autonomous change in aggregate spending to the size of that autonomous change. An increase in government purchases of goods and services is an example of an autonomous increase in aggregate spending. Any change in government purchases of goods and services will lead to an even greater change in real GDP. This chain reaction will cause the initial change in government purchases to multiply through the economy, resulting in an even larger final change in real GDP. The initial change in spending, multiplied by the multiplier gives us the final change in real GDP.

Let’s consider a simple case in which there are no taxes or international trade. In this case, any change in GDP accrues entirely to households. Assume that the aggregate price level is fixed, so that any increase in nominal GDP is also a rise in real GDP, and that the interest rate is fixed. In that case, the multiplier is $1/(1 - \text{MPC}).$ Recall that $\text{MPC}$ is the marginal propensity to consume, the fraction of an additional dollar in disposable income that is spent. For example, if the marginal propensity to consume is 0.5, the multiplier is $1/(1 - 0.5) = 1/0.5 = 2.$ Given a multiplier of 2, a $50 billion increase in government purchases of goods and services would increase real GDP by $100 billion. Of that $100 billion, $50 billion is the initial effect from the increase in $G,$ and the remaining $50 billion is the subsequent effect of more production leading to more income which leads to more consumer spending, which leads to more production, and so on.

What happens if government purchases of goods and services are instead reduced? The math is exactly the same, except that there’s a minus sign in front: if government purchases of goods and services fall by $50 billion and the marginal propensity to consume is 0.5, real GDP falls by $100 billion. This is the result of less production leading to less income, which leads to less consumption, which leads to less production, and so on.
Multiplier Effects of Changes in Government Transfers and Taxes

Expansionary or contractionary fiscal policy need not take the form of changes in government purchases of goods and services. Governments can also change transfer payments or taxes. In general, however, a change in government transfers or taxes shifts the aggregate demand curve by less than an equal-sized change in government purchases, resulting in a smaller effect on real GDP.

To see why, imagine that instead of spending $50 billion on building bridges, the government simply hands out $50 billion in the form of government transfers. In this case, there is no direct effect on aggregate demand as there was with government purchases of goods and services. Real GDP and income grow only because households spend some of that $50 billion—and they probably won’t spend it all. In fact, they will spend additional income according to the MPC. If the MPC is 0.5, households will spend only 50 cents of every additional dollar they receive in transfers.

Table 21.1 shows a hypothetical comparison of two expansionary fiscal policies assuming an MPC equal to 0.5 and a multiplier equal to 2: one in which the government directly purchases $50 billion in goods and services and one in which the government makes transfer payments instead, sending out $50 billion in checks to consumers. In each case, there is a first-round effect on real GDP, either from purchases by the government or from purchases by the consumers who received the checks, followed by a series of additional rounds as rising real GDP raises income (all of which is disposable under our assumption of no taxes), which raises consumption.

| Table 21.1 | Hypothetical Effects of a Fiscal Policy with a Multiplier of 2 |
| --- | --- | --- |
| Effect on real GDP | $50 billion rise in government purchases of goods and services | $50 billion rise in government transfer payments |
| First round | $50 billion | $25 billion |
| Second round | $25 billion | $12.5 billion |
| Third round | $12.5 billion | $6.25 billion |
| Eventual effect | $100 billion | $50 billion |

However, the first-round effect of the transfer program is smaller; because we have assumed that the MPC is 0.5, only $25 billion of the $50 billion is spent, with the other $25 billion saved. And as a result, all the further rounds are smaller, too. In the end, the transfer payment increases real GDP by only $50 billion. In comparison, a $50 billion increase in government purchases produces a $100 billion increase in real GDP.

Overall, when expansionary fiscal policy takes the form of a rise in transfer payments, real GDP may rise by either more or less than the initial government outlay—that is, the multiplier may be either more or less than 1. In Table 21.1, a $50 billion rise in transfer payments increases real GDP by $50 billion, so that the multiplier is exactly 1. If a smaller share of the initial transfer had been spent, the multiplier on that transfer would have been less than 1. If a larger share of the initial transfer had been spent, the
A tax cut has an effect similar to the effect of a transfer. It increases disposable income, leading to a series of increases in consumer spending. But the overall effect is smaller than that of an equal-sized increase in government purchases of goods and services: the autonomous increase in aggregate spending is smaller because households save part of the amount of the tax cut. They save a fraction of the tax cut equal to their $MPS$ (or $1 - MPC$).

We should also note that taxes introduce a further complication: they typically change the size of the multiplier. That’s because in the real world governments rarely impose lump-sum taxes, in which the amount of tax a household owes is independent of its income. Instead, the great majority of tax revenue is raised via taxes that depend positively on the level of real GDP. As we’ll discuss shortly, taxes that depend positively on real GDP reduce the size of the multiplier.

In practice, economists often argue that it also matters who among the population gets tax cuts or increases in government transfers. For example, compare the effects of an increase in unemployment benefits with a cut in taxes on profits distributed to shareholders as dividends. Consumer surveys suggest that the average unemployed worker will spend a higher share of any increase in his or her disposable income than would the average recipient of dividend income. That is, people who are unemployed tend to have a higher $MPC$ than people who own a lot of stocks because the latter tend to be wealthier and tend to save more of any increase in disposable income. If that’s true, a dollar spent on unemployment benefits increases aggregate demand more than a dollar’s worth of dividend tax cuts. Such arguments played an important role in the final provisions of the 2008 stimulus package.
Government taxes capture some part of the increase in real GDP that occurs in each round of the multiplier process, since most government taxes depend positively on real GDP. As a result, disposable income increases by considerably less than $1 once we include taxes in the model.

The increase in government tax revenue when real GDP rises isn't the result of a deliberate decision or action by the government. It's a consequence of the way the tax laws are written, which causes most sources of government revenue to increase automatically when real GDP goes up. For example, income tax receipts increase when real GDP rises because the amount each individual owes in taxes depends positively on his or her income, and households’ taxable income rises when real GDP rises. Sales tax receipts increase when real GDP rises because people with more income spend more on goods and services. And corporate profit tax receipts increase when real GDP rises because profits increase when the economy expands.

The effect of these automatic increases in tax revenue is to reduce the size of the multiplier. Remember, the multiplier is the result of a chain reaction in which higher real GDP leads to higher disposable income, which leads to higher consumer spending, which leads to further increases in real GDP. The fact that the government siphons off some of any increase in real GDP means that at each stage of this process, the increase in consumer spending is smaller than it would be if taxes weren't part of the picture. The result is to reduce the multiplier.

Many macroeconomists believe it’s a good thing that in real life taxes reduce the multiplier. Most, though not all, recessions are the result of negative demand shocks. The same mechanism that causes tax revenue to increase when the economy expands causes it to decrease when the economy contracts. Since tax receipts decrease when real GDP falls, the effects of these negative demand shocks are smaller than they would be if there were no taxes. The decrease in tax revenue reduces the adverse effect of the initial fall in aggregate demand. The automatic decrease in government tax revenue generated by a fall in real GDP—caused by a decrease in the amount of taxes households pay—acts like an automatic expansionary fiscal policy implemented in the face of a recession. Similarly, when the economy expands, the government finds itself automatically pursuing a contractionary fiscal policy—a tax increase. Government spending and taxation rules that cause fiscal policy to be automatically expansionary when the economy contracts and automatically contractionary when the economy expands, without requiring any deliberate action by policy makers, are called automatic stabilizers.

The rules that govern tax collection aren't the only automatic stabilizers, although they are the most important ones. Some types of government transfers also play a stabilizing role. For example, more people receive unemployment insurance when the economy is depressed than when it is booming. The same is true of Medicaid and food stamps. So transfer payments tend to rise when the economy is contracting and fall when the economy is expanding. Like changes in tax revenue, these automatic changes in transfers tend to reduce the size of the multiplier because the total change in disposable income that results from a given rise or fall in real GDP is smaller.

As in the case of government tax revenue, many
A historical example of discretionary fiscal policy was the Works Progress Administration (WPA), a relief measure established during the Great Depression that put the unemployed to work building bridges, roads, buildings, and parks. AP Photo

Discretionary fiscal policy is fiscal policy that is the direct result of deliberate actions by policy makers rather than rules.
economists who believed that the multiplier on the plan would be around 0.75. (Remember, the multiplier on changes in taxes or transfers can be less than 1.) Some economists were critical, arguing that Congress should have insisted on a plan that yielded more “bang for the buck.”

Both Democratic and Republican economists working for Congress defended the plan, arguing that the perfect is the enemy of the good—that it was the best that could be negotiated on short notice and was likely to be of real help in fighting the economy’s weakness. But by late summer 2008, with the U.S. economy still in the doldrums, there was widespread agreement that the plan’s results had been disappointing. And by late 2008, with the economy shrinking further, policy makers were working on a new, much larger stimulus plan that relied more heavily on government purchases. The American Recovery and Reinvestment Act was passed in February 2009. The bill called for $787 billion in expenditures on stimulus in three areas: help for the unemployed and those receiving Medicaid and food stamps; investments in infrastructure, energy, and health care; and tax cuts for families and small businesses.

Despite controversies over specifics, the general consensus about active stabilization policy is apparent: when at first you don’t succeed, try, try again.

⇒ How Taxes Affect the Multiplier ⇒
Check Your Understanding

1. Explain why a $500 million increase in government purchases of goods and services will generate a larger rise in real GDP than a $500 million increase in government transfers.

[Answer Field]

2. Explain why a $500 million reduction in government purchases of goods and services will generate a larger fall in real GDP than a $500 million tax increase.

[Answer Field]

3. The country of Boldovia has no unemployment insurance benefits and a tax system using only lump-sum taxes. The neighboring country of Moldovia has generous unemployment benefits and a tax system in which residents must pay a percentage of their income. Which country will experience greater variation in real GDP in response to demand shocks, positive and negative? Explain.

[Answer Field]
1. The marginal propensity to consume
   I. has a negative relationship to the multiplier.
   II. is equal to 1.
   III. represents the proportion of consumers’ disposable income that is spent.
   a. I only  
   b. II only  
   c. III only  
   d. I and III only  
   e. I, II, and III

2. Assume that taxes and interest rates remain unchanged when government spending increases, and that both savings and consumer spending increase when income increases. The ultimate effect on real GDP of a $100 million increase in government purchases of goods and services will be
   a. an increase of $100 million.  
   b. an increase of more than $100 million.  
   c. an increase of less than $100 million.  
   d. an increase of either more than or less than $100 million, depending on the MPC.  
   e. a decrease of $100 million.

3. The presence of taxes has what effect on the multiplier? They
   a. increase it.  
   b. decrease it.  
   c. destabilize it.  
   d. negate it.  
   e. have no effect on it.

4. A lump-sum tax is
   a. higher as income increases.  
   b. lower as income increases.  
   c. independent of income.  
   d. the most common form of tax.  
   e. a type of business tax.

5. Which of the following is NOT an automatic stabilizer?
   a. income taxes  
   b. unemployment insurance  
   c. Medicaid  
   d. food stamps
e. monetary policy
1. Assume the $MPC$ in an economy is 0.8 and the government increases government purchases of goods and services by $50$ million. Also assume the absence of taxes, international trade, and changes in the aggregate price level.
   a. What is the value of the multiplier?
      [Answer Field]
   b. By how much will real GDP change as a result of the increase in government purchases?
      [Answer Field]
   c. What would happen to the size of the effect on real GDP if the $MPC$ fell? Explain.
      [Answer Field]
   d. If we relax the assumption of no taxes, automatic changes in tax revenue as income changes will have what effect on the size of the multiplier?
      [Answer Field]

   **Answer (5 points)**
   1 point: Multiplier $= 1/(1 - MPC) = 1/(1 - 0.8) = 1/0.2 = 5$
   1 point: $50$ million $\times 5 = 250$ million
   1 point: It would decrease.
   1 point: The multiplier is $1/(1 - MPC)$. A fall in $MPC$ increases the denominator, $(1 - MPC)$, and therefore decreases the multiplier.
   1 point: Decrease it

2. A change in government purchases of goods and services results in a change in real GDP equal to $200$ million. Assume the absence of taxes, international trade, and changes in the aggregate price level.
   a. Suppose that the $MPC$ is equal to 0.75. What was the size of the change in government purchases of goods and services that resulted in the increase in real GDP of $200$ million?
      [Answer Field]
   b. Now suppose that the change in government purchases of goods and services was $20$ million. What value of the multiplier would result in an increase in real GDP of $200$ million?
      [Answer Field]
   c. Given the value of the multiplier you calculated in part b, what marginal propensity to save would have led to that value of the multiplier?
      [Answer Field]
Summary

1. The **consumption function** shows how an individual household’s consumer spending is determined by its current disposable income. The **aggregate consumption function** shows the relationship for the entire economy. According to the life-cycle hypothesis, households try to smooth their consumption over their lifetimes. As a result, the aggregate consumption function shifts in response to changes in expected future disposable income and changes in aggregate wealth.

2. **Planned investment spending** depends negatively on the interest rate and on existing production capacity; it depends positively on expected future real GDP.

3. Firms hold **inventories** of goods so that they can satisfy consumer demand quickly. **Inventory investment** is positive when firms add to their inventories, negative when they reduce them. Often, however, changes in inventories are not a deliberate decision but the result of mistakes in forecasts about sales. The result is **unplanned inventory investment**, which can be either positive or negative. **Actual investment spending** is the sum of planned investment spending and unplanned inventory investment.

4. The **aggregate demand curve** shows the relationship between the aggregate price level and the quantity of aggregate output demanded.

5. The aggregate demand curve is downward sloping for two reasons. The first is the **wealth effect of a change in the aggregate price level**—a higher aggregate price level reduces the purchasing power of households’ wealth and reduces consumer spending. The second is the **interest rate effect of a change in the aggregate price level**—a higher aggregate price level reduces the purchasing power of households’ and firms’ money holdings, leading to a rise in interest rates and a fall in investment spending and consumer spending.

6. The aggregate demand curve shifts because of changes in expectations, changes in wealth not due to changes in the aggregate price level, and the effect of the size of the existing stock of physical capital. Policy makers can use **fiscal policy** and **monetary policy** to shift the aggregate demand curve.

7. The **aggregate supply curve** shows the relationship between the aggregate price level and the quantity of aggregate output supplied.

8. The **short-run aggregate supply curve** is upward sloping because **nominal wages** are **sticky** in the short run: a higher aggregate price level leads to higher profit per unit of output and increased aggregate output in the short run.

9. Changes in commodity prices, nominal wages, and productivity lead to changes in producers’ profits and shift the short-run aggregate supply curve.

10. In the long run, all prices, including nominal wages, are flexible and the economy produces at its **potential output**. If actual aggregate output exceeds potential output, nominal wages will eventually rise in response to low unemployment and aggregate output will fall. If potential output exceeds actual aggregate output, nominal wages will eventually fall in response to high unemployment and aggregate output will rise. So the **long-run aggregate supply curve** is vertical at potential output.

11. In the **AD–AS model**, the intersection of the short-run aggregate supply curve and the long-run aggregate supply curve determines the price level and the quantity of output in the long run.
curve and the aggregate demand curve is the point of **short-run macroeconomic equilibrium**. It determines the **short-run equilibrium aggregate price level** and the level of **short-run equilibrium aggregate output**.

12. Economic fluctuations occur because of a shift of the aggregate demand curve (a **demand shock**) or the short-run aggregate supply curve (a **supply shock**). A **demand shock** causes the aggregate price level and aggregate output to move in the same direction as the economy moves along the short-run aggregate supply curve. A **supply shock** causes them to move in opposite directions as the economy moves along the aggregate demand curve. A particularly nasty occurrence is **stagflation**—inflation and falling aggregate output—which is caused by a negative supply shock.

13. Demand shocks have only short-run effects on aggregate output because the economy is **self-correcting** in the long run. In a **recessionary gap**, an eventual fall in nominal wages moves the economy to **long-run macroeconomic equilibrium**, in which aggregate output is equal to potential output. In an **inflationary gap**, an eventual rise in nominal wages moves the economy to long-run macroeconomic equilibrium. We can use the **output gap**, the percentage difference between actual aggregate output and potential output, to summarize how the economy responds to recessionary and inflationary gaps. Because the economy tends to be self-correcting in the long run, the output gap always tends toward zero.

14. The high cost—in terms of unemployment—of a recessionary gap and the future adverse consequences of an inflationary gap lead many economists to advocate active **stabilization policy**: using fiscal or monetary policy to offset demand shocks. There can be drawbacks, however, because such policies may contribute to a long-term rise in the budget deficit, leading to lower long-run growth. Also, poorly timed policies can increase economic instability.

15. Negative supply shocks pose a policy dilemma: a policy that counteracts the fall in aggregate output by increasing aggregate demand will lead to higher inflation, but a policy that counteracts inflation by reducing aggregate demand will deepen the output slump.

16. The government plays a large role in the economy, collecting a large share of GDP in taxes and spending a large share both to purchase goods and services and to make transfer payments, largely for **social insurance**. **Fiscal policy** is the use of taxes, government transfers, or government purchases of goods and services to shift the aggregate demand curve. But many economists caution that a very active fiscal policy may in fact make the economy less stable due to time lags in policy formulation and implementation.

17. Government purchases of goods and services directly affect aggregate demand, and changes in taxes and government transfers affect aggregate demand indirectly by changing households’ disposable income. **Expansionary fiscal policy** shifts the aggregate demand curve rightward; **contractionary fiscal policy** shifts the aggregate demand curve leftward.

18. Fiscal policy has a multiplier effect on the economy, the size of which depends upon the fiscal policy. Except in the case of lump-sum taxes, taxes reduce the size of the multiplier. Expansionary fiscal policy leads to an increase in real GDP, while contractionary fiscal policy leads to a reduction in real GDP. Because part of any change in taxes or transfers is absorbed by savings in the first round of spending, changes in government purchases of goods and services have a more powerful effect on the economy than equal-size changes in taxes or transfers.

19. An **autonomous change in aggregate spending** leads to a chain
reaction in which the total change in real GDP is equal to the multiplier times the initial change in aggregate spending. The size of the **multiplier**, \(1/(1 - \text{MPC})\), depends on the marginal propensity to consume, \(\text{MPC}\), the fraction of an additional dollar of disposable income spent on consumption. The larger the \(\text{MPC}\), the larger the multiplier and the larger the change in real GDP for any given autonomous change in aggregate spending. The fraction of an additional dollar of disposable income that is saved is called the **marginal propensity to save**, \(\text{MPS}\).

20. Rules governing taxes—with the exception of lump-sum taxes—and some transfers act as **automatic stabilizers**, reducing the size of the multiplier and automatically reducing the size of fluctuations in the business cycle. In contrast, **discretionary fiscal policy** arises from deliberate actions by policy makers rather than from the business cycle.
Key Terms

- Marginal propensity to consume (MPC)
- Marginal propensity to save (MPS)
- Autonomous change in aggregate spending
- Multiplier
- Consumption function
- Autonomous consumer spending
- Aggregate consumption function
- Planned investment spending
- Inventories
- Inventory investment
- Unplanned inventory investment
- Actual investment spending
- Aggregate demand curve
- Wealth effect of a change in the aggregate price level
- Interest rate effect of a change in the aggregate price level
- Fiscal policy
- Monetary policy
- Aggregate supply curve
- Nominal wage
- Sticky wages
- Short-run aggregate supply curve
- Long-run aggregate supply curve
- Potential output
- AD–AS model
- Short-run macroeconomic equilibrium
- Short-run equilibrium aggregate price level
- Short-run equilibrium aggregate output
- Demand shock
- Supply shock
- Stagflation
- Long-run macroeconomic equilibrium
- Recessionary gap
- Inflationary gap
- Output gap
- Self-correcting
- Stabilization policy
- Social insurance
- Expansionary fiscal policy
- Contractionary fiscal policy
- Lump-sum taxes
- Automatic stabilizers
- Discretionary fiscal policy
1. A fall in the value of the dollar against other currencies makes U.S. final goods and services cheaper to foreigners even though the U.S. aggregate price level stays the same. As a result, foreigners demand more American aggregate output. Your study partner says that this represents a movement down the aggregate demand curve because foreigners are demanding more in response to a lower price. You, however, insist that this represents a rightward shift of the aggregate demand curve. Who is right? Explain.

2. Your study partner is confused by the upward-sloping short-run aggregate supply curve and the vertical long-run aggregate supply curve. How would you explain the shapes of these two curves?

3. Suppose that in Wageland all workers sign annual wage contracts each year on January 1. No matter what happens to prices of final goods and services during the year, all workers earn the wage specified in their annual contract. This year, prices of final goods and services fall unexpectedly after the contracts are signed. Answer the following questions using a diagram and assume that the economy starts at potential output.
   a. In the short run, how will the quantity of aggregate output supplied respond to the fall in prices?
   b. What will happen when firms and workers renegotiate their wages?

4. Determine whether, in the short run, each of the following events causes a shift of a curve or a movement along a curve. Also determine which curve is involved and the direction of the change.
   a. As a result of new discoveries of iron ore used to make steel, producers now pay less for steel, a major commodity used in production.
   b. An increase in the money supply by the Federal Reserve increases the quantity of money that people wish to lend, lowering interest rates.
   c. Greater union activity leads to higher nominal wages.
   d. A fall in the aggregate price level increases the purchasing power of households’ and firms’ money holdings. As a result, they borrow less and lend more.

5. Suppose that all households hold all their wealth in assets that automatically rise in value when the aggregate price level rises (an
example of this is what is called an “inflation-indexed bond”—a bond for which the interest rate, among other things, changes one-for-one with the inflation rate). What happens to the wealth effect of a change in the aggregate price level as a result of this allocation of assets? What happens to the slope of the aggregate demand curve? Will it still slope downward? Explain.

[Answer Field]

6. Suppose that the economy is currently at potential output. Also suppose that you are an economic policy maker and that a college economics student asks you to rank, if possible, your most preferred to least preferred type of shock: positive demand shock, negative demand shock, positive supply shock, negative supply shock. For those shocks that can be ranked, how would you rank them and why?

[Answer Field]

7. Explain whether the following government policies affect the aggregate demand curve or the short-run aggregate supply curve and how.
   a. The government reduces the minimum nominal wage.
      [Answer Field]
   b. The government increases Temporary Assistance to Needy Families (TANF) payments, government transfers to families with dependent children.
      [Answer Field]
   c. To reduce the budget deficit, the government announces that households will pay much higher taxes beginning next year.
      [Answer Field]
   d. The government reduces military spending.
      [Answer Field]

8. In Wageland, all workers sign an annual wage contract each year on January 1. In late January, a new computer operating system is introduced that increases labor productivity dramatically. Explain how Wageland will move from one short-run macroeconomic equilibrium to another. Illustrate with a diagram.

[Answer Field]

9. The Conference Board publishes the Consumer Confidence Index (CCI) every month based on a survey of 5,000 representative U.S. households. It is used by many economists to track the state of the economy. A press release by the Board on April 29, 2008 stated: “The Conference Board Consumer Confidence Index, which had declined sharply in March, fell further in April. The Index now stands at 62.3 (1985 = 100), down from 65.9 in March.”
   a. As an economist, is this news encouraging for economic growth?
      [Answer Field]
   b. Explain your answer to part a with the help of the AD–AS model. Draw a typical diagram showing two equilibrium points ($E_1$) and ($E_2$). Label the vertical axis “Aggregate price level” and the horizontal axis “Real GDP.” Assume that all other major macroeconomic factors remain unchanged.
c. How should the government respond to this news? What are some policy measures that could be used to help neutralize the effect of falling consumer confidence?

10. There were two major shocks to the U.S. economy in 2007, leading to a severe economic slowdown. One shock was related to oil prices; the other was the slump in the housing market. This question analyzes the effect of these two shocks on GDP using the AD–AS framework.

a. Draw typical aggregate demand and short-run aggregate supply curves. Label the horizontal axis “Real GDP” and the vertical axis “Aggregate price level.” Label the equilibrium point \( E_1 \), the equilibrium quantity \( Y_1 \), and equilibrium price \( P_1 \).

b. Data taken from the Department of Energy indicate that the average price of crude oil in the world increased from $54.63 per barrel on January 5, 2007, to $92.93 on December 28, 2007. Would an increase in oil prices cause a demand shock or a supply shock? Redraw the diagram from part a to illustrate the effect of this shock by shifting the appropriate curve.

c. The Housing Price Index, published by the Office of Federal Housing Enterprise Oversight, calculates that U.S. home prices fell by an average of 3.0% in the 12 months between January 2007 and January 2008. Would the fall in home prices cause a supply shock or demand shock? Redraw the diagram from part b to illustrate the effect of this shock by shifting the appropriate curve. Label the new equilibrium point \( E_2 \), the equilibrium quantity \( Y_2 \), and equilibrium price \( P_2 \).

d. Compare the equilibrium points \( E_1 \) and \( E_2 \) in your diagram for part c. What was the effect of the two shocks on real GDP and the aggregate price level (increase, decrease, or indeterminate)?

11. Using aggregate demand, short-run aggregate supply, and long-run aggregate supply curves, explain the process by which each of the following economic events will move the economy from one long-run macroeconomic equilibrium to another. Illustrate with diagrams. In each case, what are the short-run and long-run effects on the aggregate price level and aggregate output?

a. There is a decrease in households’ wealth due to a decline in the stock market.

b. The government lowers taxes, leaving households with more disposable income, with no corresponding reduction in government purchases.

12. Using aggregate demand, short-run aggregate supply, and long-run aggregate supply curves, explain the process by which each of the following economic events will move the economy from one long-run macroeconomic equilibrium to another. Illustrate with diagrams. In each case, what are the short-run and long-run effects on the aggregate price level and aggregate output?
aggregate supply curves, explain the process by which each of the following government policies will move the economy from one long-run macroeconomic equilibrium to another. Illustrate with diagrams. In each case, what are the short-run and long-run effects on the aggregate price level and aggregate output?

a. There is an increase in taxes on households.

b. There is an increase in the quantity of money.

c. There is an increase in government spending.

13. The economy is in short-run macroeconomic equilibrium at point $E_1$ in the accompanying diagram. Based on the diagram, answer the following questions.

a. Is the economy facing an inflationary or a recessionary gap?

b. What policies can the government implement that might bring the economy back to long-run macroeconomic equilibrium? Illustrate with a diagram.

c. If the government did not intervene to close this gap, would the economy return to long-run macroeconomic equilibrium? Explain and illustrate with a diagram.

d. What are the advantages and disadvantages of the government implementing policies to close the gap?

14. In the accompanying diagram, the economy is in long-run macroeconomic equilibrium at point $E_1$ when an oil shock shifts the short-run aggregate supply curve to $SRAS_2$. Based on the diagram, answer the following questions.

a. How do the aggregate price level and aggregate output change in the short run as a result of the oil shock? What is this phenomenon known as?

b. What fiscal policies can the government use to address the effects of the supply shock? Use a diagram that shows the effect of policies chosen to address the change in real GDP. Use another diagram to show the effect of policies chosen to address the change in the aggregate price level.
c. Why do supply shocks present a dilemma for government policy makers?

15. The late 1990s in the United States were characterized by substantial economic growth with low inflation; that is, real GDP increased with little, if any, increase in the aggregate price level. Explain this experience using aggregate demand and aggregate supply curves. Illustrate with a diagram.

16. In each of the following cases, either a recessionary or inflationary gap exists. Assume that the aggregate supply curve is horizontal, so that the change in real GDP arising from a shift of the aggregate demand curve equals the size of the shift of the curve. Calculate both the change in government purchases of goods and services, and, alternatively, the change in government transfers necessary to close the gap.

   a. Real GDP equals $100 billion, potential output equals $160 billion, and the marginal propensity to consume is 0.75.

   b. Real GDP equals $250 billion, potential output equals $200 billion, and the marginal propensity to consume is 0.5.

   c. Real GDP equals $180 billion, potential output equals $100 billion, and the marginal propensity to consume is 0.8.

17. Most macroeconomists believe it is a good thing that taxes act as automatic stabilizers and lower the size of the multiplier. However, a smaller multiplier means that the change in government purchases of goods and services, government transfers, or taxes necessary to close an inflationary or recessionary gap is larger. How can you explain this apparent inconsistency?

18. The accompanying table shows how consumers’ marginal propensities to consume in a particular economy are related to their level of income.

<table>
<thead>
<tr>
<th>Income range</th>
<th>Marginal propensity to consume</th>
</tr>
</thead>
<tbody>
<tr>
<td>$0 – $20,000</td>
<td>0.9</td>
</tr>
<tr>
<td>$20,001 – $40,000</td>
<td>0.8</td>
</tr>
<tr>
<td>$40,001 – $60,000</td>
<td>0.7</td>
</tr>
<tr>
<td>$60,001 – $80,000</td>
<td>0.6</td>
</tr>
<tr>
<td>Above $80,000</td>
<td>0.5</td>
</tr>
</tbody>
</table>

a. Suppose the government engages in increased purchases of goods and services. For each of the income groups in the accompanying table, what is the value of the multiplier—that is, what is the “bang for the
buck” from each dollar the government spends on government purchases of goods and services in each income group?

[Answer Field]

b. If the government needed to close a recessionary or inflationary gap, at which group should it primarily aim its fiscal policy of changes in government purchases of goods and services?

[Answer Field]

19. From 2003 to 2008, Eastlandia experienced large fluctuations in both aggregate consumer spending and disposable income, but wealth, the interest rate, and expected future disposable income did not change. The accompanying table shows the level of aggregate consumer spending and disposable income in millions of dollars for each of these years. Use this information to answer the following questions.

<table>
<thead>
<tr>
<th>Year</th>
<th>Disposable income (millions of dollars)</th>
<th>Consumer spending (millions of dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>$100</td>
<td>$180</td>
</tr>
<tr>
<td>2004</td>
<td>350</td>
<td>380</td>
</tr>
<tr>
<td>2005</td>
<td>300</td>
<td>340</td>
</tr>
<tr>
<td>2006</td>
<td>400</td>
<td>420</td>
</tr>
<tr>
<td>2007</td>
<td>375</td>
<td>400</td>
</tr>
<tr>
<td>2008</td>
<td>500</td>
<td>500</td>
</tr>
</tbody>
</table>

a. Plot the aggregate consumption function for Eastlandia.

[Answer Field]

b. What is the marginal propensity to consume? What is the marginal propensity to save?

[Answer Field]

c. What is the aggregate consumption function?

[Answer Field]

20. From the end of 1995 to March 2000, the Standard and Poor’s 500 (S&P 500) stock index, a broad measure of stock market prices, rose almost 150%, from 615.93 to a high of 1,527.46. From that time to September 10, 2001, the index fell 28.5% to 1,092.54. How do you think the movements in the stock index influenced both the growth in real GDP in the late 1990s and the concern about maintaining consumer spending after the terrorist attacks on September 11, 2001?

[Answer Field]

21. How will investment spending change as the following events occur?

a. The interest rate falls as a result of Federal Reserve policy.

[Answer Field]

b. The U.S. Environmental Protection Agency decrees that corporations must upgrade or replace their machinery in order to reduce their emissions of sulfur dioxide.

[Answer Field]
22. Explain how each of the following actions will affect the level of investment spending and unplanned inventory investment.

a. The Federal Reserve raises the interest rate.

b. There is a rise in the expected growth rate of real GDP.

c. A sizable inflow of foreign funds into the country lowers the interest rate.

23. The accompanying diagram shows the current macroeconomic situation for the economy of Albernia. You have been hired as an economic consultant to help the economy move to potential output, \( Y_P \).

a. Is Albernia facing a recessionary or inflationary gap?

b. Which type of fiscal policy—expansionary or contractionary—would move the economy of Albernia to potential output, \( Y_P \)? What are some examples of such policies?

c. Use a diagram to illustrate the macroeconomic situation in Albernia after the successful fiscal policy has been implemented.

24. The accompanying diagram shows the current macroeconomic situation for the economy of Brittania; real GDP is \( Y_1 \), and the aggregate price level is \( P_1 \). You have been hired as an economic consultant to help the economy move to potential output, \( Y_P \).

a. Is Brittania facing a recessionary or inflationary gap?

b. Which type of fiscal policy—expansionary or contractionary—would move the economy of Brittania to potential output, \( Y_P \)? What are some examples of such policies?

c. Illustrate the macroeconomic situation in Brittania with a diagram after the successful fiscal policy has been implemented.
25. An economy is in long-run macroeconomic equilibrium when each of the following aggregate demand shocks occurs. What kind of gap— inflationary or recessionary—will the economy face after the shock, and what type of fiscal policies would help move the economy back to potential output? How would your recommended fiscal policy shift the aggregate demand curve?

a. A stock market boom increases the value of stocks held by households.  
   [Answer Field]

b. Firms come to believe that a recession in the near future is likely.  
   [Answer Field]

c. Anticipating the possibility of war, the government increases its purchases of military equipment.  
   [Answer Field]

d. The quantity of money in the economy declines and interest rates increase.  
   [Answer Field]