CHAPTER 15

Monetary Policy

Introduction When it comes to monetary policy, most economists agree that the goals of monetary policy are to stabilize the price level, to achieve low unemployment, and to promote economic growth, among other things. What they sometimes disagree about is the degree to which, and under what conditions, monetary policy achieves these goals. In this chapter we discuss monetary policy, beginning with the details of the money market. Then we discuss how changes in the money market—brought about by changes in the money supply—can affect the economy.

15-1 Transmission Mechanisms

Changes in one market can often ripple outward to affect other markets. The routes, or channels, that these ripple effects travel are known as the **transmission mechanism**. In this section we discuss two transmission mechanisms: the Keynesian and the monetarist.

Transmission Mechanism
The routes, or channels, traveled by the ripple effects that the money market creates and that affect the goods and services market (represented by the aggregate demand and aggregate supply curves in the *AD–AS* framework).

15-1a The Money Market in the Keynesian Transmission Mechanism

Like all markets, the money market has two sides: a demand side and a supply side.[1]

THE DEMAND FOR MONEY In an illustration of the **demand for money (balances)**, the price of holding money balances is on the vertical axis, and the quantity of money is on the horizontal axis. The price of holding money balances—specifically, the opportunity cost of holding money—is the interest rate. By holding money, individuals forfeit the opportunity to hold that portion of their wealth in other forms. For example, the person who holds $1,000 in cash gives up the opportunity to purchase a $1,000 asset that yields

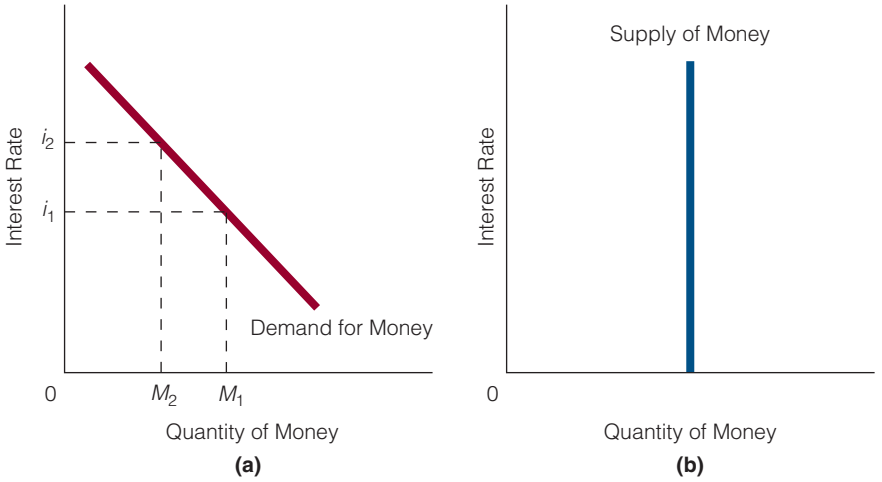
Demand for Money (Balances)
The inverse relationship between the quantity demanded of money balances and the price of holding money balances.

1. In everyday language, the term *money market* is often used to refer to the market for short-term securities, where there is a demand for and a supply of short-term securities. This is not the money market discussed here. In this money market, there is a demand for and a supply of *money*.

EXHIBIT 1

The Demand for and Supply of Money

(a) The demand curve for money is downward sloping. (b) The supply curve of money is a vertical line at the quantity of money that is largely but not exclusively determined by the Fed.



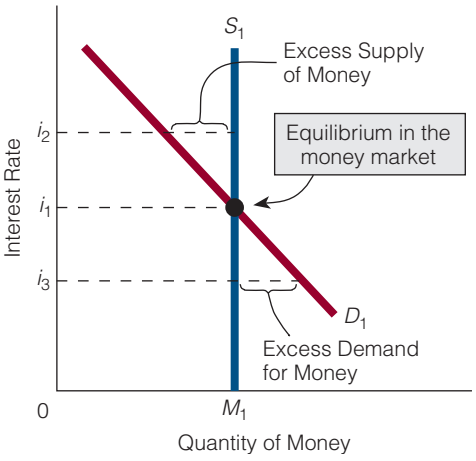
interest (e.g., a bond). Thus the interest rate is the opportunity cost of holding money. A person can be described as "paying the price" of forfeited interest by holding money.

Exhibit 1(a) illustrates the demand for money (balances). As the interest rate increases, the opportunity cost of holding money increases, and individuals choose to hold less money. As the interest rate decreases, the opportunity cost of holding money decreases, and individuals choose to hold more money.

THE SUPPLY OF MONEY Exhibit 1(b) shows the supply of money as a vertical line at the quantity of money that is largely determined by the Fed. The money supply is largely but not exclusively determined by the Fed because both banks and the public are important players in the money supply process (as explained in earlier chapters). For example, when banks do not lend their entire excess reserves, the money supply is not as large as it is when they do.

EQUILIBRIUM IN THE MONEY MARKET The money market is in equilibrium when the quantity demanded of money equals the quantity supplied. In Exhibit 2, equilibrium exists at the interest rate i_1. At a higher interest rate, i_2, the quantity supplied of money is greater than the quantity demanded, and there is an excess supply of money ("too much" money). At a lower interest rate, i_3, the quantity demanded of money is greater than the quantity supplied, and there is an excess demand for money ("too little" money). Only at i_1 are the quantity demanded and the quantity supplied of money equal. At i_1, there are no shortages or surpluses of money and no excess demands or excess supplies. Individuals are holding the amounts of money they want to hold.

EXHIBIT 2



Equilibrium in the Money Market

At an interest rate of i_1, the money market is in equilibrium: There is neither an excess supply of money nor an excess demand for money.

15-1b The Keynesian Transmission Mechanism: Indirect

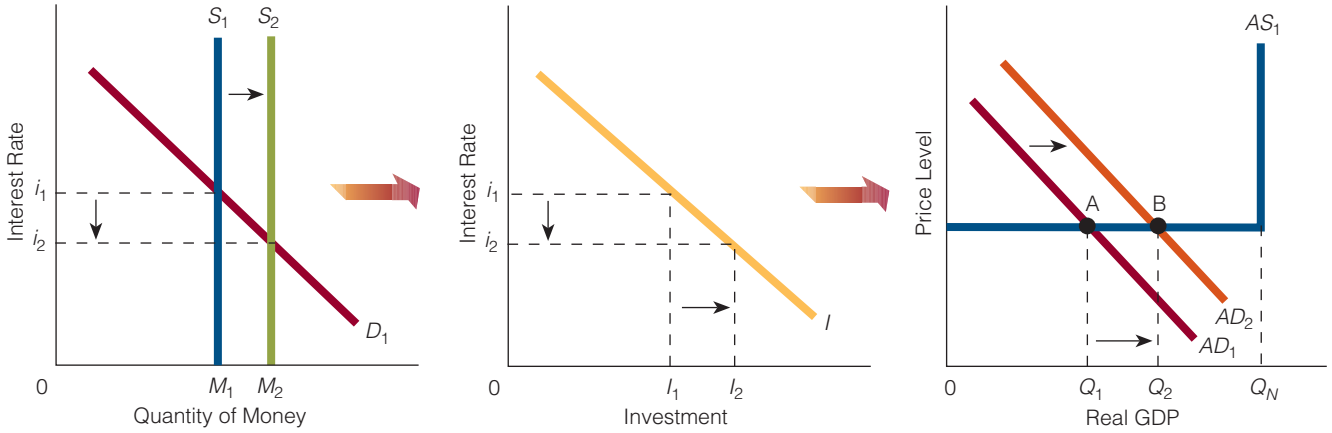
The Keynesian route between the money market and the goods and services market is an indirect one. Exhibit 3 is a market-by-market depiction of the Keynesian transmission mechanism.

1. *The Money Market.* Suppose the money market is in equilibrium at interest rate i_1 in part (a). Then, the Fed increases the reserves of the banking system through an open market purchase, resulting in an increase in the money supply. The money supply curve shifts rightward

EXHIBIT 3

The Keynesian Transmission Mechanism

The exhibit shows how the Keynesian transmission mechanism operates given an increase in the money supply. (a) An increase in the money supply brings on a lower interest rate. (b) As a result, investment increases. (c) As investment increases, total expenditures rise and the aggregate demand curve shifts rightward. Real GDP rises from Q_1 to Q_2.



from S_1 to S_2. The reserves of the banking system are increased, resulting in more loans being made. A greater supply of loans puts downward pressure on the interest rate, as reflected in the movement from i_1 to i_2.

2. *The Investment Goods Market.* A fall in the interest rate stimulates investment. In the investment goods market in part (b), investment rises from I_1 to I_2.
3. *The Goods and Services Market (AD–AS Framework).* Recall that the Keynesian model has a horizontal aggregate supply curve in the goods and services market until full employment or Natural Real GDP is reached (see Chapter 10). The decline in the interest rate has brought about an increase in investment, as shown in part (b). Rising investment increases total spending in the economy and shifts the *AD* curve to the right [part (c)]. As a result, Real GDP rises from Q_1 to Q_2, and the price level does not change.

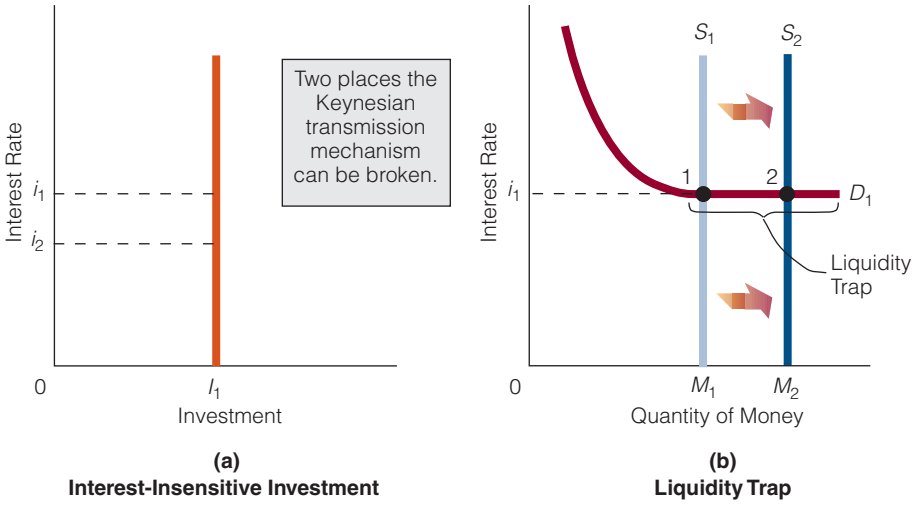
In summary, when the money supply increases, the Keynesian transmission mechanism works as follows: An increase in the money supply lowers the interest rate, which causes investment to rise and the *AD* curve to shift rightward. As a result, Real GDP increases. The process works in reverse for a decrease in the money supply.

$$\text{Money supply} \uparrow \rightarrow i \downarrow \rightarrow I \uparrow \rightarrow AD \uparrow \rightarrow Q \uparrow, \bar{P}$$
$$\text{Money supply} \downarrow \rightarrow i \uparrow \rightarrow I \downarrow \rightarrow AD \downarrow \rightarrow Q \downarrow, \bar{P}$$

15-1c The Keynesian Mechanism May Get Blocked

The Keynesian transmission mechanism is *indirect.* Changes in the money market *do not directly affect* the goods and services market (and thus Real GDP) because the investment goods market stands between the two markets. Possibly (although not likely), the link between the money market and the goods and services market could be broken in the investment goods market. Here's how.

EXHIBIT 4



Breaking the Link Between the Money Market and the Goods and Services Market: Interest-Insensitive Investment and the Liquidity Trap

The Keynesian transmission mechanism allows the link between the money market and the goods and services market to be broken in two places. (a) If investment is totally interest sensitive, a change in the interest rate will not change investment; therefore, aggregate demand and Real GDP will not change. (b) If the money market is in the liquidity trap, an increase in the money supply will not lower the interest rate. It follows that there will be no change in investment, aggregate demand, or Real GDP.

INTEREST-INSENSITIVE INVESTMENT Some Keynesian economists believe that investment is not always responsive to interest rates. For example, when business firms are pessimistic about future economic activity, a decrease in interest rates will do little, if anything, to increase investment. When investment is completely insensitive to changes in interest rates, the investment demand curve is vertical, as in Exhibit 4(a).

This condition has an affect on the Keynesian transmission mechanism described in Exhibit 3. If the investment demand curve is vertical (instead of downward sloping), a fall in interest rates will not increase investment; if investment does not increase, neither will aggregate demand or Real GDP. Thus, the Keynesian transmission mechanism would be short-circuited in the investment goods market, severing the link between the money market in part (a) of Exhibit 3 and the goods and services market in part (c).

Money supply ↑ → i ↓
Investment insensitive to changes in i → $\bar{I}$ → $\overline{AD}$ → $\bar{Q}$, $\bar{P}$

THE LIQUIDITY TRAP Keynesians have sometimes argued that the demand curve for money could become horizontal at some low interest rate. In Exhibit 4(b), the demand curve for money becomes horizontal at i_1. This horizontal section is referred to as the **liquidity trap**.

Liquidity Trap
The horizontal portion of the demand curve for money.

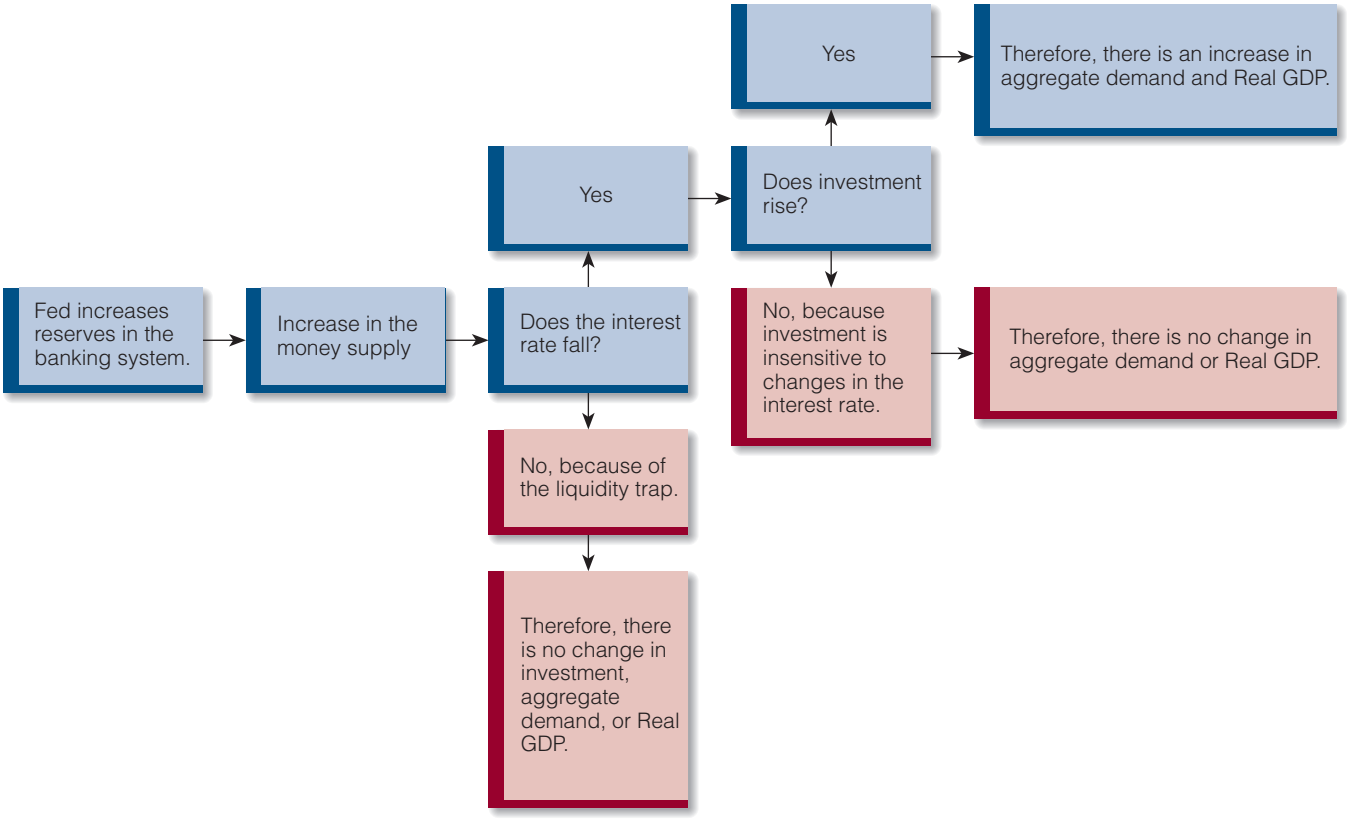
If the money supply is increased (e.g., from S_1 to S_2) when the money market is in the liquidity trap, the money market moves from point 1 to point 2, and individuals are willing to hold all the additional money supply at the given interest rate. Once again, this condition breaks the Keynesian transmission mechanism illustrated in Exhibit 3. Obviously, if an increase in the money supply does not lower the interest rate, then neither investment, aggregate demand, nor Real GDP changes. The liquidity trap can thus break the link between the money market and the goods and services market.

Money supply ↑
Liquidity trap → $\bar{i}$ → $\bar{I}$ → $\overline{AD}$ → $\bar{Q}$, $\bar{P}$

EXHIBIT 5

The Keynesian View of Monetary Policy

According to the Keynesian transmission mechanism, if the Fed increases reserves in the banking system and therefore raises the money supply, the interest rate will drop, stimulating investment and aggregate demand. Consequently, Real GDP will rise. However, things may not work out this way if there is a liquidity trap or if investment is insensitive to changes in the interest rate.



Because the Keynesian transmission mechanism is indirect, both *interest-insensitive investment demand* and the *liquidity trap* may occur. Therefore, Keynesians conclude that at times monetary policy will be unable to increase Real GDP and decrease unemployment. Viewing the money supply as a string, some economists have argued that you cannot push on a string. In other words, you cannot always force Real GDP up by increasing (pushing up) the money supply.

See Exhibit 5 for a review of the Keynesian transmission mechanism and how it may get blocked.

BOND PRICES, INTEREST RATES, AND THE LIQUIDITY TRAP The liquidity trap, or the horizontal section of the demand curve for money, seems to come out of the clear blue sky. Why might the demand curve for money become horizontal at some low interest rate? To understand the explanation, you must first understand the relationship between bond prices and interest rates.

Consider Jessica Howard, who buys good X for $100 today and sells it one year later for $110. Her actual rate of return is 10 percent; the difference between the selling price

and buying price ($10) divided by the buying price ($100) is 10 percent. Now suppose good X is a bond. Jessica buys the bond for $100 and sells it one year later for $110. Her actual interest rate return is the same: 10 percent. If Jessica buys the bond for $90 instead of $100 but still sells it for $110, her interest rate return is 22 percent: $20 ÷ $90 = 22 percent. The point is simple: *As the price of a bond decreases, the actual interest rate return, or the interest rate, increases.*

So bond prices and interest rates are inversely related. For example, last year Rob bought a bond for $1,000 that promises to pay him $100 a year in interest. The annual interest rate return is 10 percent: $100 ÷ $1,000 = 10 percent. Suppose, however, the market, or nominal, interest rate is higher now than last year when Rob bought his bond. Now bond suppliers have to promise to pay $120 a year to someone who buys a $1,000 bond.

The change in rate has an effect on the price Rob can get in the market for the $1,000 bond he bought last year, assuming he wants to sell it. If a purchaser can buy a new $1,000 bond that pays $120 a year, why pay Rob $1,000 for an (old) bond that pays only $100? Rob has to lower the price of his bond below $1,000, but the question is by how much? The price has to be far enough below $1,000 so that the interest rate return on his old bond will be competitive with (i.e., equal to) the interest rate return on new bonds.

Rob's bond will sell for $833. At that price, a buyer of his bond will receive $100 a year and an interest rate of 12 percent—the same interest rate offered by a new $1,000 bond paying $120 a year. In other words, $100 is the same percentage of $833 as $120 is of $1,000: 12 percent. Therefore, *the market interest rate is inversely related to the price of old or existing bonds.*

This relationship can help you understand how a liquidity trap comes to be. At a low interest rate, the money supply increases but does not result in an excess supply of money. Interest rates are very low, and so bond prices are very high. Would-be buyers believe that bond prices are so high that they have no place to go but down. So individuals would rather hold all the additional money supply than use it to buy bonds.

Finding Economics

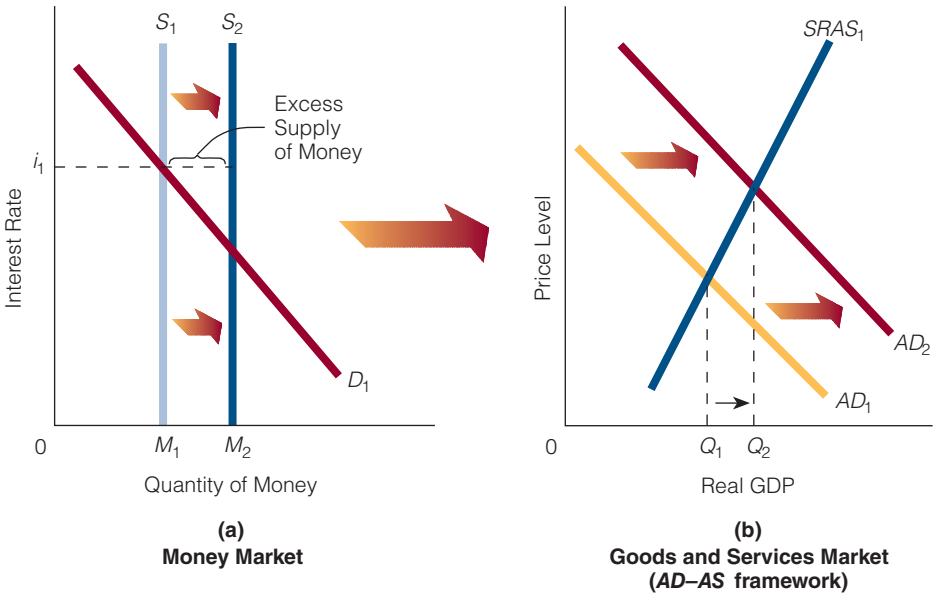
In Rising Demand for Bonds Kenneth reads in the newspaper that the demand for bonds is rising. Is there any information here that relates to the interest rate? Yes, if the demand for bonds is rising, then the price of bonds will rise too. Because the price of bonds and the interest rate are inversely related, the interest rate is about to decline.

15-1d The Monetarist Transmission Mechanism: Direct

Monetarist theory proposes a direct link between the money market and the goods and services market. The monetarist transmission mechanism is short. Changes in the money market have a direct impact on aggregate demand, as illustrated in Exhibit 6. An increase in the money supply from S_1 to S_2 in part (a) leaves individuals with an excess supply of money. As a result, they increase their spending on a wide variety of goods. Households buy more refrigerators, personal computers, television sets, clothes, and vacations. Businesses purchase additional machinery. The aggregate demand curve in part (b) is directly affected. In the short run, Real GDP rises from Q_1 to Q_2. The process works in reverse for a decrease in the money supply.

Money supply ↑ → *AD* ↑ → *Q*↑, *P* ↑
Money supply ↓ → *AD* ↓ → *Q*↓, *P*↓

EXHIBIT 6



The Monetarist Transmission Mechanism

The monetarist transmission mechanism is short and direct. Changes in the money market directly affect aggregate demand in the goods and services market. For example, an increase in the money supply leaves individuals with an excess supply of money that they spend on a wide variety of goods.

The Keynesian transmission mechanism from the money market to the goods and services market is indirect; the monetarist transmission mechanism is direct.

Self-Test

(Answers to Self-Test questions are in Answers to Self-Test Questions at the back of the book.)

1. Explain the inverse relationship between bond prices and interest rates.
2. According to the Keynesian transmission mechanism, as the money supply rises, there is a direct impact on the goods and services market. Do you agree or disagree with this statement? Explain your answer.
3. Explain how the monetarist transmission mechanism works when the money supply rises.

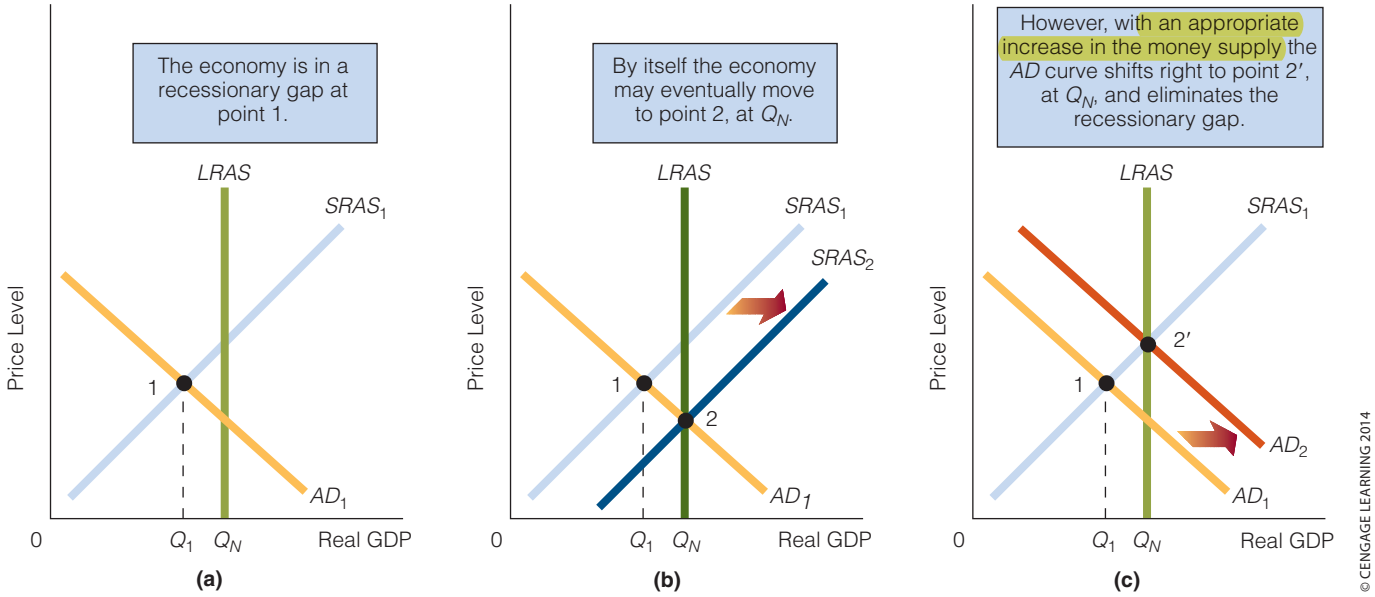
15-2 Monetary Policy and the Problem of Inflationary and Recessionary Gaps

In Chapter 11, we explained how expansionary and contractionary fiscal policies might be used to move the economy out of recessionary and inflationary gaps, respectively, and questioned the effectiveness of fiscal policy. In this section, we discuss how monetary policy might be used to eliminate both recessionary and inflationary gaps.

In Exhibit 7(a), the economy is in a recessionary gap at point 1; aggregate demand is too low to bring the economy into equilibrium at Natural Real GDP.

EXHIBIT 7

Monetary Policy and a Recessionary Gap



- Economist A argues that, in time, the short-run aggregate supply curve will shift rightward to point 2 [see Exhibit 7(b)]; so it is best to leave things alone.
- Economist B says that the economy will take too long to get to point 2 on its own and that in the interim the economy is suffering the high cost of unemployment and a lower level of output.
- Economist C maintains that the economy is stuck in the recessionary gap.

Expansionary Monetary Policy
The policy by which the Fed increases the money supply.

Economists B and C propose **expansionary monetary policy** to move the economy to its Natural Real GDP level. An appropriate increase in the money supply will shift the aggregate demand curve rightward to AD_2, and the economy will be in long-run equilibrium at point 2′ [see Exhibit 7(c)]. The recessionary gap is eliminated through the use of expansionary monetary policy.[2]

In Exhibit 8(a), the economy is in an inflationary gap at point 1.

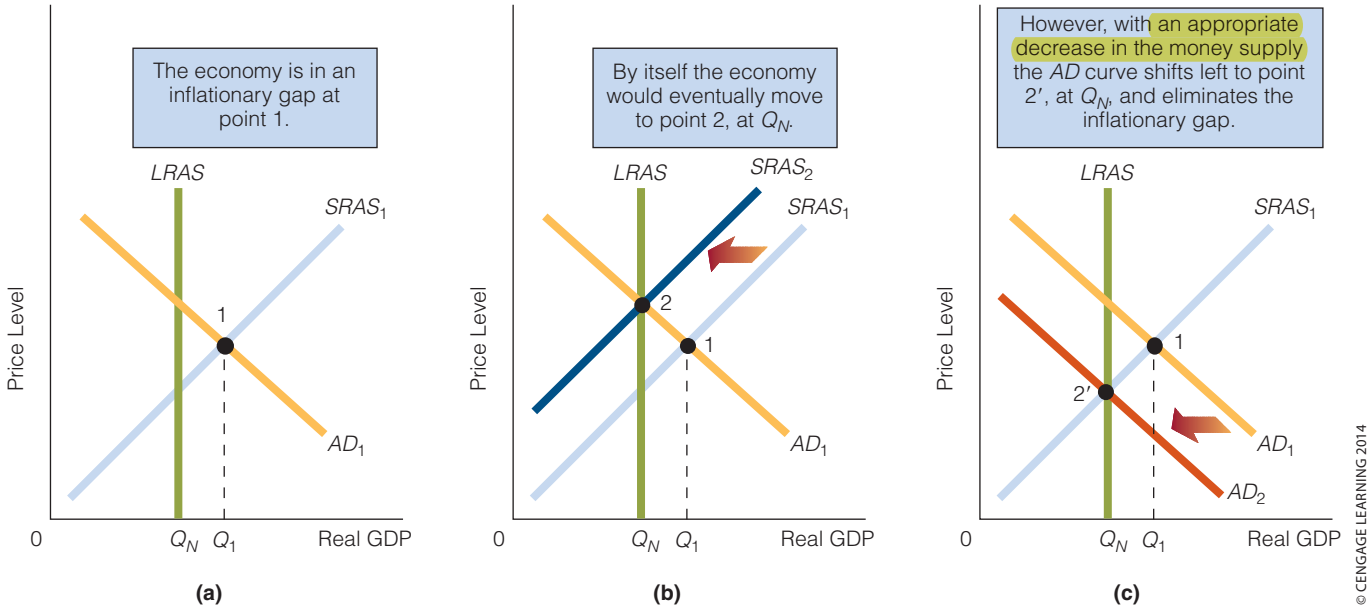
- Economist A argues that, in time, the economy will move to point 2 [see Exhibit 8(b)]; so it is best to leave things alone.
- Economist B argues that it would be better to decrease the money supply (**contractionary monetary policy**) so that aggregate demand shifts leftward to AD_2 and the economy moves to point 2′, [see Exhibit 8(c)].
- Economist C agrees with economist B and points out that the price level is lower at point 2′ than at point 2, although Real GDP is the same at both points.

Contractionary Monetary Policy
The policy by which the Fed decreases the money supply.

2. In a static framework, expansionary monetary policy means an increase in the money supply, and contractionary monetary policy refers to a decrease in the money supply. In a dynamic framework, expansionary monetary policy refers to an increase in the rate of growth of the money supply, and contractionary monetary policy means a decrease in the growth rate of the money supply. In the real world, where things are constantly changing, the growth rate of the money supply is more indicative of the direction of monetary policy.

EXHIBIT 8

Monetary Policy and an Inflationary Gap



Most Keynesians believe that the natural forces of the market economy work much faster and more assuredly in eliminating an inflationary gap than in eliminating a recessionary gap. In terms of Exhibits 7 and 8, they argue that the short-run aggregate supply curve in Exhibit 8(b) is much more likely to shift leftward to point 2, eliminating the inflationary gap, than that the short-run aggregate supply curve in Exhibit 7(b) will shift rightward to point 2, eliminating the recessionary gap. The reason is that wages and prices rise more quickly than they fall. (Of course, many Keynesians believe wages are inflexible in a downward direction.) Consequently, Keynesians are more likely to advocate expansionary monetary policy to eliminate a stubborn recessionary gap than they are to recommend contractionary monetary policy to eliminate a not-so-stubborn inflationary gap.

15-2a A Different View of the Economy: Patterns of Sustainable Specialization and Trade (PSST)

Economist Arnold Kling has proposed a new perspective on the economy,[3] called patterns of sustainable specialization and trade (PSST). The perspective is very different from what has been expressed in the *AD–AS* model (discussed widely in this textbook). Many of the models and theories we have discussed emphasize aggregate demand. Specifically, in an economy that is in long-run equilibrium and producing Natural Real GDP, something changes in such a way as to lower aggregate demand. The *AD* curve shifts leftward, and the economy falls into a recessionary gap; that is, economic activity decreases due to a drop in aggregate demand.

3. To read about this perspective in detail, see two articles by Arnold Kling: (1) "Patterns of Sustainable Specialization and Trade: A Smith-Ricardo Theory of Macroeconomics" at http://www.adamsmith.org/sites/default/files/research/files/PSST.pdf and (2) "PSST: Patterns of Sustainable Specialization and Trade" at http://arnoldkling.com/essays/papers/PSSTCap.pdf

ECONOMICS 24/7

The Fed Can't Always Be Sure Banks Will Lend

One way to stimulate spending is for the Fed to increases reserves in the banking system. Recall the process: The Fed injects reserves into the banking system (say, by undertaking an open market purchase), and then banks use the additional reserves to make loans to individuals and firms. These loans stimulate spending because the people who take out the loans do so in order to increase their spending. In other words, greater reserves in the banking system lead to more loans, which lead to more spending. The AD curve in the economy shifts rightward.

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Reserves increase → More loans → More spending → AD curve shifts rightward

However, things do not always work out the way the Fed intends. Something the Fed cannot do is force banks to lend out reserves. At the end of 2008 and into much of 2009, banks were adding to their reserves, but they weren't turning them into loans, largely because of the financial shape they were in. At the time, many banks were either insolvent (their liabilities were greater than their assets) or close to being insolvent. When banks are close to being insolvent, they are particularly wary of making loans, especially in uncertain environments. Even as the Fed was injecting reserves into the banking system, some businesses were failing, and the economic future looked uncertain. Banks couldn't be sure that the loans they created would be repaid. So, instead of creating loans from the reserves the Fed was injecting into the banking system, the banks took the reserves and bought safe Treasury securities or simply earned the interest rate the Fed paid on reserves.

The banks looked at their plight this way: The interest rate they could earn by creating loans may have been higher than the interest rate they could earn by buying Treasury securities, but if the loans weren't likely to be repaid, what good was the higher rate? In the uncertain economic environment, better to buy low-interest Treasury securities than to create higher-interest loans that wouldn't be repaid.

The ineffectiveness of the Fed at getting the banks to increase their lending caused some economists to wonder whether monetary policy didn't work anymore or, at minimum, didn't work when the economic future looked bleak or uncertain. The so-called textbook model of how monetary policy works (say, in a recessionary gap) is that the Fed undertakes open market purchases, reserves flow into the banking system, banks take the reserves and create loans and new checkable deposits, the money supply rises, and the AD curve shifts to the right. (This is how it works in this textbook.) In 2008 and much of 2009, however, the textbook model was correct most of the time, but not always. At times, it seemed, the Fed could try to get the money supply to rise, but the banks just wouldn't go along.

Now according to Kling, the decline in economic activity may have nothing to do with a decrease in aggregate demand. In fact, a decline in economic activity can occur even if aggregate demand remains constant. Kling argues that economic activity should not be viewed solely as stemming from spending in the economy. Instead, he argues that economic activity is best viewed by focusing on specialization and trade.

At any given point in time, certain specializations are needed to sustain the pattern of trade, as dictated by buying preferences. For example, buyers may want to buy goods X, Y, and Z in large quantities, and specializations X, Y, and Z are necessary to produce these goods. If either business firms are not producing X, Y, and Z, or if labor is not skilled in those specializations, then what buyers want to buy is out of sync with what business

and labor are producing and have to sell. As a result, sales decline, not necessarily because aggregate demand in the economy has dropped but because, as stated, *businesses and labor are out of sync with what buyers want to buy*. In short, the current pattern of specialization and trade is *unsustainable*. To illustrate, a person who was taking applications for subprime mortgages in 2006 had to find a different line of work by 2009, and someone who operated a large bookstore in a mall ten years ago might find that business unsustainable today.

The job of the entrepreneur, in Kling's perspective on the economy, is to reconfigure specializations and trade so that both are sustainable—so that both are consistent with what buyers want to buy. Usually, this is not easy to do. Entrepreneurs may have to experiment with configurations of specializations and trade before they figure out which are in sync with what buyers want to buy.

Now certainly, in a dynamic economy, these reconfigurations go on all the time, but, Kling argues, at times they are harder to figure out or to adjust to. For example, given large-scale demand shifts or major changes in technology, it might take more trial and error before the reconfiguration of capital and labor is consistent with a pattern of sustainable specialization and trade.

In addition, reconfigurations of capital and labor sometimes run into impediments that are unrelated to purely economic issues. For example, suppose reconfigurations of capital and labor are needed in a field such as health care or education. Entrepreneurs are willing and able to direct the reconfigurations into a sustainable pattern of specialization and trade, but, because of the licensing or credential requirements for entry into the field, they cannot.

From the PSST perspective of the economy, therefore, a fiscal and monetary stimulus that is designed to boost aggregate demand sometimes does not work at reviving the economy. If the recession is due to buyers and sellers being out of sync with each other, greater aggregate demand isn't the solution. In that case, not only is a boost in aggregate demand not the solution; it could just make matters worse. If the stimulus is directed at propping up unsustainable specializations and trade, then it sends the wrong signal to some workers. It is erroneously telling them that their current specializations (job skills) will continue to be in demand when, in fact, they may not be.

15-2b Monetary Policy and the Activist–Nonactivist Debate

Recall that some economists argue that fiscal policy either is ineffective (owing to crowding out) or works in unintended and undesirable ways (owing to lags). Other economists, notably Keynesians, believe that neither is the case and that fiscal policy not only can, but should, be used to smooth out the business cycle. This point of contention is part of the activist–nonactivist debate, which encompasses both fiscal and monetary policy. This section addresses the *monetary policy* component of the activist–nonactivist debate.

Activists argue that monetary policy should be deliberately used to smooth out the business cycle. They are in favor of economic **fine-tuning**, which is the (usually frequent) use of monetary policy to counteract even small undesirable movements in economic activity. Sometimes, the monetary policy they advocate is called either *activist* or *discretionary monetary policy.*

Nonactivists argue *against* the use of activist or discretionary monetary policy. Instead, they propose a rules-based monetary policy. Sometimes, the monetary policy they propose is called either *nonactivist*, or *rules-based*, *monetary policy.* An example of a rules-based monetary policy is one based on a predetermined steady growth rate in the money supply, such as allowing the money supply to grow 3 percent a year, no matter what is happening in the economy.

Activists
Persons who argue that monetary and fiscal policies should be deliberately used to smooth out the business cycle.

Fine-Tuning
The (usually frequent) use of monetary and fiscal policies to counteract even small undesirable movements in economic activity.

Nonactivists
Persons who argue against the deliberate use of discretionary fiscal and monetary policies. They believe in a permanent, stable, rule-oriented monetary and fiscal framework.

ECONOMICS 24/7

Monetary Policy and Blue Eyes

Two days before the beginning of the fall semester at a college in the Midwest, Suzanne, a student at the college, was waiting in line to register for classes. As she waited, she looked through the fall schedule. She had to take an economics principles course at 10 a.m., and two sections were listed for that time. Hernandez was the instructor for one section; Jones, for the other. Suzanne, not knowing which section to take, asked the person behind her in line if he had ever taken a course with either instructor. The person said that he had taken a course with Hernandez and that he was very good. That was enough for Suzanne; she signed up for Hernandez's class.

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While a student in Hernandez's class, Suzanne met the person whom she ended up marrying. His name is Bob. Suzanne often says to Bob, "You know, if that guy behind me in line that day had said that Hernandez wasn't a good teacher or hadn't said anything at all, I might never have taken Professor Hernandez's class. I might have taken Jones's class instead, and I would never have met you. I'd probably be married to someone else right now." This (untrue) story is representative of the many little things that happen every day. Little events can make big differences.

Consider another story (this one about monetary policy) that is also not true but that, if it hasn't happened, certainly can.

A few years ago, Real GDP was below its natural level, and the Fed decided to increase the money supply. As a result, the *AD* curve in the economy shifted to the right. One of the first places to feel the new demand in the economy was Denver, where economic activity increased. Jake, who lived in Austin at the time, was out of work and looking for a job. He heard about the job prospects in Denver, and so one day he got into his car and headed for Denver. Luckily for him, a few days after arriving in Denver, he got a job and rented an apartment near his workplace. He became a friend of Nick, who lived in the apartment across the hall.

Nick, knowing that Jake was new in town, asked Jake if he wanted a date with his girlfriend's friend, Melanie, and Jake said yes. Jake and Melanie ended up dating for two years, and they've been married now for ten years. They have three children, all of whom have blue eyes.

One day, the youngest child asked her mother why she had blue eyes. Her mother told her it's because both she and her daddy have blue eyes. And that's not an incorrect explanation, as far as it goes. But we can't help wondering if the youngest child has blue eyes because of an event that took place years ago, an event that has to do with the Fed and the money supply. After all, if the Fed hadn't increased the money supply when it did, maybe Denver's job prospects wouldn't have been so attractive, and maybe Jake wouldn't have left Austin. And if Jake had not left Austin, he wouldn't have married Melanie and had three children, each with blue eyes.

We're just speculating, of course.

15-2c The Case for Activist (or Discretionary) Monetary Policy

The case for activist (or discretionary) monetary policy rests on three major claims:

1. *The economy does not always equilibrate quickly enough at Natural Real GDP.* Consider the economy at point 1 in Exhibit 7(a). Some economists maintain that, left on its own, the economy will eventually move to point 2 in part (b). Activists argue that the economy takes too long to move from point 1 to point 2 and that in the interim too much output is lost and too high an unemployment rate must be tolerated. They believe that an activist monetary policy speeds things along so that higher output and a lower unemployment rate can be achieved more quickly.

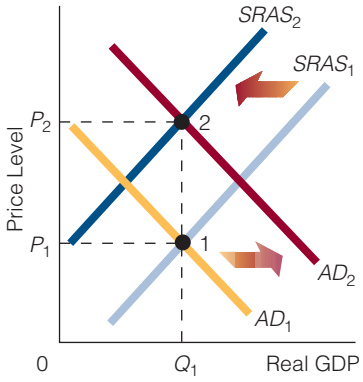
2. *Activist monetary policy works; it is effective at smoothing out the business cycle.* Activists are quick to point to the undesirable consequences of the constant monetary policy of the mid-1970s. In 1973, 1974, and 1975, the money supply growth rates were 5.5 percent, 4.3 percent, and 4.7 percent, respectively. These percentages represent a nearly constant growth rate in the money supply. The economy, however, went through a recession during this time; Real GDP fell between 1973 and 1974 and between 1974 and 1975. Activists argue that an activist and flexible monetary policy would have reduced the high cost the economy had to pay in terms of lost output and high unemployment.
3. *Activist monetary policy is flexible; nonactivist (rules-based) monetary policy is not.* Activists argue that flexibility is a desirable quality in monetary policy; inflexibility is not. Implicitly, activists maintain that the more closely monetary policy can be designed to meet the particulars of a given economic environment, the better. For example, at certain times the economy requires a sharp increase in the money supply and at other times, a sharp decrease; at still other times, only a slight increase or decrease is needed. Activists argue that activist (discretionary) monetary policy can change as the monetary needs of the economy change; nonactivist, rules-based, or the-same-for-all-seasons monetary policy cannot.

15-2d The Case for Nonactivist (Rules-Based) Monetary Policy

The case for nonactivist (rules-based) monetary policy also rests on three major claims:

1. *In modern economies, wages and prices are sufficiently flexible to allow the economy to equilibrate at reasonable speed at Natural Real GDP.* For example, nonactivists point to the sharp drop in union wages in 1982 in response to high unemployment. In addition, they argue that government policies largely determine the flexibility of wages and prices. For example, when government decides to cushion people's unemployment (e.g., through unemployment compensation), wages will not fall as quickly as when government does nothing. Nonactivists believe that a laissez-faire, hands-off approach by government promotes speedy wage and price adjustments and thus a quick return to Natural Real GDP.
2. *Activist monetary policies may not work.* Some economists argue that there are really two types of monetary policy: (1) monetary policy that is anticipated by the public and (2) monetary policy that is not. Anticipated monetary policy may not be effective at changing Real GDP or the unemployment rate. We discuss this subject in detail in the next chapter, but here is a brief explanation. Suppose the public correctly anticipates that the Fed will soon increase the money supply by 10 percent. Consequently, the public reasons that aggregate demand will increase from AD_1 to AD_2, as shown in Exhibit 9, and prices will rise.

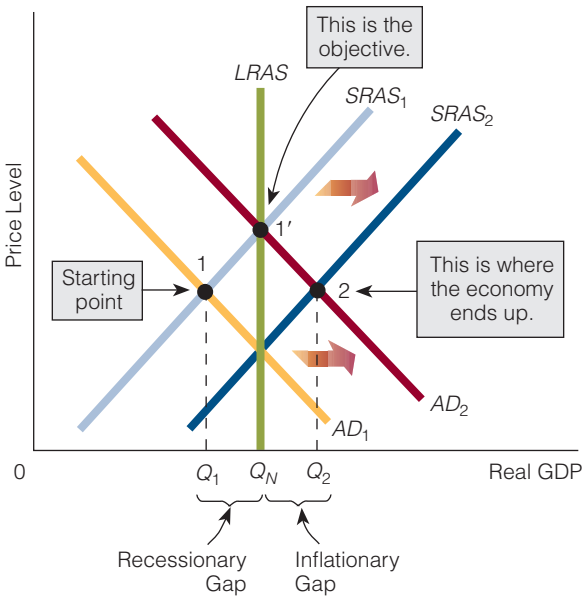
EXHIBIT 9



Expansionary Monetary Policy and No Change in Real GDP

If expansionary monetary policy is anticipated (thus, a higher price level is anticipated), workers may bargain for and receive higher wage rates. Possibly, the *SRAS* curve will shift leftward to the same degree that expansionary monetary policy shifts the *AD* curve rightward. Result: No change in Real GDP.

EXHIBIT 10



Monetary Policy May Destabilize the Economy

In this scenario, the *SRAS* curve is shifting rightward (ridding the economy of its recessionary gap), but Fed officials do not realize this is happening. They implement expansionary monetary policy, and the *AD* curve ends up intersecting $SRAS_2$ at point 2 instead of intersecting $SRAS_1$ at point 1′. Fed officials end up moving the economy into an inflationary gap and thus destabilizing the economy.

Workers are particularly concerned about the expected higher price level because they know higher prices decrease the buying power of their wages. In an attempt to maintain their real wages, workers bargain for and receive higher money wage rates, thereby shifting the short-run aggregate supply curve from $SRAS_1$ to $SRAS_2$ in Exhibit 9.

Now, if the *SRAS* curve shifts leftward (owing to higher wage rates) to the same degree as the *AD* curve shifts rightward (owing to the increased money supply), Real GDP does not change but stays constant at Q_1. Thus, *a correctly anticipated increase in the money supply will be ineffective at raising Real GDP.*

3. *Activist monetary policies are likely to be destabilizing rather than stabilizing; they are likely to make matters worse, not better.* Nonactivists point to lags as the main reason that activist (or discretionary) monetary policies are likely to be destabilizing. (The total lag consists of the data, wait-and-see, legislative, transmission, and effectiveness lags discussed in Chapter 11.) Nonactivists argue that a long lag (e.g., 12 to 20 months) makes it almost impossible to conduct effective activist monetary policy. By the time the Fed's monetary stimulus arrives on the scene, the economy may not need any stimulus, and thus the policy measures will likely destabilize the economy. In this instance, the stimulus makes things worse rather than better.

Exhibit 10 illustrates the last point. Suppose the economy is currently in a recessionary gap at point 1. The recession is under way before Fed officials recognize it. Once they become aware of the recession, however, the officials consider expanding the money supply in the hopes of shifting the *AD* curve from AD_1 to AD_2 so that it will intersect the *SRAS* curve at point 1′, at Natural Real GDP.

In the interim, however, unknown to everybody, the economy is regulating itself: The *SRAS* curve is shifting to the right. Fed officials don't realize that this shift is occurring because collecting and analyzing data about the economy take time. Thinking that the economy is not regulating itself, or not regulating itself quickly enough, Fed officials implement expansionary monetary policy, and the *AD* curve shifts rightward. By the time the increased money supply is felt in the goods and services market, the *AD* curve intersects the *SRAS* curve at point 2. In short, the Fed has moved the economy from point 1 to point 2—not, as it had hoped, from point 1 to point 1′. The Fed has moved the economy into an inflationary gap. Instead of stabilizing and moderating the business cycle, the Fed has intensified it.

ECONOMICS 24/7

Who Gets the Money First, and What Happens to Relative Prices?

Besides expansionary and contractionary monetary policies and their effects on Real GDP and the price level, other effects have to be considered:

- The distribution of the increase in the money supply (in the case of expansionary monetary policy)
- How a change in the money supply might affect relative prices (as opposed to the price level)

Let's look at how these two effects interact. When the money supply expands by, say, $100 billion, not every member of the public gets some of the new money. To illustrate, suppose the Fed undertakes an open market purchase, which results in a rise in reserves in the banking system. Faced with greater (and excess) reserves, banks start to make more loans (new checkable deposits). The first economic actors to get the new money (as a result of the open market purchase) are the banks; the second economic actors are the individuals and firms who take out loans.

Now let's say that one of the second economic actors is Caroline, who spends the money from her new loan to buy good X from Richard. If Caroline would not have purchased good X without the loan, then the demand for good X presumably rises because of the loan (which the bank created as a result of the Fed's open market purchase). Therefore, if the demand for good X rises, so will its absolute (or money) price. If the absolute price of good X rises, so will its relative price, *ceteris paribus*. Conclusion: An increase in the money supply can change not only the price level, but relative prices too.

Of course, an increase in the money supply changes relative prices because not everyone gets the new money at the same time. Caroline gets the new money before the seller of good X (Richard) gets it, and so on. When the money supply is increased, some people get the new money before others, and so the goods and services these people buy rise in price relative to the prices of the goods and services they do not buy. If the Carolines of the world (who get the new money first) buy good X and not good Y, and the non-Carolines of the world (who get the new money later) buy good Y, we can expect that, initially, the price of good X will rise relative to good Y.

15-3 Nonactivist Monetary Proposals

The five nonactivist (rules-based) monetary proposals are as follows:

1. Constant-money-growth-rate rule
2. Predetermined-money-growth-rate rule
3. The Taylor rule
4. Inflation targeting
5. (Nominal) GDP targeting

15-3a Constant-Money-Growth-Rate Rule

Many nonactivists argue that the sole objective of monetary policy is to stabilize the price level. To this end, they propose a *constant-money-growth-rate rule.* One version of the rule is:

> *The annual money supply growth rate will be constant at the average annual growth rate of Real GDP.*

For example, if the average annual Real GDP growth rate is approximately 3.3 percent, the money supply should be put on automatic pilot and be permitted to grow at an annual rate of 3.3 percent. The money supply will grow at this rate regardless of the state of the economy.

Some economists predict that a constant-money-growth-rate rule will bring about a stable price level over time because of the equation of exchange ($MV \equiv PQ$). If the average annual growth rate in Real GDP (Q) is 3.3 percent and the money supply (M) grows at 3.3 percent, the price level should remain stable over time. Advocates of this rule argue that in some years the growth rate in Real GDP will be below its average rate, causing an increase in the price level, and that in other years the growth rate in Real GDP will be above its average rate, causing a fall in the price level, but over time, the price level will be stable.

15-3b Predetermined-Money-Growth-Rate Rule

Critics of the constant-money-growth-rate rule point out that it makes two assumptions: (1) Velocity is constant; (2) the money supply is defined correctly. Critics argue that velocity has not been constant in some periods. Also, not yet clear is which definition of the money supply is the proper one and therefore which money supply growth rate should be fixed: M1, M2, or some broader monetary measure.

Largely in response to the charge that velocity is not always constant, some nonactivists prefer the following rule:

> *The annual growth rate in the money supply will be equal to the average annual growth rate in Real GDP minus the growth rate in velocity.*

In other words,

$$\%\Delta M = \%\Delta Q - \%\Delta V$$

With this rule, the growth rate of the money supply is not fixed. It can vary from year to year, but it is predetermined in that it is dependent on the growth rates of Real GDP and velocity. For this reason, we call it the *predetermined-money-growth-rate rule.* To illustrate the workings of this rule, consider the following extended version of the equation of exchange:

$$\%\Delta M + \%\Delta V = \%\Delta P + \%\Delta Q$$

Suppose $\%\Delta Q$ is 3 percent and $\%\Delta V$ is 1 percent. The rule specifies that the growth rate in the money supply should be 2 percent. This growth rate would keep the price level stable; there would be a 0 percent change in P:

$$\%\Delta M + \%\Delta V = \%\Delta P + \Delta Q$$
$$2\% + 1\% = 0\% + 3\%$$

15-3c The Fed and the Taylor Rule

Economist John Taylor has argued for a middle ground, of sorts, between activist and nonactivist monetary policy. He has proposed that monetary authorities use a rule to guide them in making their discretionary decisions.

His rule has come to be known as the *Taylor rule*, which specifies how policy makers should set the federal funds rate target (recall from an earlier chapter that the federal funds rate is the interest rate banks charge one another for reserves). The economic thinking implicit behind the Taylor rule is that there is some federal funds rate target that is consistent with (1) stabilizing inflation around a rather low inflation rate and (2) stabilizing Real GDP around its full-employment level. The aim is to find this target and then to use the Fed's tools to hit it.

Here is how John Taylor, for whom the Taylor rule is named, defines the particulars of the rule: The federal funds rate target "should be one-and-a-half times the inflation rate plus one-half times the GDP gap plus one."[4]

Algebraically, the Taylor rule specifies:

$$\text{Federal funds rate target} = 1.5\,(\text{inflation rate}) + 0.5\,(\text{GDP gap}) + 1$$

In this equation, the GDP gap measures the percentage deviation of Real GDP from its potential level. Let's use the rule to find the federal funds rate target that Taylor recommends to the Fed. Suppose the inflation rate is 5 percent and the GDP gap is 3 percent. Putting these percentages in our equation, we get:

$$\begin{aligned}\text{Federal funds rate target} &= 1.5\,(5 \text{ percent}) + 0.5\,(3 \text{ percent}) + 1\\ &= 7.5 + 1.5 + 1\\ &= 10 \text{ percent}\end{aligned}$$

15-3d Inflation Targeting

Many economists recommend **inflation targeting**, which requires that the Fed try to keep the inflation rate near a predetermined level. Three major issues surround inflation targeting. The first deals with whether the inflation rate target should be a specific percentage rate (e.g., 2.5 percent) or a narrow range (e.g., 1.0–2.5 percent). Second, whether it is a specific percentage rate or range, what should the rate or range be? For example, if it is specific percentage rate, should it be, say, 2.0 percent or 3.5 percent? The last issue deals with whether the inflation rate target should be announced or not. In other words, if the Fed adopts an inflation rate target of, say, 2.5 percent, should the target be disclosed to the public?

Inflation Targeting
Targeting that requires the Fed to keep the inflation rate near a predetermined level.

Numerous central banks in the world practice inflation targeting, and they announce their targets. For example, the Bank of Canada has set a target of 2 percent (inflation), and it has been announcing its inflation target since 1991. Other central banks that practice inflation targeting are the Bank of England, the Central Bank of Brazil, the Bank of Israel, and the Reserve Bank of New Zealand.

For an inflation rate target approach, the Fed would undertake monetary policy actions to keep the actual inflation rate near or at its target. For example, if its target rate is 2 percent and the actual inflation rate is, say, 5 percent, it would cut back the growth rate in the money supply (or the absolute money supply) to bring the actual inflation rate nearer to the target.

The proponents of inflation targeting argue that such a policy is more in line with the Fed's objective of maintaining near price stability. The critics of inflation targeting often argue that such a policy would constrain the Fed at times, such as when it might need to overlook the target to deal with a financial crisis.

15-3e Nominal GDP Targeting

A new economic school arose in the late 2000s: *market monetarism*.[5] It originated not in the academic journals or in a university economics department, but in the blogosphere.

4. John Taylor, *Getting Office Track* (Hoover Institution Press, 2009), p. 67.
5. The term *market monetarism* was coined by Danish economist Lars Christennsen in August 2011. He writes that "market monetarism shares many of the views of traditional monetarist but unlike traditional monetarism, market monetarism is skeptical about the usefulness of monetary aggregates as policy instruments and as an indicator for the monetary policy stance. Instead, market monetarists recommend using market pricing to evaluate the stance of monetary policy and as a policy instrument. Contrary to traditional monetarists – who recommend a rule for money supply growth – market monetarists recommend targeting the Nominal GDP (NGDP) level."

The event that prompted the birth of market monetarism was the Great Recession, the recession that began in December 2007 and took a sharp downward movement in September 2008. Many economists argued that the Great Recession was caused by the financial crisis (to be discussed in Chapter 18) that was occurring at the time. Problems in the banking and financial sectors of the economy, they argued, were the cause of the recession. Other economists, who came to be known as market monetarists, disagreed. They argued that the recession was caused by monetary policy that was too tight or not expansionary enough. Economist Scott Sumner (Bentley University) strongly advocates market monetarist ideas in his blog *The Money Illusion*. Sumner, like other market monetarists, argues that the optimal monetary policy is for the Fed to set a nominal GDP target, such as a rise in nominal GDP of 5 to 6 percent a year, and then to adjust money supply growth in such a way as to hit the target.

We can understand the policy prescription in terms of the equation of exchange (discussed in an earlier chapter), which states that the money supply times velocity must equal (nominal) GDP: $M \times V \equiv$ GDP. Now suppose a financial crisis occurs, and as a result, people try to hold more money (spend less). This reaction is likely to reduce velocity, and if the Fed doesn't sufficiently offset this decline in velocity, GDP will decline. If velocity declines by, say, 8 percent, and the money supply rises by 6 percent, GDP will *decline* by 2 percent. If the objective is to raise GDP by 5 percent, an 8 percent decline in velocity would obligate the Fed to increase the money supply by 13 percent. Any less of an increase would prompt market monetarists to argue that the monetary policy is "too tight."

If monetary policy leads to a decline in nominal GDP, nominal income also declines (nominal GDP and nominal income are two sides of the same coin). As a result of the decline in their nominal incomes, individuals will have a hard time paying off their debts (which were contracted at an earlier time, based on nominal incomes that were not expected to decline or to decline so much). Take a representative case: A person with an income of $100,000 a year incurs a debt that he has to pay off monthly for five years. Each month for five years, he must pay $2,000. Then nominal GDP and nominal income decline. The debtor's income falls, and thus he finds it harder to make his monthly payment of $2,000. As a result, he contracts his spending in the economy, and his demand for goods and services declines. If enough debtors cut back on their spending, aggregate demand in the economy declines, firms lose sales and lay off employees, the unemployment rate rises, and so on.

Self-Test

1. Would a rules-based monetary policy produce price stability?
2. Suppose the inflation rate is 4 percent, and the GDP gap is 5 percent. What is the Taylor rule recommendation for the federal funds rate target?
3. What is the monetary policy prescription of the market monetarists?

Office Hours

"Does Monetary Policy Always Have the Same Effects?"

STUDENT:

Does monetary policy always have the same effects?

INSTRUCTOR:

Instead of my giving you the answer, think back to the Keynesian transmission mechanism, and try to answer your question.

STUDENT:

In the transmission mechanism, an increase in the money supply lowers the interest rate. The lower interest rate then increases investment. And the increased investment raises aggregate demand.

INSTRUCTOR:

Ask yourself whether the lower interest rate always raises investment.

STUDENT:

No, it doesn't always raise investment. If investment is interest insensitive, the lower interest rate will leave investment unchanged.

INSTRUCTOR:

There's something else too. Suppose investment is responsive to changes in the interest rate. In other words, if the interest rate falls, investment will rise. But the question is whether investment always rises by the same amount. For example, if in year 1 the interest rate falls from 6 percent to 5 percent and investment rises from $300 billion to $400 billion, does it follow that every time the interest rate falls from 6 percent to 5 percent, investment will rise by $100 billion?

STUDENT:

I see your point. You're saying that, although investment might always rise as the interest rate falls, it doesn't necessarily rise by the same amount every time. If it doesn't rise by the same amount every time, then there is no guarantee that aggregate demand will rise by the same amount every time (because increases in investment lead to increases in aggregate demand).

INSTRUCTOR:

That's correct. We'd now have to conclude that expansionary monetary policy won't always increase aggregate demand by the same amount. In other words, a money supply expansion of $30 billion might raise aggregate demand more at one time than at some other time.

STUDENT:

So one answer to my question—whether monetary policy always has the same effects—is, no, monetary policy doesn't always change aggregate demand by the same amount.

INSTRUCTOR:

That's correct. This discussion also helps us to understand why economists—even those of the same school of thought—might disagree with each other. For example, suppose Smith and Jones both believe that monetary policy affects the economy through the Keynesian transmission mechanism. Just because both accept the Keynesian transmission mechanism, they don't both necessarily think that a given increase in the money supply is going to affect aggregate demand to the same degree. Although both might agree that an expansion in the money supply will increase aggregate demand, they might disagree as to how much aggregate demand will increase. Smith might think aggregate demand will rise only a little because investment will not rise much when the interest rate drops. Jones might think aggregate demand will rise a lot because investment will rise a lot when the interest rate drops.

POINTS TO REMEMBER

1. Monetary policy doesn't always have the same effects. With reference to the Keynesian transmission mechanism, expansionary monetary policy might lead to a large change in investment at some times (when investment is highly responsive to changes in the interest rate) and only a small change in investment at other times (when investment is somewhat insensitive to changes in the interest rate). Expansionary monetary policy therefore might not always change aggregate demand to the same degree.
2. Even economists of the same school of thought can disagree with each other at times. For example, although two economists might agree that a rise in the money supply will change investment (or aggregate demand), they might disagree as to *how much* investment (or aggregate demand) will change.

Chapter Summary

THE KEYNESIAN TRANSMISSION MECHANISM

- The Keynesian route between the money market and the goods and services market is indirect. Changes in the money market must affect the investment goods market before the goods and services market is affected. Assuming that no liquidity trap exists and investment is not interest insensitive, the transmission mechanism works as follows for an increase in the money supply: an increase in the money supply lowers the interest rate and increases investment, thereby increasing aggregate demand and thus shifting the *AD* curve rightward. Consequently, Real GDP rises. Under the same assumptions, the transmission mechanism works as follows for a decrease in the money supply: a decrease in the money supply raises the interest rate and decreases investment, thereby decreasing aggregate demand and thus shifting the *AD* curve leftward. As a result, Real GDP falls.
- The Keynesian transmission mechanism may be short-circuited either by the liquidity trap or by interest-insensitive investment. Both are Keynesian notions. If either is present, Keynesians predict that expansionary monetary policy will be unable to change Real GDP.

THE MONETARIST TRANSMISSION MECHANISM

- The monetarist route between the money market and the goods and services market is direct. Changes in the money supply affect aggregate demand. An increase in the money supply causes individuals to increase their spending on a wide variety of goods.

BOND PRICES AND INTEREST RATES

- Interest rates and the prices of old or existing bonds are inversely related.

THE ACTIVIST–NONACTIVIST DEBATE

- Activists argue that monetary policy should be deliberately used to smooth out the business cycle; they favor using activist, or discretionary, monetary policy to fine-tune the economy. Nonactivists argue against the use of discretionary monetary policy; they propose nonactivist, or rules-based, monetary policy.
- The case for discretionary monetary policy rests on three major claims: (1) The economy does not always equilibrate quickly enough at Natural Real GDP. (2) Activist monetary policy works. (3) Activist monetary policy is flexible, and flexibility is a desirable quality in monetary policy.
- The case for nonactivist monetary policy rests on three major claims: (1) There is sufficient flexibility in wages and prices in modern economies to allow them to equilibrate at reasonable speed at Natural Real GDP. (2) Activist monetary policies may not work. (3) Activist monetary policies are likely to make matters worse rather than better.

NONACTIVIST (RULES-BASED) MONETARY PROPOSALS

- The constant-money-growth-rate rule states that the annual money supply growth rate will be constant at the average annual growth rate of Real GDP.
- The predetermined-money-growth-rate rule states that the annual growth rate in the money supply will be equal to the average annual growth rate in Real GDP minus the growth rate in velocity.
- The Taylor rule specifies: Federal funds rate target = 1.5 (inflation rate) + 0.5 (GDP gap) + 1.
- Inflation targeting requires the Fed to keep the inflation rate near a predetermined level.
- Market monetarists advocate a monetary policy that targets nominal GDP.

Key Terms and Concepts

Transmission Mechanism
Demand for Money (Balances)
Liquidity Trap
Expansionary Monetary Policy
Contractionary Monetary Policy
Activists
Fine-tuning
Nonactivists
Inflation Targeting

Video Questions and Problems

For video tutorials and answers, visit www.cengagebrain.com and search Arnold.

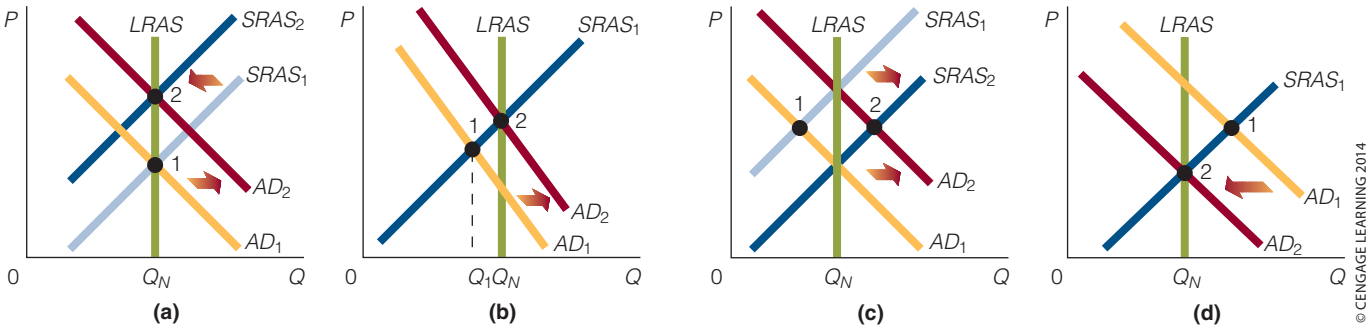
1. Explain and diagrammatically represent the Keynesian transmission mechanism.
2. Explain how monetary policy can (under certain conditions) remove an economy from a recessionary gap.
3. Explain how monetary policy may destabilize the economy.
4. Saying that individuals are holding an excess supply of money is absurd because no one ever has enough money. Do you agree or disagree? Explain your answer.
5. What does it mean to say that investment is interest insensitive?

Questions and Problems

1. Consider the following: Two researchers, A and B, are trying to determine whether eating fatty foods leads to heart attacks. The researchers proceed differently. Researcher A builds a model in which fatty foods may first affect X in one's body, and if X is affected, then Y may be affected, and if Y is affected, then Z may be affected. Finally, if Z is affected, the heart is affected, and the individual has an increased probability of suffering a heart attack. Researcher B doesn't proceed in this step-by-step fashion. She conducts an experiment to see whether people who eat many fatty foods have more, fewer, or the same number of heart attacks as people who eat few fatty foods. Which researcher's methods have more in common with the research methodology implicit in the Keynesian transmission mechanism? Which researcher's methods have more in common with the research methodology implicit in the monetarist transmission mechanism? Explain your answer.
2. If bond prices fall, will individuals want to hold more or less money? Explain your answer.
3. Why is the demand curve for money downward sloping?
4. Explain how it is possible to have too much money.
5. Explain how the Keynesian transmission mechanism works.
6. Explain how the monetarist transmission mechanism works.
7. It has been suggested that nonactivists are not concerned with the level of Real GDP and unemployment because most (if not all) nonactivist monetary proposals set as their immediate objective the stabilization of the price level. Discuss.
8. Suppose the combination of more accurate data and better forecasting techniques would make it easy for the Fed to predict a recession 10 to 16 months in advance. Would this strengthen the case for activism or nonactivism? Explain your answer.
9. According to the theory of PSST (patterns of specialization and sustainable trade), economic activity can decline in the face of unchanged aggregate demand. How so?
10. Suppose it were proved that liquidity traps do not occur and that investment is not interest insensitive. Would this be enough to disprove the Keynesian claim that expansionary monetary policy is not always effective at changing Real GDP? Why or why not?
11. Both activists and nonactivists make good points for their respective positions. Do you think activists could say anything to nonactivists to convince them to accept the activist position, and vice versa? If so, what is it? If not, why not?
12. The discussion of supply and demand in Chapter 3 noted that if two goods are substitutes, the price of one and the demand for the other are directly related. For example, if Pepsi-Cola and Coca-Cola are substitutes, an increase in the price of Pepsi-Cola will increase the demand for Coca-Cola. Suppose that bonds and stocks are substitutes. We know that interest rates and bond prices are inversely related. What do you predict is the relationship between stock prices and interest rates? Explain your answer.
13. Argue the case for and against a monetary rule.
14. How does inflation targeting work?
15. Monetary policy can affect relative prices. Do you agree or disagree with this statement? Explain your answer.
16. According to market monetarists, what problems might arise from a sharp decline in Nominal GDP?
17. Does the monetary policy of the market monetarists take into account changes in velocity? Explain your answer.

Working with Numbers and Graphs

1. Manuel bought a bond last year for $10,000 that promises to pay him $900 a year. This year, he can buy a bond for $10,000 that promises to pay $1,000 a year. If Manuel wants to sell his old bond, what is its price likely to be?
2. Charu bought a bond last year for $10,000 that promises to pay her $1,000 a year. This year, investors can buy a bond for $10,000 that promises to pay $800 a year. If Charu wants to sell her old bond, what is its price likely to be?
3. The annual average percentage change in Real GDP is 2.3 percent, and the annual average percentage change in velocity is 1.1 percent. Using the monetary rule discussed in the text, what percentage change in the money supply will keep prices stable (on average)?
4. Graphically show that the more interest insensitive the investment demand curve is, the less likely it is that monetary policy will be effective at changing Real GDP.
5. Which panel in the figure best describes the situation in each of parts (a)–(d)?
   a. Expansionary monetary policy that effectively removes the economy from a recessionary gap
   b. Expansionary monetary policy that is destabilizing
   c. Contractionary monetary policy that effectively removes the economy from an inflationary gap
   d. Monetary policy that is ineffective at changing Real GDP
6. Graphically portray the Keynesian transmission mechanism under the following conditions:
   a. A decrease in the money supply
   b. No liquidity trap
   c. Downward-sloping investment demand
7. Graphically portray the monetarist transmission mechanism when the money supply declines.
8. According to the Taylor rule, if inflation is 8 percent and the GDP gap is 3 percent, what is the recommendation for the federal funds rate target?



APPENDIX D

Bond Prices and the Interest Rate

Bond prices and the interest rate are inversely related: As the price of bonds rises, the interest rate falls; as the price of bonds falls, the interest rate rises. In this appendix, we explain this relationship by looking closely at the money market and the bond market. The money market is shown in equilibrium in Exhibit 1(a). The equilibrium interest rate is 5 percent. The bond market is shown in equilibrium in Exhibit 1(b). The equilibrium bond price is P_{B1}.

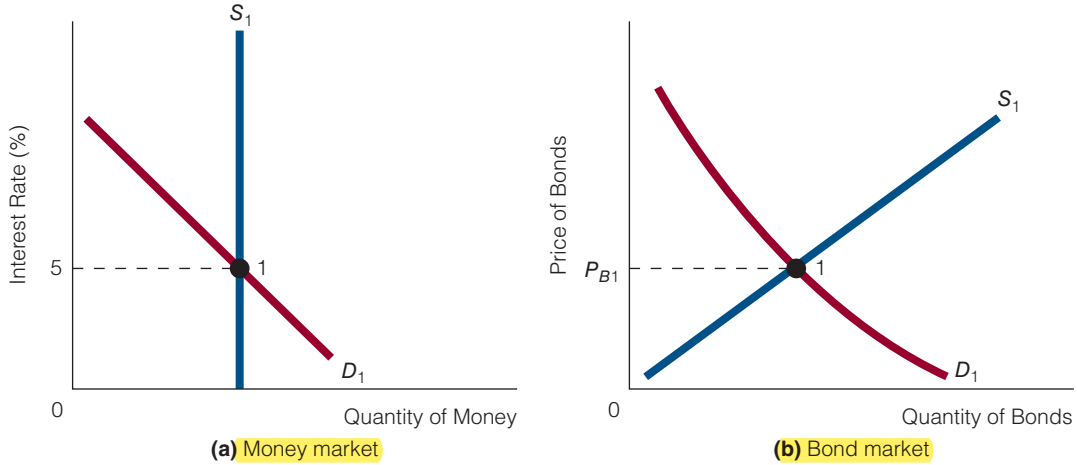
Suppose people have only two ways to hold their wealth: in money or in bonds. In other words, a person must always decide, "How much of my wealth do I hold in money and how much do I hold in bonds?" If someone's wealth is currently equal to $100,000, does this person hold $50,000 (of that wealth) in money and $50,000 in bonds, or $25,000 in money and $75,000 in bonds, and so on?

Because wealth can be held only in the form of money and bonds, if someone thinks she is holding *too much* money, she also must be thinking that she is holding too few bonds. In other words, a surplus of money necessarily implies a shortage of bonds. To illustrate, let's say the person is currently holding $25,000 in money and $75,000 in bonds. Then she thinks that she is holding too much money; so she must also think she is holding too little of her wealth in bonds. She might want to take $5,000 of her money and buy $5,000 worth of bonds so that she has $20,000 in money and $80,000 in bonds.

So, if a surplus of money signifies a shortage of bonds, then, in market terms, a surplus in the money market implies a shortage in the bond market. Suppose our person believes

EXHIBIT 1

The Money Market and the Bond Market (a) The money market in equilibrium at an interest rate of 5 percent. (b) The bond market is in equilibrium at a bond price of P_{B1}. When one of these markets is in equilibrium, the other is too.



that she is holding *too little* money. Instead of holding $25,000 in money, she would prefer to hold $30,000 in money. But of course, holding too little money necessarily implies that our person is holding too much of her wealth in bonds. In other words, a shortage of money implies a surplus of bonds.

So, a shortage in the money market implies a surplus in the bond market. Let's recap:

Holding too much of one's wealth in money → Holding too little of one's wealth in bonds

or

Surplus in the money market → Shortage in the bond market

and

Holding too little of one's wealth in money → holding too much of one's wealth in bonds

or

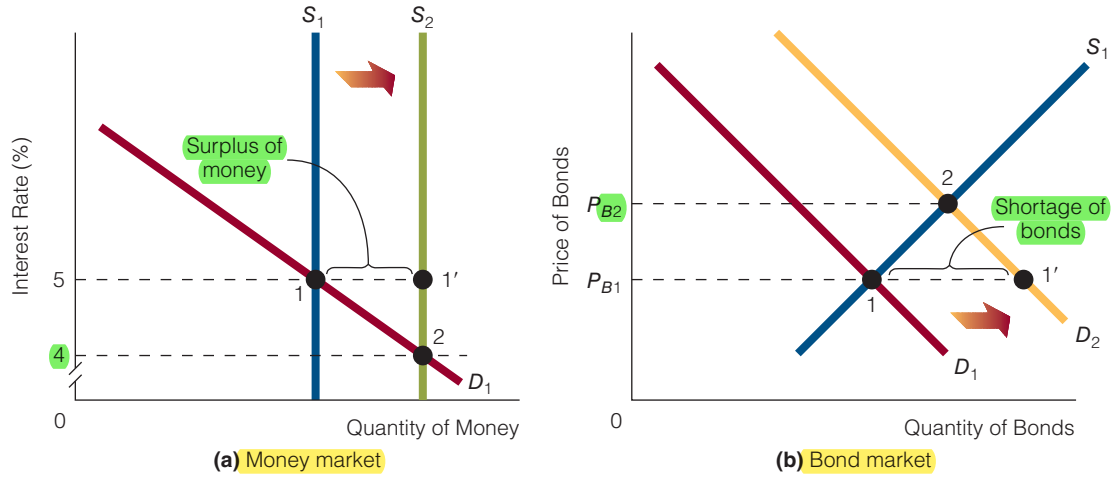
Shortage in the money market → Surplus in the bond market

Now let's look at Exhibit 2. At point 1 in each market, both the money market and the bond market are in equilibrium. People are holding just the right amount of money and

EXHIBIT 2

Changes in the Money Market Affect the Bond Market

(a) The money market is initially in equilibrium at point 1; the equilibrium interest rate is 5 percent. (b) The bond market is initially in equilibrium at point 1; the equilibrium bond price is P_{B1}. The Fed increases the money supply. In the money market [shown in part (a)], the supply of money curve shifts rightward from S_1 to S_2. At the interest rate of 5 percent, there is now a surplus of money. With their surplus of money, individuals start to buy more bonds, so the demand for bonds curve in panel (b) shifts rightward from D_1 to D_2. The result is a shortage of bonds in the bond market at the price of P_{B1}. Both markets are now in disequilibrium. The equilibrating process in the bond market pushes bond prices up. As bond prices rise, the interest rate falls, and that happens in the money market [shown in part (a)]. Eventually, both markets are back in equilibrium. The equilibrium interest rate is now 4 percent, and the price of bonds is now P_{B2}.



just the right amount of bonds. Suppose the Fed undertakes an action that increases the money supply. The money supply curve in Exhibit 2(a) shifts rightward from S_1 to S_2. At the initial interest rate of 5 percent, the money market now has a surplus of money. But as we recall, a surplus of money in the money market must mean a shortage of bonds in the bond market.

How does this shortage manifest itself? As a result of the surplus in the money market, individuals take their "surplus money" and start to buy bonds. The demand for bonds in the bond market shifts rightward from D_1 to D_2. So now there is a surplus of money in the money market at 5 percent and a shortage of bonds in the bond market at P_{B1}. Both markets are in disequilibrium at the specified interest rate and bond price.

The markets will begin to equilibrate. In the bond market, the price of bonds will begin to rise toward P_{B2}. As the price of bonds rises, the interest rate in the money market starts to fall, moving toward its equilibrium level of 4 percent. Finally, both markets are in equilibrium: the money market is at 4 percent and the bond market at P_{B2}.

Appendix Summary

- Suppose that an individual can hold his wealth only in terms of money and bonds. So if a person believes he is holding too much of his wealth in money, he also believes that he is holding too little of it in bonds. Similarly, if he believes he is holding too little of his wealth in money, he also believes that he is holding too much of it in bonds.
- A surplus in the money market implies a shortage in the bond market. A shortage in the money market implies a surplus in the bond market.

Questions and Problems

1. Draw both the money market and bond market in equilibrium. Next, explain and diagrammatically show what happens to the interest rate and the price of bonds as a result of the Fed's increasing the money supply.
2. Draw both the money market and bond market in equilibrium. Next, explain and diagrammatically show what happens to the interest rate and the price of bonds as a result of the Fed's decreasing the money supply.
3. Identify the state of the bond market (equilibrium, shortage, surplus), given each of the following:
   a. Shortage in the money market
   b. Surplus in the money market
   c. Equilibrium in the money market
4. Fed actions affect the money market but not the bond market. Do you agree or disagree with this statement? Explain your answer.