



Chapter 16: Monetary Theory and Monetary Policy

Learning Objectives

After studying this chapter, you should be able to

- 16.1** Understand the quantity theory of money
- 16.2** Discuss the Keynesian theory of money
- 16.3** Explain the liquidity preference theory of interest rate determination
- 16.4** Explain how changes in the demand for and supply of money affect the equilibrium rate of interest
- 16.5** Understand the relationship between the quantity of money and the level of gross domestic product
- 16.6** Discuss the meaning and objectives of monetary policy
- 16.7** Discuss the tools of monetary policy and explain how monetary policy works
- 16.8** Discuss the role of monetary policy in dealing with the 2008–2009 recession
- 16.9** Discuss the effectiveness and limitations of monetary policy

Assess Your Knowledge

- 1.** Is there any relationship between the quantity of money and the value of money?
- 2.** Is there any relationship between the level of income and the quantity of money that will be demanded?
- 3.** Indicate whether each of the following is true (T) or false (F):

- a. The higher the rate of interest, the greater the amount of money that will be deposited in savings accounts.
- b. Monetary policy is conducted by the Department of Finance.
- c. The actions of the Bank of Canada have no effect on the rate of interest.
- d. The commercial banks can borrow from the Bank of Canada.
- e. Monetary policy can be used to combat unemployment but not inflation.

The Quantity Theory of Money

LO 16.1 Understand the quantity theory of money

What Monetary Theory Studies

Monetary theory examines how the demand for and supply of money influence income, output, and the price level. It asks whether a link exists between the quantity of money and the price level, how interest rates are set, and what happens to output and interest rates when money demand rises. Each of these questions falls within the scope of monetary theory.

The Classical View: Quantity Theory of Money

Classical economists argued that changes in the quantity of money explain changes in the price level. This became known as the quantity theory of money—a theory that dominated thinking in the 19th and early 20th centuries.

Quantity theory of money: the theory that the price level moves in proportion to changes in the quantity of money.

By the 1930s, the quantity theory lost ground to Keynesian theory, which seemed to better explain the Great Depression. But Keynesian ideas struggled in the 1970s, when inflation and unemployment rose together. In response, Milton Friedman revived the quantity theory under a new name: monetarism.

The Basic Quantity Theory

The classical version of the theory states that the price level moves in direct proportion to the money supply. If the quantity of money doubles, prices are expected to double as well.

To understand this reasoning, classical economists introduced two tools: the velocity of money and the equation of exchange. The next section begins with the concept of velocity.

Velocity of Money

The velocity of circulation measures how many times, on average, a unit of money is spent in a year on final goods and services. For example, if Canada's gross domestic product is \$500 billion and the money supply is \$50 billion, then each dollar is used 10 times per year, on average, to purchase goods and services. The velocity in this case is 10.

Velocity of circulation: the average number of times a unit of money is spent per year.

Velocity is calculated as

$$V = \text{GDP} / M$$

where V is velocity, GDP is gross domestic product, and M is the quantity of money.

When economists first discussed velocity, GDP had not yet been developed. But since nominal GDP equals the price level multiplied by real output, we can write:

$$\text{Real GDP} = \text{GDP} / P$$

or

$$\text{GDP} = P \times \text{Real GDP}$$

Letting Q represent real GDP, we get:

$$\text{GDP} = P \times Q$$

Substituting into the velocity formula gives:

$$V = \text{GDP} / M = (P \times Q) / M$$

In other words, velocity equals the price level multiplied by real output, divided by the money supply.

The Equation of Exchange

Irving Fisher developed the equation of exchange in the early 20th century to formalize the relationship between money, output, and prices. It is written as:

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$$MV = PQ$$

Equation of exchange: an identity stating that the quantity of money multiplied by its velocity equals the price level multiplied by real output.

The variables have the same meanings as before: M is the money supply, V is velocity, P is the price level, and Q is real GDP. This equation is simply a restatement of the velocity formula; multiplying both sides of the velocity equation by M gives $MV = PQ$.

The left side, MV, represents total spending in the economy. For example, if the money supply is \$50 billion and each dollar is spent 10 times per year, then total spending is \$500 billion. The right side, PQ, represents nominal GDP—the market value of goods and services produced.

Since total spending equals the total value of output by definition, the equation of exchange is always true. It is an identity that links money, prices, and output.

From Identity to Theory

While the equation of exchange is always true by definition, it does not explain how prices are determined unless assumptions are added. Classical economists used the equation to build the quantity theory of money by making three key assumptions:

1. **The money supply is fixed by the central bank**—that is, **M is set independently of other economic forces**.
2. **Velocity, V, is constant** because it depends on habits and institutional arrangements—**not on M, P, or Q**.
3. **Real GDP, Q, is fixed at its full-employment level in the short run**.

Under these assumptions, P becomes the only variable that adjusts. Dividing both sides of the equation $MV = PQ$ by V gives:

$$M = (P \times Q) / V$$

Since Q and V are both fixed, the price level must move in direct proportion to the quantity of money.

In summary, the classical version of the quantity theory states: the price level is determined by the money supply. A change in the money supply causes a proportional change in prices.

The Logic of the Quantity Theory

The quantity theory of money rests on the idea that people hold money only to carry out transactions.

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Households and firms keep part of their wealth in cash or demand deposits **to pay for goods and services**. These forms of money **earn little or no interest**, so holding more than necessary offers no benefit.

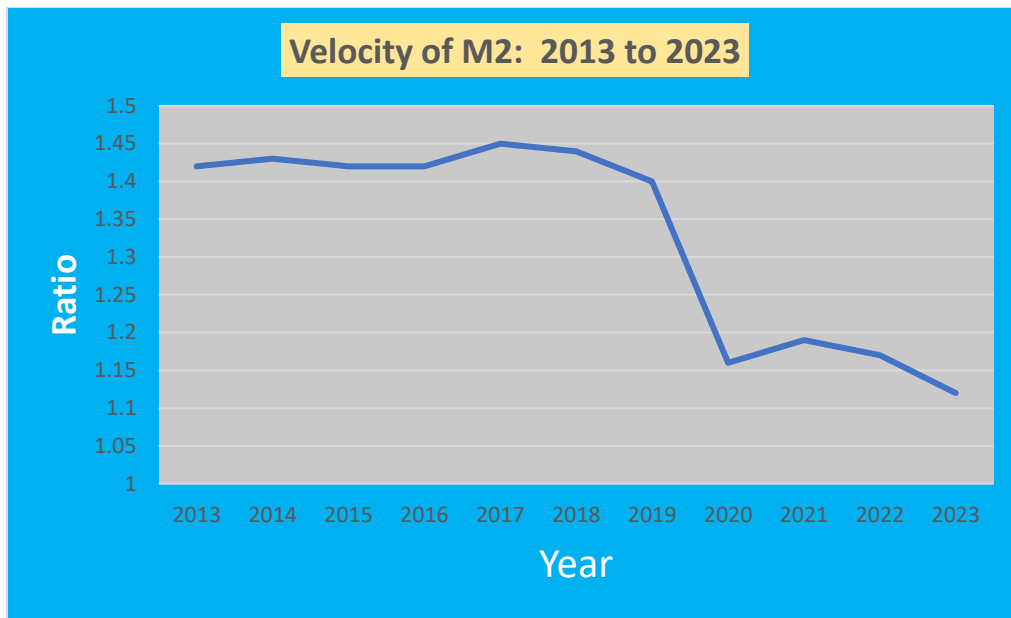
When the money supply increases, people find themselves holding more money than they need. Since they want to spend the excess, **total spending in the economy rises**. But under the assumption of **full employment**, output cannot rise to meet this extra demand.

As a result, the increase in spending pushes up prices. In this way, **an increase in the money supply leads directly to a rise in the price level**, not because output grows, but because the amount of money chasing goods increases.

Weaknesses of the theory

The quantity theory of money just presented has some limitations. Let us discuss them.

Figure 16.1 The Velocity of Circulation, 2013—2023



Sources: Statistics Canada, Table 36-10-0104-01: [Gross domestic product, expenditure-based, Canada, quarterly](#); Bank of Canada: [Monetary Aggregates](#).

Changes in the Velocity of Money in Canada (2013–2023)

Figure 16.1 shows that between 2013 and 2023, the velocity of money in Canada—measured using M2—**declined steadily from 1.42 to 1.12**. This trend indicates that each dollar was used less frequently to purchase goods and services over time.

From 2013 to 2019, velocity remained relatively stable, fluctuating between **1.40 and 1.45**. During this period, GDP and the money supply grew at similar rates. The Bank of Canada maintained moderate interest rates, and inflation was low. The stable velocity suggests that money demand and spending behavior remained unchanged.

In 2020, velocity dropped sharply from **1.40 to 1.16**, triggered by the COVID-19 pandemic. Several factors likely contributed:

- **Consumer spending collapsed** during lockdowns, particularly in travel, hospitality, and discretionary retail.
- **Precautionary savings increased** as households and firms held more money due to economic uncertainty.

- **The money supply expanded rapidly** because of emergency fiscal transfers and central bank asset purchases.

From **2021 to 2023**, velocity remained low, hovering around **1.12 to 1.19**. Although GDP recovered, the money supply continued to rise faster than spending:

- **Interest rates remained low**, reducing the cost of holding money.
- **Structural shifts in financial behavior**, such as increased saving and reduced cash usage, likely lowered the need for frequent money transactions.

In summary, the decline in Canada's velocity of money from 2013 to 2023 reflects **greater liquidity preferences, prolonged monetary stimulus, and pandemic-induced shifts in spending behavior**. While nominal GDP eventually recovered, the expanded money supply was not matched by a proportional increase in transaction volume.

Limitations of the Basic (Crude) Quantity Theory

The version of the quantity theory of money presented above—sometimes called the **crude** or **naive** quantity theory—relies on assumptions that weaken its explanatory power.

First, the theory assumes that output stays fixed at the full-employment level. In reality, the Canadian economy frequently operates **below full capacity**, as seen in past recessions and during periods of high unemployment. When real output (**Q**) varies, an increase in the money supply (**M**) may lead to **higher output rather than higher prices**. Alternatively, increases in **M** may raise both output and prices—but not necessarily in direct proportion to changes in the money supply.

Second, the theory assumes that the **velocity of money remains constant**. While velocity may be stable under certain conditions, it tends to fluctuate during periods of economic uncertainty. **In times of inflation**, for example, households and businesses try to **spend money more quickly**, anticipating further declines in purchasing power. This behavior causes **velocity to increase**.

Historical data supports this variation. In Canada, the velocity of circulation declined from **16.4 in 1990 to 6.3 in 2009**. In the United States, velocity dropped to **5.9 in 1993**, then rose to a peak of **10.1 in 2007**. These shifts illustrate that **velocity has not remained constant** over time, undermining one of the core assumptions of the crude quantity theory.

Modifications to the Crude Quantity Theory

The limitations of the crude quantity theory—**the assumptions that output is fixed at full employment and that velocity remains constant**—led economists to develop a more refined version known as monetarism.

The New Quantity Theory (Monetarism)

Monetarism represents a modern version of the quantity theory of money. It accepts that the economy can operate **below full employment**, allowing for fluctuations in output. This adjustment reflects a more realistic view of how actual economies behave over time.

Output as a Variable

In contrast to the crude theory, **monetarism allows real output to vary**, especially in the short run. The economy may experience **underutilized resources or cyclical unemployment**, meaning that increases in the money supply might raise both output and prices—**not prices alone**.

Predictable Changes in Velocity

While rejecting the notion that velocity is perfectly constant, monetarists argue that **changes in velocity occur gradually and predictably**. As a result, **velocity remains stable enough to retain its role in the quantity theory**, provided it is understood as a long-run average rather than a fixed number.

Focus on Nominal Income

Whereas the crude version emphasized a direct relationship between **money supply and the price level**, the modern approach focuses on **the relationship between the money supply and nominal income**—the product of the price level and real output.

Reformulated Quantity Equation

The updated version of the equation of exchange is:

$$M = (1/V) \times P \times Q$$

This form highlights that **nominal GDP ($P \times Q$)** is proportional to the money supply when **velocity changes predictably**. In this framework, **money plays a central role in determining income and expenditure over time**.

Velocity and the Income Equation

If **V is constant**, then **$1/V$** , denoted by **k**, is also constant. Since **$P \times Q$** equals **nominal income (Y)**, the quantity equation becomes:

$$M = kY$$

This equation implies that when **k is constant**, the **money supply is directly proportional to nominal income**. But in the modern version, because **V changes slightly over time**, **k is not fixed**. The implication is that **increases in M lead to increases in Y**, and **reductions in M lower Y**.

The Money–Income Relationship

The new quantity theory links changes in the money supply to changes in nominal income. Rather than focusing solely on price levels, **it emphasizes the total value of output and spending**.

Friedman and the Demand for Money

The revival of quantity theory thinking came largely from **Milton Friedman**, who reformulated it as a **theory of the demand for money**. Friedman treated money as an asset and believed that **people choose how much money to hold based on income and interest rates**.

Main Conclusions of Friedman’s Restatement

- 1. The demand for money rises with the price level.**
- 2. Real income influences the demand for money.**
- 3. The growth of the money supply and the growth of nominal income are directly linked.**

Monetarism as a School of Thought

This approach is known as **monetarism**—a theory that stresses the role of money in causing **economic fluctuations**. Monetarists argue that **macroeconomic stability depends on steady, predictable growth in the money supply**.

monetarism the school of thought that claims that changes in the money supply are the major cause of economic fluctuations and that macroeconomic stability can be achieved by a steady increase in the money supply.

The Keynesian Theory of Money

LO 16.2 Discuss the Keynesian theory of money

The Keynesian Theory of Money

The Keynesian theory is not an extension of the classical quantity theory—it is an **alternative framework**. Rather than focusing on the supply of money and its direct link to prices or income, **Keynes emphasized the motives behind the demand for money**. In Keynes's model, households and firms hold money not only for transactions but also for other reasons related to uncertainty and expectations.

Why Do People Hold Money?

Keynes identified **three motives** for holding money: **transactions, precautionary, and speculative**. Each

reflects a different reason for preferring liquidity over interest-bearing assets.

Reading Comprehension

1. According to the crude quantity theory of money, what is the relationship between the quantity of money and the price level?
2. Define the velocity of circulation of money. How can the velocity of circulation of money be measured?
3. Explain the equation of exchange. Is this equation a theory of money?
4. What are the assumptions of the crude quantity theory of money?
5. Does the Canadian or U.S. experience in recent years support the assumption of a constant velocity of circulation of money? Explain.
6. How does the new quantity theory differ from the crude quantity theory?
7. What are the main conclusions of the new quantity theory of money?

The Transactions Demand for Money

The **transactions demand** refers to the **money people hold to carry out everyday payments**—such as buying groceries, paying bills, or purchasing services. In this respect, Keynes's view echoed the classical theory.

Transactions demand for money: the desire to hold money for transaction purposes.

The amount held for transactions increases with income. A household earning \$60,000 annually will typically hold more money than one earning \$50,000 because it has more

purchases to make. Similarly, the higher the national income, the greater the demand for money for transactions.

The Precautionary Demand for Money

The **precautionary motive** arises from uncertainty about future expenses. Households and firms hold money as a buffer against unforeseen events—medical emergencies, job loss, or business disruptions.

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The **precautionary demand for money** rises with income, as higher-income individuals and businesses are more likely to maintain larger reserves for contingencies. Like **transactions demand**, it varies directly with income.

Precautionary demand for money: the desire to hold money for unexpected contingencies.

However, widespread access to **credit cards** and **lines of credit** reduces the need to hold large cash balances. When credit is easily available, households and firms can manage short-term risks without relying on idle cash.

Speculative Demand for Money

The **speculative demand for money** refers to money held in anticipation of future changes in asset prices or interest rates. When people expect bond prices to fall or interest rates to rise, they may delay purchasing financial assets and hold money instead. This form of demand is inversely related to the interest rate: as rates rise, the opportunity cost of holding money increases, reducing speculative demand. Conversely, when interest rates are low and expected to rise, people prefer to hold money to avoid capital losses on bonds.

Speculative demand for money: the desire to hold money in anticipation of movements in the prices of financial assets.

To illustrate, assume wealth can be held in two forms:

1. **Money**, which earns no interest.
2. **Bonds**, which earn interest and have prices that fluctuate based on market expectations.

Suppose a bond pays \$10 annually. If it sells for \$100, the interest rate is **10%**. If the bond price rises to \$200, the interest rate falls to **5%**. In this context, **rising bond prices equal falling interest rates**, and vice versa.

Determinants of the Speculative Demand for Money

The **speculative demand for money** varies **inversely with the interest rate**.

- When **interest rates are high**, people expect them to fall and bond prices to rise. They buy bonds and hold **less money**.
- When **interest rates are low**, people expect them to rise and bond prices to fall. To avoid capital losses, they hold **more money**.

In summary, **as interest rates fall, the speculative demand for money rises**; as interest rates rise, the demand falls.

The Asset Demand for Money

Beyond transactions, precautionary, and speculative motives, there is **another reason for holding money**: its function as a **store of value**. People can allocate their wealth across various financial and real assets, such as **real estate, stocks, bonds, or savings accounts**. Among these, **money is the most liquid asset**, making it convenient to hold for flexibility and immediate purchasing power.

Asset demand for money: the desire to hold money because of its liquidity as a store of value.

Money as an asset has both advantages and disadvantages.

- **Advantage**: It is immediately available for purchases or investment opportunities.
- **Disadvantages**: It earns **little or no interest** and loses **purchasing power during inflation**.

Determinants of the Asset Demand for Money

The amount of money held as a liquid asset depends on the interest rate, risk perceptions, and expectations about future financial conditions. The opportunity cost of holding money is the interest income forgone by not investing in other financial assets. The asset demand for money is inversely related to the interest rate. When interest rates are high, people reduce money holdings in favor of interest-earning assets. When interest rates are low, the cost of holding money falls, and people are more willing to hold cash as a store of value. In addition to interest rates, risk and uncertainty in financial markets influence asset demand. During volatile periods, people may prefer to hold money over riskier investments, even when interest rates are elevated. Expectations also matter: if people anticipate falling interest rates or declining asset prices, they may hold money in the short term while waiting for better investment opportunities.

The Total Demand for Money

The **total demand for money** consists of **transactions, precautionary, speculative, and asset demands**. These separate motives reflect different reasons for holding money rather than interest-earning assets.

Liquidity preference: the desire to hold money rather than less liquid interest-earning assets.

Holding money has an opportunity cost. Instead of holding cash, people could invest in **interest-bearing instruments**, such as bonds or savings accounts. The **rate of interest** becomes the **cost of holding money**.

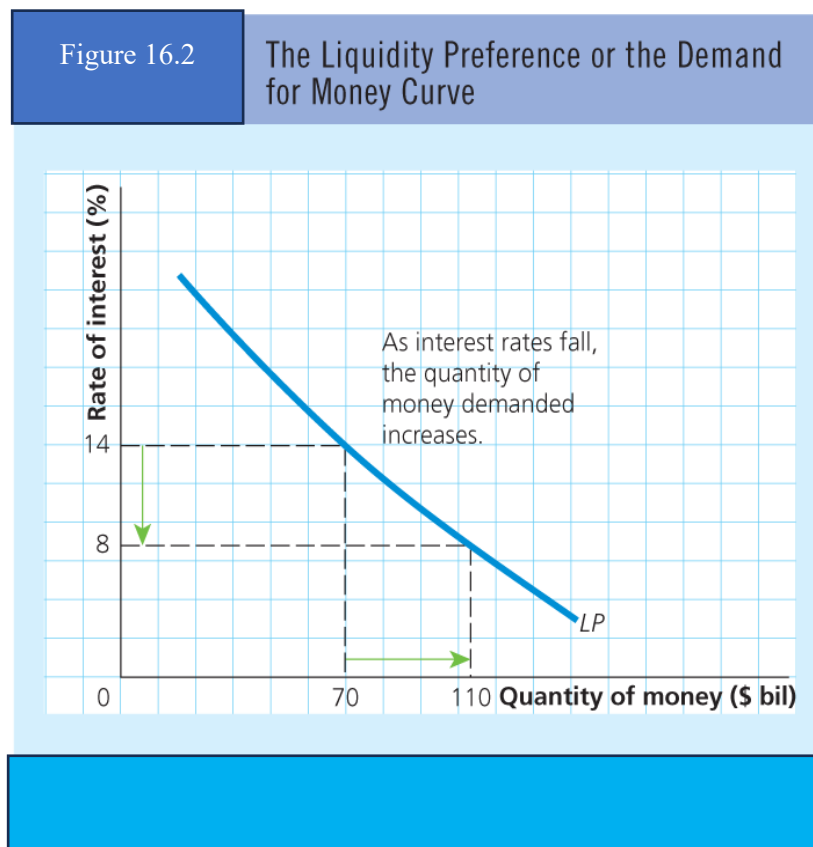
- When interest rates are **high**, people prefer to hold assets that earn a return, so they **reduce their money holdings**.
- When interest rates are **low**, the opportunity cost of holding money is small, and people **increase their cash balances**.

This behavior generates a **liquidity preference curve**, also known as the **money demand curve**, which shows an **inverse relationship** between the **quantity of money demanded** and the **rate of interest**.

Liquidity preference curve: the curve showing the inverse relationship between the quantity of money demanded and the rate of interest.

For example, when the interest rate is **14%**, the quantity of money demanded may be **\$70 billion**. If the rate falls to **8%**, demand rises to **\$110 billion**. This negative slope illustrates how the public balances liquidity against forgone interest.

Figure 16.2 The Liquidity Preference or the Demand for Money Curve



Effect of Changes in Income on the Demand for Money
Changes in the interest rate do not shift the demand for money curve—they cause **movement along the curve**.

A higher interest rate reduces the quantity of money demanded; a lower rate increases it. But these are changes in the **quantity demanded**, not changes in **demand**.

When income changes, the entire demand curve shifts.

As income rises, households and firms conduct more transactions and face greater

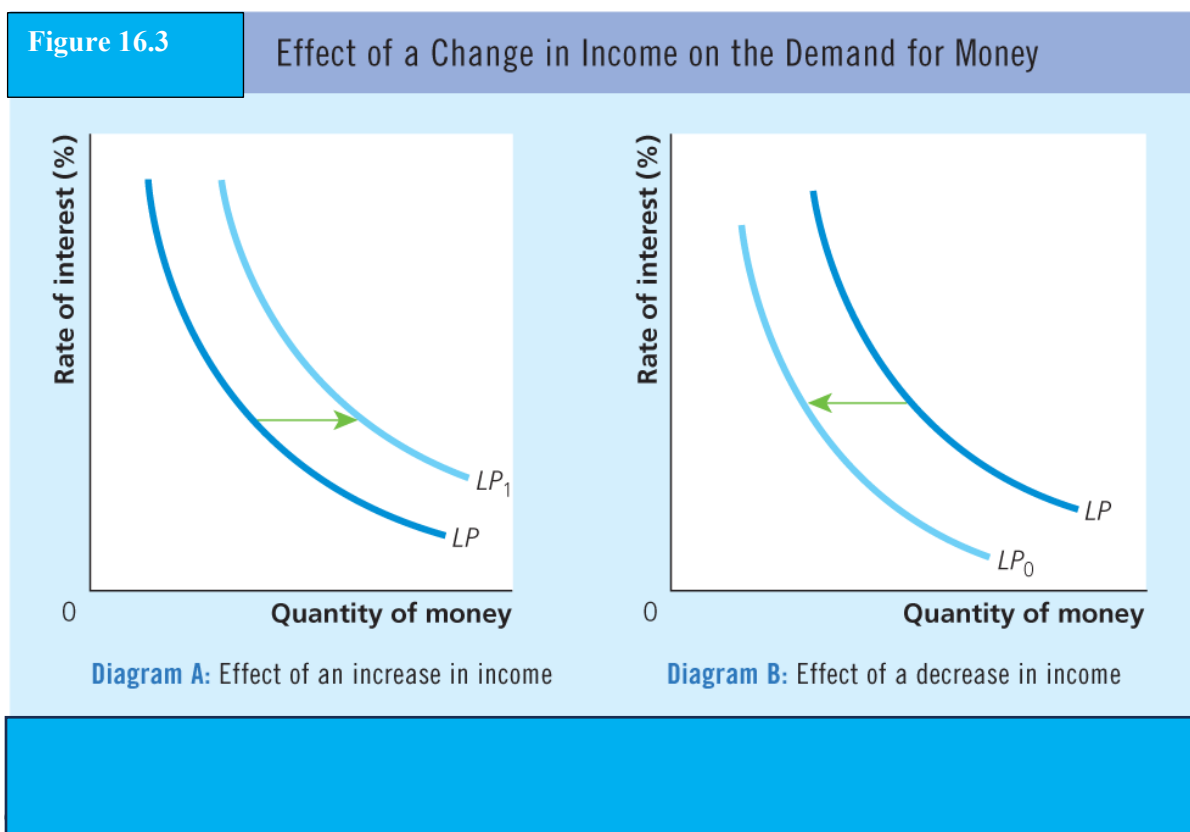
uncertainty. As a result, they hold more money at every interest rate. This causes the liquidity preference curve to shift to the right.

For example, in **Diagram A of Figure 16.3**, the demand curve shifts from **LP** to **LP₁** when income increases. This shift reflects **a higher total demand for money at each interest rate**, driven by increased economic activity.

Figure 16.3 Effect of a Change in Income on the Demand for Money

Diagram A: Effect of an increase in income

Diagram B: Effect of a decrease in income



Income and Shifts in the Demand for Money

If **income falls**, households and firms reduce their spending and face fewer transactions. As a result, **they hold less money at every interest rate**, causing the **demand curve for money to shift to the left**—from **LP to LP_o**, as shown in **Diagram B**.

All else equal,

- **An increase in income shifts the demand curve to the right.**
- **A decrease in income shifts the demand curve to the left.**

These shifts reflect how the **total demand for money changes in response to changes in national income**, regardless of the interest rate.

Reading Comprehension

1. According to the classical economists, people hold money for transaction purposes only. What additional reasons (motives) do people have for holding money?
2. Explain the asset demand for money. How do changes in interest rates affect the quantity of money held as an asset?
3. What is liquidity preference?

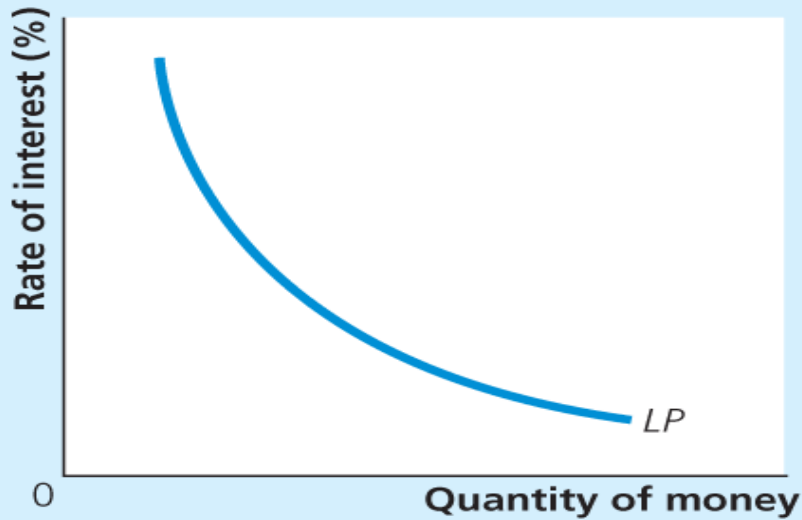
Interest Rate Determination (Liquidity Preference Theory)

LO 16.3 Explain the liquidity preference theory of interest rate determination

Figure 16.4 Demand for Money Curve

Figure 16.4

Demand for Money Curve

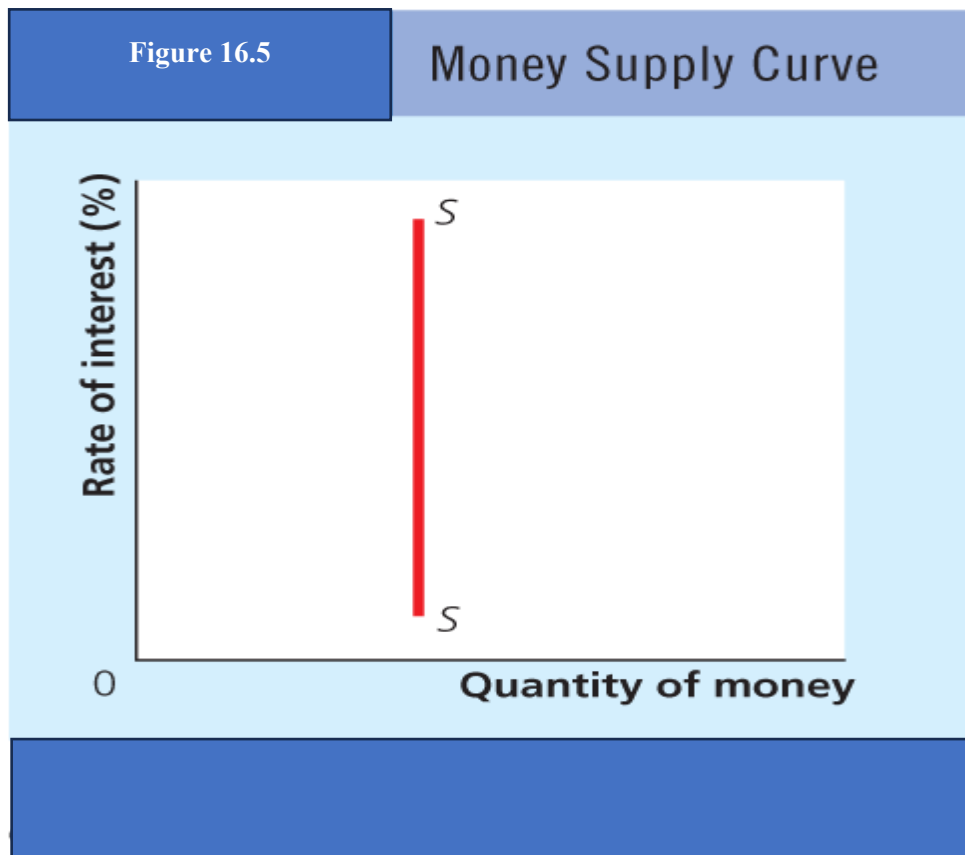


Determination of the Rate of Interest

The rate of interest functions as the price of money. Just as the price of a good—like DVDs—is determined by **supply and demand in a product market**, the **rate of interest is determined by the interaction of money supply and money demand** in the **money market**.

When the demand for money intersects with the supply of money, **the equilibrium rate of interest is established**. This is the point where the amount of money people want to hold equals the amount made available by the central bank.

Figure 16.5 The Money Supply



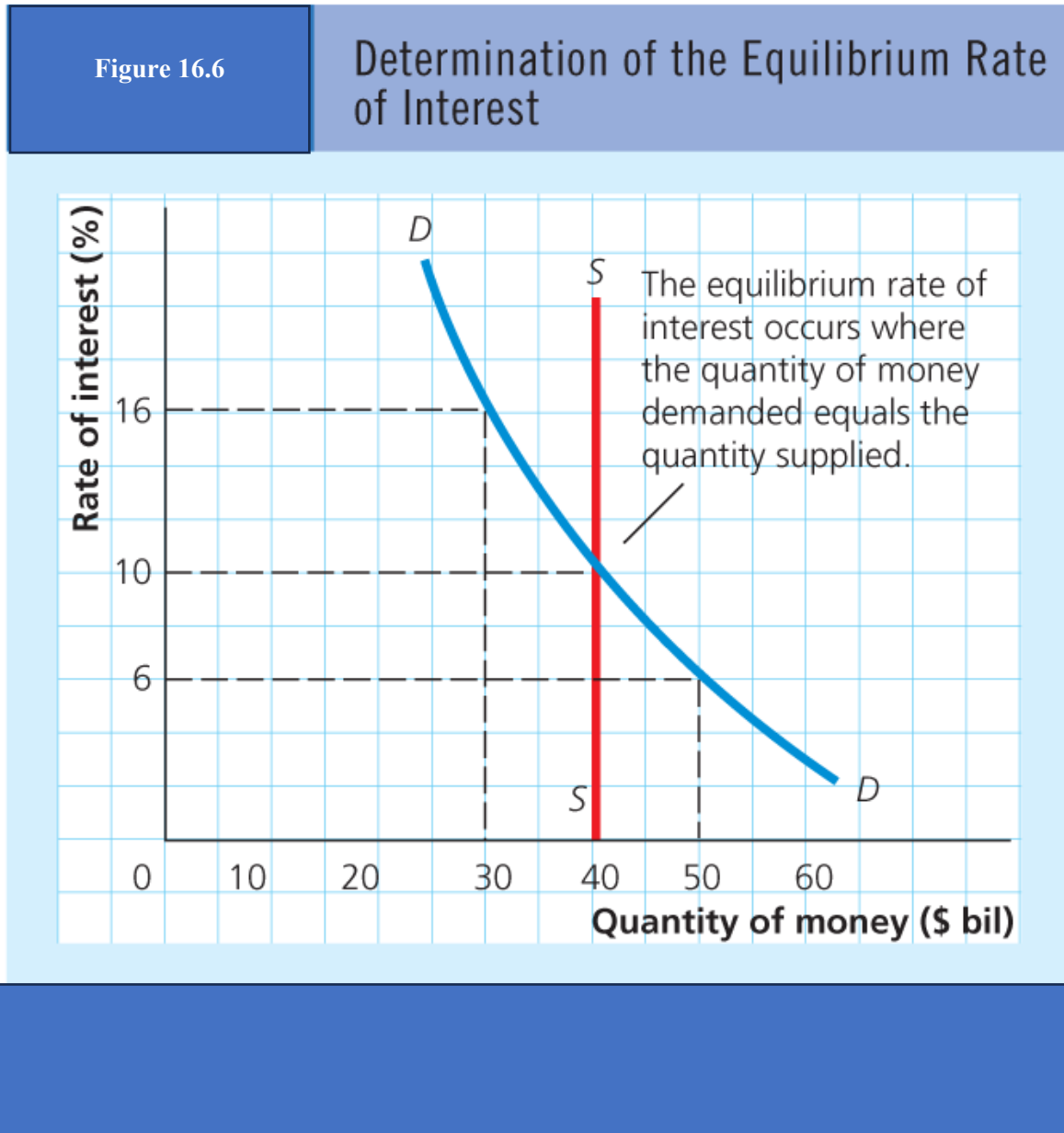
A Model for Interest Rate Determination

The liquidity preference theory provides a framework for explaining how the interest rate is determined in the money market. This model combines the total demand for money and the money supply.

Liquidity Preference Curve

As discussed earlier, the **demand curve for money** is downward sloping. At **higher interest rates**, people hold **less money** and invest more in interest-earning assets. At **lower interest rates**, the **cost of holding money falls**, so the quantity demanded increases. This inverse relationship is captured by the **liquidity preference curve**, shown in **Figure 16.4**.

Figure 16.6 Determination of the Equilibrium Rate of Interest



The Money Supply

Money supply: the total quantity of money supplied at various rates of interest.

In this model, the **Bank of Canada determines the money supply**, which is treated as **fixed or exogenous**—independent of the interest rate. This makes the **money supply curve vertical** on a graph, showing that the **quantity of money remains constant regardless of the interest rate**.

Equilibrium Interest Rate

The **interest rate is determined at the point where the liquidity preference curve intersects the vertical money supply curve**. This is the rate at which the quantity of money demanded equals the quantity supplied. At this equilibrium, the money market clears.

***money supply** the total quantity of money supplied at various rates of interest*

The Shape of the Money Supply Curve

Because the **money supply is fixed by the monetary authorities**, changes in the interest rate do **not** affect its quantity. This assumption implies that the **money supply curve is vertical**. In **Figure 16.5**, the vertical line **SS** represents the money supply, showing that the central bank sets the quantity of money independently of the interest rate.

Interest Rate Determination

By combining the **demand for money (DD)** and the **money supply (SS)**, we determine the **equilibrium interest rate**—as illustrated in **Figure 16.6**.

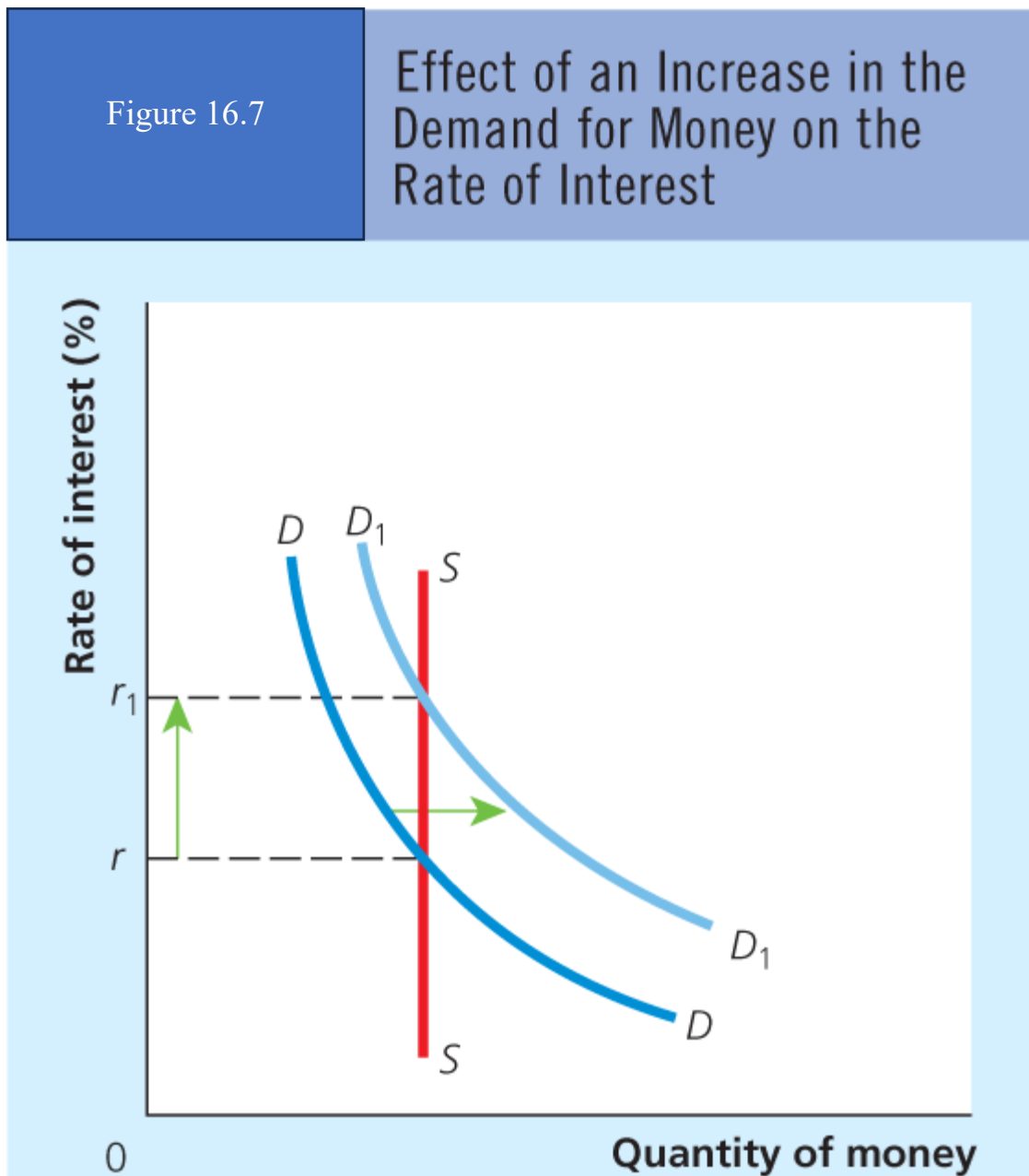
- At **16%**, the quantity of money demanded is **\$30 billion**, while the quantity supplied is **\$40 billion**. The surplus of money puts **downward pressure** on the interest rate.
- At **6%**, demand rises to **\$50 billion**, exceeding the supply of **\$40 billion**. The resulting **shortage** pushes the interest rate **upward**.
- At **10%**, the **quantity of money demanded equals the quantity supplied—\$40 billion**. The money market is in equilibrium, and **10% is the equilibrium interest rate** for this graph.

In short, the interaction of money demand and a fixed money supply determines the market-clearing interest rate.

Money Supply and Demand and Interest Rates

LO 16.4 Explain how changes in the demand for and supply of money affect the equilibrium rate of interest

Figure 16.7 The Effect of An Increase in Demand



Effect of an Increase in the Demand for Money on the Interest Rate

An increase in the demand for money, holding other factors constant, raises the interest rate. This can be shown graphically.

Assume the money market is initially in equilibrium at interest rate r , where the **demand curve for money (DD)** intersects the **vertical supply curve (SS)**, as illustrated in **Figure 16.7**.

Reading Comprehension

1. Briefly explain the liquidity preference theory of interest rate determination.
2. If the quantity of money demanded exceeds the quantity supplied, explain the process by which the equilibrium rate of interest is achieved.
3. If the quantity of money demanded is less than the quantity supplied, explain the process by which the equilibrium rate of interest is achieved.

Now suppose **income increases**, leading to a higher transactions demand for money. The **demand curve shifts to the right**, from **DD to D_1D_1** .

At the original rate r , the quantity of money demanded now exceeds the quantity supplied, creating a **shortage** in the money market. This **excess demand pushes the interest rate up**, establishing a new equilibrium at r_1 .

The increase in demand leads to a higher interest rate when the money supply is fixed.

Other things being equal, an increase in the demand for money will result in an increase in the rate of interest.

Let us now analyze the effect of a decrease in the demand for money.

Effect of a Decrease in the Demand for Money on the Interest Rate

In **Figure 16.8**, the money market begins at equilibrium where the **demand curve for money (DD)** intersects the **money supply curve (SS)** at interest rate r .

Now suppose there is a **decrease in the demand for money**, perhaps because of a fall in income or greater use of credit. The **demand curve shifts to the left**, from **DD to D_0D_0** .

At the original rate r , the quantity of money supplied now exceeds the quantity demanded. This **surplus of money puts downward pressure on the interest rate**, lowering it to a new equilibrium level.

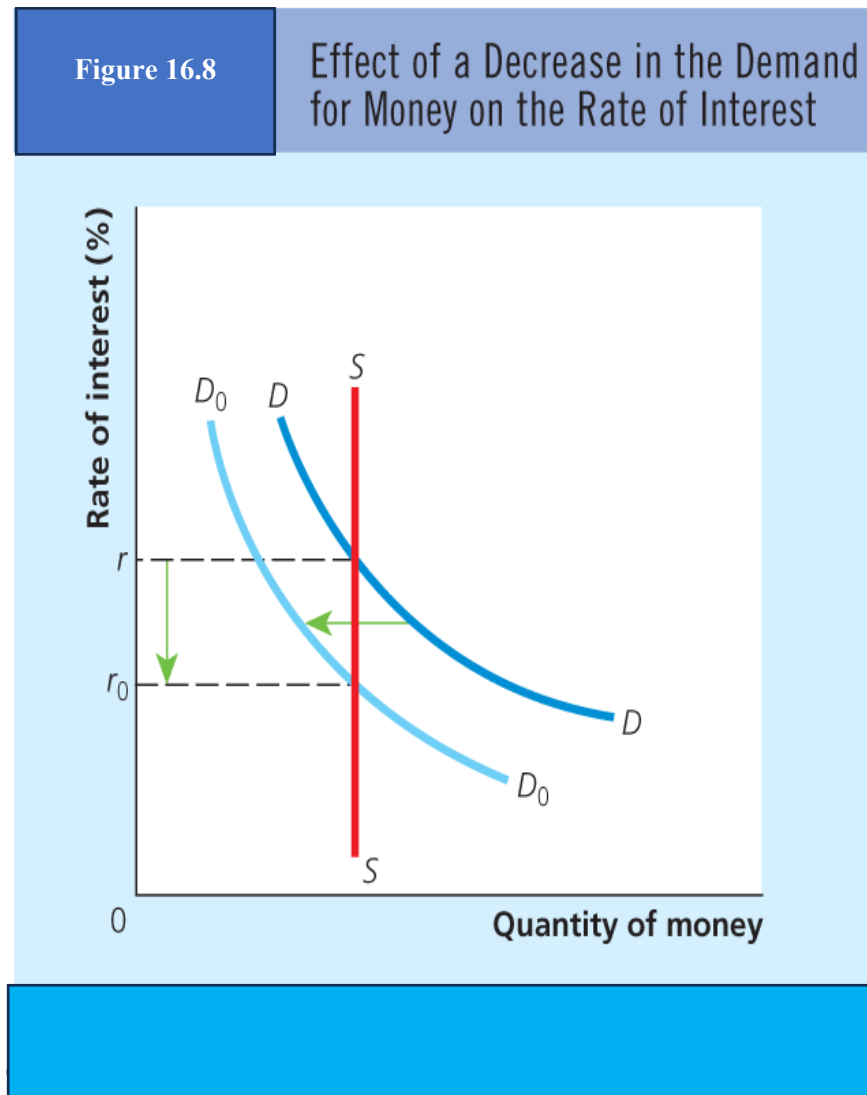
A fall in the demand for money, with the money supply held constant, reduces the interest rate.

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As a result of the decrease in the demand for money, the equilibrium rate of interest falls from r to r_0 .

Other things being equal, a decrease in the demand for money will result in a fall in the rate of interest.

Figure 16.8 The Effect of a Decrease in Demand



Effect of an Increase in the Money Supply on the Interest Rate

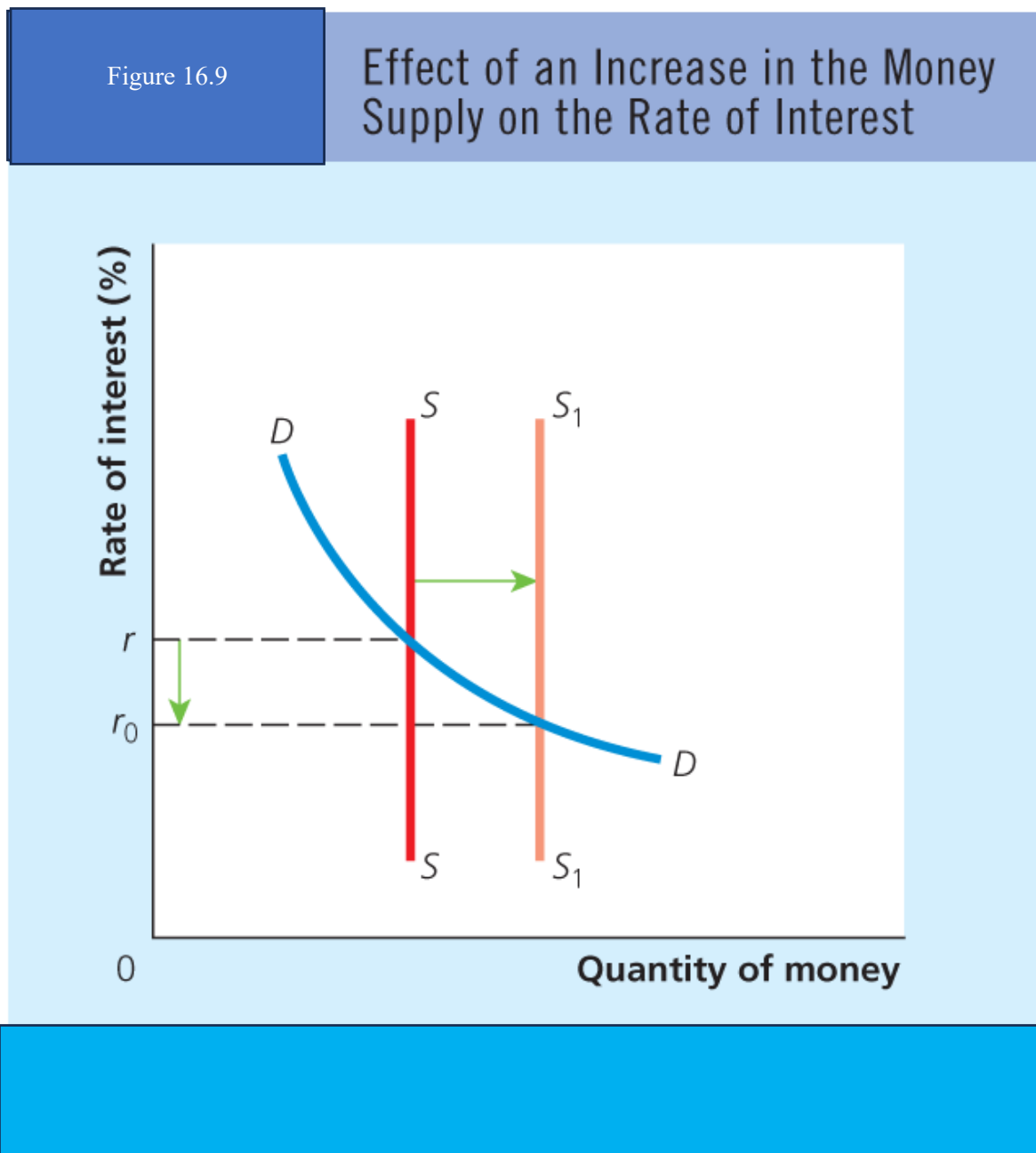
Assume the money market is initially in equilibrium at interest rate r , where the **demand for money curve (DD)** intersects the **supply curve (SS)**, as shown in **Figure 16.9**.

Suppose the **monetary authorities increase the money supply**—perhaps through open market purchases or lower reserve requirements. The **supply curve shifts to the right**, from **SS to S_1S_1** .

At the original rate r , the quantity of money supplied now exceeds the quantity demanded, creating a **surplus**. This exerts **downward pressure on the interest rate**, pushing it down to a new equilibrium rate r_0 .

Other things being equal, an increase in the money supply lowers the interest rate.

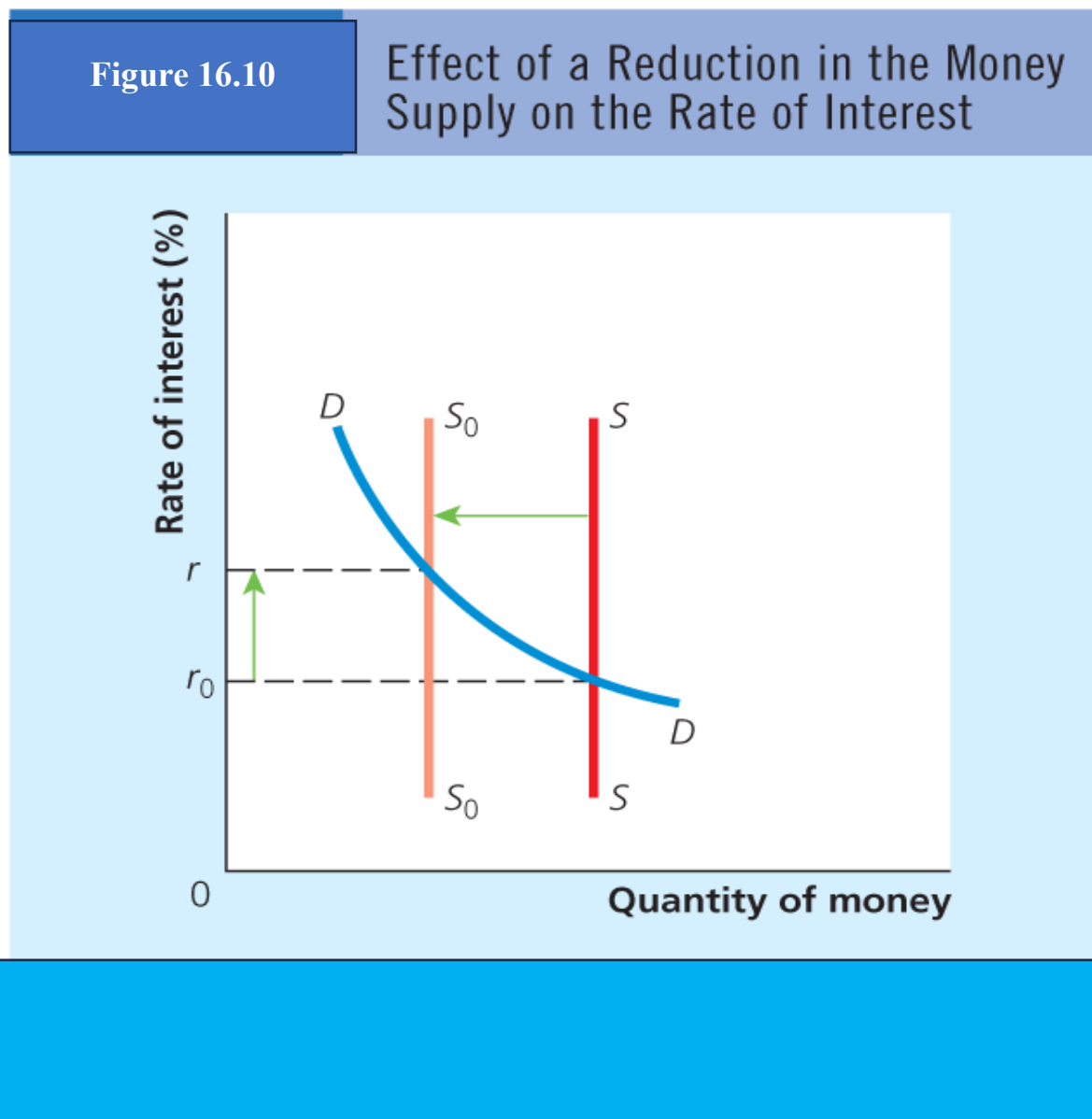
Figure 16.9. Effect of an Increase in Money



Now suppose the **monetary authorities reduce the money supply**. The **supply curve shifts to the left**, from **S to S_0** .

At the original rate **r** , the quantity of money demanded now exceeds the reduced supply, creating a **shortage** in the money market. This excess demand pushes the interest rate upward until equilibrium is

Figure 16.10: The Effect of a Decrease in Money Supply



Effect of a Decrease in the Money Supply on the Interest Rate

Now consider the opposite case. Suppose the central bank **reduces the money supply**, perhaps through asset sales or tighter monetary policy. The **supply curve shifts to the left**, from SS to S_0S_0 .

At the original rate r , the quantity of money demanded exceeds the smaller supply. This **shortage in the money market** raises the interest rate until a new equilibrium is reached at a higher level.

A reduction in the money supply, holding other factors constant, causes the interest rate to rise.

Other things being equal, **a reduction in the supply of money raises the interest rate**.

Effect of an Increase in Money Supply on GDP

An increase in the money supply shifts the money supply curve to the right. In the short run, assuming the demand for money remains unchanged, this creates an excess supply of money at the original interest rate. To restore equilibrium in the money market, the interest rate must fall. Lower interest rates reduce the opportunity cost of holding money and encourage people to hold larger balances, which re-establishes equality between money demand and the expanded supply.

This fall in the interest rate—denoted as r —stimulates borrowing and investment, particularly in interest-sensitive sectors like housing, business capital, and durable goods. As credit becomes cheaper, aggregate demand rises, leading to higher output and employment in the short run. The magnitude and speed of this effect depend on how responsive investment and consumption are to interest rate changes, as well as the shape of the money demand curve.

Figure 16.11 The Effect of an Increase in the Money Supply on GDP

Figure 16.11

Effect of an Increase in the Money Supply on GDP

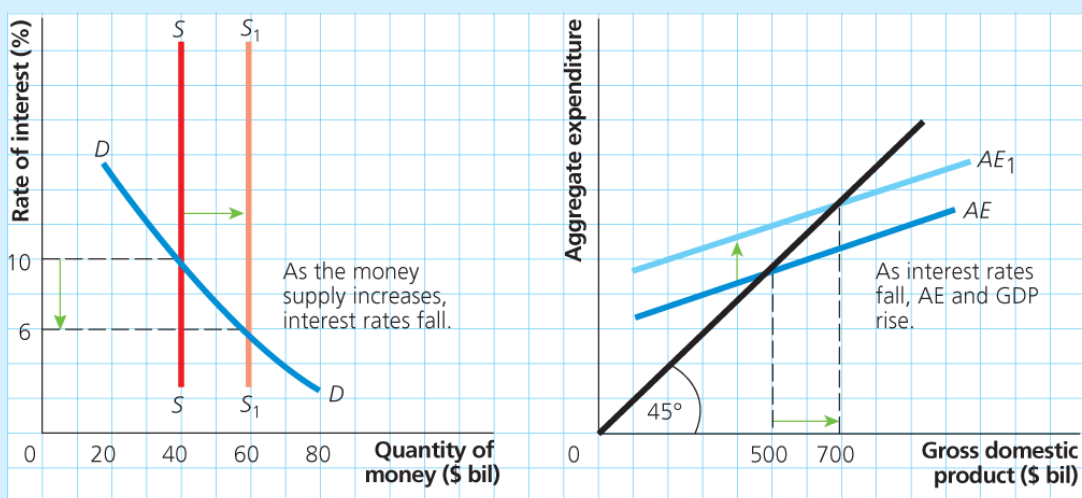


Diagram A: Increase in money supply

Diagram B: Resulting shift in aggregate expenditure

Effects of an Increase in the Money Supply on GDP

Reading Comprehension

1. Explain the process by which an increase in the demand for money, other things being equal, results in an increase in the equilibrium rate of interest.
2. Explain the process by which a decrease in the demand for money, other things being equal, results in a fall in the equilibrium rate of interest.
3. Other things being equal, how will an increase in income affect the equilibrium rate of interest?
4. Explain the process by which an increase in the supply of money, other things being equal, results in a decrease in the equilibrium rate of interest.
5. Explain the process by which a decrease in the supply of money, other things being equal, results in an increase in the equilibrium rate of interest.

Suppose the demand for money is given, and the **initial money supply is \$40 billion**, resulting in an **equilibrium interest rate of 10%**, as shown in **Diagram A of Figure 16.11**. Under these conditions, the **equilibrium level of GDP is \$500 billion**, as shown in **Diagram B**.

Now consider an **increase in the money supply to \$60 billion**. The supply curve shifts rightward from **SS to S_1S_1** , causing the **interest rate to fall to 6%**. As borrowing becomes cheaper, **consumption and investment increase**. This rise in spending shifts the **aggregate expenditure curve** upward, from **AE to AE_1** .

As a result, **GDP increases from \$500 billion to \$700 billion**. An increase in the money supply lowers the interest rate, which raises consumption and investment, thereby increasing GDP.

Effects of a Reduction in the Money Supply on GDP

Now assume the **money supply is reduced from \$40 billion to \$20 billion**, shifting the supply curve leftward from **SS to S_0S_0** , as shown in **Diagram A of Figure 16.12**. At the original interest rate of 10%, the reduced money supply creates a **shortage**, driving the **interest rate up to 14%**.

The higher interest rate discourages **consumption and investment**, shifting the **aggregate expenditure curve** downward from **AE to AE_0** . In turn, **GDP falls from \$500 billion to \$300 billion**, as shown in **Diagram B**.

A reduction in the money supply raises the interest rate, which lowers consumption and investment, thereby reducing GDP.

LO 16.5 Understand the relationship between the quantity of money and the level of gross domestic product

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Keynesian View on the Effects of a Change in the Money Supply

According to the **Keynesian model**, an **increase in the money supply** reduces the **rate of interest**. As explained earlier, this occurs because the supply of money exceeds the quantity demanded at the original interest rate, leading to **downward pressure on interest rates**.

Lower interest rates stimulate investment spending, as borrowing becomes cheaper for firms and households. Higher investment increases **aggregate demand**, which raises **total output and income**, provided there is unused capacity in the economy.

Therefore, **like the quantity theory**, the Keynesian model also predicts that **an increase in the money supply can increase total income**, but only under certain conditions—particularly when the economy is operating **below full employment**.

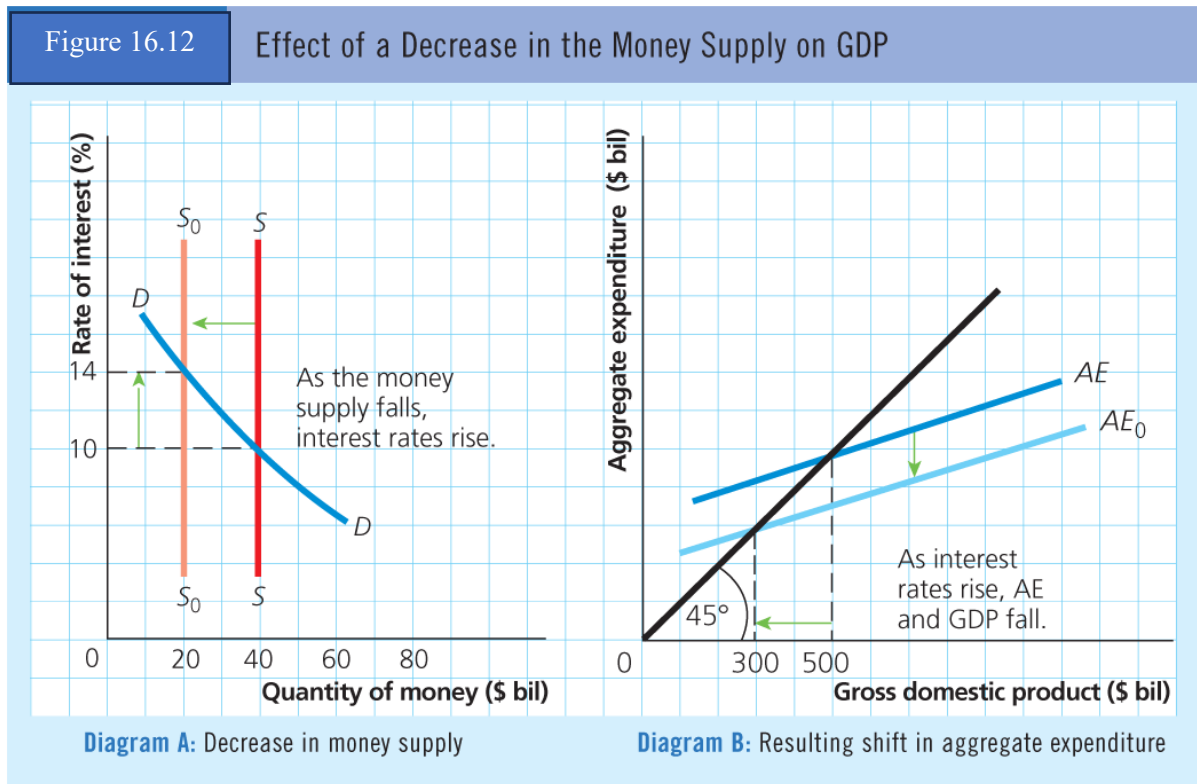
Let us now examine the effects of a **decrease in the money supply**.

Effect of a Decrease in the Money Supply on GDP

A decrease in the money supply shifts the supply curve of money to the left. At the original interest rate, the quantity of money demanded exceeds the supply. To restore balance, the interest rate rises. Higher interest rates discourage borrowing, reduce investment, and weaken consumption of interest-sensitive goods—especially homes, vehicles, and capital equipment.

As spending declines, aggregate demand contracts. Businesses scale back production and may reduce employment. GDP falls, especially if the economy is already operating below capacity. The extent of the decline depends on how strongly interest rates affect investment and consumption, and on the responsiveness of aggregate supply.

Figure 16.12 The Effect of a Decrease in Money Supply on GDP



The Meaning and Objectives of Monetary Policy

LO 16.6 Discuss the meaning and objectives of monetary policy

Definition of Monetary Policy

A policy is a course of action adopted to achieve a specific goal. In earlier chapters, monetary policy was defined as the central bank's use of changes in the money supply and interest rates to meet economic objectives.

This definition can be expanded: **Monetary policy refers to the actions taken by the central bank—such as the Bank of Canada—to influence the money supply, the availability of credit, and the level of interest rates to affect overall economic activity.**

Clarifying the Meaning of Monetary Policy

To understand the expanded definition of monetary policy, several points must be emphasized:

1. **Monetary policy in Canada is conducted by the Bank of Canada**—no other institution has this responsibility.
2. **The purpose of monetary policy is to influence overall economic activity**—through changes that affect spending, investment, and output.
3. **Monetary policy involves deliberate changes in the money supply and interest rates**—but only when these changes are initiated by the Bank of Canada.

Changes in the money supply or interest rates do not qualify as monetary policy unless they originate from the Bank of Canada. For example, if interest rates rise because of government borrowing, that is a result of **fiscal policy**, not monetary policy.

Objectives of Monetary Policy

Like all policy, monetary policy is designed to achieve specific goals. In earlier eras, the objectives were very different. During the **mercantilist period**, when national wealth was equated with gold reserves, monetary policy focused on **encouraging gold inflows and discouraging outflows**. The goal was to **accumulate precious metals**, which were seen as the foundation of wealth.

In the **1920s**, the focus shifted to **supporting the business sector**, ensuring that credit was available to meet investment needs. During **World War II**, monetary policy served the **financial needs of government**, particularly in financing wartime expenditures.

Modern Objectives of Monetary Policy in Canada

Today, monetary policy is guided by the **broader economic goals of Canadian society**. These objectives are widely accepted and shape the direction of all macroeconomic policy, including monetary decisions. The Bank of Canada aligns its actions with the following four goals:

1. **Full employment**
2. **Price stability**

3. Growth of real output

4. Equilibrium in the balance of payments

Canada's economy would be considered well-managed if all four objectives were simultaneously achieved. Each goal, however, presents its own challenges and trade-offs that require careful policy calibration.

Reading Comprehension

1. According to the Keynesian model, how does an increase in the money supply affect GDP?
2. According to the Keynesian model, changes in the money supply affect GDP indirectly rather than directly. Explain.

Full Employment

As we saw earlier, full employment does not mean that every individual in the labour force is working. In a market-based economy, **some level of unemployment is inevitable**—particularly **frictional unemployment**, which arises from normal job turnover. Other institutional factors also prevent the unemployment rate from falling to

zero. These include **minimum wage laws**, **collective bargaining agreements** that push wages above market-clearing levels, and **employment insurance** that allows some individuals to remain unemployed without seeking work actively.

This unavoidable level of unemployment is called the natural rate of unemployment. Full employment, then, is achieved when the actual unemployment rate equals the natural rate. If the natural rate is **7%**, then full employment corresponds to **93% employment**; if the natural rate is **6%**, then full employment implies **94% employment**.

Closely linked to this objective is the aim of reaching and maintaining a level of **real output consistent with full employment**. Unemployment reflects idle resources that could be used to increase production. Once full employment is reached, however, expanding output further in the long run becomes increasingly difficult. **Full employment and maximum real output are therefore closely connected**, and the policy objective is to keep the economy operating at this full-employment output level.

Price Stability

Large and unpredictable changes in the price level are harmful. **Rapid inflation can distort resource allocation, redistribute income unfairly, and undermine confidence in money as a store of value.** If inflation becomes severe, the public may reject money altogether and revert to barter, risking a breakdown in the monetary system.

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While inflation's dangers are more familiar, **deflation also has damaging effects**. Although falling prices may seem beneficial because they increase purchasing power, sharp deflation reduces business revenues, discourages investment, and leads to job cuts. It also increases the real burden of debt, hurting borrowers. In practice, prices are sticky downward, so forces that would lower prices often result instead in a contraction of employment and output.

A **zero inflation rate** would equalize the nominal and real interest rates—something many economists view as ideal. But given the realities of economic management, **a low and stable rate of inflation is more achievable than zero inflation**. For this reason, the **Bank of Canada targets a 2% inflation rate**, balancing price stability with economic flexibility.

Maximum Growth of Real Output

Most Canadians would support the goal of **raising the standard of living**. This means increasing the **availability of goods, services, and leisure**. While redistribution can improve conditions for specific groups, **a sustained rise in real output is essential for broad improvements in economic well-being**.

Economic growth is not automatic. It requires stable policy support and productive use of the economy's resources. Long-term growth depends on **human and physical capital, natural resources, and technological progress**—factors commonly described as the **supply-side** of the economy.

Monetary policy contributes by **managing demand** to ensure that available resources are actually used. But policies that promote full employment do not always promote growth. For example, capital-intensive methods may boost productivity but reduce employment. Even so, a high level of employment is generally a condition for sustained growth, because unemployment reflects underused capacity.

Balance of Payments

A final objective is to maintain **balance in Canada's international accounts**. Policymakers are concerned not only with domestic stability but also with **external equilibrium**. This means ensuring that **foreign trade and capital flows remain sustainable** over time.

Central to this goal is the **stability of the exchange rate**, which reflects the **external value of the Canadian dollar**. As international trade and finance expand, **a stable currency becomes more important**. One of the Bank of Canada's recognized functions is to **manage the external value of the dollar**, contributing to overall balance of payments stability in an increasingly globalized economy.

Specific Tools of Monetary Policy and How Monetary Policy Works

Lo 16.7 Discuss the tools of monetary policy and explain how monetary policy works

Tools of Monetary Policy

The Bank of Canada uses several instruments to influence the money supply and interest rates. These include:

1. Open market operations
2. Central bank advances and the policy interest rate
3. Switching government deposits and foreign exchange swaps
4. Purchase and resale agreements (repos)

Reading Comprehension

1. What is monetary policy? Who conducts monetary policy in Canada?
2. It is easy to confuse monetary policy with fiscal policy. How can the confusion be avoided?
3. Give an example of a change in the rate of interest that would not be regarded as monetary policy.

5. Moral suasion
6. Forward guidance
7. Quantitative easing

Supplementary instrument

8. **Foreign exchange swap transactions** – used occasionally to manage liquidity, typically in coordination with the Exchange Fund Account.

Each tool affects either the monetary base or the reserves of commercial banks.

Open Market Operations

Open-market operations refer to the **buying and selling of government securities by the Bank of Canada**. These operations are a primary tool for influencing the **monetary base**, which consists of currency in circulation and bank reserves.

- When the **Bank of Canada buys securities**, it pays by injecting money into the banking system. This increases both the **assets and liabilities** of the central bank and expands the **monetary base**. Through the **money multiplier**, the total **money supply grows by a multiple** of the initial injection.
- When the **Bank sells securities**, it withdraws money from the system. The monetary base contracts, and the **money supply decreases** through the same multiplier process.

Open-market operations also influence **interest rates**. When the Bank **purchases securities**, their prices rise and **interest rates fall**. When the Bank **sells securities**, prices fall and **interest rates rise**.

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Central Bank Advances and the Bank Rate

Members of the **Canadian Payments Association**, including commercial banks, can borrow from the Bank of Canada to meet reserve shortfalls. The **bank rate** is the interest rate charged by the Bank of Canada on these advances.

- When the **bank rate increases**, borrowing from the central bank becomes more expensive. Banks may respond by **calling in loans** or **reducing lending**, leading to a **decline in the money supply**.
- When the **bank rate decreases**, borrowing costs fall. Banks may **lower their lending rates** and **expand credit**, leading to an **increase in the money supply**.

Changes in the bank rate also act as **signals**. Financial institutions interpret a **rise in the bank rate** as a sign that the Bank of Canada wants higher interest rates more broadly. They may **raise their own rates and restrict credit**. A **fall in the bank rate** has the opposite effect.

The Overnight Rate and the Policy Interest Rate

Closely tied to the bank rate is the **overnight rate**—the interest rate that large financial institutions charge one another for one-day loans. The Bank of Canada sets a **target for the overnight rate**, which functions as its **key policy rate**. This target serves as the benchmark for other short-term interest rates and is the main instrument through which the Bank implements monetary policy.

The Bank Rate and the Money Supply

Changes in the bank rate affect other interest rates, which in turn influence **borrowing, spending, and money holdings**.

- **Higher interest rates** discourage borrowing and encourage saving, reducing the money supply.
- **Lower interest rates** promote borrowing and increase liquidity in the economy, expanding the money supply.

By adjusting the **bank rate**, the Bank of Canada can regulate money and credit conditions to meet its macroeconomic objectives.

Switching Government Accounts

The Bank of Canada can influence the money supply by **transferring government funds between its own accounts and those of commercial banks**. This process is called **switching government accounts**.

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- A **redeposit** or **deposit switching** occurs when the Bank of Canada **moves government funds from its own accounts to commercial banks**. This increases **bank reserves**, enabling banks to expand credit and increase the **money supply**.
- A **drawdown** refers to the opposite action—**transferring funds from commercial banks back to the central bank**. This reduces bank reserves and contracts the **money supply**.

Switching government deposits has become an important monetary policy tool, used to influence liquidity without directly altering interest rates.

Swap Transactions

Swap transactions are another tool used to affect liquidity, involving the **Exchange Fund Account**, which holds Canada's **foreign currency reserves**.

- To **increase the money supply**, the Bank of Canada may **purchase foreign currency assets from the Exchange Fund Account**, paying in Canadian dollars. This action raises the government's balance in Canadian dollars at the central bank.
- The government can then **redeposit** these funds in commercial banks, which **raises their reserves** and allows for **credit expansion**.

Both deposit switching and swap transactions allow the central bank to manage liquidity in the banking system and support its broader monetary policy objectives.

Unwinding a Swap Transaction

If the **Bank of Canada sells foreign currency assets back to the Exchange Fund Account**, the operation is known as **unwinding a swap**. To pay for these assets, the Exchange Fund Account borrows Canadian dollars from the Bank of Canada, which reduces the government's balance at the Bank of Canada. To replenish this balance, the central bank transfers funds from chartered bank deposits, effectively reducing bank reserves and tightening liquidity in the financial system.

Advantages of Swap Transactions

Swap transactions offer two practical advantages as a tool of monetary policy:

1. **Speed** – They can be initiated or unwound quickly at the discretion of the Bank of Canada, making them highly responsive to changing conditions.

2. **Market neutrality** – Because they involve internal government accounts—specifically, the Exchange Fund Account—they do **not directly affect the money market or foreign exchange market**, thereby avoiding disruptive signals.

Purchase and Resale Agreements (PRAs)

Among the most **frequently used tools of monetary policy** are **purchase and resale agreements (PRAs)**. For decades, the Bank of Canada has conducted PRAs with **investment dealers**, buying **short-term government securities** under an agreement to resell them at a later date and predetermined price.

When the Bank **purchases securities**, funds are credited to the dealers' accounts, increasing **bank reserves** and temporarily expanding liquidity. To strengthen its ability to respond flexibly, the Bank introduced:

- **Special Purchase and Resale Agreements (SPRAs)** in 1985, allowing it to **offer liquidity on its own initiative**.
- **Special Sale and Repurchase Agreements (SSRAs)** in 1986, allowing it to **withdraw liquidity** by initiating sales of securities to dealers, with agreements to repurchase them later.

***SPRAs inject reserves; SSRAs withdraw them.** Together, these tools give the Bank precise short-term control over money market conditions.*

Moral Suasion

Moral suasion refers to the Bank of Canada's use of **non-coercive methods—statements, meetings, or memoranda—to influence the behavior of financial institutions**.

Moral suasion: any persuasive tactic used by the central bank to secure the cooperation of commercial banks.

Its success depends largely on **clear communication and institutional cooperation**. The **small number of major banks** in Canada and the system's centralized structure make coordination relatively straightforward.

When the Bank is pursuing a **tight monetary policy**, it may encourage banks to **limit lending and investment**, reinforcing its policy stance. Conversely, under an **expansionary policy**, the Bank may seek cooperation to **encourage more credit issuance** and boost aggregate demand.

The historical record includes both successes and failures. In 1956, for instance, the Bank failed to persuade **finance companies to restrict consumer credit**, prompting it to pressure chartered banks to reduce credit lines to those companies.

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While not always effective, moral suasion remains part of the Bank's toolkit, especially when its policy goals align with the financial institutions' own interests.

Using Monetary Policy to Reduce Unemployment

When unemployment rises, the Bank of Canada can adjust its monetary tools to stimulate demand, lower interest rates, and support job creation. Each tool contributes in a specific way to easing financial conditions and encouraging spending and investment.

Open Market Operations

To combat unemployment, the Bank of Canada purchases government securities in the open market, injecting liquidity into the financial system. These purchases expand the monetary base and lower short-term interest rates, encouraging banks to lend and businesses to invest. During the **2008–2009 crisis** and the **2020 recession**, the Bank actively used open market operations to stabilize money markets and support credit availability.

Policy Interest Rate (Overnight Rate)

The Bank of Canada uses its key policy rate—the overnight rate—to influence borrowing costs throughout the economy. Lowering this rate reduces the cost of credit, prompting households and businesses to increase spending and investment. In both the **2008–2009** and **2020** downturns, the Bank reduced the overnight rate to **0.25%**, its effective lower bound, to provide maximum short-term stimulus.

Switching Government Deposits (Redeposits and Drawdowns)

By transferring government deposits from its own accounts to those held by commercial banks, the Bank increases bank reserves, which enhances the banks' lending capacity. While less visible than other tools, this practice—known as **redepositing**—was used selectively in both crises to manage liquidity and support broader expansionary efforts.

Swap Transactions with the Exchange Fund Account

In periods of financial stress, the Bank may conduct currency swaps with the Exchange Fund Account to provide Canadian-dollar liquidity in exchange for foreign currency assets. These transactions help manage the money supply without disturbing foreign exchange markets. During the **2008 crisis**, the Bank used **U.S. dollar swap lines** coordinated with the Federal Reserve. In **2020**, similar swaps were used to maintain access to foreign currency amid global volatility.

Purchase and Resale Agreements (PRAs, SPRAs, SSRAs)

Purchase and resale agreements allow the Bank to supply short-term liquidity to financial markets. In a **SPRA**, the Bank buys securities from dealers with an agreement to resell them later, temporarily

boosting reserves and easing funding conditions. These transactions were widely used in both **2008–2009** and **2020**, helping to stabilize key money markets during episodes of extreme stress.

Moral Suasion

Moral suasion involves the Bank of Canada encouraging financial institutions to align their lending behavior with broader policy objectives. By issuing statements, hosting meetings, or communicating informally, the Bank can persuade banks to expand credit during downturns. In both recessions, the Bank relied on moral suasion to reinforce its expansionary stance and maintain financial system confidence.

Forward Guidance

The Bank uses forward guidance to shape expectations about the future path of interest rates. By committing to low rates over a sustained period, it encourages investment and borrowing today. In **2009**, the Bank explicitly stated it would keep rates at 0.25% until mid-2010. In **2020**, forward guidance was tied to inflation outcomes, with the Bank promising to hold rates low until inflation was sustainably at its 2% target.

Quantitative Easing (QE)

When interest rates are near zero and conventional tools are exhausted, the Bank may engage in quantitative easing—buying long-term government bonds to reduce long-term interest rates and inject liquidity directly into the economy. While not used in **2008–2009**, QE was a central feature of the Bank’s **2020 response**, supporting credit markets and reinforcing its policy signals by expanding its balance sheet substantially.

Together, these eight instruments form a coherent framework for supporting recovery and reducing unemployment. Used in combination, they allow the Bank of Canada to stabilize financial markets, stimulate spending, and move the economy back toward full employment.

As previously discussed, **changes in the money supply affect output, employment, and the price level**. With a range of instruments at its disposal, the **Bank of Canada uses monetary policy to stabilize the economy**, including during periods of high unemployment.

Expansionary monetary policy aims to **stimulate aggregate demand** by **increasing the money supply and lowering interest rates**, thereby encouraging borrowing, investment, and consumption. This approach is used to **combat unemployment**. In contrast, **contractionary policy** is designed to reduce inflationary pressure.

Monetary Policy in Response to Unemployment in Practice

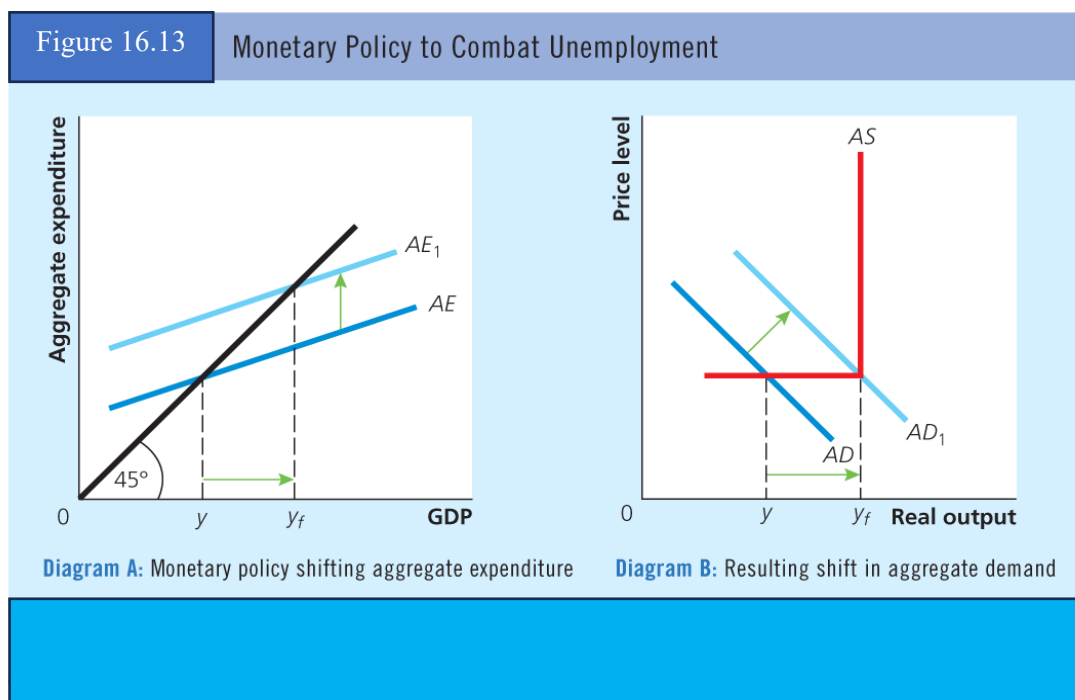
Suppose the Canadian economy is experiencing unemployment, and the Bank of Canada seeks to restore full employment. This is illustrated in **Figure 16.13**:

- In **Diagram A**, national income is at Y , below the **full-employment level Y_f** .
- In **Diagram B**, the economy is at **output level y** , where the **aggregate demand (AD)** curve intersects the **aggregate supply (AS)** curve.

Figure 16.13 Monetary Policy to Combat Unemployment

Diagram A: Monetary policy shifting aggregate expenditure

Diagram B: Resulting shift in aggregate demand



To move the economy closer to full employment, the **Bank of Canada may adopt an expansionary monetary policy**—for example, by conducting **open-market purchases**, **lowering the policy interest rate**, or **injecting liquidity through repo operations**.

- In **Diagram A**, this policy causes the **aggregate expenditure curve to shift upward** from **AE** to **AE₁**.
- In **Diagram B**, it causes the **aggregate demand curve to shift from AD to AD₁**, resulting in higher output and income.

The Bank of Canada has used this approach during major downturns. During the **2008–2009 global financial crisis**, it reduced the target for the overnight rate to historically low levels and expanded liquidity to prevent a deeper recession. More recently, in response to the **2020 COVID-19 recession**, the Bank again cut the policy interest rate to near-zero and implemented **large-scale asset purchases (quantitative easing)** to stabilize financial markets and support employment.

Expansionary monetary policy, when timed and applied appropriately, plays a central role in reducing unemployment and restoring economic activity.

Adjusting Monetary Policy Instruments to Combat Inflation

When inflation rises above the 2% target, the Bank of Canada activates a coordinated tightening strategy to reduce aggregate demand, raise interest rates, and restore price stability. Each monetary policy instrument plays a distinct role in reducing liquidity and curbing inflationary pressure. During the **2022–2023 inflation cycle**, which followed the COVID-19 recovery period, the Bank made extensive use of several instruments—most notably interest rate hikes, forward guidance, and balance sheet reduction.

Open Market Operations

To tighten monetary conditions, the Bank of Canada may sell government securities in the open market to withdraw liquidity from the financial system and push up short-term interest rates. During the 2022–2023 period, **open market operations were used moderately** as part of routine liquidity absorption, but they were **not the primary tool** in the inflation-fighting effort.

Policy Interest Rate (Overnight Rate)

The **policy interest rate was the central instrument** used to combat inflation. Between **March 2022 and July 2023**, the Bank raised the overnight rate from **0.25% to 5.0%**, marking the most aggressive series of rate increases in decades. These hikes directly increased borrowing costs for households and businesses, slowed mortgage and credit demand, and contributed to a broad deceleration in consumer spending and housing activity.

Switching Government Deposits (Redeposits and Drawdowns)

The Bank of Canada can reduce liquidity by transferring government deposits from commercial banks back to its own balance sheet—a process known as a **drawdown**. While there was **no public emphasis** on deposit switching during the 2022–2023 tightening phase, it may have been used as part of behind-the-scenes liquidity management.

Swap Transactions with the Exchange Fund Account

The Bank also has the option of reducing liquidity by **selling foreign currency assets to the Exchange Fund Account**, which limits the Canadian-dollar funds available for redeposit into the banking system. During the 2022–2023 inflation episode, **no swap transactions were reported or required** for monetary policy purposes, as foreign exchange markets remained stable.

Purchase and Resale Agreements (PRAs, SPRAs, SSRAs)

The Bank can temporarily absorb liquidity through **Special Sale and Repurchase Agreements (SSRAs)**. These operations allow the Bank to sell securities to dealers with a repurchase agreement, thereby tightening short-term liquidity. During the 2022–2023 period, **short-term repo operations were minimal**, as markets remained orderly and broader tools such as rate hikes and QT dominated the tightening effort.

Moral Suasion

The Bank regularly uses **moral suasion**—persuasive communication with financial institutions—to encourage lending restraint during periods of excessive inflation. In 2022 and 2023, the Bank relied on frequent public statements, Monetary Policy Reports, and media briefings to signal its firm commitment to price stability. These messages were aimed not only at markets but also at banks and credit providers, reinforcing the need for responsible lending during a high-interest-rate environment.

Forward Guidance

Forward guidance played a **critical role** in anchoring inflation expectations. The Bank of Canada **signaled clearly and consistently** that interest rates would remain elevated until inflation was firmly under control. This guidance influenced consumer and business behavior, contributing to slower wage growth and more cautious pricing decisions. By early 2023, the Bank adjusted its tone, stating that **policy was “sufficiently restrictive”**, signaling a temporary pause in rate increases while still reinforcing its commitment to the 2% inflation target.

Quantitative Tightening (QT)

In **April 2022**, the Bank launched a program of **quantitative tightening**, allowing maturing Government of Canada bonds to **roll off its balance sheet without reinvestment**. This marked the first formal QT

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program in Canadian monetary history. Over the next 18 months, the Bank steadily reduced its holdings of government securities, reinforcing the effect of higher policy rates by gradually draining excess liquidity from the financial system.

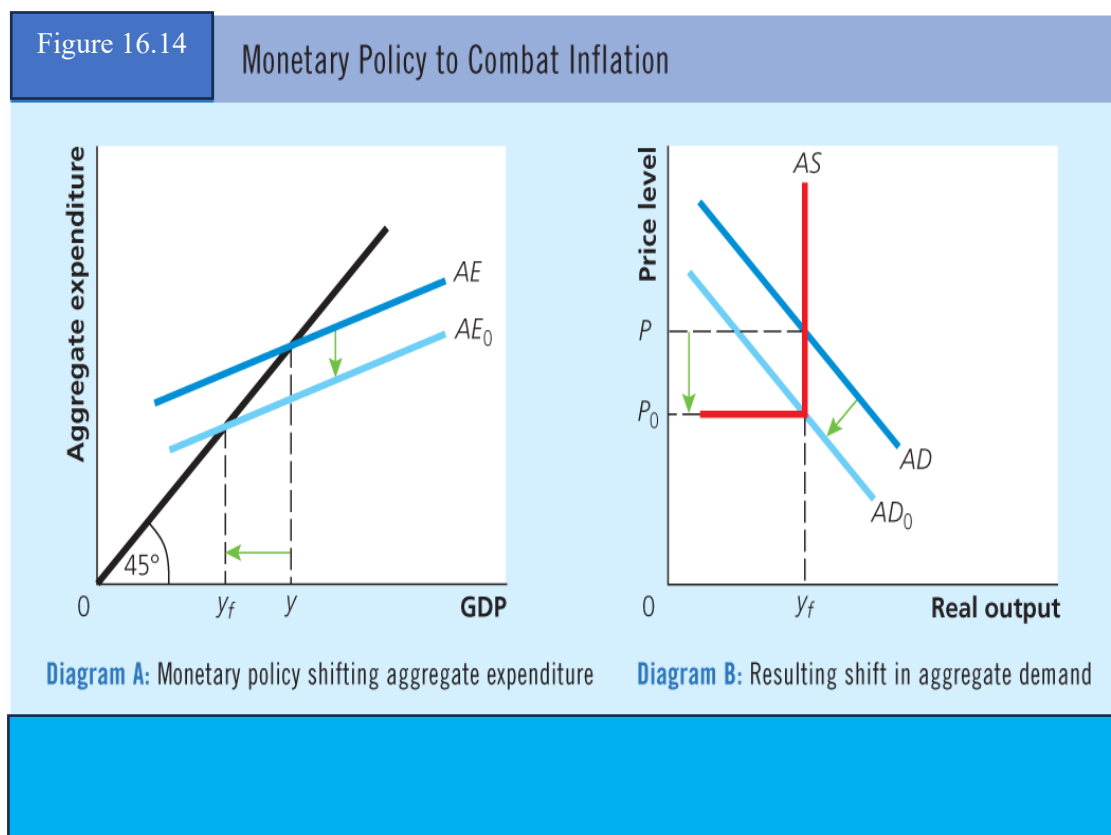
Conclusion

During the **2022–2023 inflationary period**, the Bank of Canada relied heavily on a combination of **policy rate hikes, forward guidance, and quantitative tightening**, while using other instruments like open market operations, moral suasion, and liquidity management to support its overall strategy. These coordinated actions helped to cool domestic demand, slow inflation, and begin the process of bringing the economy back to its inflation target. The episode highlights how each instrument plays a distinct but complementary role in controlling inflation in a modern monetary framework.

Figure 16.14 Monetary Policy to Combat Inflation

Diagram A: Monetary policy shifting aggregate expenditure

Diagram B: Resulting shift in aggregate demand



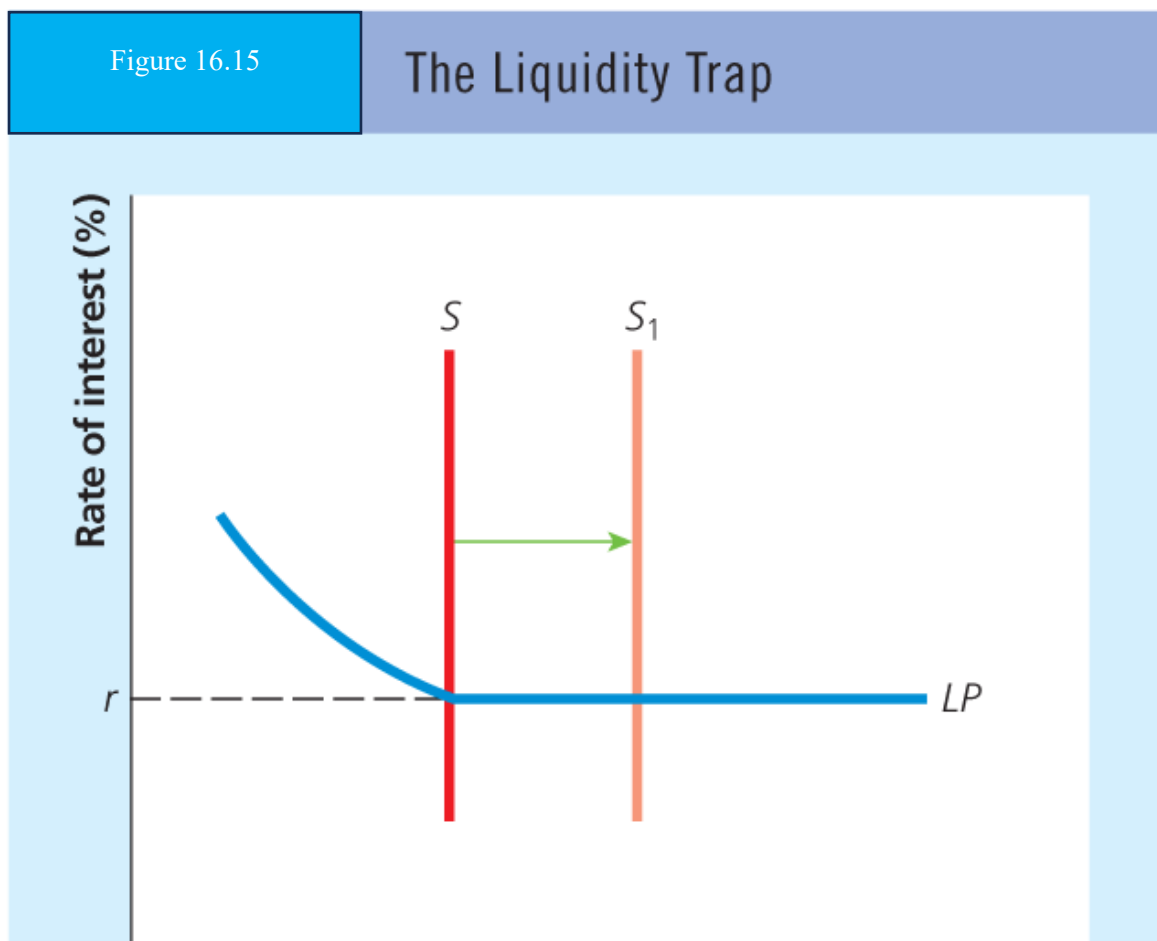
The Effectiveness and Limitations of Monetary Policy

LO 16.9 Discuss the effectiveness and limitations of monetary policy

How Effective Is Monetary Policy in Stimulating Economic Activity?

The effectiveness of monetary policy is a key issue in macroeconomics and is central to the ongoing debate between **Keynesian and monetarist economists**. While monetary policy is widely used to manage short-run fluctuations in output and employment, its success depends on how strongly changes in the money supply affect interest rates, and in turn, how those interest rate changes influence spending and investment. In two theoretical cases, however, monetary policy may be largely ineffective: the **liquidity trap** and the **case of interest-insensitive investment**.

Figure 16.15 The Liquidity Trap



The Case of the Liquidity Trap

A liquidity trap occurs when increases in the money supply **fail to reduce interest rates**, rendering monetary policy powerless to stimulate spending. In this scenario, the **liquidity preference curve is flat**, and even large expansions of the money supply do not lower the equilibrium interest rate. **Figure 16.15** illustrates this case: the money supply curve shifts from **S** to **S₁**, but the interest rate remains fixed at **r**, as the demand for money is perfectly elastic at that rate.

This situation arises when interest rates are already **extremely low**, and people expect them to rise in the future, which would lead to **falling bond prices**. As a result, households and firms prefer to **hold money rather than invest in interest-bearing assets**. Under these conditions, monetary policy loses its traction.

Liquidity trap: a situation in which the interest rate is so low that people prefer to hold large amounts of money rather than invest in other liquid assets.

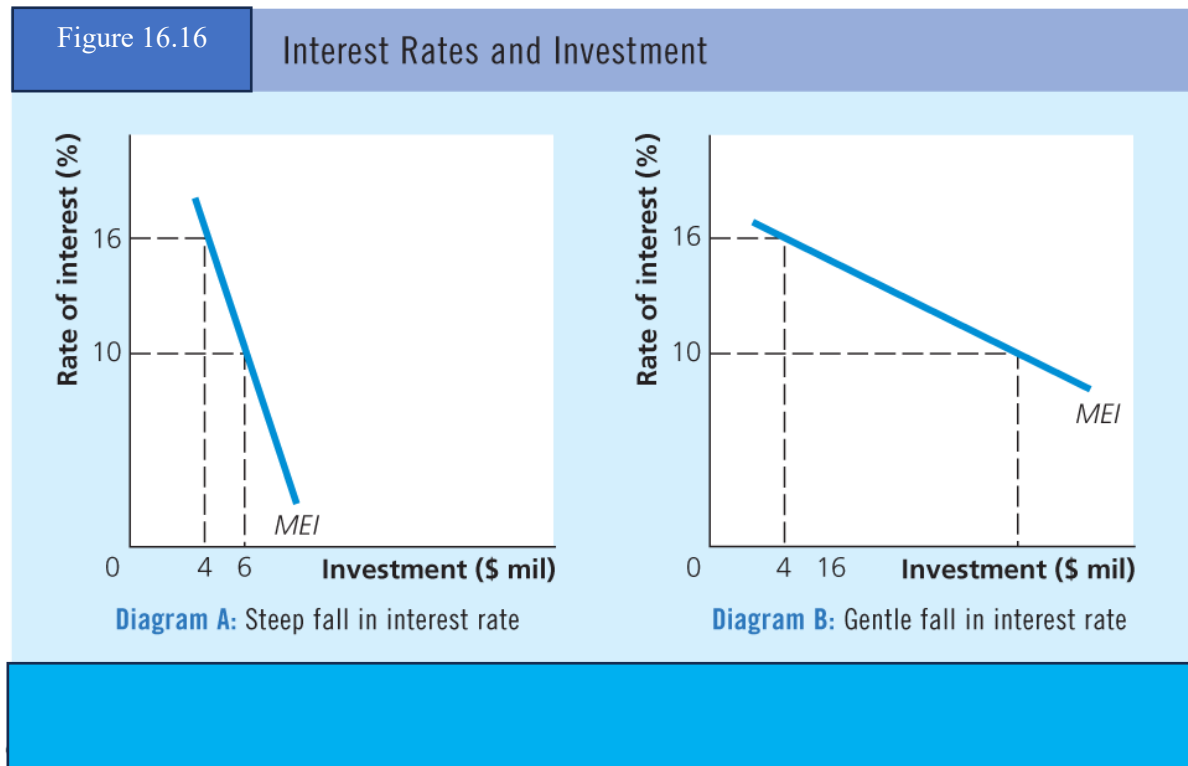
Because interest rates have rarely remained at historically low levels for extended periods, many economists viewed the liquidity trap as largely theoretical. That perception changed after **2008**, and again in **2020**, when central banks—including the Bank of Canada—lowered interest rates close to zero. Even with unprecedented monetary easing, investment and output remained sluggish, highlighting the limits of interest rate policy near the **zero lower bound**.

In general, the **steeper the liquidity preference curve**, the more responsive interest rates are to changes in the money supply. A steep curve means that a monetary expansion leads to a noticeable fall in interest rates, making policy more effective. A flat curve, by contrast, diminishes the interest rate response and weakens monetary transmission.

Figure 16.16 Interest Rates and Investment

Diagram A: Steep fall in interest rate

Diagram B: Gentle fall in interest rate



The Effectiveness of Monetary Policy: The Role of Investment Sensitivity

As previously shown, the Keynesian transmission mechanism relies on a chain of responses that begins with an increase in the money supply and ends with a rise in national income. This chain can be summarized as:

$$\Delta M \uparrow \rightarrow \Delta r \downarrow \rightarrow \Delta I \uparrow \rightarrow \Delta GDP \uparrow$$

where:

M = money supply

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r = rate of interest

I = level of investment

GDP = national income or output

The effectiveness of monetary policy therefore depends not only on how much a change in the money supply lowers the interest rate, but also on **how responsive investment is to interest rate changes**. This responsiveness is determined by the **slope of the marginal efficiency of investment (MEI) curve**, also referred to as the **investment demand curve**.

The Case of Interest-Insensitive Investment

If the MEI curve is **steep**, then a given reduction in the interest rate will result in **only a small increase in investment**. If, by contrast, the MEI curve is **flat**, the same interest rate reduction will lead to a **much larger increase in investment**, making monetary policy more potent.

Figure 16.16 illustrates these differences:

- In **Diagram A**, a decrease in the interest rate from **16% to 10%** raises investment from **\$4 million to \$6 million**—a relatively modest change.
- In **Diagram B**, the same reduction in the interest rate causes investment to increase from **\$4 million to \$16 million**, indicating much greater sensitivity to interest rate movements.

This comparison demonstrates that the **flatter the MEI curve**, the more effective monetary policy becomes in stimulating aggregate demand. A flat investment demand curve implies that businesses are highly responsive to borrowing costs and are willing to significantly increase capital spending when interest rates fall.

The flatter the marginal efficiency of investment curve, other things being equal, the more effective monetary policy will be.

Combining Interest and Investment Sensitivity

The effectiveness of monetary policy is maximized when both of the following conditions are met:

Reading Comprehension

1. Explain how each of the following will affect the money supply:

- a. The Bank of Canada purchases securities on the open market.
- b. The Bank of Canada raises the bank rate.
- c. The Bank of Canada switches funds from the Bank of Canada to the commercial banks.
- d. The Bank of Canada undertakes a drawdown operation.

1. What is the effect of
 - a. An open-market sale of securities on the rate of interest?
 - b. A lowering of the bank rate on the money supply?
2. Discuss moral suasion as an instrument of monetary policy.
3. Briefly explain how monetary policy can be used to
 - a. Curb inflation
 - b. Reduce unemployment
4. Define the target for the overnight rate. How does this rate differ from the bank rate?
5. What kind of monetary policy did the Bank of Canada adopt as a response to the recession?
6. Explain how lowering the key policy rate affects employment and GDP.

1. The **liquidity preference curve is steep**, meaning that an increase in the money supply leads to a noticeable drop in interest rates.

2. The **marginal efficiency of investment curve is flat**, meaning that lower interest rates lead to a large increase in investment.

This ideal configuration ensures that monetary expansion transmits strongly through both the financial and real sectors of the economy. In contrast, a flat liquidity preference curve or a steep investment curve can significantly weaken the monetary transmission process, reducing the ability of the central bank to influence output and employment.

Thus, while monetary policy can be a powerful tool under the right conditions, its effectiveness ultimately depends on **the sensitivity of both money demand and investment demand to interest rate changes**.

The Limitations of Monetary Policy

Although monetary policy is a central tool for managing economic activity, it has several limitations—both theoretical and practical—that can reduce its effectiveness in achieving macroeconomic goals. Beyond the **liquidity trap** and **interest-insensitive investment**, which render monetary expansion ineffective through technical or structural transmission failures, there are **at least three additional limitations** that deserve attention.

1. Weak Credit Demand During Recessions

Monetary policy relies on increasing the availability and reducing the cost of credit. Yet even when **loans are easily accessible and interest rates are low**, households and firms may **choose not to borrow** if they lack confidence in

the future. In severe recessions, **pessimism about future income or sales** may lead to a reluctance to take on new debt, even under favourable financial conditions. In such cases, the economy may remain stagnant despite the best efforts of the central bank to encourage spending through monetary easing.

This problem becomes more acute when business sentiment is fragile or when consumers prioritize saving over spending.

2. Time Lags in Monetary Transmission

While monetary policy can generally be implemented more rapidly than fiscal policy—because central banks can act independently of legislative processes—it still faces the problem of **time lags**. These lags fall into three categories:

- The **recognition lag**: time required to detect the need for policy intervention.
- The **implementation lag**: typically short for monetary policy, as central banks can act immediately.
- The **impact lag**: the time between policy implementation and observable effects on output, employment, and inflation.

The **impact lag** is especially problematic. It may take **six to eighteen months** for changes in interest rates to meaningfully affect economic activity. As a result, a policy introduced in response to current conditions might produce its full effects only after the economic environment has changed—potentially **exacerbating instability rather than reducing it**.

3. Limited Effect on Investment Financed by Retained Earnings

Not all business investment is funded through external borrowing. Many firms—particularly large corporations—finance capital expenditures from **retained earnings**. In these cases, the **cost of borrowing is irrelevant** to the investment decision. Even sharp changes in the policy interest rate may have **little influence** on firms that rely on internal funds to finance expansion. This limits the reach of monetary policy, particularly in mature business sectors where cash reserves are substantial and financing is self-contained.

Other Considerations

In an increasingly globalized financial system, **capital mobility and exchange rate effects** may also weaken the domestic impact of monetary policy. For example, interest rate changes can trigger **exchange rate movements** that offset some of the intended effects on aggregate demand. Moreover, **financial innovation and the expansion of non-bank financial intermediaries** may reduce the influence of central bank actions over broad credit conditions.

In summary, monetary policy remains a critical instrument of macroeconomic stabilization. Yet it is not a panacea. Its effectiveness can be constrained by structural factors, behavioural responses, and timing mismatches. These limitations underscore the importance of using monetary policy in coordination with **fiscal policy and structural reforms**—especially during deep downturns or periods of economic uncertainty.

Reading Comprehension

1. Mention some of the limitations of monetary policy.
2. Under what circumstances will monetary policy be least effective in stimulating economic activity?
3. What is the liquidity trap? Why are economists today not terribly concerned about the liquidity trap?

Review

1. Review the learning objectives listed at the beginning of the chapter.
2. Have you accomplished all the objectives? One way to determine this is to answer the Reading Comprehension Questions at the end of each section. This will help you assess the extent to which you have accomplished the learning objectives.
3. If you have not accomplished an objective, review the relevant material before proceeding.

Key Points to Remember

1. LO 16.1

The **crude quantity theory of money** argues that changes in the price level are primarily driven by changes in the money supply. The theory assumes **constant velocity** and **full-employment output**, both of which are unrealistic. The **new quantity theory (monetarism)** replaces these assumptions with a stable relationship between **money growth** and **nominal income growth**.

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2. **LO 16.2**

The **Keynesian theory of money** outlines three primary motives for holding money: **transactions**, **precautionary**, and **speculative**. In addition, individuals may hold money as a **liquid asset**, especially when uncertainty is high.

3. **LO 16.3, 16.4**

The **equilibrium interest rate** is determined by the intersection of **money demand** and **money supply**. An **increase in money demand** raises the interest rate; a **decrease** lowers it, **holding other factors constant**.

4. **LO 16.4, 16.5**

An **increase in the money supply** reduces the interest rate, increases investment, and raises GDP through the **multiplier effect**. A **reduction in the money supply** has the opposite effect—higher interest rates, lower investment, and reduced GDP.

5. **LO 16.6**

Monetary policy consists of actions taken by the **Bank of Canada** to influence the money supply and interest rates in pursuit of economic objectives—**full employment**, **price stability**, **sustainable real output growth**, and **external balance**.

6. **LO 16.7**

The Bank of Canada uses multiple tools to implement monetary policy:

- **Open-market operations**
- **Central bank advances** and the **bank rate**
- **Switching government deposits**
- **Swap transactions**
- **Purchase and resale agreements (PRAs, SPRAs, SSRAs)**
- **Moral suasion**
- **Forward guidance**—used to shape expectations about the future path of interest rates
- **Quantitative easing (QE)**—used to inject liquidity by purchasing long-term assets
- **Quantitative tightening (QT)**—used to withdraw liquidity by allowing assets to mature without reinvestment

The **overnight rate** is the Bank's key policy rate and the primary short-term instrument.

7. **LO 16.7**

An **expansionary monetary policy** is employed to reduce unemployment and stimulate

aggregate demand. A **contractionary monetary policy** is used to control inflation and stabilize prices.

8. **LO 16.8**

In response to the **2008–2009 recession** and the **2020 pandemic recession**, the Bank of Canada implemented **expansionary monetary policies**, including cutting interest rates to near zero and, in 2020, introducing **quantitative easing** to support financial markets and economic recovery.

9. **LO 16.9**

Monetary policy may be **ineffective** in certain situations—such as a **liquidity trap** or when investment is **insensitive to interest rate changes**. Moreover, **time lags** between policy actions and their economic effects may limit the precision and timeliness of monetary interventions.

Problems and Exercises

Basic

1. **LO 16.1** Table 16.2 contains data on GDP and the money supply for a hypothetical economy. Complete the velocity column.

Table 16.2 Data on GDP and the Money Supply for a Hypothetical Economy

Year	GDP (\$ bil)	Money Supply (\$ bil)	Velocity
2018	350	60	
2019	375	63	
2020	378	68	
2021	380	74	
2022	383	78	
2023	384	84	
2024	387	90	