

PART VI Other Macroeconomic Issues



Chapter 17: Inflation and Anti-Inflation Policies

Learning Objectives

After studying this chapter, you should be able to

- 17.1** Discuss the causes of inflation
- 17.2** Explain the Phillips curve
- 17.3** Discuss the accelerationists' position
- 17.4** Understand policies designed to deal with stagflation
- 17.5** Discuss the rational expectations hypothesis
- 17.6** Distinguish between new classical and new Keynesian macroeconomics

Assess Your Knowledge

1. Suppose most people anticipate that the rate of inflation will increase and are able to adjust their nominal income accordingly. How will this affect the rate of inflation?
2. Can an expansionary policy designed to reduce unemployment increase the rate of inflation?
3. How could the increase in the world price of oil as a result of the political upheaval in the Middle East affect employment in Alberta?

Causes of Inflation

LO 17.1 – Discuss the causes of inflation

Before turning to the causes of inflation, it is important to recall the distinction made in Chapter 6 between a one-time increase in the price level and a sustained increase. Inflation is defined as a persistent rise in the average price level over time, typically measured by the percentage change in a price index, such as the Consumer Price Index (CPI). Inflation becomes relevant not simply because prices are rising, but because it erodes the purchasing power of money. Economic actors are primarily concerned with how inflation affects their real income: the income adjusted for changes in the price level. As discussed earlier, the percentage change in real income equals the percentage change in money income minus the rate of inflation.

To understand why inflation persists, we must examine the forces that **transform an initial price increase into a continuing rise in the price level**. These forces include:

- **Changes in money wages**
- **Variations in productivity**
- **Shifts in inflation expectations**
- **Growth in the money supply**

Each of these factors influences whether an isolated shock to prices—such as a spike in energy costs or a currency depreciation—leads to temporary inflation or evolves into ongoing inflationary pressure.

In the following sections, we will explore demand-pull and cost-push inflation, along with the roles of expectations and monetary expansion in sustaining inflation over time.

Demand-Pull Inflation

Demand-pull inflation refers to a sustained rise in the price level driven by excess aggregate demand in an economy operating at or near full employment. When total spending exceeds the productive capacity of the economy, prices rise. In simple terms, too much money chases too few goods.

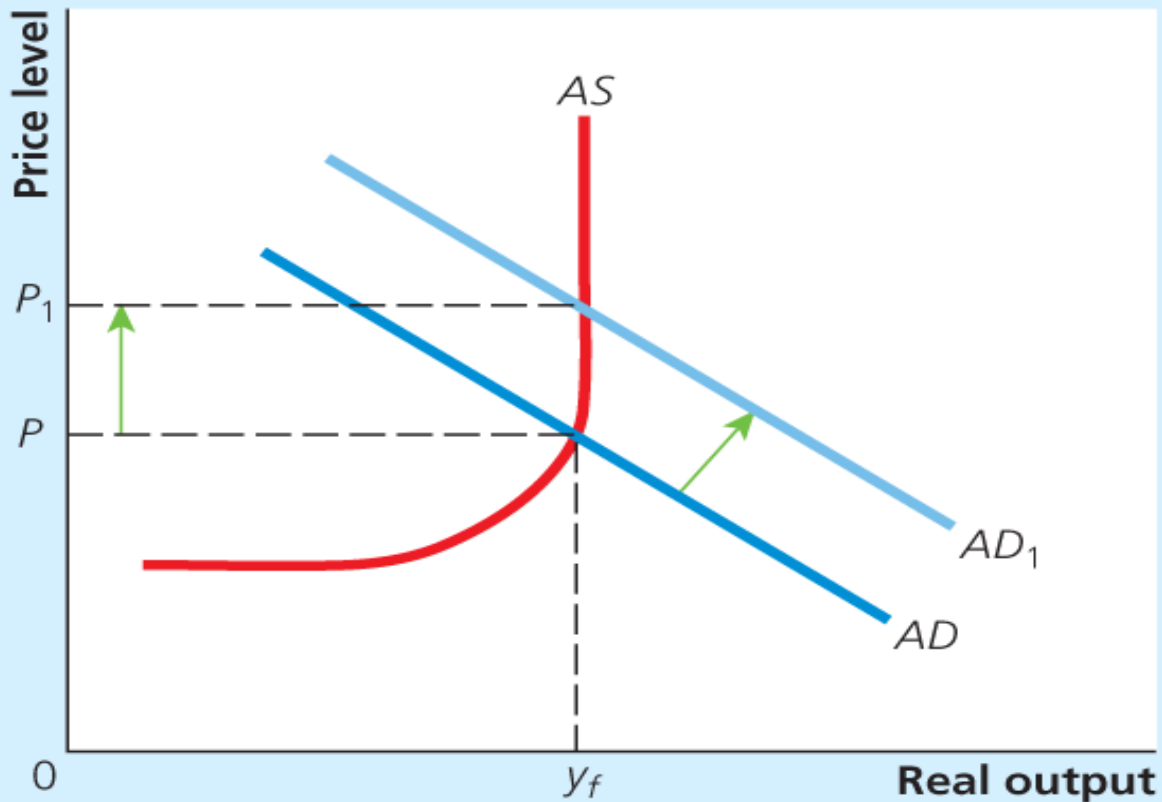
Demand-pull inflation arises when aggregate expenditure is excessively high, or when the velocity of money (V) increases significantly, placing upward pressure on the price level. With output fixed at full employment, increases in spending raise prices rather than real output. Demand-pull inflation or excess demand inflation is defined as a persistent increase in the average price level caused by excess aggregate demand in a full-employment economy.

Figure 17.1 illustrates demand-pull inflation. Initially, the economy is in equilibrium at the full-employment level of output, Y_f , and the average price level is P . An increase in aggregate expenditure shifts the **aggregate demand (AD)** curve rightward from AD to AD_1 , raising the price level from P to P_1 .

Figure 17.1 Demand Pull Inflation

Figure 17.1

Demand-Pull Inflation



1. The Monetary Theory of Inflation

This theory attributes inflation to excessive growth in the money supply. When the central bank increases the money supply faster than the growth of real output, and if velocity is stable, the result is inflation. The equation $MV = PQ$ shows that if M increases while Q is fixed, P must rise.

2. The Budget Deficit Theory of Inflation

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This theory links inflation to deficit spending financed by central bank borrowing. When the government runs a large budget deficit and finances it through monetary expansion, aggregate demand increases beyond the economy's capacity, causing inflation. The problem arises not from the deficit itself, but from the method of financing—printing money rather than taxing or borrowing from the public.

Demand-Pull Inflation

The Monetary Theory of Inflation

The **monetary theory of inflation** builds on the **quantity theory of money** and emphasizes the relationship between the growth of the money supply and the price level. According to this theory, **inflation occurs when the money supply increases at a rate faster than the growth of real output.**

People wish to hold a certain level of cash balances for transactions, precautionary, and speculative purposes. If the central bank increases the quantity of money beyond what households and firms want to hold, these excess balances are spent on goods and services. The resulting increase in aggregate demand causes the **average price level** to rise.

Monetary theory of inflation: the theory that inflation is caused by increases in the money supply.

If real output grows faster than the money supply, inflation will not occur. Inflation arises only when the **money supply expands more rapidly than real output**, causing demand to exceed supply at prevailing prices.

Theories of Demand-Pull Inflation

The Budget Deficit Theory of Inflation

The budget deficit theory of inflation holds that government deficit spending can lead to inflation. When the government increases its expenditure beyond tax revenues, it creates a budget deficit. This deficit increases aggregate demand and puts upward pressure on the price level.

Budget deficit theory of inflation: the theory that government deficit spending causes inflation.

To a large extent, the budget deficit theory is a variant of the monetary theory. Proponents of the monetary theory argue that deficits are inflationary only when financed by money creation. If the government borrows from the central bank (monetizing the debt), the money supply expands and inflation follows.

If the deficit is financed through borrowing from households and firms—by issuing government bonds—the funds used for public spending are drawn from private savings. In this case, the increase in

government expenditure may be offset by a reduction in private sector spending, producing no net increase in aggregate demand. This is referred to as the crowding-out effect.

Crowding-out effect: *the concept that increases in government spending leads to a reduction in private sector spending.*

Whether a government deficit is inflationary depends on **how it is financed**. Only when financed through money creation does the deficit raise aggregate demand without a corresponding reduction in private spending, resulting in inflationary pressure.

Cost-Push Inflation

Cost-push inflation, also known as **sellers' inflation**, occurs when the price level rises due to increases in the costs of production, rather than from excess demand. In contrast to demand-pull theories, which focus on aggregate demand, cost-push theories emphasize supply-side pressures as the main cause of inflation.

Cost-push inflation or sellers' inflation: inflation resulting from increases in wages and other supply-side factors.

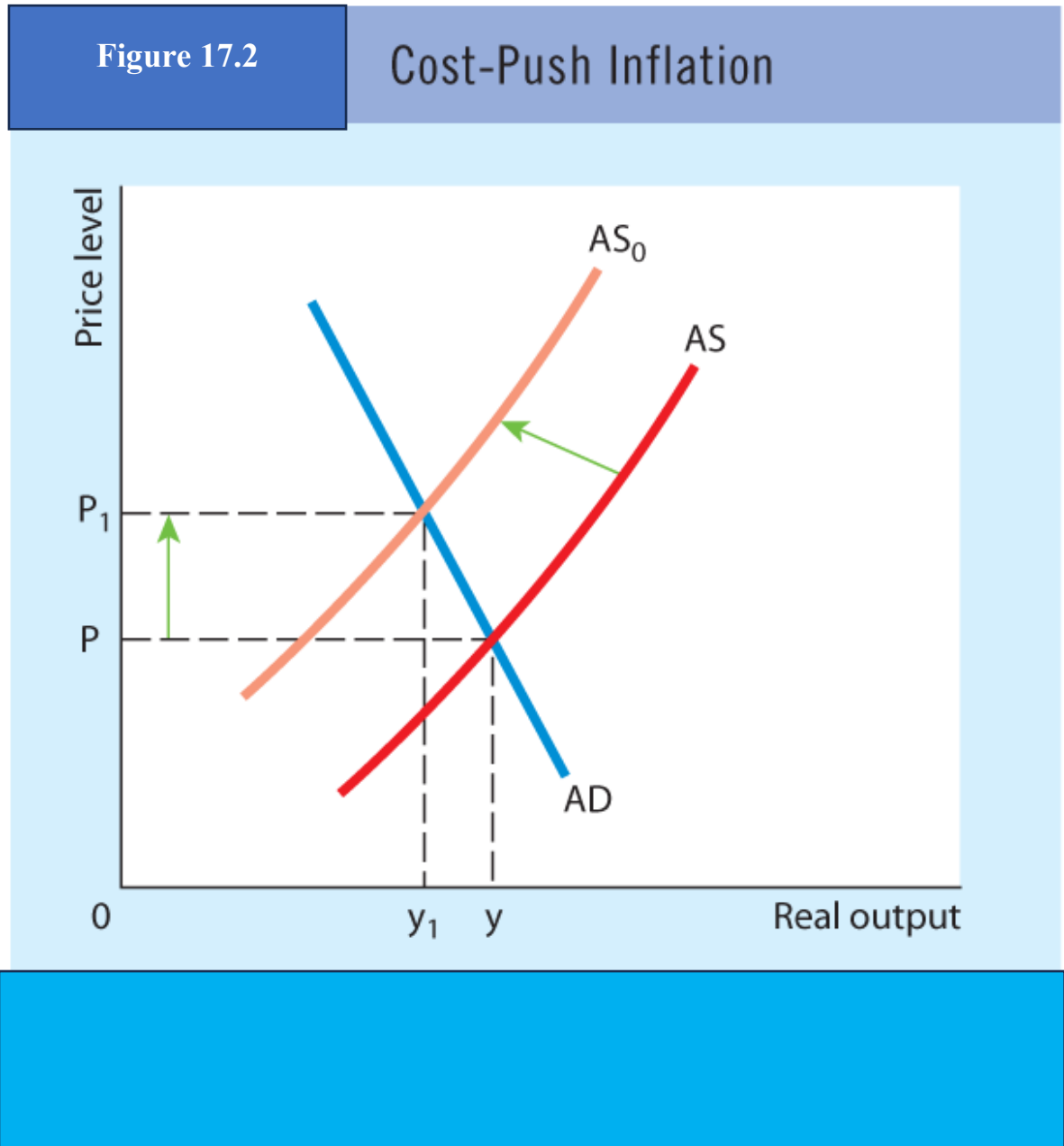
Cost-push inflation arises when wages increase **without corresponding gains in productivity**, or when the prices of key inputs—such as raw materials, energy, or intermediate goods—rise. These higher costs force firms to **reduce output** and **raise prices**, shifting the **aggregate supply (AS)** curve to the **left**, as illustrated in **Figure 17.2**. The price level rises from **P** to **P₁**, and real output falls from **Y_f** to **Y₁**.

Cost-push inflation is also associated with **market power** among labour unions and large firms. According to this view, powerful **unions** may push for higher wages regardless of productivity gains. Firms, facing higher wage bills, raise their prices to maintain profit margins. These higher prices, in turn, lead unions to demand further wage increases—triggering a **wage-price spiral**.

Wage-price spiral: a cycle of successive increases in wages and prices, where rising wages push up costs and prices, which in turn prompt further wage demands.

This feedback loop can create **persistent inflation**, even in the absence of strong aggregate demand, and can lead to **stagflation**—a period of rising prices combined with falling output.<FIG>

Figure 17.2 Cost-Push Inflation



Firms can also initiate the cost-push process. For instance, **monopolists** or firms with strong pricing power may raise prices to increase profits, regardless of changes in costs. As prices rise, **workers face higher living costs** and **unions demand higher wages** to preserve purchasing power. In response, firms raise prices again to offset the increased wage bill—triggering a **wage-price spiral**.

This feedback mechanism, whether initiated by **labour or firms**, results in an upward shift in the **aggregate supply curve**, causing inflation even in the absence of excess demand.

Imported Inflation

Another form of cost-push inflation is **imported inflation**. In an **open economy**, increases in the prices of imported goods—either inputs or final consumer goods—can drive domestic inflation.

Imported inflation: inflation caused by increases in the prices of imported inputs or imported consumer goods.

When the prices of **imported inputs** rise—such as crude oil, metals, or components—domestic producers face higher costs and respond by **raising prices**. Similarly, if there is **inflation in foreign countries**, the prices of **imported consumer goods** increase, and domestic retailers may raise prices to match. This process is particularly relevant for **small open economies** like Canada, where a large share of goods consumed or used in production are imported.

Figure 17.2 illustrates the process of cost-push inflation. Suppose the economy is producing real output at level **y** and the price level is **P**. An increase in firms' production costs causes the **aggregate supply (AS)** curve to shift **leftward** to **AS₀**. The result is a higher price level, **P₁**, and lower real output.

Cost-push inflation can occur even when the economy is operating below full employment. An upward shift in the aggregate supply curve—whether caused by wage increases, profit-driven price hikes, or rising import prices—can trigger inflation without any corresponding increase in aggregate demand.

BUSINESS SITUATION

17.1

Your father runs a small business, importing products from the United States for sale in Canada.

How might inflation in the United States affect your father's business?

The answer to this Business Situation can be found in Appendix A.

Validation and the Persistence of Inflation

Theories of demand-pull and cost-push inflation explain the initial causes of a rise in the price level. However, they do not explain why inflation persists. For the price level to continue rising over time, there must be a sustained increase in the money supply.

When the central bank increases the money supply in response to a decrease in aggregate supply, the process is known as validation.

Validation: *an increase in the money supply in response to the decrease in aggregate supply.*

Most economists agree that **cost increases alone**—such as rising wages or higher import prices—**do not cause sustained inflation** unless they are accompanied by **monetary expansion**. In the absence of an increase in the money supply, cost increases would force consumers and firms to **cut back spending elsewhere**, leaving the overall price level unchanged.

An important historical example is the **Canadian experience in the 1970s**. In **1974**, the **Organization of Petroleum Exporting Countries (OPEC)** significantly raised the price of oil. This drove up the price of petroleum and petroleum-related products, putting upward pressure on the overall price level. If these price increases had been offset by **lower prices in other sectors**, the **average price level would have remained stable**. In theory, with a fixed money supply, higher spending on energy products would reduce demand for other goods, limiting broader inflation.

But this did not happen. Instead, the **Bank of Canada increased the money supply**, allowing overall spending to rise. This validated the cost-push shock, turning a temporary rise in relative prices into a **generalized and sustained increase in the price level**. As a result, **aggregate demand shifted rightward**, reinforcing the initial supply shock and producing **ongoing inflation**. It is in this sense that many economists argue that **inflation is ultimately a monetary phenomenon**.

A more recent illustration occurred in **2025**, when trade tensions between Canada and the United States led to the imposition of **tariffs** on Canadian exports. These tariffs raised the cost of imported goods and drove **inflation up to 2.6%** in February 2025. In response, the **Bank of Canada reduced its policy interest rate** to 3% on January 29, 2025, aiming to support economic activity amid the anticipated slowdown (Bank of Canada, 2025, <https://www.bankofcanada.ca/2025/01/fad-press-release-2025-01-29>).

Although the central bank acted to mitigate the economic impact, Governor Tiff Macklem emphasized the importance of preventing tariff-induced price increases from becoming entrenched, highlighting the need to keep inflation expectations anchored (Bank of Canada, 2025, <https://www.bankofcanada.ca/speeches/2025/02/anchoring-expectations-in-uncertain-times/>).

This case reinforces the central insight: **cost shocks may trigger inflation**, but **monetary accommodation is what sustains it**. Validation, therefore, lies at the heart of the transition from temporary price pressure to ongoing inflation.

Other Cause of Inflation

Economists have identified another type of inflation, referred to as **expectational inflation** or **inertial inflation**, which plays a significant role in sustaining inflation over time. It incorporates elements of both demand-pull and cost-push inflation and is initiated by the behaviour of buyers and sellers responding to inflation expectations.

Expectational Inflation

Expectational inflation or **inertial inflation**: inflation caused by the behaviour of buyers and sellers responding to expectations of inflation.

When people expect prices to rise in the future, they may **increase their current spending** to avoid paying higher prices later. This increased expenditure shifts the **aggregate demand curve** to the **right**, as shown in **Figure 17.1**. This represents the **demand-driven** aspect of expectational inflation.

At the same time, **unions and workers**, anticipating higher inflation, may demand wage increases that reflect expected future price rises. Employers, facing higher wage costs, raise prices to maintain profit margins. This shifts the **aggregate supply curve** to the **left**, as shown in **Figure 17.2**, reinforcing the inflationary process.

The result is a **wage-price spiral**: rising wages cause rising prices, which in turn prompt further wage demands, sustaining the inflationary cycle.

Expectational inflation becomes especially persistent when **inflation expectations are unanchored**—that is, when households, businesses, and wage negotiators believe that prices will continue to rise and act accordingly. This makes managing expectations a critical task for central banks aiming to preserve **price stability**.

Structural Inflation

Structural inflation arises from persistent **rigidities or inefficiencies** in the economy's supply side. These include mismatches in labour markets, production bottlenecks, or regulatory constraints that prevent output from adjusting flexibly to changes in demand.

Structural inflation: inflation caused by persistent supply-side inefficiencies or institutional rigidities that limit the economy's ability to expand output.

Exchange Rate–Induced Inflation

Exchange rate–induced inflation occurs when a **depreciation of the domestic currency** raises the domestic cost of imported goods and services, feeding directly into the price level even if global prices remain stable.

Exchange rate–induced inflation: inflation caused by depreciation of the domestic currency, which increases the domestic price of imports.

Table 17.1

Main Types of Inflation: Summary Table

Type	Main Cause	How It Works
Demand-pull	Excess aggregate demand	AD curve shifts right
Cost-push	Higher input costs or wages	AS curve shifts left
Imported	Increase in global prices for imports	Higher import costs passed on to domestic prices
Expectational	Anticipated future inflation	Buyers spend early; unions demand higher wages
Validation	Central bank accommodates inflation	Money supply increases sustain higher prices
Structural	Supply-side rigidities and inefficiencies	Output cannot expand even as demand rises
Exchange rate–induced	Currency depreciation	Import prices rise; CPI increases
Administered price	Market power in concentrated industries	Firms raise prices strategically, not due to costs

This type of inflation is particularly relevant in **small open economies** like Canada, where a weaker dollar can sharply increase the cost of imported food, fuel, and manufactured goods.

Administered Price Inflation

Administered price inflation arises when firms in **concentrated industries** exercise **market power** to raise prices independently of changes in demand or production costs. In contrast to inflation driven by excess demand or rising input prices, this type of inflation results from the **strategic pricing decisions of dominant firms**, often in oligopolistic sectors where competition is limited.

Administered price inflation: inflation caused by the pricing power of firms in concentrated industries, where prices are set administratively rather than by competitive market forces.

In markets characterized by **imperfect competition**, prices are not determined by supply and demand

alone. Large firms may increase prices **not because costs have risen**, but because they anticipate **inelastic demand**, limited competitive response, or the ability to **maintain profit margins** during periods of general inflation. This behavior is particularly evident in sectors such as energy, telecommunications, food retail, and pharmaceuticals.

Administered price inflation may also interact with **expectational inflation**, as firms pre-emptively raise prices in anticipation of cost increases, or with **cost-push inflation**, if dominant firms pass on even modest cost increases at a magnified rate.

Although related to **structural inflation**, administered price inflation differs by focusing specifically on **pricing behaviour under market concentration**, rather than broader institutional inefficiencies. It has gained renewed attention in recent years, as **corporate consolidation** has increased in many advanced economies, including Canada.

This form of inflation underscores the role of **market structure and regulatory oversight** in maintaining price stability and has become a subject of interest in both monetary policy debates and competition policy reform.

The Dominant cause of inflation

Economists disagree over the dominant cause of inflation. **Monetarists** argue that inflation is fundamentally rooted in **monetary expansion**. As Milton Friedman famously stated, *“Inflation is everywhere and always a monetary phenomenon.”* In this view, **demand-pull inflation**, triggered by an increase in the money supply or its velocity, is the central explanation.

Neo-Keynesians, on the other hand, emphasize the role of **aggregate expenditure components**—particularly **government spending** and **private investment**—in generating excess demand. For them, **fiscal policy** and changes in consumer or business confidence can create inflationary pressure even in the absence of monetary expansion.

In contrast, other economists argue that inflation can also **originate from the supply side**, in the form of **wage-push** or **price-push** dynamics. According to this view, **strong unions, monopolistic firms, or import price shocks** can initiate inflation without any change in demand. These pressures raise production costs and lead to **cost-push inflation**, often accompanied by a **wage-price spiral**.

While the theoretical perspectives differ, most economists agree on two critical points:

1. **Inflation tends to generate inflationary expectations.**

Once inflation begins, households, firms, and unions expect it to continue and adjust their behaviour accordingly. These expectations—when embedded in wage contracts and pricing strategies—help sustain the inflationary process.

2. **Inflation is often validated by monetary authorities.**

If central banks respond to cost-push inflation by expanding the money supply—rather than allowing temporary price shocks to play out—then inflation becomes entrenched and prolonged.

In practice, **distinguishing demand-pull from cost-push inflation is difficult**. What is observable is the increase in the average price level, not the underlying cause. Consider the following scenario:

An increase in government spending raises aggregate demand. This increases the demand for labour, which raises wages. Higher wages raise production costs, prompting firms to raise prices. A wage-price spiral begins.

Is this inflation demand-pull or cost-push? It begins as demand-pull, triggered by increased spending. But the **immediate mechanism**—rising wages and costs—resembles cost-push inflation. In reality, many episodes of inflation involve both demand and supply elements, making neat classifications elusive. This reinforces the view that inflation is a complex and cumulative process, shaped by the interaction of real shocks, expectations, and monetary policy.

The Phillips Curve

LO 17.2 Explain the Phillips curve

The Phillips Curve

The **Phillips curve** illustrates the **inverse relationship** between the **rate of unemployment** and the **rate of wage inflation**, a relationship first identified by New Zealand economist **A.W. Phillips (1914–1975)**.

Reading Comprehension

1. What is demand-pull inflation?
2. What is cost-push inflation?
3. Discuss the process of validation.

Drawing on empirical data from the United Kingdom, Phillips observed that **when unemployment was high, wage increases tended to be slow**; when unemployment was low, **wages rose more rapidly**.

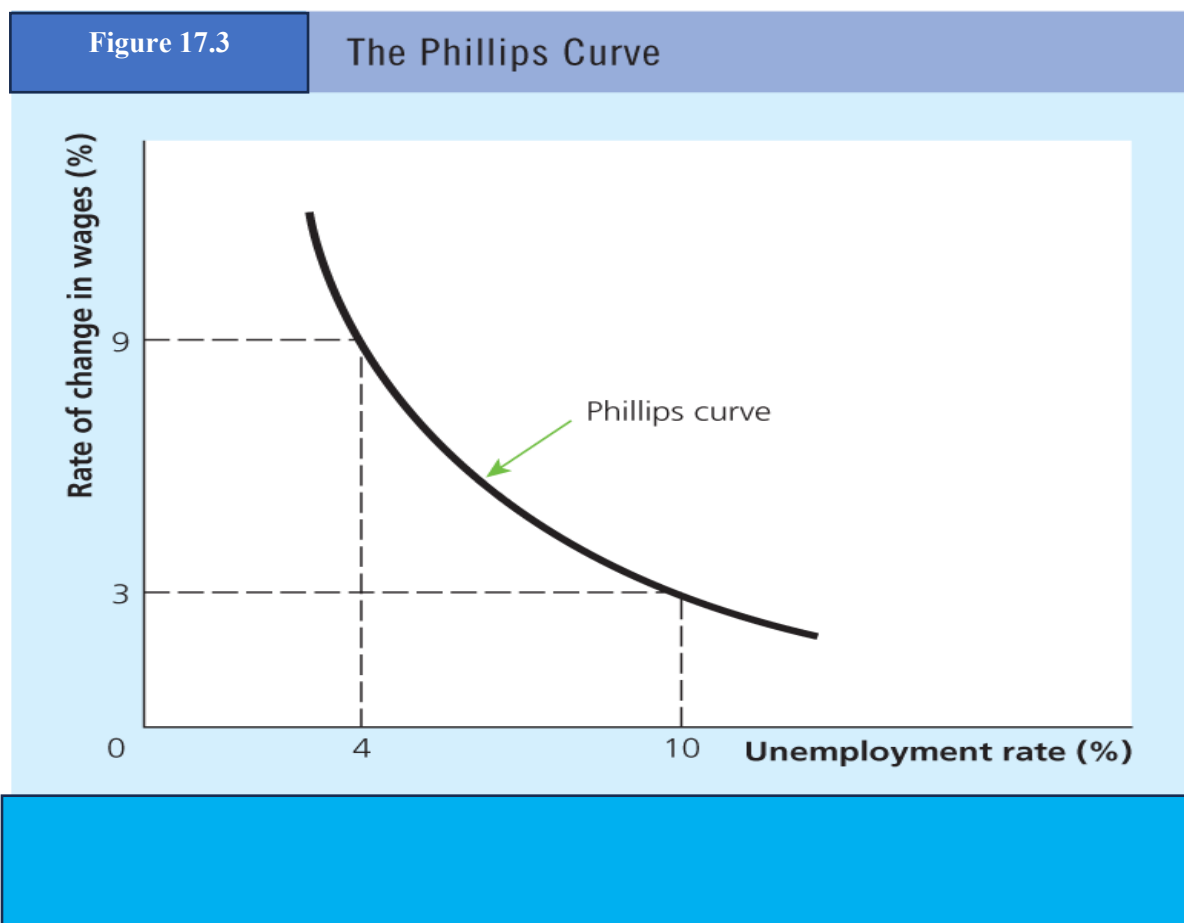
Phillips curve: a curve that shows the inverse relationship between the rate of unemployment and the rate of wage (or price) inflation.

The logic behind this relationship rests on **labour market dynamics**. When **unemployment is high**, a large pool of job seekers competes for limited job openings, reducing workers' bargaining power. Under these conditions, firms face **less pressure to raise wages**, and unions are more cautious in their wage demands. Conversely, when **unemployment is low**, labour becomes scarce. Employers must **compete for workers**, often by offering **higher wages**, and unions are in a stronger position to demand better compensation for their members.

Though Phillips originally focused on **wage inflation**, economists later extended the concept to **price inflation**, producing a version of the Phillips curve that maps **inflation** against **unemployment**. In its original formulation, the Phillips curve implied a **trade-off**: governments could achieve **lower unemployment** at the cost of **higher inflation**, and vice versa.

This relationship formed a central part of macroeconomic thinking during the 1950s and 1960s. Policymakers believed that they could **fine-tune the economy** by accepting some inflation in exchange for lower unemployment—or tighten policy to curb inflation, knowing that unemployment would temporarily rise.

Figure 17.3 The Phillips Curve



However, this trade-off was called into question during the **1970s**, when **Canada and other advanced economies experienced stagflation**—a combination of **high unemployment and high inflation**—which the Phillips curve, in its original form, could not explain. This led to a rethinking of the Phillips relationship, incorporating factors such as **expectations**, **supply shocks**, and the concept of a **non-accelerating inflation rate of unemployment (NAIRU)**.

Understanding the Phillips curve remains central to debates on **monetary policy**, **wage dynamics**, and **inflation targeting**, especially in periods when inflation and unemployment behave in unexpected ways.

wage increase. When unemployment is high, wage growth is slow; when unemployment is low, wages tend to rise more quickly. This relationship reflects the **bargaining power of labour** and the **competitive pressure in the labour market**.

***Phillips curve**: a curve showing the inverse relationship between the unemployment rate and the rate of wage increase.*

Graphically, the Phillips curve plots **unemployment rates** on the horizontal axis and **rates of wage change** on the vertical axis. The curve slopes **downward**, indicating that lower unemployment is associated with faster wage growth, and vice versa.

For example, the curve might show that:

- At **10% unemployment**, wages increase by **3%**, but
- At **4% unemployment**, wages rise by **9%**.

This trade-off suggests that policymakers could, in principle, target **lower unemployment** by accepting **faster wage increases**, or suppress wage growth by tolerating **higher unemployment**. This idea was influential in macroeconomic policy during the 1950s and 1960s.

Yet, over time, economists have come to view the original Phillips curve as **incomplete**. During the 1970s, **Canada and other advanced economies experienced stagflation**—high unemployment coupled with high inflation—which the original Phillips curve could not explain. In response, later models incorporated **inflation expectations**, leading to a distinction between:

- The **short-run Phillips curve**, which reflects a temporary trade-off between inflation and unemployment, and
- The **long-run Phillips curve**, which is **vertical**, implying that **no permanent trade-off** exists between inflation and unemployment once expectations adjust.

Despite its limitations, the Phillips curve remains a valuable framework for analyzing the **labour market**, **wage dynamics**, and the **transmission of monetary policy**, especially in discussions about **labour shortages**, **tight employment conditions**, and **wage-driven inflation**.

The curve shows the various combinations of unemployment rates and changes in wage rates that the economy can attain. It shows, for example, that when the unemployment rate is 10%, wages rise by 3%, and when the unemployment rate is 4%, wages rise by 9%.

The Relationship Between Inflation and Unemployment

While the **original Phillips curve** described the **inverse relationship** between the **rate of change in wages** and **unemployment**, it is possible to derive a similar relationship between **inflation** and **unemployment**.

This step is based on the insight from **cost-push theories of inflation**, which suggest that **wage increases are a primary driver of inflation**. If firms face higher wage costs—especially during periods of low unemployment—they raise prices to maintain profit margins. In this way, **higher wage growth translates into higher inflation**.

By **replacing the rate of wage increase in the Phillips curve with the rate of inflation**, we obtain a new version of the Phillips curve: one that links **inflation** directly to **unemployment**.

Conclusion: The higher the rate of unemployment, the lower the rate of inflation; the lower the rate of unemployment, the higher the rate of inflation.

This inverse relationship is now commonly depicted as the **modern Phillips curve**, shown in **Figure 17.4**. It reflects the idea that **tight labour markets** (i.e., low unemployment) produce **inflationary pressure**, while **slack labour markets** (i.e., high unemployment) restrain inflation.

Although the **original Phillips curve** strictly described wage dynamics, today the term is widely used to refer to the **inflation-unemployment trade-off**. In the **remainder of this chapter**, we will adopt this broader interpretation and examine how the inflation-unemployment relationship behaves in both the **short run** and the **long run**, including the role of **expectations** and **policy credibility**.

The Natural Rate of Unemployment

The **natural rate of unemployment**—also referred to as the **non-accelerating inflation rate of unemployment (NAIRU)**—is defined as the **rate of unemployment consistent with stable inflation**. It is the unemployment rate that prevails when the economy is at **full employment**, meaning that all remaining unemployment is either **frictional** or **structural**.

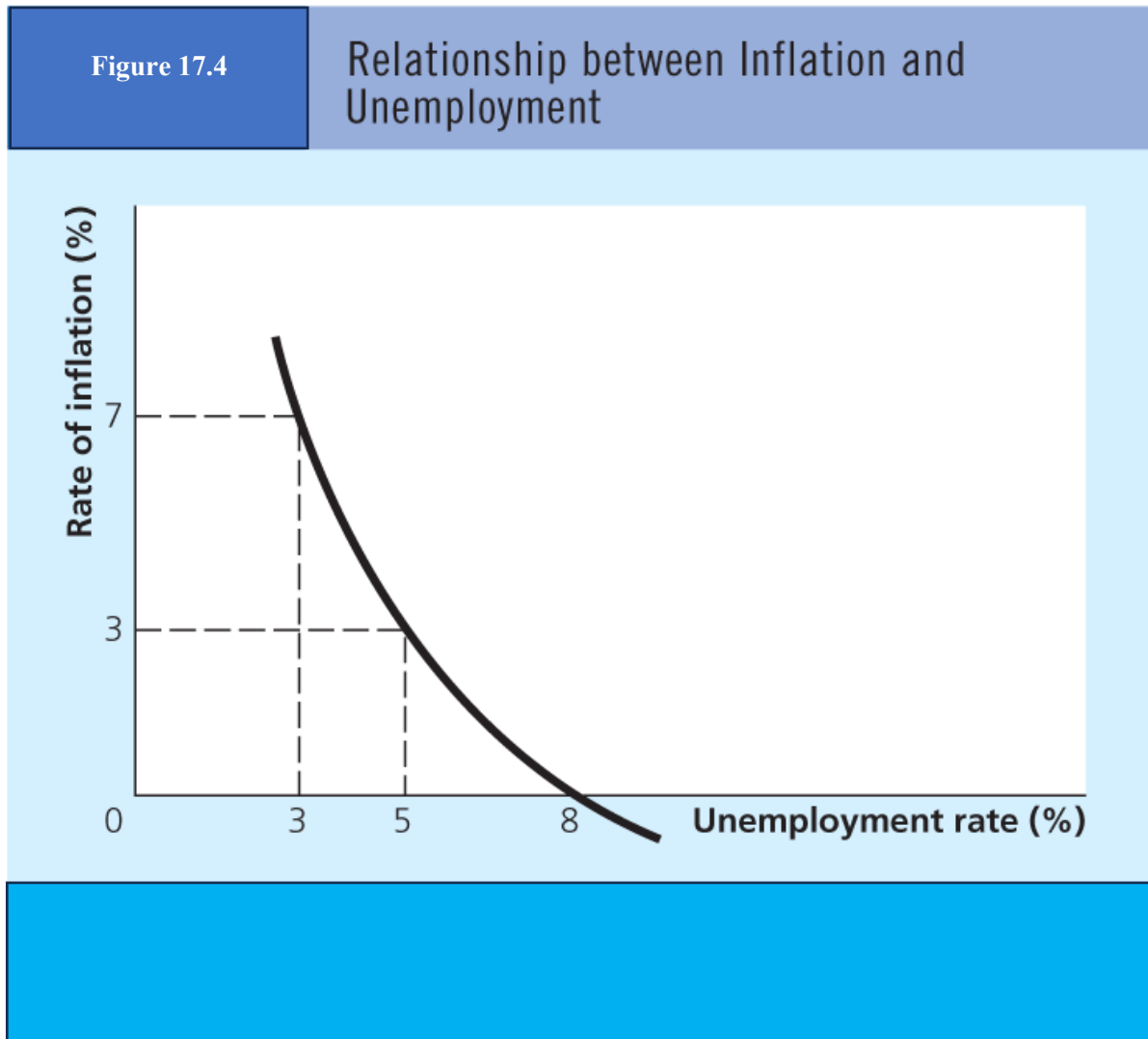
Natural rate of unemployment (NAIRU): *the rate of unemployment consistent with a constant rate of inflation.*

In **Chapter 6**, full employment was described as a situation in which **only frictional and structural unemployment remain**. Frictional unemployment arises from normal job turnover and the time it takes for workers to find new employment, while structural unemployment results from mismatches between workers' skills and the demands of employers.

Even when the economy is operating at its full productive capacity, not everyone in the labour force is employed. **Some unemployment is unavoidable**, reflecting the ongoing reallocation of resources and workers across industries and regions.

In the **long run**, labour markets adjust through **flexible wages and prices**, enabling the economy to reach an equilibrium where **the quantity of labour demanded equals the quantity supplied** at the prevailing wage rate. At this point, any additional unemployment above the natural rate is considered **voluntary**, in the sense that workers are choosing not to accept jobs at market wages.

Figure 17.4 Relationship between Inflation and Unemployment



The concept of the natural rate of unemployment plays a central role in macroeconomic theory and policy. It defines a threshold: **if unemployment falls below the natural rate, inflation tends to accelerate**; if unemployment remains above it, inflationary pressures subside. This idea is the basis for the **long-run vertical Phillips curve**, which shows that no permanent trade-off exists between unemployment and inflation once expectations adjust.

Estimates of the natural rate vary over time and across countries. In Canada, for example, the natural rate has been estimated to lie between **5% and 6%**, although shifts in demographics, technology, and labour market institutions can influence its level. Central banks, including the **Bank of Canada**, use the

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natural rate as a **benchmark** to assess whether the economy is overheating or operating below potential.

The definition of the natural rate of unemployment reflects the idea that in long-run equilibrium, inflation remains **constant**, not because there is no unemployment, but because the unemployment that remains—**frictional and structural**—does not place upward or downward pressure on wages and prices. Frictional unemployment results from normal job turnover, and structural unemployment arises from mismatches between workers' skills and job requirements.

Some economists refer to the natural rate of unemployment as the unemployment rate consistent with price stability. This is why the natural rate of unemployment is often referred to as **NAIRU**: the **non-accelerating inflation rate of unemployment**.

Although the natural rate cannot be observed directly, it plays a critical role in guiding **monetary policy**. Central banks, including the **Bank of Canada**, monitor labour market indicators and inflation trends to estimate where the natural rate lies. If unemployment falls **below** the NAIRU, inflation tends to **rise**; if it rises **above** the NAIRU, inflation tends to **fall**. In this way, the natural rate serves as a benchmark for assessing whether the economy is **overheating** or **operating below potential**.

The Natural Rate of Unemployment in Canada

Although the term **natural rate of unemployment** might suggest a fixed, stable, or ideal level of unemployment, economists caution against interpreting it this way. **Milton Friedman**, who first popularized the concept, emphasized that **the natural rate is not immutable or unchangeable**. Rather, it depends on evolving labour market dynamics, institutional structures, and macroeconomic conditions.

As Friedman noted, *“By using the term ‘natural’ rate of unemployment I don’t mean to suggest that it is immutable or unchangeable.”*

In **Canada**, historical evidence illustrates that the natural rate has varied significantly over time. In the **1960s**, unemployment remained **low**, yet inflation was also **modest**, suggesting that the economy could sustain high employment without generating inflationary pressure. In contrast, during the **1970s**, Canada experienced **stagflation**—a combination of **high unemployment and high inflation**—that challenged the traditional view of a stable trade-off between the two. In the **early 2000s**, both unemployment and inflation trended **low**, again revealing that the natural rate is not fixed across decades.

More recently, the **Bank of Canada** has recognized that there is **no unique or time-invariant natural rate of unemployment**. Instead, economists now refer to a **time-varying NAIRU**, influenced by:

- **Demographic shifts** (e.g., an aging labour force)
- **Technological changes** (e.g., automation or digitization)

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- **Labour market policy and institutions** (e.g., changes to employment insurance or minimum wage laws)
- **Global economic integration** (e.g., outsourcing or immigration)

Current estimates place Canada's natural rate of unemployment at **approximately 5.5% to 6.0%**, though these figures are subject to frequent revision as new data become available and labour market conditions evolve ([Bank of Canada, 2024](#)).

In practice, this means there is **no singular threshold** below which inflation will necessarily accelerate. Instead, the natural rate functions as a **policy benchmark**—a moving target that helps guide central banks in assessing the economy's position relative to **full employment and inflation stability**.

Main Factors Affecting the Natural Rate of Unemployment

The **natural rate of unemployment** reflects the rate of unemployment at which inflation is stable. It fluctuates depending on labour market dynamics, institutional changes, and macroeconomic conditions. The **NAIRU** is influenced by several factors, which can either **increase** or **decrease** the natural rate of unemployment:

1. Job Search Behaviour

Workers often prioritize finding a job that aligns with their skills and preferences rather than accepting the first available offer. For example, if a marketing specialist loses their job, they may search primarily for positions within their field. Prolonged job search increases the duration of unemployment.

Employment insurance can alleviate the pressure to accept any job immediately, allowing for a longer job search, which ultimately raises the natural rate of unemployment.

2. Labour Market Information, Training, and Human Resource Planning

Efficient job matching is key to reducing unemployment. Access to accurate job market information, as well as relevant **training programs**, can help workers find jobs faster. **Human resource planning** that aligns with industry needs also facilitates job matching. Improved labour market information and planning lower the natural rate of unemployment by increasing the rate at which workers find jobs.

3. Labour Force Growth

An expanding labour force—due to **immigration**, higher **participation rates**, or **demographic changes**—can put pressure on the economy's ability to absorb new workers. When the **growth rate of the labour force exceeds job creation**, it leads to a higher unemployment rate. Therefore, rapid labour force growth can raise the NAIRU.

4. Employment Insurance

While **employment insurance** provides essential income support, it can also influence job-search behaviour. **EI benefits** reduce the urgency for workers to quickly accept job offers, which can lengthen the job search process and increase the natural rate of unemployment. Additionally, knowing that they are eligible for benefits can reduce workers' incentives to retain a job, contributing to a higher rate of job loss.

5. Technological Change

Advancements in technology can affect the **NAIRU** by disrupting labour markets. **Automation** or the adoption of new technologies may make certain jobs obsolete, causing **structural unemployment** as workers transition to new sectors. Although technological change can create new opportunities, it can also slow job matching, raising the natural rate of unemployment in the short term.

6. Demographics

Shifts in the **age structure** or **participation rates** of the labour force can influence the NAIRU. For example, as **baby boomers** retire, they may leave behind a smaller, more experienced labour force, potentially lowering the unemployment rate. Conversely, **increased youth participation** in the workforce or an influx of **immigrants** may raise the unemployment rate if the economy cannot quickly absorb these new workers.

In conclusion, the **natural rate of unemployment** is influenced by both **short-term fluctuations** (such as changes in job search behaviour and labour force dynamics) and **long-term structural factors** (like technological advancements and demographic shifts). Policymakers monitor these factors closely to assess inflationary pressures and design appropriate economic policies.

Table 17.2 Summary of Factors Affecting the Natural Rate of Unemployment

Factor	Effect on NAIRU	Explanation
Job Search Behaviour	Increases NAIRU	Prolonged job search increases unemployment duration, especially when workers are selective or supported by employment insurance .
Labour Market Information, Training, and HR Planning	Decreases NAIRU	Better matching between job seekers and employers, through improved information, training, and planning, reduces the duration of unemployment.
Labour Force Growth	Increases NAIRU	Rapid growth in the labour force may strain the economy's ability to absorb new workers, increasing the unemployment rate.

Employment Insurance	Increases NAIRU	EI reduces the urgency to find jobs quickly and may encourage workers to refuse unsuitable jobs, which prolongs unemployment.
Technological Change	Increases NAIRU (in the short term)	Technological advancements can cause structural unemployment if workers need time to transition to new sectors or acquire new skills.
Demographics	Varies	Changes in the age structure or workforce participation can either lower or raise the NAIRU, depending on whether the economy absorbs new entrants effectively.

Summary of Factors Affecting NAIRU

Below is a summary table outlining the key factors that affect the **natural rate of unemployment** and their impact.

Policy Implication: The Trade-Off Between Inflation and Unemployment

The **Phillips curve** illustrates the **trade-off** between **inflation** and **unemployment**. Policymakers face a challenge: reducing inflation may lead to higher unemployment, and vice versa. For example, if the government wants to **reduce inflation** from **7% to 3%**, it can use contractionary monetary or fiscal policies. However, this action may **raise the unemployment rate** from **3% to 5%**.

This dilemma is often referred to in terms of the **discomfort index** or **misery index**, which is the sum of **inflation and unemployment** rates. Policymakers must consider the broader economic impact of these trade-offs. While **inflation** can be taxing, **unemployment** is generally perceived as the more serious issue, especially when inflation is moderate. Therefore, reducing the **discomfort index** by simultaneously managing both inflation and unemployment is a **tremendous task** for policymakers.

Is the Trade-Off Between Inflation and Unemployment Fixed?

When the **Phillips curve** was first introduced, economists believed there was a relatively **fixed trade-off** between **inflation** and **unemployment**. This implied that policymakers could **reduce unemployment** at the cost of **higher inflation** and, conversely, **reduce inflation** at the cost of **higher unemployment**. For many years, this relationship was thought to be stable.

However, in the **1970s**, economists observed a shift in the Phillips curve—specifically, it **shifted to the right**. This meant that, at a given level of inflation, unemployment was higher than expected. For

example, when inflation reached 7%, the unemployment rate was above 3%, which was contrary to earlier expectations.

Figure 17.5 Aggregate Supply and Stagflation

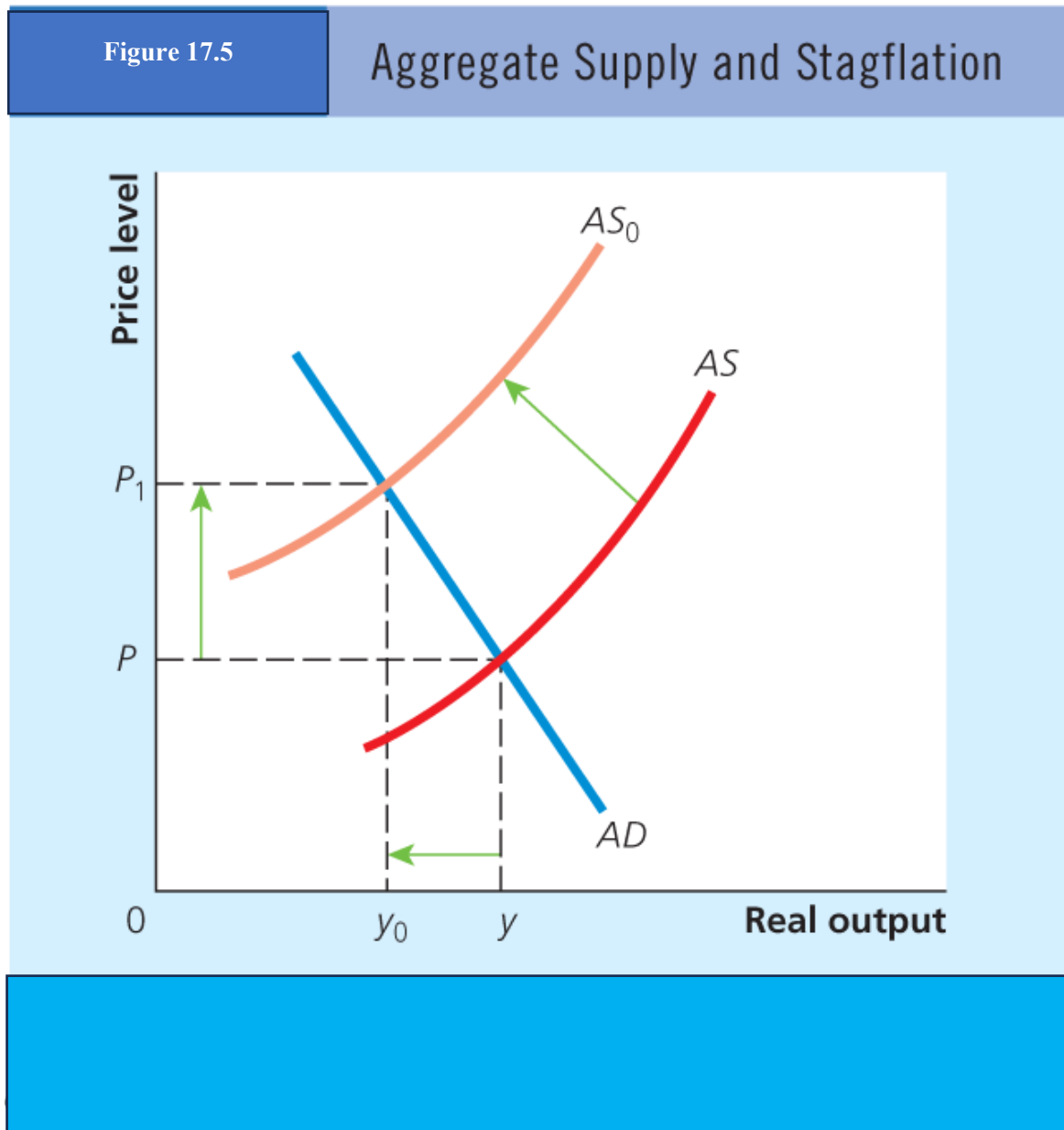


Figure 17.5 illustrates this process. The economy initially sits at equilibrium, where aggregate demand (AD) intersects aggregate supply (AS), determining real output at y and the price level at P . A negative

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supply shock shifts the aggregate supply curve leftward to **AS₀**. As a result, real output falls to **y₀** and the price level rises to **P₁**—producing stagflation.

Stagflation and Aggregate Supply

The experience of stagflation in the 1970s challenged the earlier assumption of a stable Phillips curve and led economists to re-evaluate the nature of the **inflation-unemployment trade-off**. It became clear that this trade-off was not fixed and could be influenced by **external shocks**, **expectations**, and **structural changes** in the economy.

This shift in the Phillips curve led many economists to argue that it was caused by **supply-side shocks**, such as the **1973 oil crisis**, which saw a significant increase in oil prices. These shocks **reduced aggregate supply**, shifting the **aggregate supply curve** to the left. This **supply shock** resulted in both **higher inflation** and **higher unemployment** simultaneously—a situation known as **stagflation**.

Stagflation refers to the **simultaneous rise in inflation and unemployment**—a rare combination that contradicts the typical trade-off between these two variables. The term combines **stagnation** and **inflation**, pointing to falling output and rising prices at the same time.

This phenomenon relates directly to changes in **aggregate supply**. A **leftward shift of the aggregate supply curve**, caused by rising production costs or supply disruptions, **reduces output and raises the price level**.

A modern example occurred in **2022**, when global energy prices surged due to the war in Ukraine. In Canada, **inflation reached 6.8%** while **unemployment hovered around 5.4%**, straining household budgets and slowing output growth (Statistics Canada, 2024).

Supply Shocks and Stagflation

An upward shift in the aggregate supply curve lowers real output and employment while raising the price level. Aggregate demand–aggregate supply analysis identifies supply shocks as the source of stagflation—rising prices combined with declining employment and output. Some economists reject the idea of a long-run trade-off between inflation and unemployment, arguing that inflation can persist even when output falls.

The Accelerationists and the Long-Run Phillips Curve

LO 17.3 Discuss the accelerationists' position

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The Long-Run View: No Trade-off

Some economists, such as Milton Friedman and Edmund Phelps, argue that the trade-off between inflation and unemployment holds only in the short run. In the long run, they reject the existence of any trade-off, claiming that the Phillips curve becomes vertical, as illustrated in Figure 17.6. According to this view, expansionary monetary or fiscal policies may temporarily reduce unemployment but will ultimately lead to rising inflation. Economists who hold this position are called accelerationists—they argue that any attempt to keep unemployment below its natural level will accelerate inflation without producing lasting employment gains.

***accelerationists** economists who claim that attempts to keep unemployment below its natural level will simply accelerate inflation*

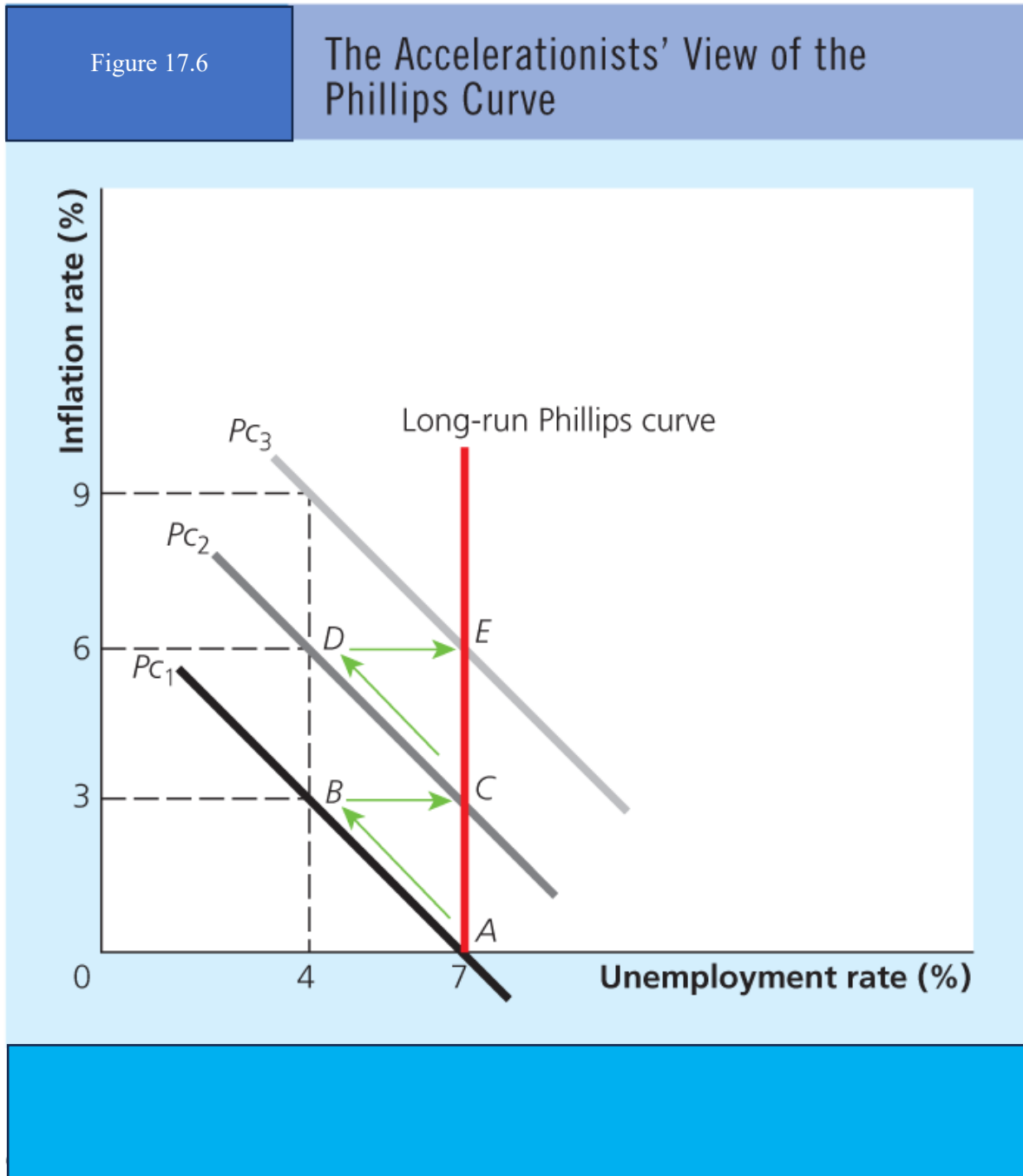
Short-Run Gains and Rising Inflation

Suppose the natural rate of unemployment is 7%, but policymakers attempt to lower it to 4%, assuming that 4% reflects full employment. To achieve this, they implement expansionary monetary and fiscal policies that raise aggregate expenditure. Because the economy is already operating at the natural rate, the increase in spending raises the price level. If nominal wages remain fixed, higher prices boost profit margins, prompting firms to expand production and hire more workers. Unemployment temporarily falls from 7% to 4%, and the economy moves from point A to point B on the short-run Phillips curve (PC_1). In this process, inflation rises from 0% to 3%. Policymakers accept a 3% inflation rate in exchange for lower unemployment. This outcome assumes that workers expect future inflation to match current inflation.

Reading Comprehension

1. What does the Phillips curve indicate?
2. Discuss the natural rate of unemployment.
3. Is the natural rate of unemployment fixed?
4. What variables affect the natural rate of unemployment?

Figure 17.6 The Accelerationists' View of the Phillips Curve



Inflation Expectations and the Vertical Phillips Curve

Accelerationists argue that the economy does not remain at point B. That position is temporary. Once inflation rises to 3%, workers adjust their expectations and demand higher wages to restore their real purchasing power. Firms respond to rising labor costs by cutting back employment and output, which returns unemployment to its natural rate of 7%, while inflation remains at 3%. The economy shifts to point C, and the short-run Phillips curve moves from PC_1 to PC_2 .

Policymakers again attempt to lower unemployment to 4% using expansionary policies.

Unemployment briefly falls, but **inflation increases from 3% to 6%**, moving the economy to **point D** on **PC_2** . Workers once more **adjust their inflation expectations upward**, and firms again respond by **reducing employment and output**. The economy returns to **7% unemployment and 6% inflation**, now at **point E** on the new curve **PC_3** .

Each attempt to reduce unemployment below its natural rate pushes inflation higher. The process repeats, creating an upward inflation spiral without lasting gains in employment. Accelerationists conclude that there is no long-run trade-off between inflation and unemployment. The long-run Phillips curve is vertical at the natural rate of unemployment.

Accelerationists claim that attempts to use expansionary monetary or fiscal policies to push unemployment below its natural rate will result only in accelerated inflation.

Despite the accelerationist argument, Canada experienced low unemployment and low inflation in the mid-2000s. In 2006, the unemployment rate fell to 6.3% while inflation remained stable at 2.0% (Statistics Canada, 2006a). *Census 2006: Labour force activity* (https://www12.statcan.gc.ca/census-recensement/2006/dp-pd/92-596/P2-2.cfm?LINE_ID=1107&Lang=eng&T=PR)

(Statistics Canada, 2006b). *Consumer Price Index, annual averages* (<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000501>)

Explaining Low Inflation and Unemployment in the Mid-2000s

The Phillips curve relationship between inflation and unemployment depends on several variables—productivity growth, monetary policy, inflation expectations, and worker bargaining power. In the mid-2000s, productivity growth accelerated compared to the previous decade, helping firms increase output without upward pressure on wages or prices.

The Bank of Canada, since 1992, had committed to an inflation-targeting regime aimed at maintaining inflation near 2% annually. Through disciplined monetary policy, it kept actual inflation close to the target, which stabilized expectations (Statistics Canada, 2006b). Workers and firms began to anticipate inflation near 2%, which limited wage and price pressures.

Wage growth also remained moderate, partly because the bargaining power of workers declined. Contributing factors included technological displacement, lower unionization rates, offshore outsourcing, and broader globalization trends, all of which weakened labour's ability to demand higher wages.

Together, rising productivity, anchored inflation expectations, and weaker wage pressure explained Canada's rare combination of low unemployment and low inflation during the mid-2000s (*Statistics Canada, 2006a*). *Census 2006: Labour force activity* (https://www12.statcan.gc.ca/census-recensement/2006/dp-pd/92-596/P2-2.cfm?LINE_ID=1107&Lang=eng&T=PR)

(*Statistics Canada, 2006b*). *Consumer Price Index, annual averages* (<https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=1810000501>)

Policies to Deal with Stagflation

LO 17.4 Understand policies designed to deal with stagflation

Policies for Addressing Stagflation

To reduce stagflation—simultaneous inflation and unemployment—policymakers aim to shift the Phillips curve toward the origin. This shift allows for lower unemployment without higher inflation, or lower inflation without higher unemployment. Figure 17.7 illustrates this point: moving from position A

to position B reduces the unemployment rate from 12% to 5% while keeping inflation at 4%.

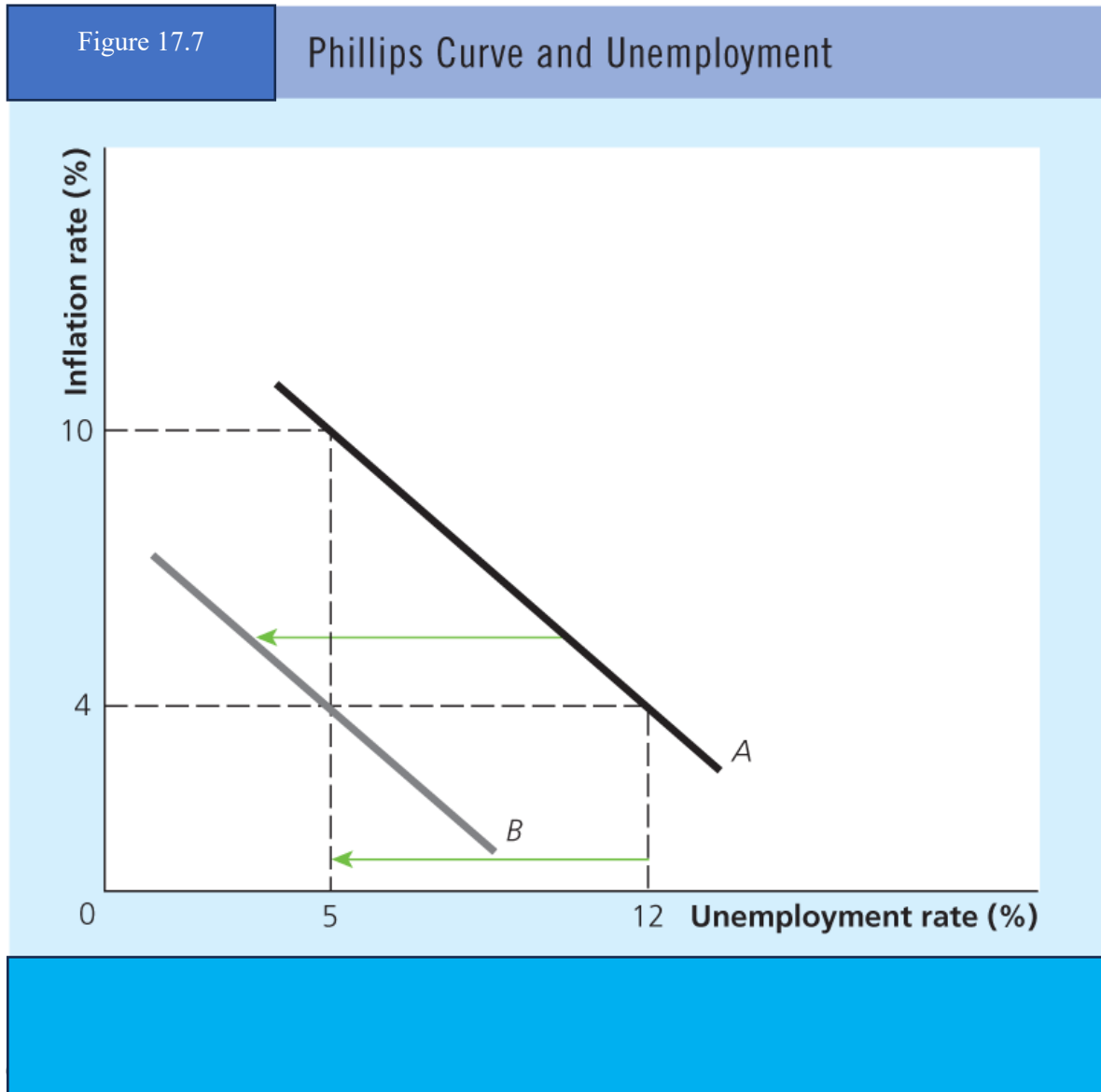
Reading Comprehension

1. Discuss the acceleration hypothesis.
2. How do price expectations affect the Phillips curve?
3. What is stagflation?

Structural policies that increase labour market efficiency can shift the Phillips curve inward. These include enhancing labour mobility, expanding job training and education, improving access to job information, and anchoring inflation expectations. These changes reduce unemployment pressures without triggering higher inflation.

Other tools involve more direct intervention. One approach is wage and price controls—government-imposed limits on wage and price increases. Such controls were used in Britain in 1948, in the United States in 1971 under President Nixon, and in Canada in 1975 under Prime Minister Trudeau.

Figure 17.7 Phillips Curve and Unemployment



Tax-based incomes policies offer another option. These policies use fiscal incentives or penalties to discourage excessive wage and price increases, aiming to moderate inflation without suppressing output or employment.

wage and price controls or incomes policies restrictions imposed by the government to limit increases in wages and prices.

Wage and Price Controls

Wage and price controls impose ceilings on wage and price increases to limit inflation. Governments have used these policies to restrain inflationary pressures during periods of economic instability.

Despite their intention, wage and price controls have generally proved ineffective. In practice, **prices continued to rise**, often through non-price mechanisms such as reduced product quality or supply shortages. **Enforcement difficulties and distortions in market signals** also weakened their impact.

Supporters argue that inflation would have accelerated further without these controls. They claim that, although imperfect, such policies **slowed the pace of inflation** during episodes when conventional monetary and fiscal tools were inadequate or politically constrained.

Wage and Price Controls

Most economists do not support wage and price controls. These measures disrupt the efficient functioning of the price system, leading to **misallocation of resources** and **distorted market signals**. Administering such programs also imposes **high administrative costs**, which are viewed as outweighing any potential benefits.

Despite these criticisms, some economists argue that controls may be justified in specific situations—for example, during **supply shocks** or **periods of severe inflation**—when other policy tools are unavailable or too slow to take effect.

Tax-Based Incomes Policies

Since the 1970s, some economists have **recommended** tax-based incomes policies (TIPS) **to reinforce compliance with** wage and price guidelines. These policies use the tax system to **promote adherence through fiscal rewards or penalties**.

One version of TIPS **relies on deterrence through taxation**. For example, the government may set a guideline limiting wage and price increases to 5%. Firms that exceed these limits face penalties through higher corporate income tax rates. This approach **discourages inflationary practices without resorting to direct controls**.

tax-based incomes policies *policies that use tax incentives to encourage compliance with wage and price controls*

Tax-based incomes policies (TIPs) have been proposed as a means to control inflation by using the tax system to influence wage and price setting. While no country has fully implemented a TIP, the United States explored the concept in the 1970s.²

In 1971, economists Henry Wallich and Sidney Weintraub proposed a TIP where firms exceeding wage or price increase guidelines would face tax penalties. The idea was to provide a fiscal deterrent against inflationary practices without resorting to direct controls. However, this policy was never enacted.

BUSINESS SITUATION

17.2

A government decides to introduce a tax-based incomes policy. It will grant tax incentives for compliance with the wage and price guidelines.

How might such a policy adversely affect businesses?

The answer to this Business Situation can be found in Appendix A.

Rational Expectations Hypothesis

LO 17.5 Discuss the rational expectations hypothesis

Introduction

In an earlier chapter, you learned that economists disagree over supply-side economic policies. The controversy extends to another area: the **rational expectations hypothesis (REH)**, one of the most disputed ideas in modern macroeconomics. To understand **rational expectations**, it is necessary to first define **adaptive expectations**. This older theory assumes that individuals base their expectations entirely on recent experience. For instance, if **inflation** was 3% last year, people would expect the same rate this year and plan accordingly.

When **actual inflation** differs from expectations, individuals adjust. **Unions** raise wage demands; **firms** change prices. According to **adaptive expectations**, most people misjudge inflation unless it remains constant. This implies that **systematic errors** are common and persistent—that people can frequently be misled by changes in inflation.

Adaptive Expectations: *The hypothesis that people form their expectations solely on the basis of the experience of the recent past.*

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Criticisms of Adaptive Expectations

The adaptive expectations hypothesis has been criticized on two counts. First, critics claim that **expectations cannot depend solely on past inflation rates**. Other influences—**such as anti-inflation policy announcements or shifts in monetary strategy—also shape expectations**. Second, critics reject the idea that **most individuals can be consistently misled**. They argue that **people act more rationally when forming expectations**.

Rational Expectations

The rational expectations hypothesis, developed as an offshoot of monetarism, addresses these criticisms. It assumes that individuals use available information—including knowledge of economic conditions and government policy—to predict inflation. People understand the determinants of inflation and incorporate this knowledge into wage and price decisions. According to this view, expectations are accurate on average. People form inflation expectations and make economic decisions—such as wage demands or pricing—based on a realistic understanding of the economy.

***Rational Expectations Hypothesis:** The hypothesis that, on average, people base their inflation expectations on their knowledge of policies and their effects.*

Prominent rational expectations theorists include Robert Lucas (1937–2023), Thomas Sargent (1943–), and Neil Wallace (1939–). According to these economists, expectations and decisions reflect anticipated government policy effects. Rational expectations theorists contend that markets function efficiently. They argue that firms use all available information, including government policy, to pursue profit maximization. Workers, likewise, adjust wage demands in light of policy consequences.

These economists conclude that the economy tends toward equilibrium at full employment—the natural rate of unemployment. Unemployment above this level is considered voluntary, since workers can find jobs by accepting lower wages.

Reading Comprehension

1. What are wage and price controls?
2. How do economists view wage and price controls?
3. What are the two ways of implementing a tax-based incomes policy?

Criticism of Rational Expectations

Critics claim that **the rational expectations hypothesis lacks realism**. They argue that inflation is shaped by complex and interacting forces, making it unreasonable to assume that individuals fully understand all determinants of inflation. **It is equally**

implausible to expect people to anticipate the precise effects of government policy.

Franco Modigliani (1918–2003), winner of the 1985 Nobel Prize in Economics, strongly rejected the rational expectations hypothesis. He argued that it conflicts with empirical evidence. The hypothesis implies that unemployment should remain close to the natural rate, yet, according to Modigliani, real-world fluctuations in unemployment contradict this prediction.

Other economists have voiced similar objections. Paul Davidson contended that rational expectations rely on the flawed assumption that subjective probabilities become objective over time, despite the presence of fundamental uncertainty in economic decision-making (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3313222).

Joseph Stiglitz and Sanford Grossman argue that if all agents formed rational expectations, there would be little incentive to gather costly information. Since information is expensive and asymmetrically distributed, markets cannot function as efficiently as rational expectations assume (<https://www.jstor.org/stable/1911362>).

Kenneth Arrow emphasizes that rational expectations require individuals to possess knowledge and forecasting skills comparable to those of professional economists, a presumption he viewed as unrealistic (https://www.tcd.ie/Economics/assets/pdf/SER/1994/cloda_lane.html).

James Heckman acknowledged the theoretical contributions of rational expectations models but criticized them for **neglecting behavioral variation and the complexities revealed by empirical research**. He argued for a more integrated approach that combines data analysis with behavioral insights (<https://www.newyorker.com/news/john-cassidy/interview-with-james-heckman>).

These critiques challenge the assumption that individuals process information flawlessly and always make accurate predictions—an assumption at the heart of the rational expectations hypothesis.

Implications for Economic Stabilization Policies

Let us assume that the economy experiences an unemployment rate of 12% and an inflation rate of 5%. Suppose policymakers respond by adopting expansionary monetary or fiscal policies to reduce unemployment. According to the rational expectations hypothesis, individuals anticipate the effects of these policies in advance.

Firms and workers expect inflation to rise. **Workers demand higher wages to preserve their purchasing power**, while firms anticipate increased wage and interest costs. In response, **firms raise prices and reduce investment**, expecting lower returns. As a result, **output and employment remain unchanged**, while inflation worsens.

Expansionary policies, therefore, become ineffective unless they come as complete surprises. This conclusion forms the basis of the policy irrelevance hypothesis—the idea that systematic monetary and

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fiscal policies cannot influence real variables like output or employment when agents have rational expectations.

policy irrelevance hypothesis the proposition that monetary and fiscal policies will be ineffective if people have rational expectations

New Classical and New Keynesian Macroeconomics

LO 17.6 Distinguish between new classical and new Keynesian macroeconomics

Reading Comprehension

1. What is difference between adaptive and rational expectations?
2. Is government policy effective under the rational expectations hypothesis?
3. Can firms and workers predict with certainty the outcomes of government policies?

Features of the New Classical Macroeconomic Model

The new classical macroeconomic model assumes that wages and prices are flexible and that macroeconomic adjustments occur rapidly. Because of this flexibility, the economy quickly returns to its natural levels of employment and output.

If the price level is expected to rise, rational expectations lead workers to demand immediate wage increases. At

the same time, firms anticipate higher production costs and reduce supply, which in turn raises the price level. In this model, wages and prices adjust without delay, neutralizing the impact of demand-side policies on real variables.

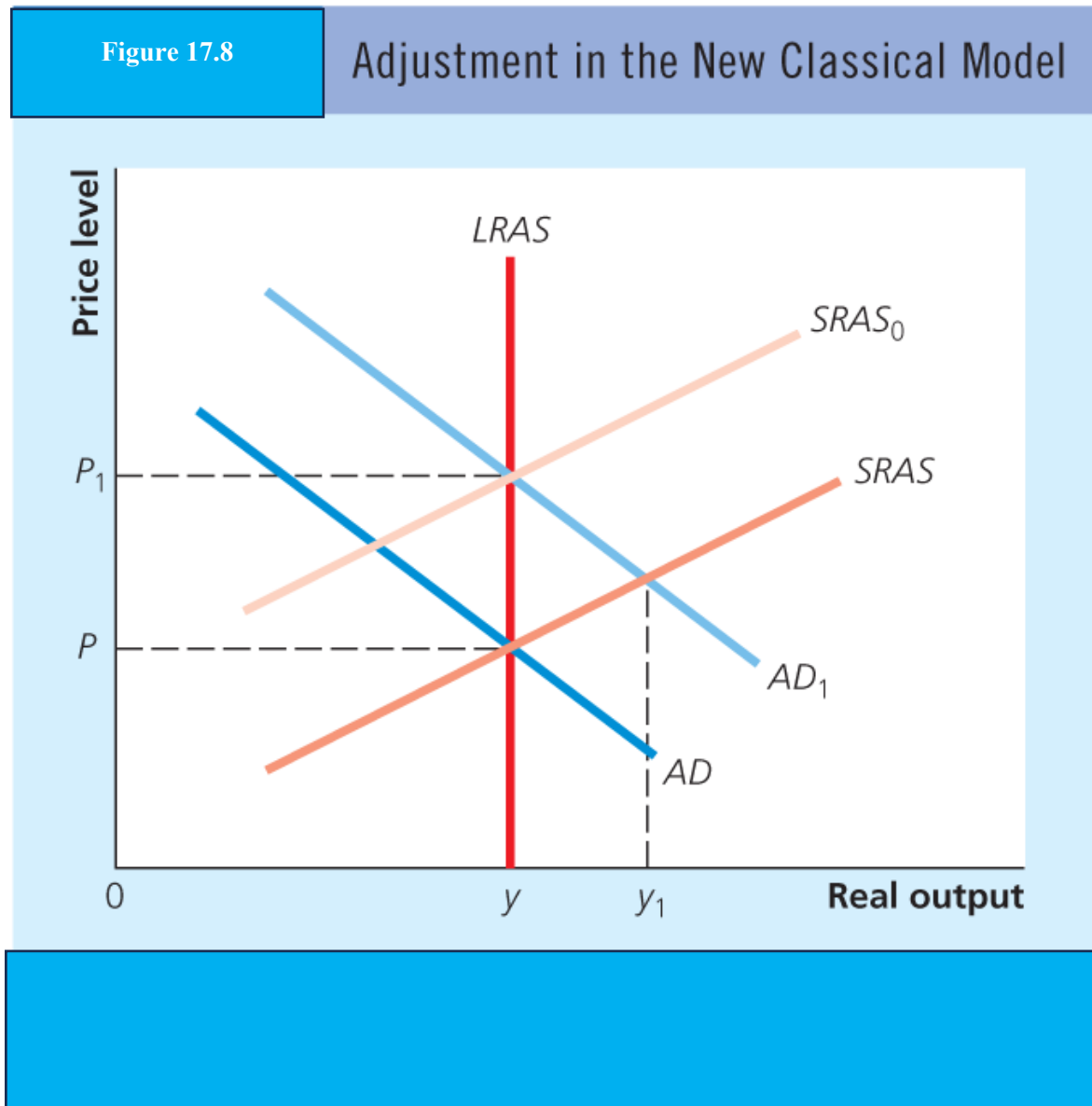
The adjustment process is illustrated using the AD–AS model. In long-run equilibrium, output is at its natural level, indicated by y , and the price level is P . The long-run aggregate supply curve (LRAS) is vertical: a reflection of the assumption that the economy always moves back to full employment as long as wages and prices remain flexible.

Let us assume that the economy is initially at long-run equilibrium. The Bank of Canada implements an expansionary monetary policy. **As a result, aggregate demand shifts rightward from AD to AD₁, and output temporarily increases to Y₁.**

The economy does not remain at Y₁. **The expectation of rising prices prompts workers and input suppliers to demand higher wages and prices.** This increases production costs and **shifts the short-run aggregate supply curve leftward from SRAS to SRAS₀.** The price level rises to P₁, and **real output immediately returns to its natural level Y.**

According to new classical economists, these adjustments occur rapidly and automatically. As a result, activist macroeconomic stabilization policies have no lasting effect on output or employment.

Figure 17.8 Adjustment in the New Classical Model



New Classical View on Unemployment

New classical economists advocate minimal government intervention in the labour market. Like classical economists, they argue that **high unemployment is a short-run issue**. Because wages and prices adjust quickly, **market forces will restore full employment without policy action**.

In this model, **only frictional and structural unemployment remain in the long run**. If unemployment persists, new classical economists attribute it to distortions caused by government policies—not market failure. They argue that minimum wage laws raise labour costs and discourage hiring, and that generous employment insurance benefits reduce incentives to seek work.

To support their view, they refer to empirical studies showing that higher minimum wages reduce employment. Accordingly, they recommend removing wage floors and reducing employment subsidies to lower unemployment.

New Classical Explanation of Minimum Wages and Unemployment

New classical economists argue that setting minimum wages above the market equilibrium wage creates unemployment. At the higher fixed wage, the quantity of labour supplied exceeds the quantity demanded, resulting in joblessness.

This effect intensifies during a recession. When the economy contracts, labour demand shifts leftward, lowering the equilibrium wage. However, the minimum wage remains unchanged, widening the gap between labour supply and labour demand. The number of workers willing to work at the minimum wage exceeds the number firms are willing to hire.

As a result, unemployment rises beyond the level that would prevail under flexible wage conditions.

New classical economists conclude that **minimum** wages distort labour markets and amplify unemployment during downturns.

New Classical Perspectives on Unemployment and Fiscal Policy

The 2007–2009 Great Recession marked a significant economic downturn in the United States, characterized by a sharp decline in GDP, prolonged recession duration, high unemployment rates, and extended periods of joblessness. In response, **new classical economists advocated for minimal government intervention, emphasizing the role of market forces in restoring full employment**.

Prominent figures like **Gary Becker** (1930–2014), a Nobel laureate at the University of Chicago, argued that **reducing minimum wages would allow labour markets to adjust more freely and reduce unemployment**. Similarly, **Robert Barro** (1944–), professor at Harvard University, contended that extended and generous unemployment insurance benefits discouraged job search. He recommended

that the Obama administration cut benefits and shorten the eligibility period to encourage employment (<https://www.wsj.com/articles/SB10001424052748703766704576008740582021520>).

During the 2020 recession, some new classical economists also criticized the large increase in government spending. **John Cochrane**, a senior fellow at the Hoover Institution, warned that excessive fiscal stimulus could crowd out private investment and fuel future inflation. (<https://johnhcochrane.blogspot.com/2020/05/stimulus.html>). **Robert Barro** similarly argued that much of the COVID-related spending produced limited output gains and created long-term fiscal risks (<https://www.project-syndicate.org/commentary/us-covid-stimulus-spending-largely-wasted-by-robert-j-barro-2021-06>).

*New classical economists continue to argue that **rigid labour market regulations and expansionary fiscal policy during recessions hinder economic recovery rather than accelerate it.***

New Keynesian View on Unemployment and Price Rigidity

There are economists who hold a different view on the government's role in reducing unemployment. **Known as new Keynesians, these economists have extended and formalized the insights of J.M. Keynes, while incorporating elements of modern microeconomic theory.**

The new Keynesian macroeconomic model assumes that wages and prices are rigid in the short run and that macroeconomic adjustments are slow. Several factors explain this rigidity.

First, **wage contracts negotiated between employers and workers often fix wages for two or more years.** Similarly, firms sign long-term supply agreements at predetermined prices, limiting their ability to adjust quickly to changes in demand.

Second, **firms face adjustment costs when changing prices known as menu costs.** These include the cost of printing new catalogues, updating systems, or informing customers. Even small costs can discourage frequent price changes.

Third, **firms may use markup pricing rather than marginal cost pricing.** In this approach, firms set prices by adding a markup to average costs, allowing for profit margins. The size of the markup depends on factors such as product differentiation, industry structure, firm size, and economic conditions. Because firms do not automatically lower prices in response to falling demand, price rigidity persists during recessions. Although new Keynesians accept that prices and wages adjust in the long run, they argue that in the short run, these rigidities justify active government policies to stabilize output and employment.

***new Keynesian macroeconomic model** Macroeconomic model that assumes that wages and prices are rigid and that macroeconomic adjustment is slow.*

markup pricing a pricing formula in which firms charge consumers the cost of production plus an additional amount—a markup—to cover profit

New Keynesian Model and Macroeconomic Adjustment

The new Keynesian macroeconomic model is illustrated in Figure 17.9. **The very short-run aggregate supply curve (VSRAS) is horizontal at the price level P** , meaning that **output can fluctuate without changing prices**. The economy is initially in full-employment equilibrium at output y and price level P .

Suppose aggregate demand decreases from AD to AD_0 . **In the short run, the price level remains unchanged, but output declines from Y to Y_0** . Firms begin to accumulate unintended inventories and respond by **reducing production and laying off workers**. Because **wages and prices do not adjust immediately**, output remains unsold and unemployment rises.

Over time, wages and prices begin to fall, lowering production costs. As a result, the VSRAS curve shifts downward to $VSRAS_1$, the price level falls from P to P_0 , and output gradually returns to its full-employment level Y .

Although the model predicts long-run return to full employment, new Keynesian economists argue that when wage and price adjustments are slow, the government should adopt stabilization policies to accelerate the recovery.

Policy Implications of the New Keynesian Model

Unlike new classical economists, **new Keynesians argue that nominal wages and prices are not perfectly flexible**. They maintain that empirical evidence does not show significant wage and price declines during recessions.

Because of this short-run rigidity, **new Keynesians support the use of stabilization policies to reduce output losses and unemployment**. They contend that when private sector adjustments are too slow, government intervention can help restore full employment more rapidly. This may include expansionary fiscal policy—such as increased government spending or tax cuts—and monetary policy to lower interest rates and stimulate demand.

The central idea is that policy can reduce the depth and duration of economic downturns by counteracting the effects of falling aggregate demand before long-run adjustments take place.

Policy Implications of the New Keynesian Model

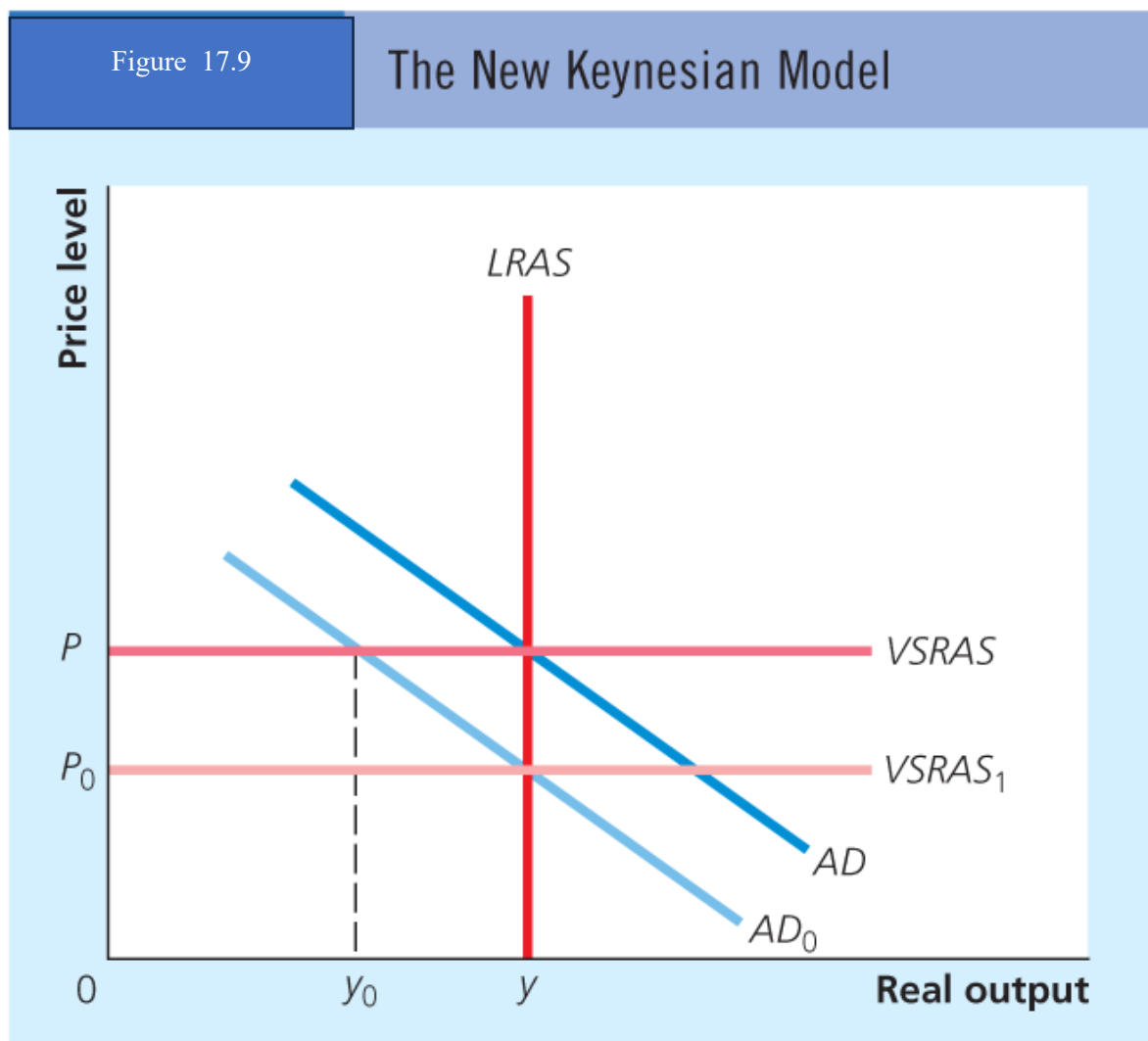
Unlike new classical economists, **new Keynesians argue that nominal wages and prices are not perfectly flexible**. They maintain that empirical evidence does not show significant wage and price declines during recessions.

They attribute this rigidity to **market structures that limit price and wage flexibility**. **Firms are not perfect price takers; they exercise control over pricing**. In a recession, when demand weakens, cutting prices may reduce revenue without increasing sales, leading firms to maintain prices even as output falls.

Similarly, **firms hesitate to reduce wages**. Wage cuts may harm employee morale and productivity, or prompt higher turnover. Long-term contracts and resistance from labour unions further limit wage flexibility. As a result, wages and prices are “sticky” in a downward direction.

This rigidity produces involuntary unemployment during downturns, since labour markets cannot clear through wage adjustments. New Keynesians conclude that policy intervention—particularly expansionary fiscal and monetary policy—is needed to close the output gap and reduce joblessness in recessions.

Figure 17.9 The New Keynesian Model



New Keynesian Assessment of Labour Market Policies

New Keynesian economists, unlike new classicals, **are not convinced that minimum wages and employment insurance benefits have a major impact on unemployment**. They argue that empirical studies on the effects of minimum wages show mixed results, and that there is no clear evidence that higher minimum wages consistently reduce employment. While they acknowledge that employment insurance benefits may affect the intensity or timing of job search, they maintain that the primary cause of unemployment during recessions is a decline in aggregate demand—not labour market distortions.

Accordingly, their policy recommendations differ sharply from those of new classical economists. New Keynesians advocate expansionary fiscal and monetary policies to stimulate demand and reduce unemployment during downturns.

For example, **Paul Krugman (1953–)**, a Nobel laureate and Distinguished Professor at the City University of New York (CUNY), called for a larger stimulus package than what was adopted by the Obama administration during the 2007–2009 Great Recession (<https://stonecenter.gc.cuny.edu/people/krugman-paul>). Similarly, Joseph Stiglitz (1943–) of Columbia University and Robert Gordon (1940–) of Northwestern University supported increased government spending to counteract falling demand and stabilize the labour market.

Additional Contributions of the New Keynesian Approach

In addition to their emphasis on wage and price rigidity, **new Keynesian economists have contributed several important theoretical and policy insights** that distinguish their framework from both classical and early Keynesian models.

First, they provide microeconomic foundations for nominal rigidities. Unlike early Keynesians, new Keynesians explain price and wage stickiness using models grounded in individual optimization. The Calvo pricing model—a model in which only a fraction of firms can adjust their prices in any given period, while others must keep prices fixed—introduces staggered price-setting that generates short-run price rigidity even in forward-looking models (<https://www.nber.org/papers/w12302>).

Second, new Keynesians emphasize the central role of expectations and monetary policy. Because households and firms make decisions based on expected inflation and interest rates, credible and transparent central bank policy becomes critical to economic stability. This insight has influenced the adoption of inflation targeting frameworks by central banks, including the Bank of Canada and the U.S. Federal Reserve (<https://www.bankofcanada.ca/wp-content/uploads/2010/05/sp98-5.pdf>; <https://www.federalreserve.gov/monetarypolicy/review-of-monetary-policy-strategy-tools-and-communications.htm>).

Third, new Keynesian models increasingly account for financial frictions. Following the 2007–2009 financial crisis, **some economists** introduced features such as credit constraints, asymmetric

information, and risk premia into macroeconomic models. These additions help explain why demand shocks may produce deeper recessions and why monetary policy may be less effective when interest rates are near zero (<https://www.imf.org/external/pubs/ft/wp/2012/wp12284.pdf>).

These extensions have allowed the new Keynesian framework to remain central to both academic research and modern macroeconomic policymaking.

Reading Comprehension

1. Under the new classical model, how do minimum wages affect unemployment?
2. In the new classical model, how do employment benefits affect unemployment?
3. Under the new Keynesian model, what causes unemployment?
4. What kind of monetary policy and fiscal policy do the new Keynesians recommend for an economy in a recession?

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 17.1** Demand-pull inflation **results from increases in aggregate expenditure that raise the general price level**. Theories of demand-pull inflation include **the monetary theory and the budget deficit theory**.
2. **LO 17.1** The cost-push theory of inflation **attributes inflation to wage demands by powerful unions and price increases by dominant firms**. These actions produce **a wage–price spiral**. Cost-push inflation includes **wage inflation and imported inflation**.
3. **LO 17.2** The Phillips curve **describes the relationship between wage growth and the unemployment rate**. It is widely used in discussions of **the inflation–unemployment trade-off**. **Accelerationists argue that the inverse relationship holds only in the short run**. In the long run, **the Phillips curve is vertical**, and efforts to push unemployment below its natural rate will **lead only to accelerating inflation**.
4. **LO 17.3** The natural rate of unemployment **is the level of unemployment consistent with price stability**. Factors influencing the non-accelerating inflation rate of unemployment (NAIRU) include **job search dynamics, access to labour-market information and training, growth of the labour force, and the structure of employment insurance programs**.
5. **LO 17.4** The coexistence of inflation and unemployment is called **stagflation**. It can be explained by **an upward shift in the aggregate supply curve**. Policies to address stagflation include **enhancing labour mobility, improving labour market information, reducing inflationary expectations, and introducing incomes policies**.
6. **LO 17.5** The **rational expectations hypothesis** suggests that **government stabilization policies will fail because households and firms adjust their behaviour in anticipation of these policies, neutralizing their effects**.
7. **LO 17.6** The **new classical macroeconomic model** assumes that **wages and prices adjust rapidly, returning the economy to its natural levels of output and employment**. **Rational expectations and efficient markets support this quick adjustment**. In contrast, the **new Keynesian macroeconomic model** holds that **wages and prices are fixed in the short run**, causing **a slow adjustment toward full employment**. Over time, **these rigidities diminish, and the economy moves to its long-run equilibrium**.

LO 17. 7 Other Contributions of New Keynesians

In addition to their focus on wage and price rigidity, new Keynesians have made several other major contributions to macroeconomic theory. First, they provide microeconomic foundations for nominal rigidity through models such as Calvo pricing. These models assume that only a portion of firms can change prices in any given period. Second, they emphasize the role of expectations and the need for credible monetary policy. Their work supports inflation targeting by central banks. Third, they introduce financial frictions into macroeconomic models. They highlight how credit constraints and imperfect information can intensify recessions and reduce the power of interest rate policy.

These elements place new Keynesian models at the core of modern macroeconomic research and policy design.

Problems and Exercises

Basic

1. **LO 17.1** Identify each of the following as demand-pull or cost-push inflation:

- a. The inflation is caused by excessive growth in the money supply.
- b. The inflation is caused by rapid wage increases.
- c. The inflation is caused by increases in the cost of imported goods.
- d. The inflation is caused by persistent government deficits.
- e. The inflation is caused by increases in production costs.
- f. The inflation is caused by monopolistic price hikes.

Table 17.3 Changes in Wages, Money Supply, and Prices in Canada, 2020—2024