PARKIN BADE

MACROECONOMICS

CANADA IN THE GLOBAL ENVIRONMENT TENTH EDITION

6 ECONOMIC GROWTH

After studying this chapter, you will be able to:

- Define and calculate the economic growth rate and explain the implications of sustained growth
- Describe the economic growth trends in Canada and other countries and regions
- Explain what makes potential GDP grow
- Explain the sources of labour productivity growth
- Explain the theories of economic growth and policies to increase its rate

The Basics of Economic Growth

Economic growth is the sustained expansion of production possibilities measured as the increase in real GDP over a given period.

Calculating Growth Rates

The economic growth rate is the annual percentage change of real GDP.

The economic growth rate tells us how rapidly the total economy is expanding.

The Basics of Economic Growth

The standard of living depends on real GDP per person.
Real GDP per person is real GDP divided by the population.
Real GDP per person grows only if real GDP grows faster than the population grows.

The Basics of Economic Growth

Economic Growth Versus Business Cycle Expansion

Real GDP can increase for two distinct reasons:

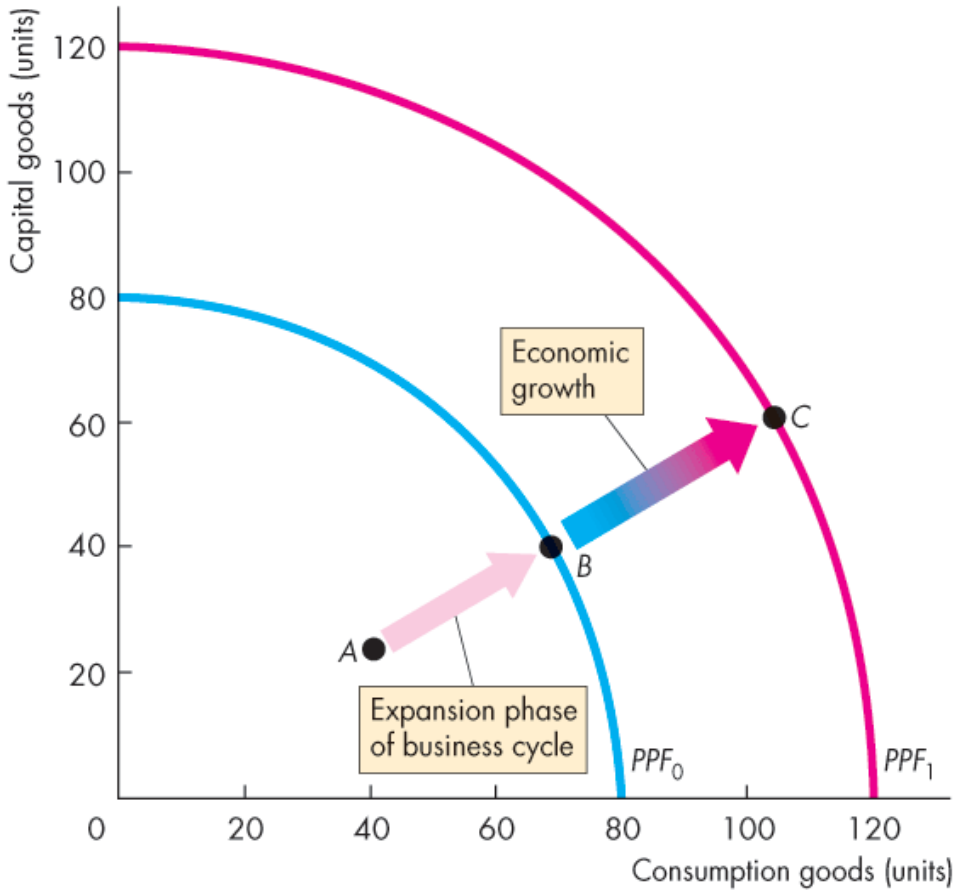
1. The economy might be returning to full employment in an expansion phase of the business cycle.
2. Potential GDP might be increasing.

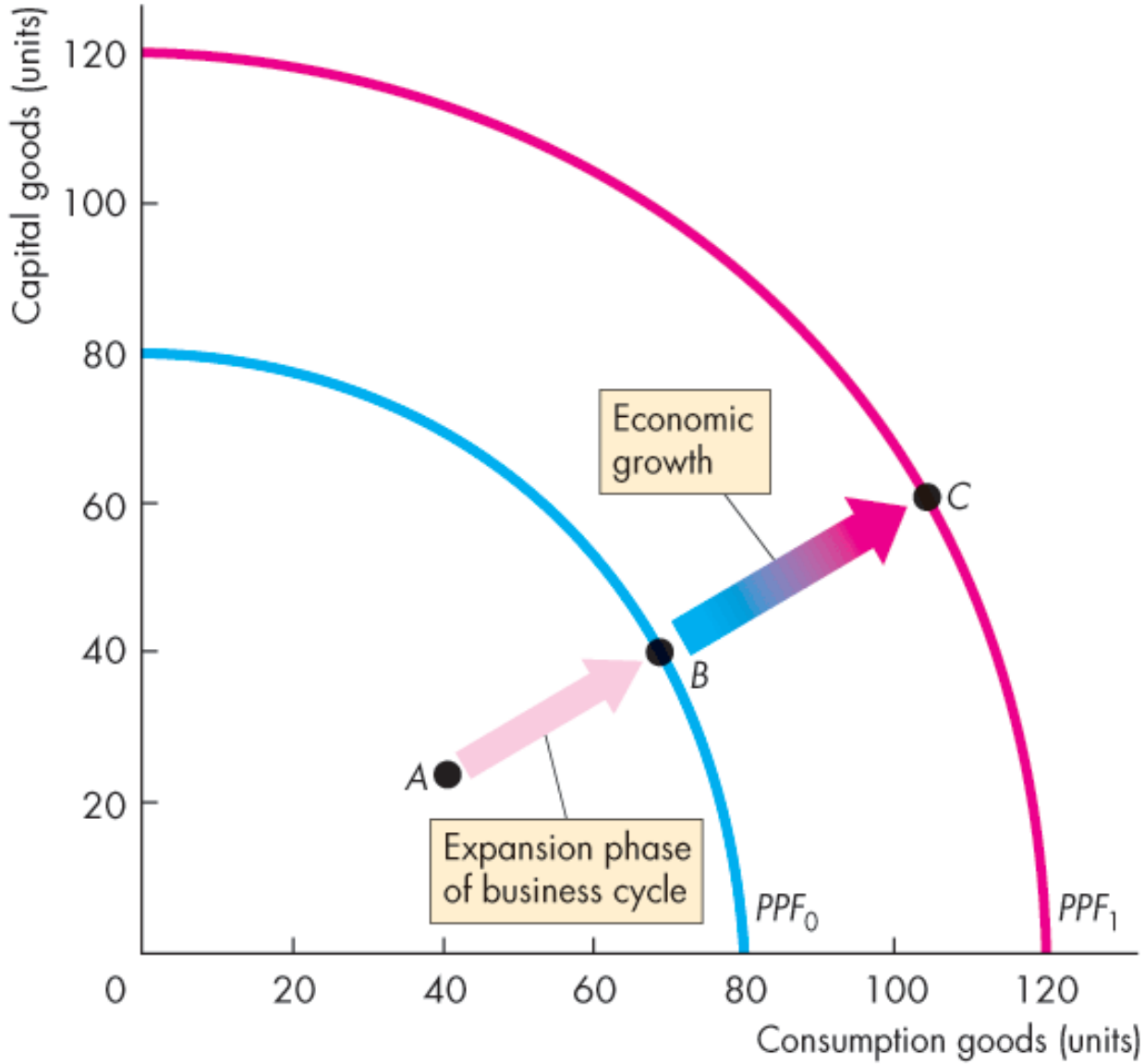
The return to full employment in an expansion phase of the business cycle isn't economic growth.

The expansion of potential GDP is economic growth.

The Basics of Economic Growth

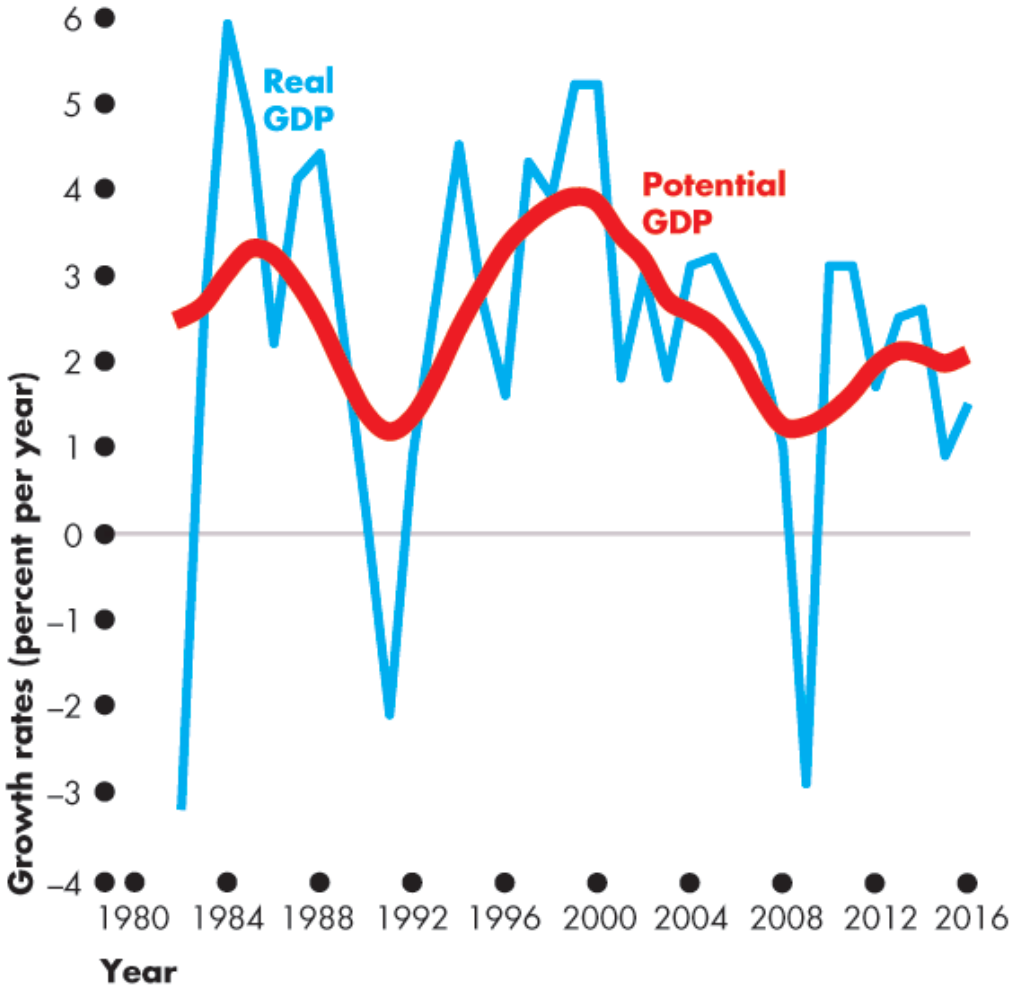
Figure 6.1 illustrates the distinction.
A return to full employment in an expansion is a movement from inside the PPF (point A) to a point on the PPF (point B).
Economic growth is the outward shift of the PPF from PPF_0 to PPF_1 and the movement from point B on PPF_0 to point C on PPF_1.

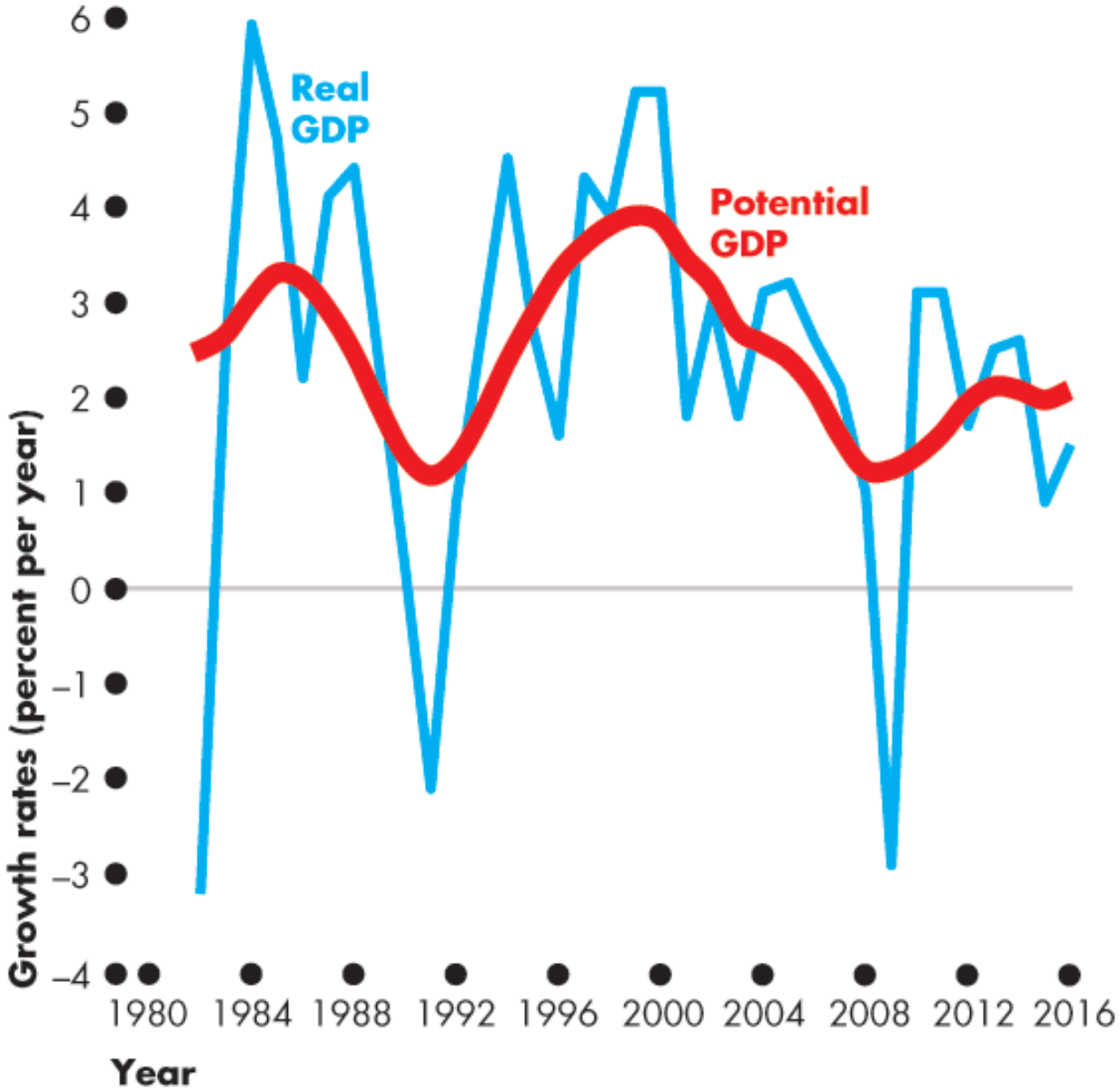




The Basics of Economic Growth

The figure shows the growth rate of real GDP. The growth rate of potential GDP measures the pace of expansion of production possibilities and …
smoothes out the business cycle fluctuations in the growth rate of real GDP.





The Basics of Economic Growth

The Magic of Sustained Growth

The Rule of 70 states that the number of years it takes for the level of a variable to double is approximately 70 divided by the annual percentage growth rate of the variable.

The Basics of Economic Growth

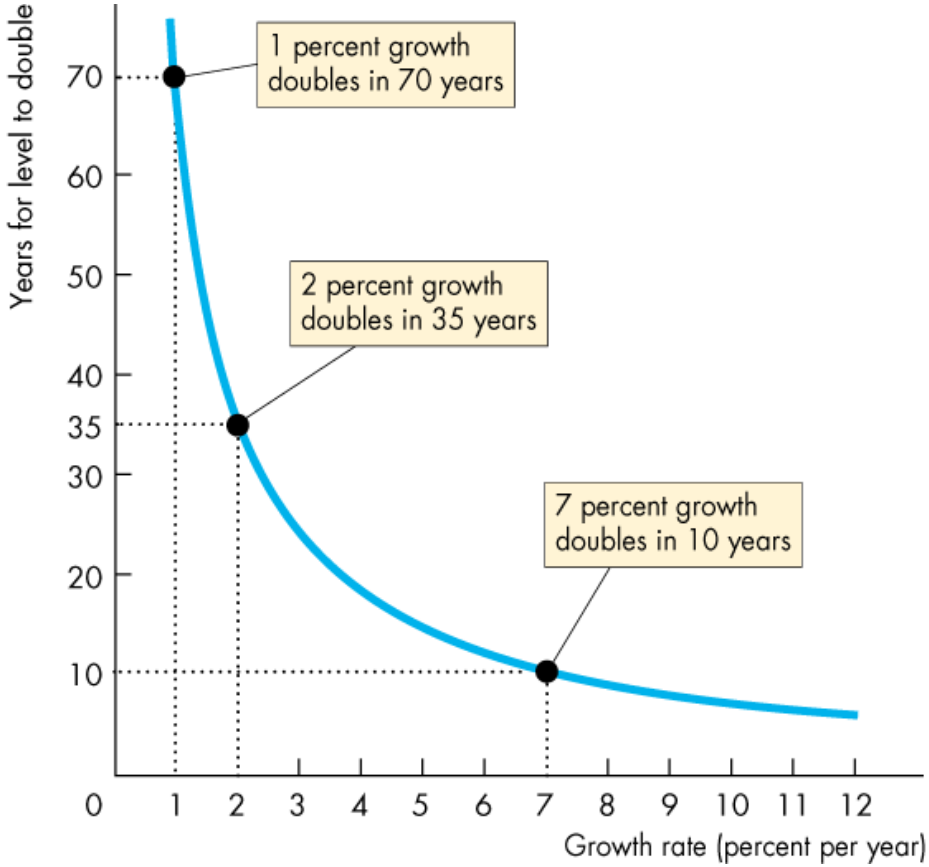
Applying the Rule of 70

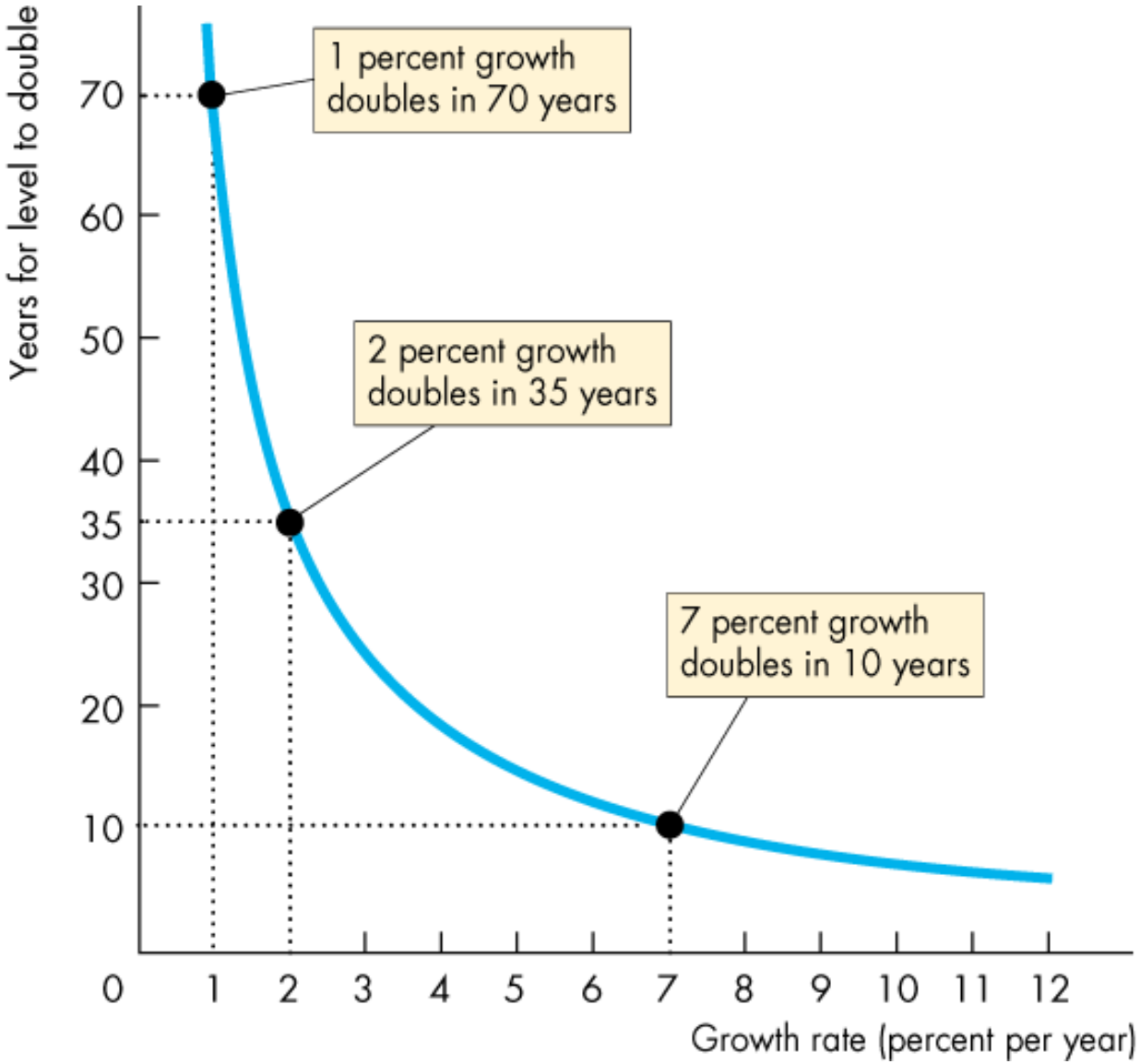
Figure 6.3 shows the doubling time for growth rates.

A variable that grows at 7 percent a year doubles in 10 years.

A variable that grows at 2 percent a year doubles in 35 years.

A variable that grows at 1 percent a year doubles in 70 years.





Long-Term Growth Trends

Growth in the Canadian Economy

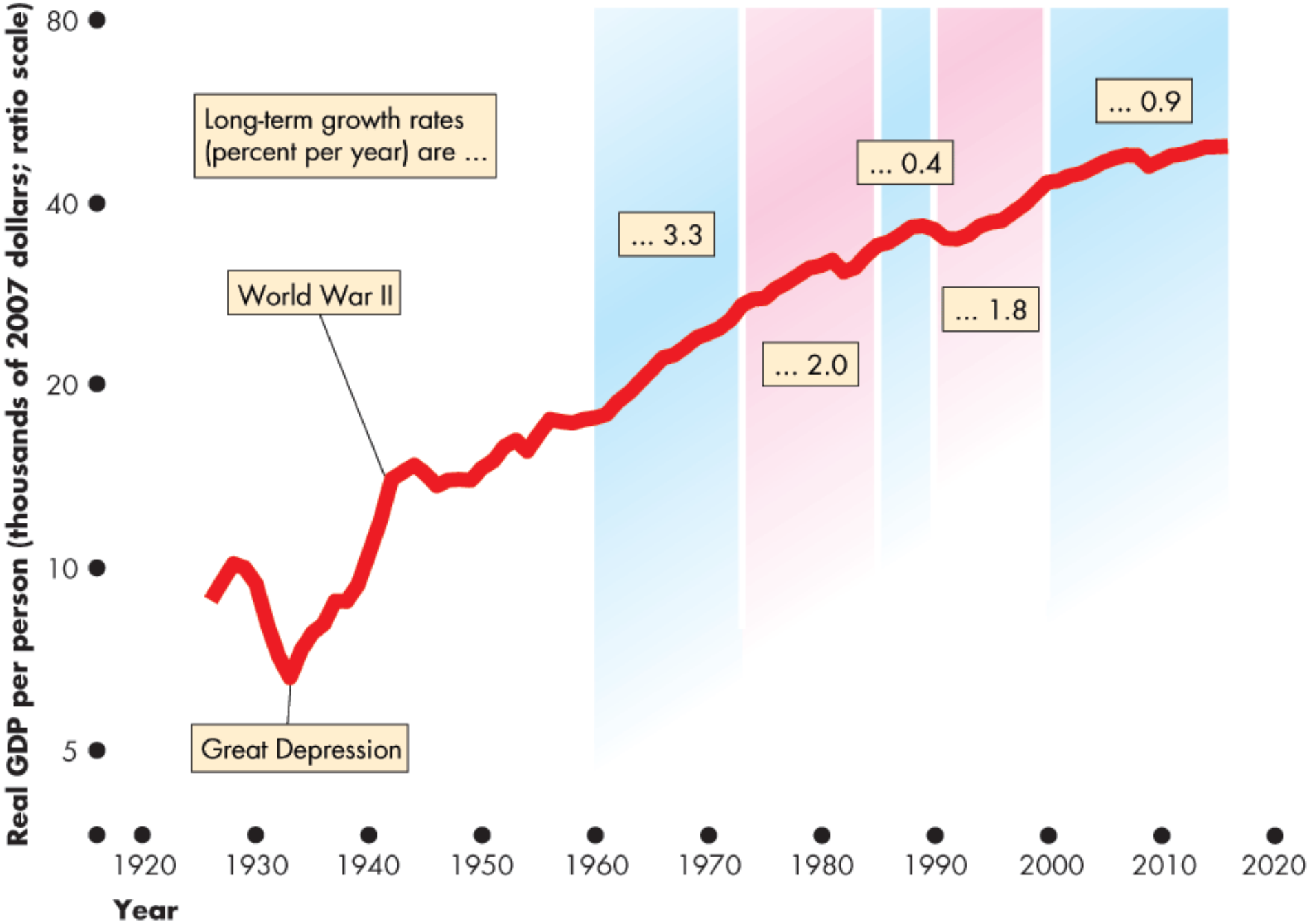
From 1926 to 2016, growth in real GDP per person in Canada averaged 2 percent a year.

Real GDP per person fell precipitously during the Great Depression and rose rapidly during World War II.

Growth was most rapid during the 1960s.

Growth slowed during the 1970s and sped up again in the 1980s and1990s.

Figure 6.4 on the next slide illustrates.

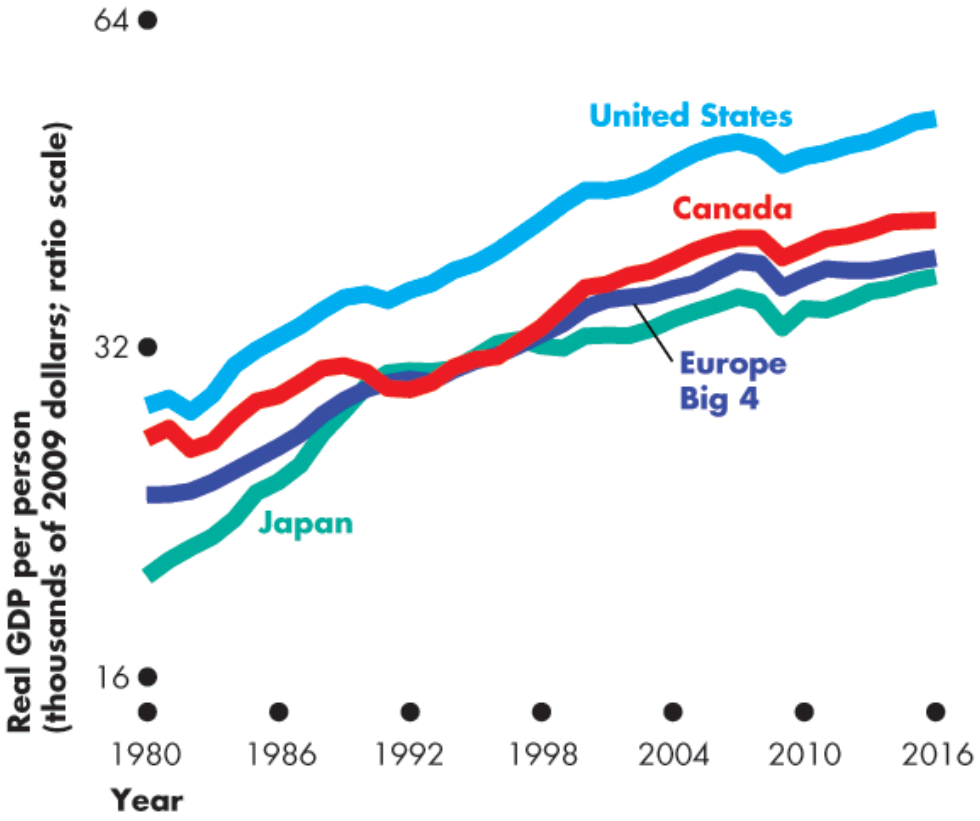


Long-Term Growth Trends

Real GDP Growth in the World Economy

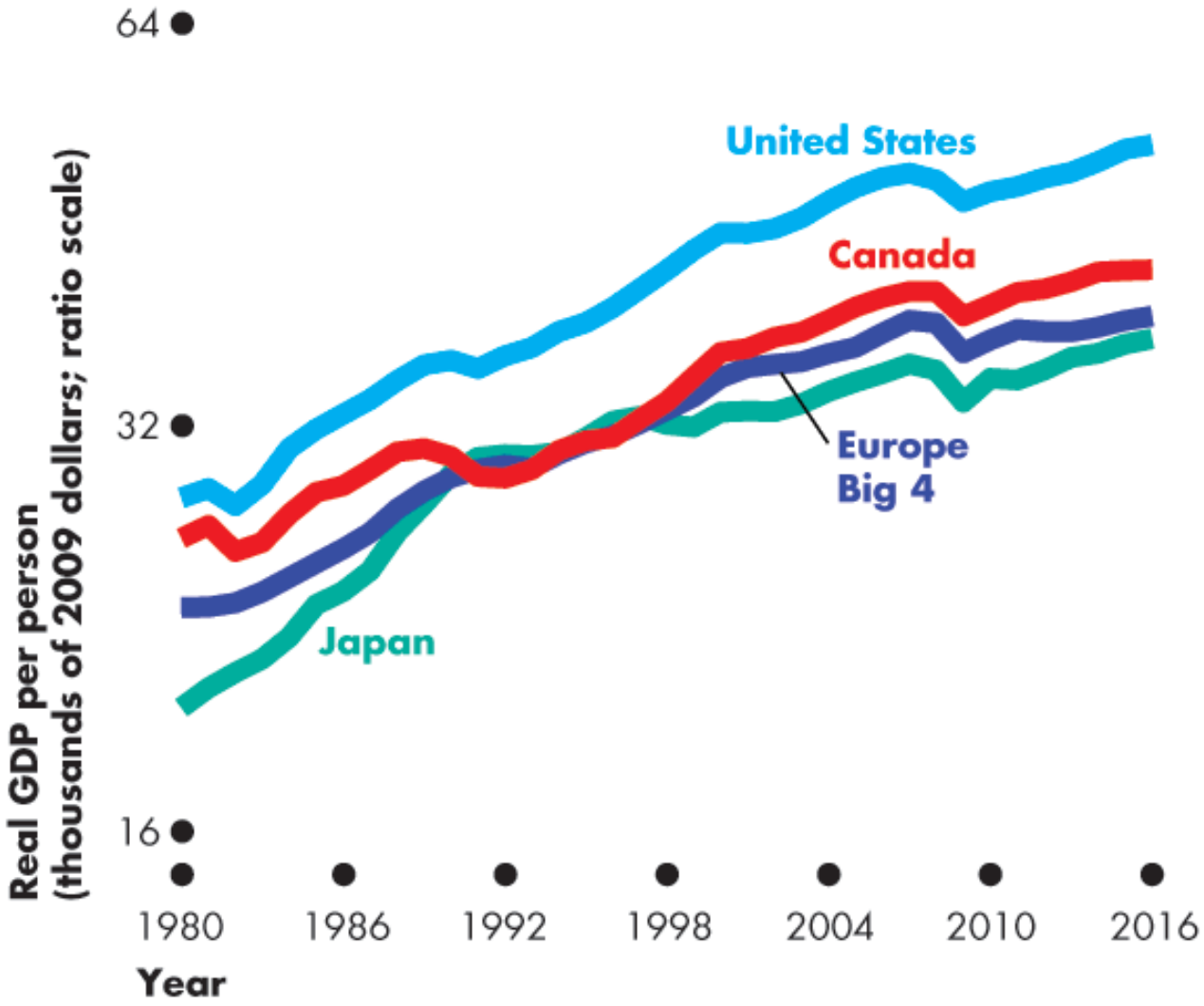
Figure 6.5(a) shows the growth in the rich countries. Japan grew rapidly in the 1960s, slower in the 1980s, and even slower in the 1990s.

Growth in Europe Big 4, the United States, and Canada has been similar.



(a) Catch-up?

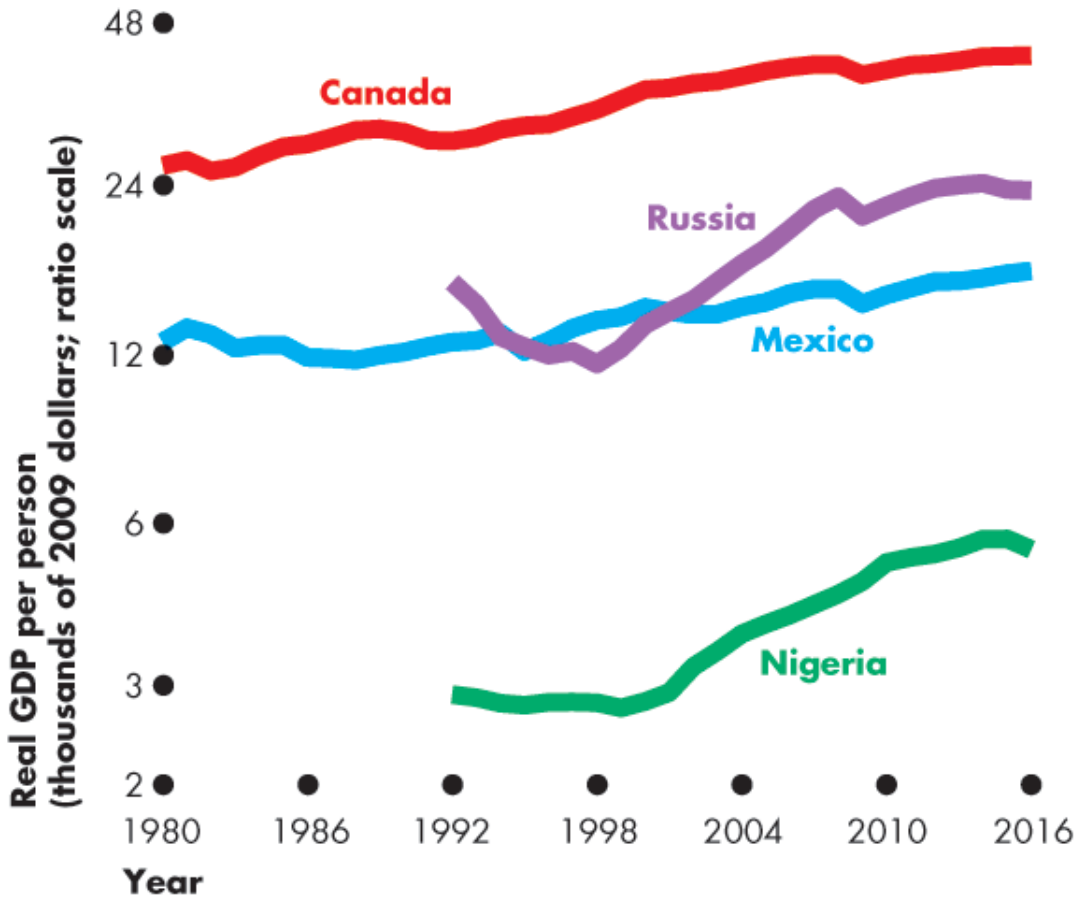
not all the poor countries developes fast.



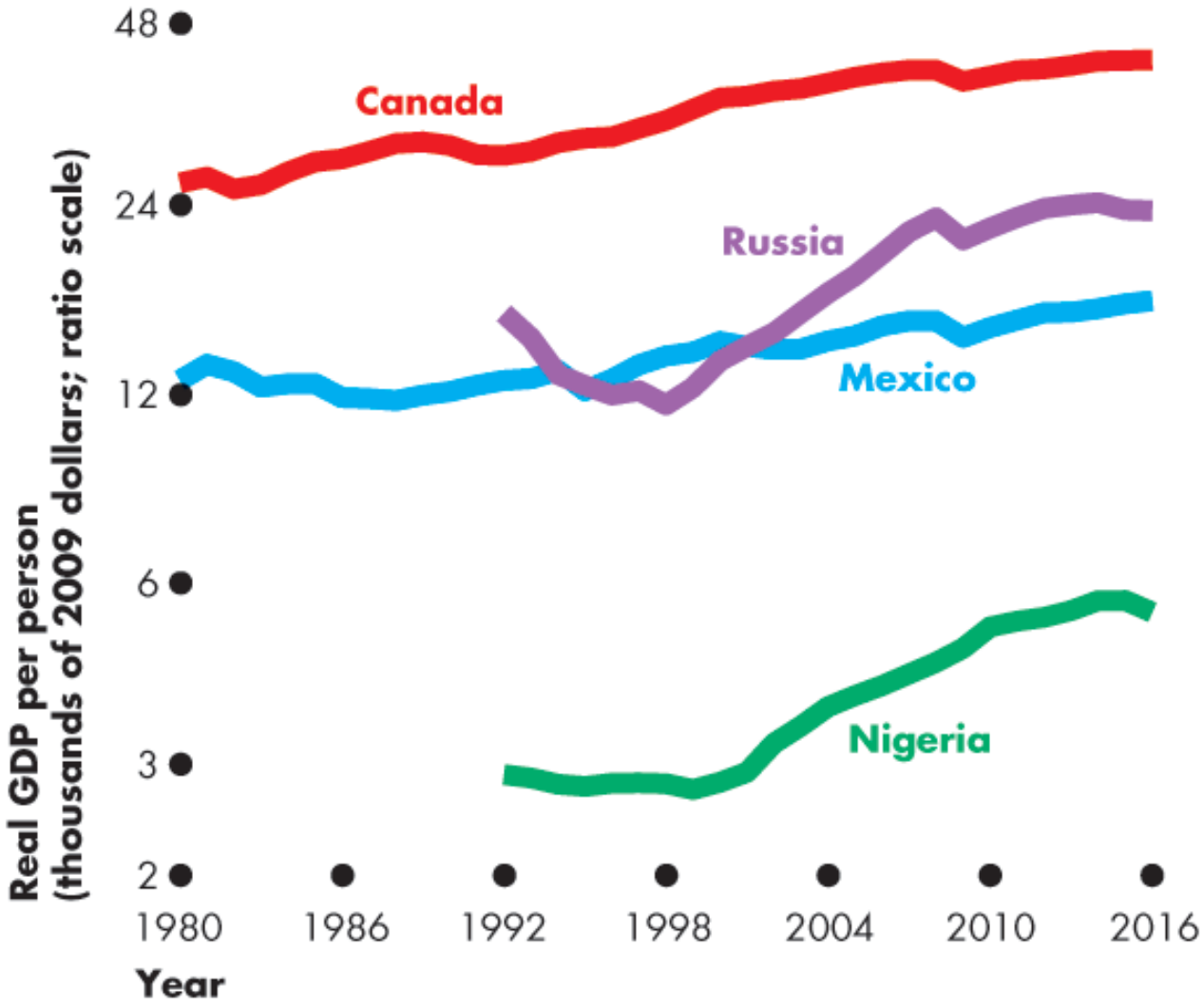
(a) Catch-up?

Long-Term Growth Trends

Figure 6.5(b) shows the growth of real GDP per person in group of poor countries.
The gaps between real GDP per person in Canada and in these countries have widened.



(b) No catch-up?



(b) No catch-up?

How Potential GDP Grows

Economic growth occurs when real GDP increases.
But a one-shot increase in real GDP or a recovery from recession is not economic growth.
Economic growth is the sustained, year-on-year increase in potential GDP.

How Potential GDP Grows

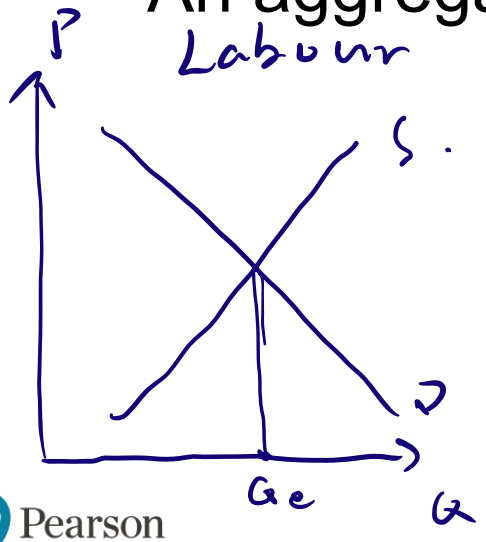
What Determines Potential GDP?

Potential GDP is the quantity of real GDP produced when the quantity of labour employed is the full-employment quantity.

$Q = Q_e$.

To determine potential GDP we use a model with two components:

- An aggregate production function
- An aggregate labour market

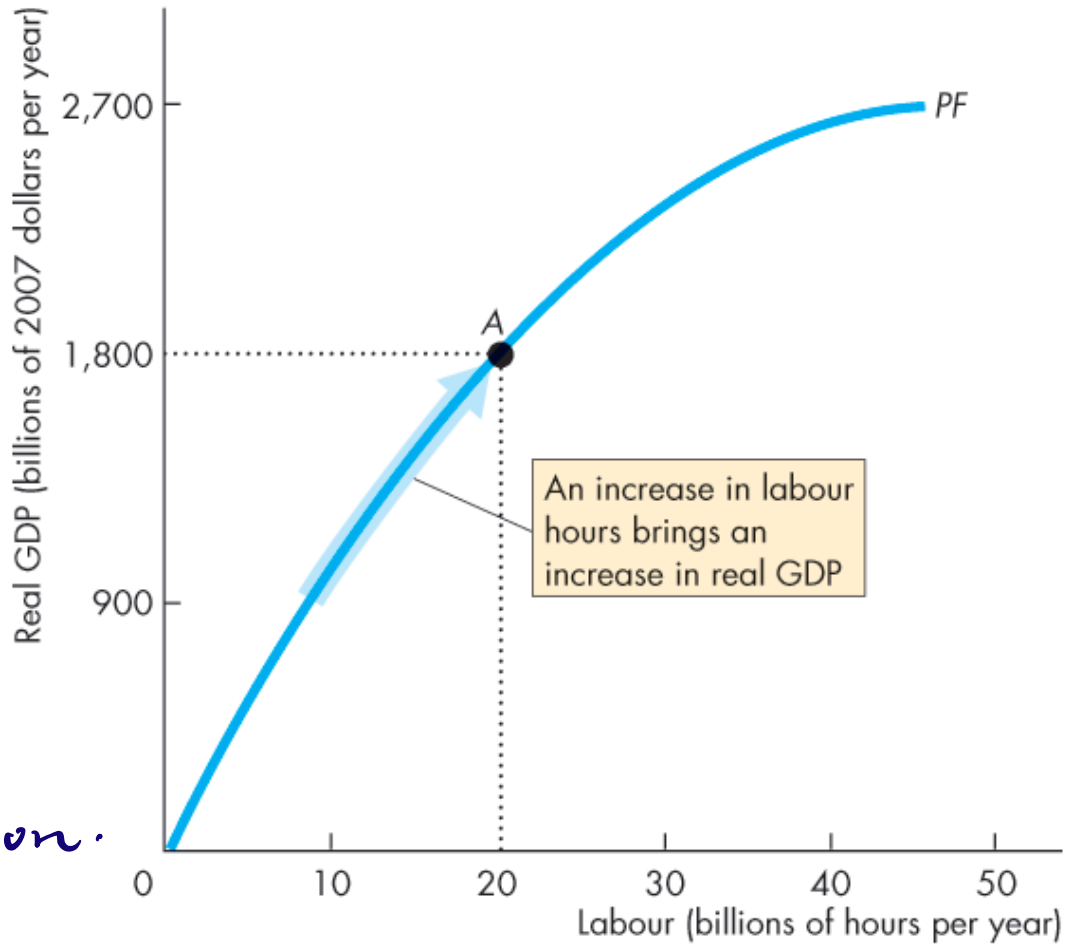


How Potential GDP Grows

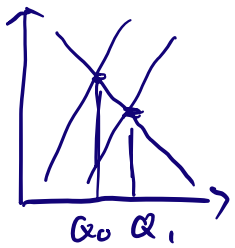
Aggregate Production Function

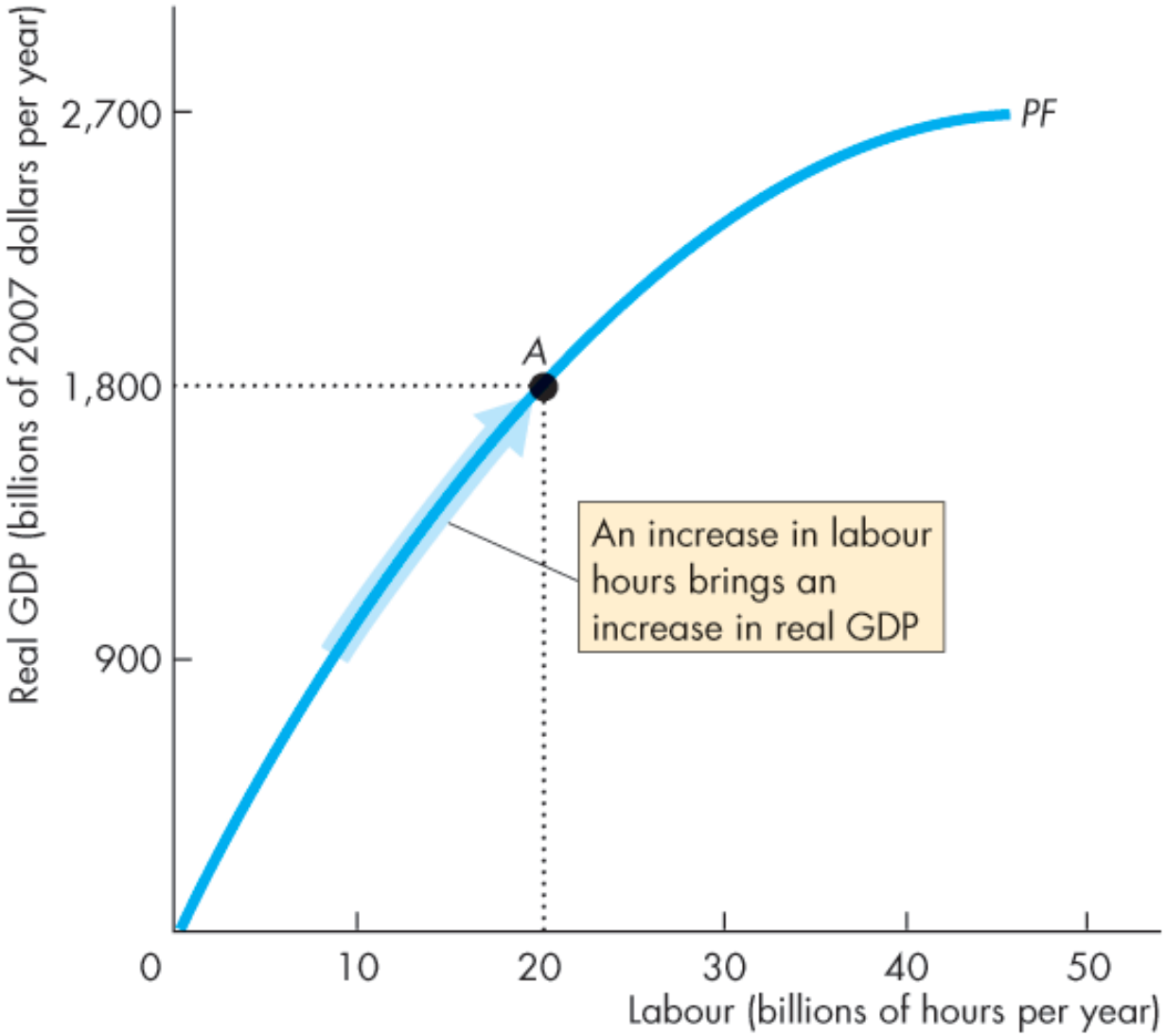
The aggregate production function tells us how real GDP changes as the quantity of labour changes, other things remaining the same.

An increase in labour increases real GDP.



Bigger Population.





How Potential GDP Grows

Aggregate Labour Market

The demand for labour shows the quantity of labour demanded and the real wage rate.

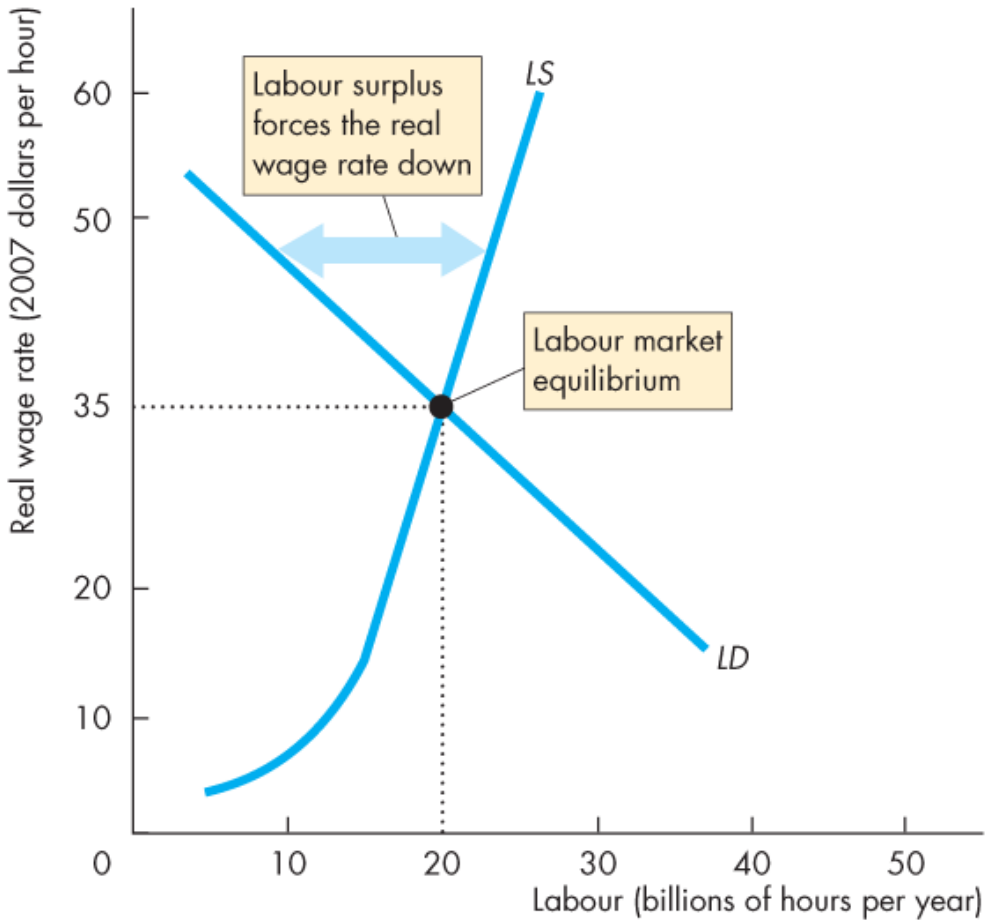
The real wage rate is the money wage rate divided by the price level.

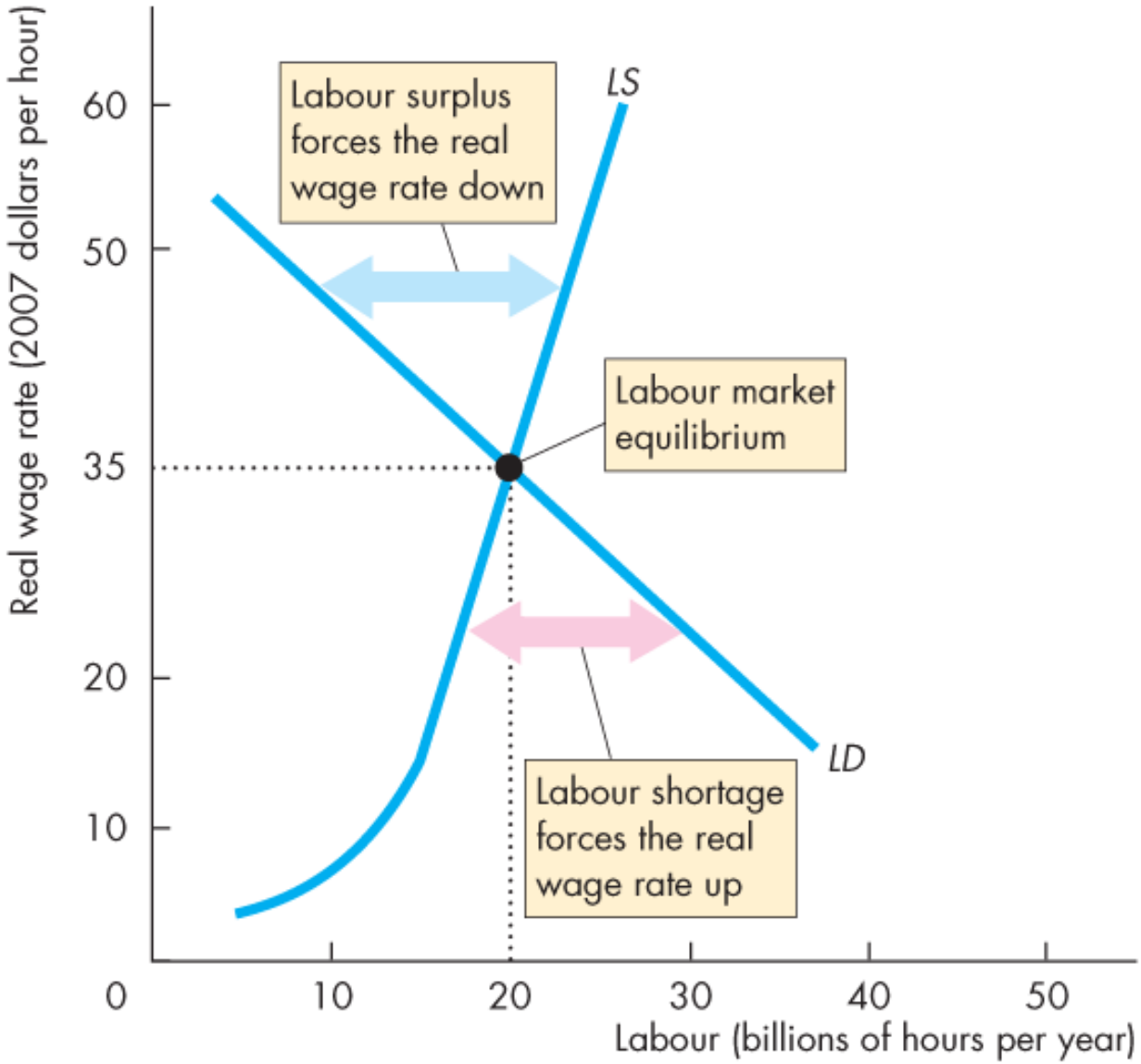
The supply of labour shows the quantity of labour supplied and the real wage rate.

The labour market is in equilibrium at the real wage rate at which the quantity of labour demanded equals the quantity of labour supplied.

How Potential GDP Grows

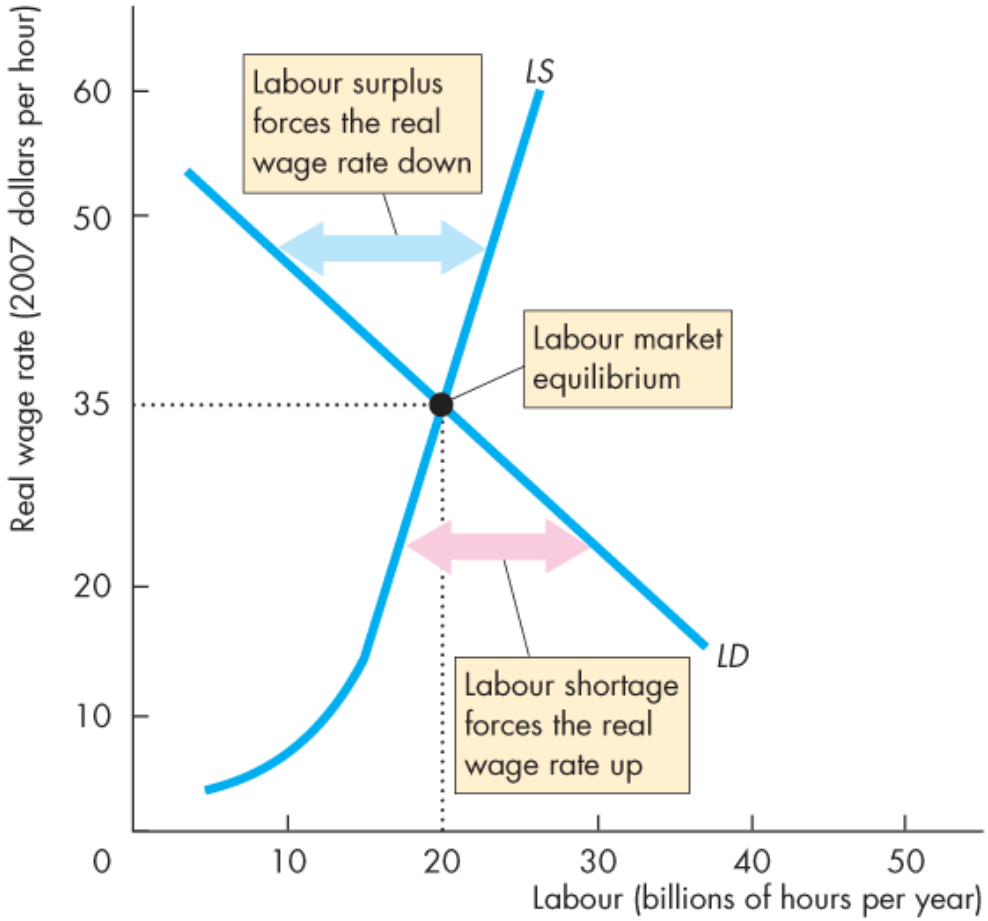
Figure 6.7 illustrates labour market equilibrium.
Labour market equilibrium occurs at a real wage rate of $35 an hour and 20 billion hours employed.
At a real wage rate above $35 an hour, there is a surplus of labour and the real wage rate falls.





How Potential GDP Grows

At a real wage rate below $35 an hour, there is a shortage of labour and the real wage rate rises.
At the labour market equilibrium, the economy is at full employment.



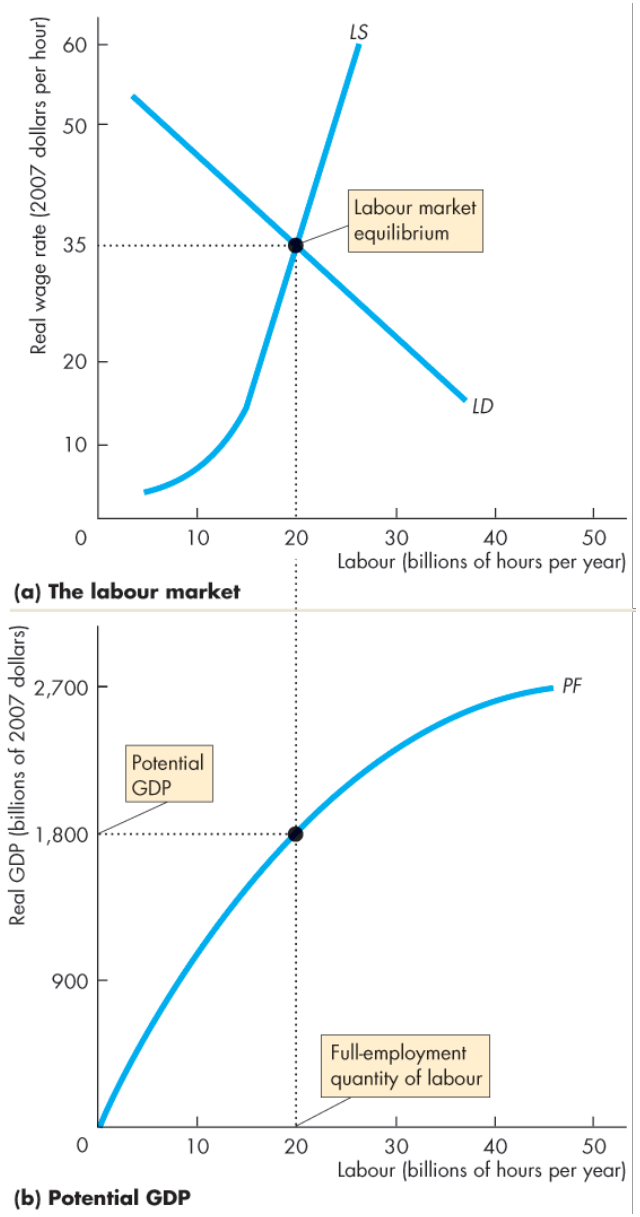
How Potential GDP Grows

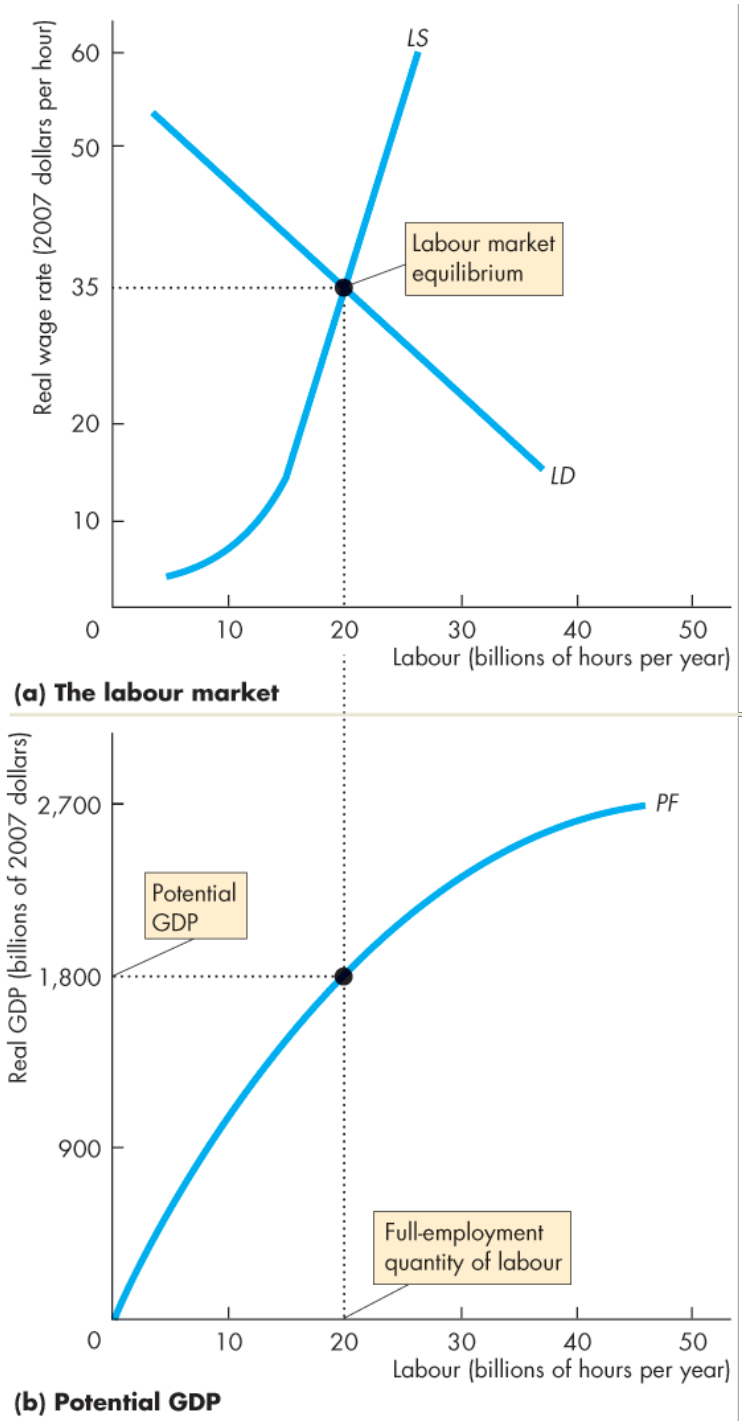
Potential GDP

The quantity of real GDP produced when the economy is at full employment is potential GDP.

The economy is at full employment when 20 billion hours of labour are employed.

Potential GDP is $1,800 billion.





How Potential GDP Grows

What Makes Potential GDP Grow?

We begin by dividing real GDP growth into the forces that increase:

- Growth in the supply of labour
- Growth in labour productivity

How Potential GDP Grows

Growth in the Supply of Labour

Aggregate hours, the total number of hours worked by all the people employed, change as a result of changes in:

1. Average hours per worker
2. Employment-to-population ratio
3. The working-age population growth

Population growth increases aggregate hours and real GDP, but …

to increase real GDP person, labour must become more productive.

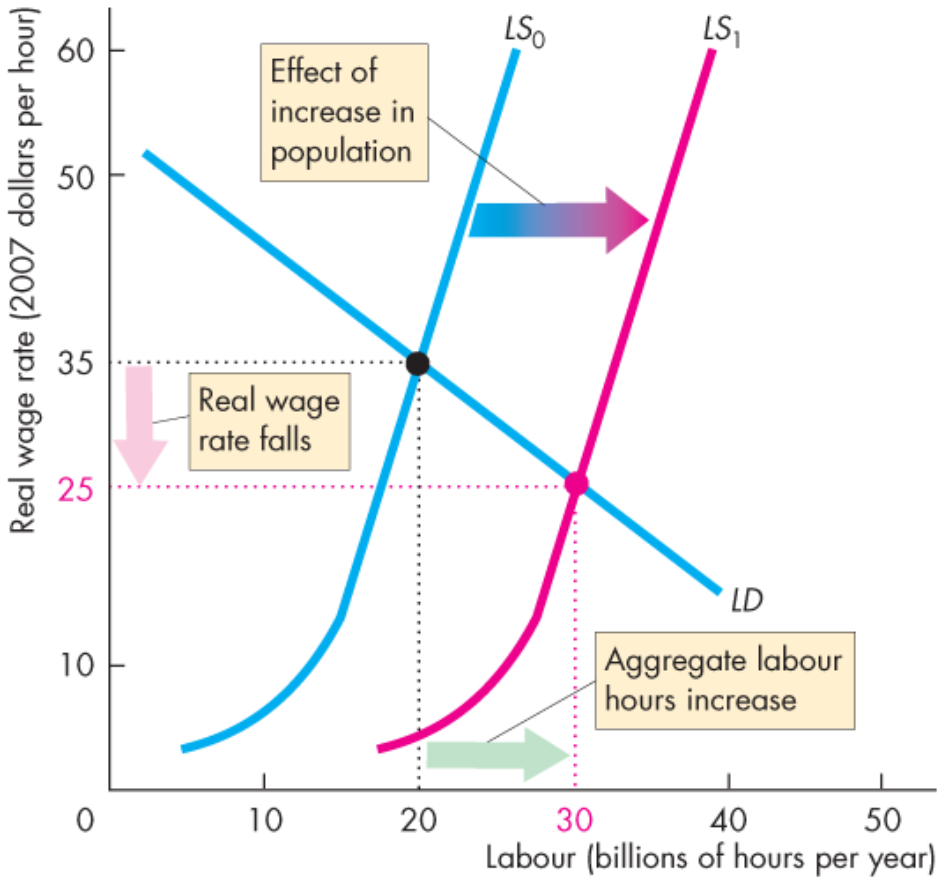
How Potential GDP Grows

The Effects of Population Growth

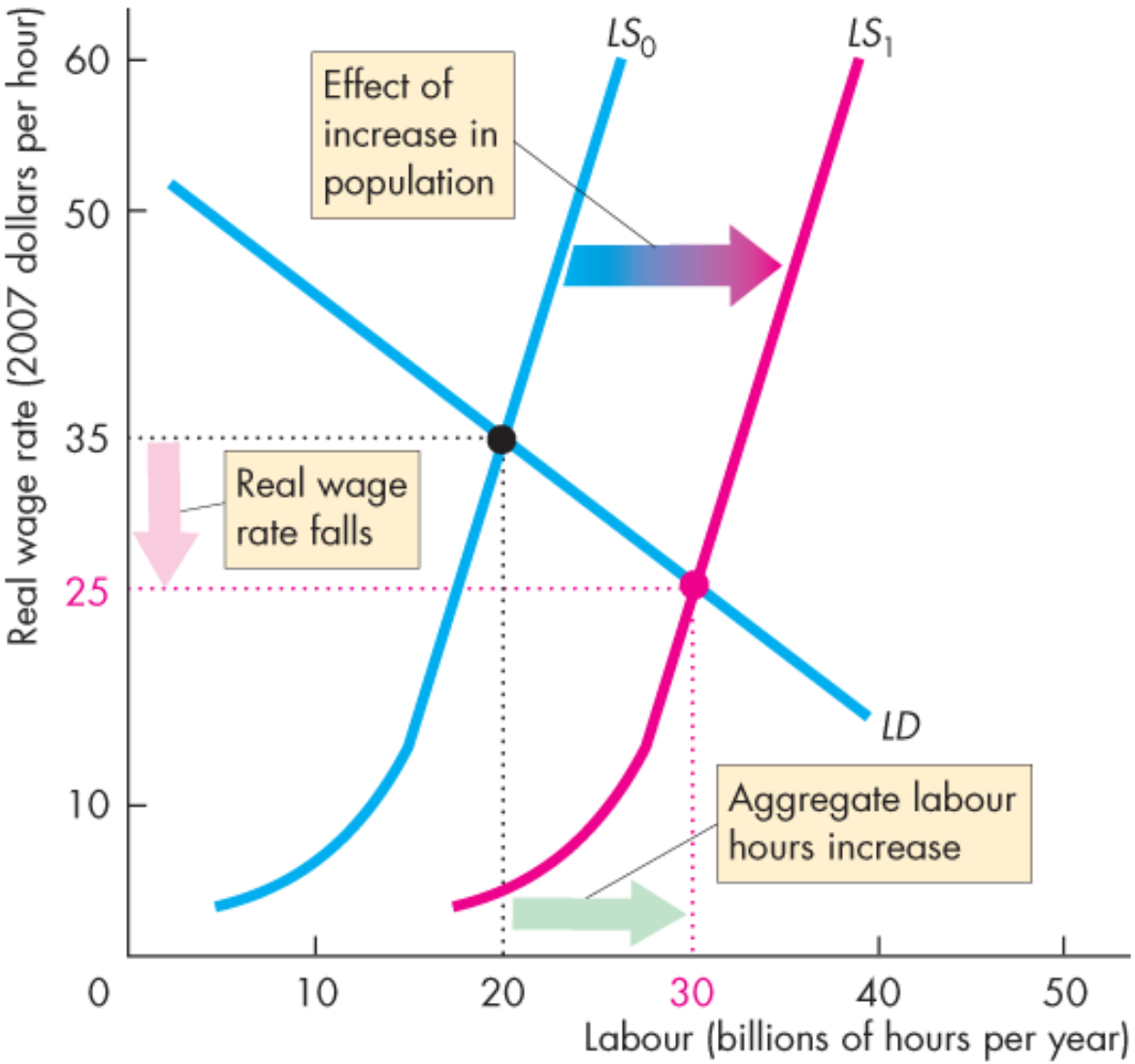
An increase in population increases the supply of labour. With no change in the demand for labour, the equilibrium real wage rate falls and the aggregate hours increase. The increase in the aggregate hours increases potential GDP.

How Potential GDP Grows

Figure 6.9(a) illustrates the effects of population growth in the labour market.
The labour supply curve shifts rightward.
The real wage rate falls … and aggregate hours increase.



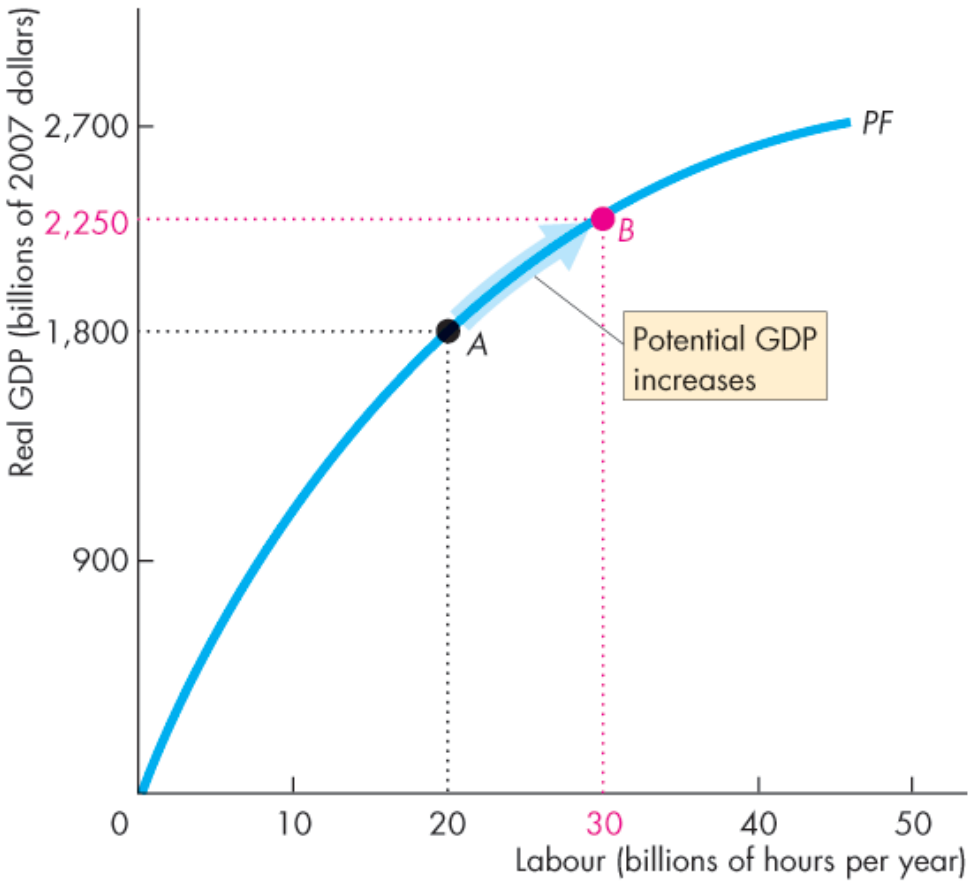
(a) The labour market



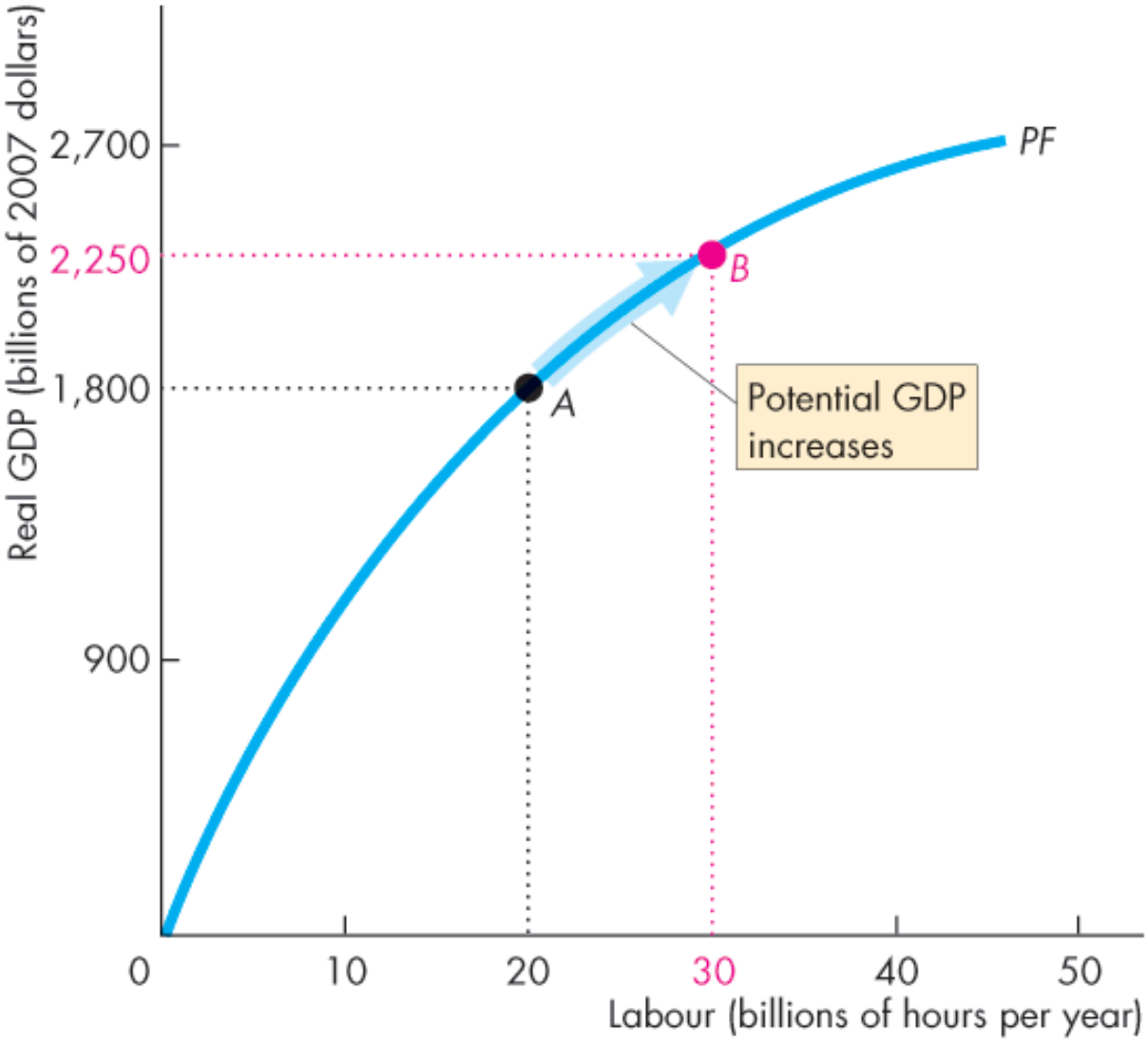
(a) The labour market

How Potential GDP Grows

The increase in aggregate hours increases potential GDP.
Because the diminishing returns, the increased population …
increases real GDP …
but decreases real GDP per hour of labour.



(b) Potential GDP



(b) Potential GDP

How Potential GDP Grows

Growth of Labour Productivity

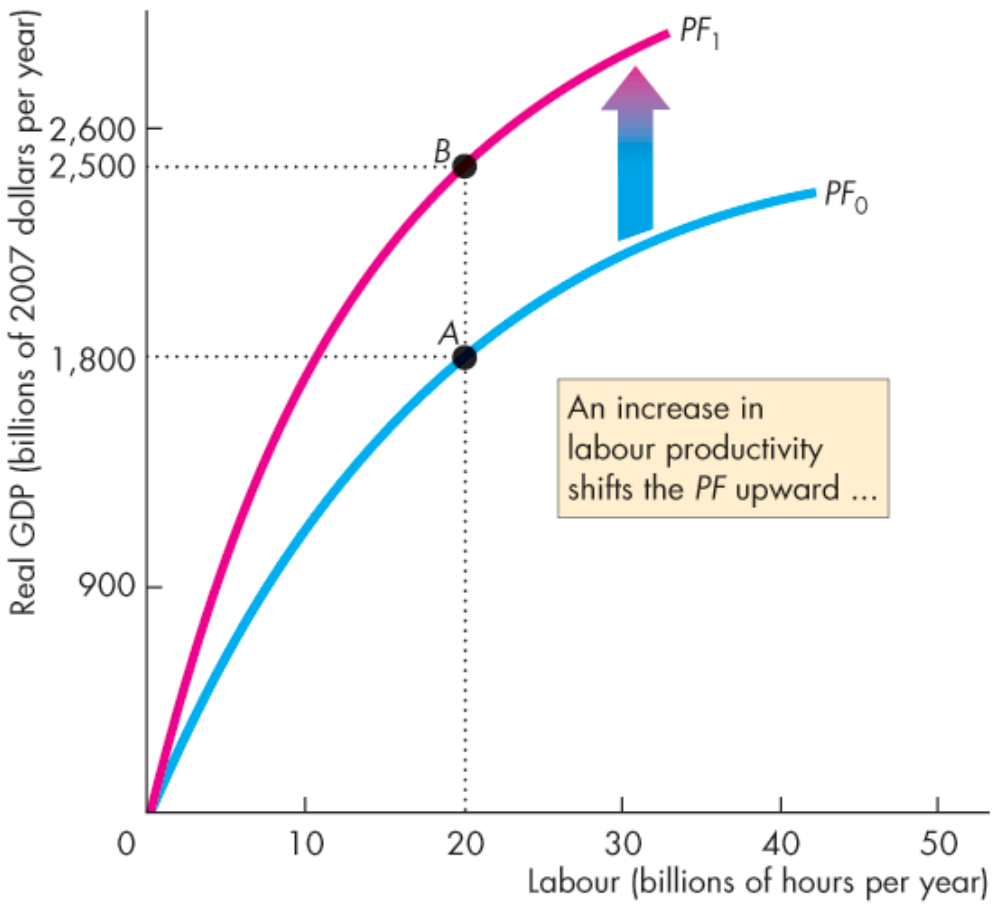
Labour productivity is the quantity of real GDP produced by an hour of labour.

Labour productivity equals real GDP divided by aggregate labour hours.

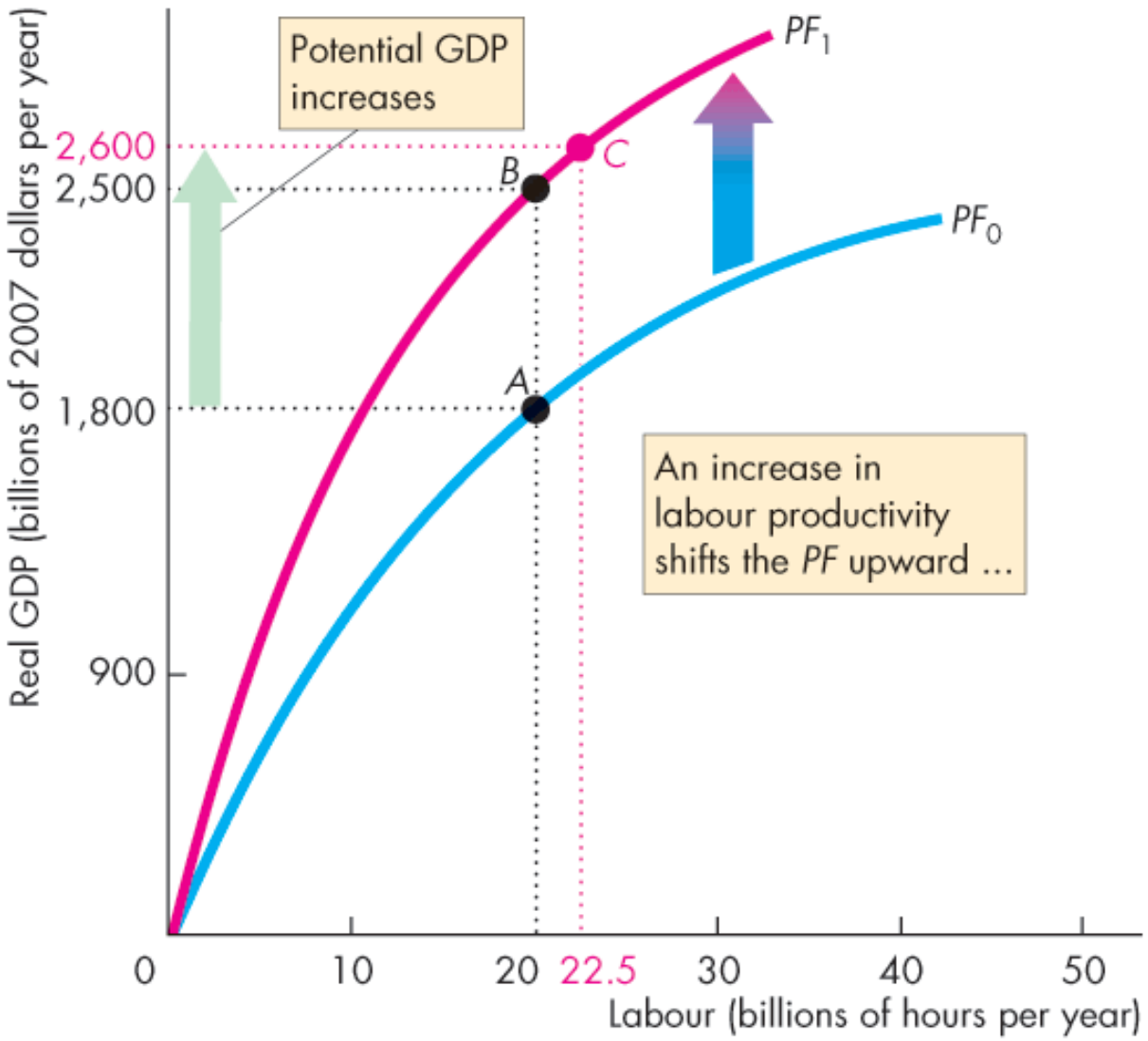
If labour become more productive, firms are willing to pay more for a given number of hours, so the demand for labour increases.

How Potential GDP Grows

Figure 6.10 shows the effect of an increase in labour productivity. The production function shifts upward.



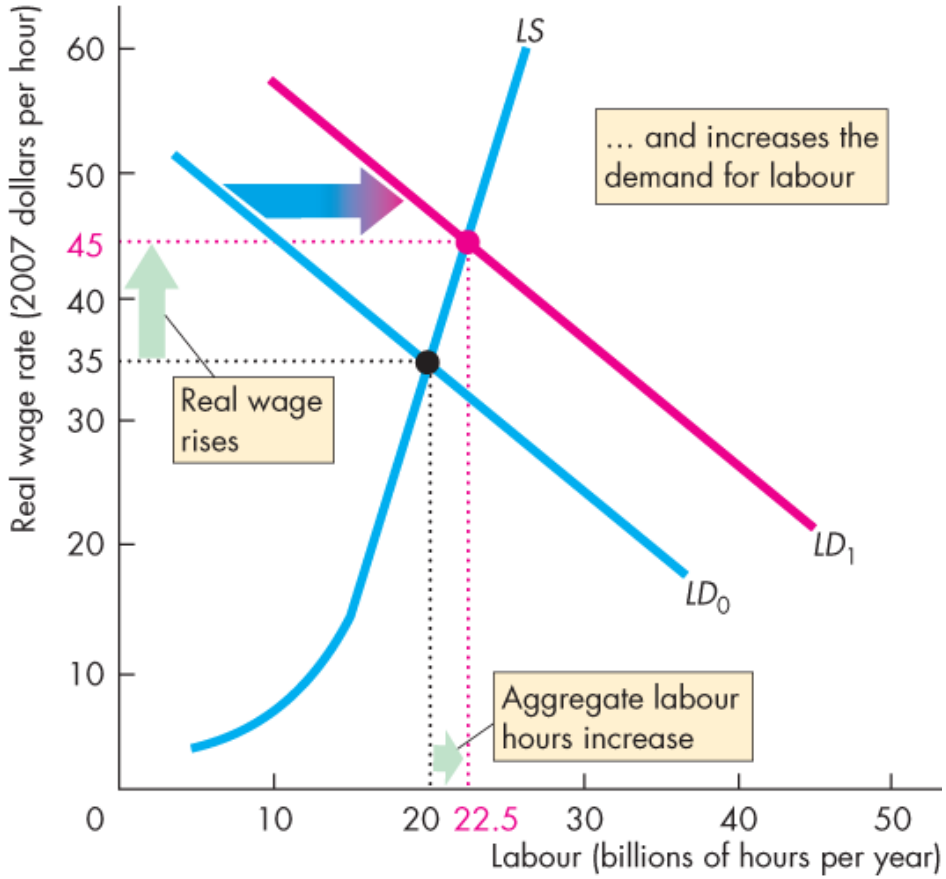
(a) Potential GDP



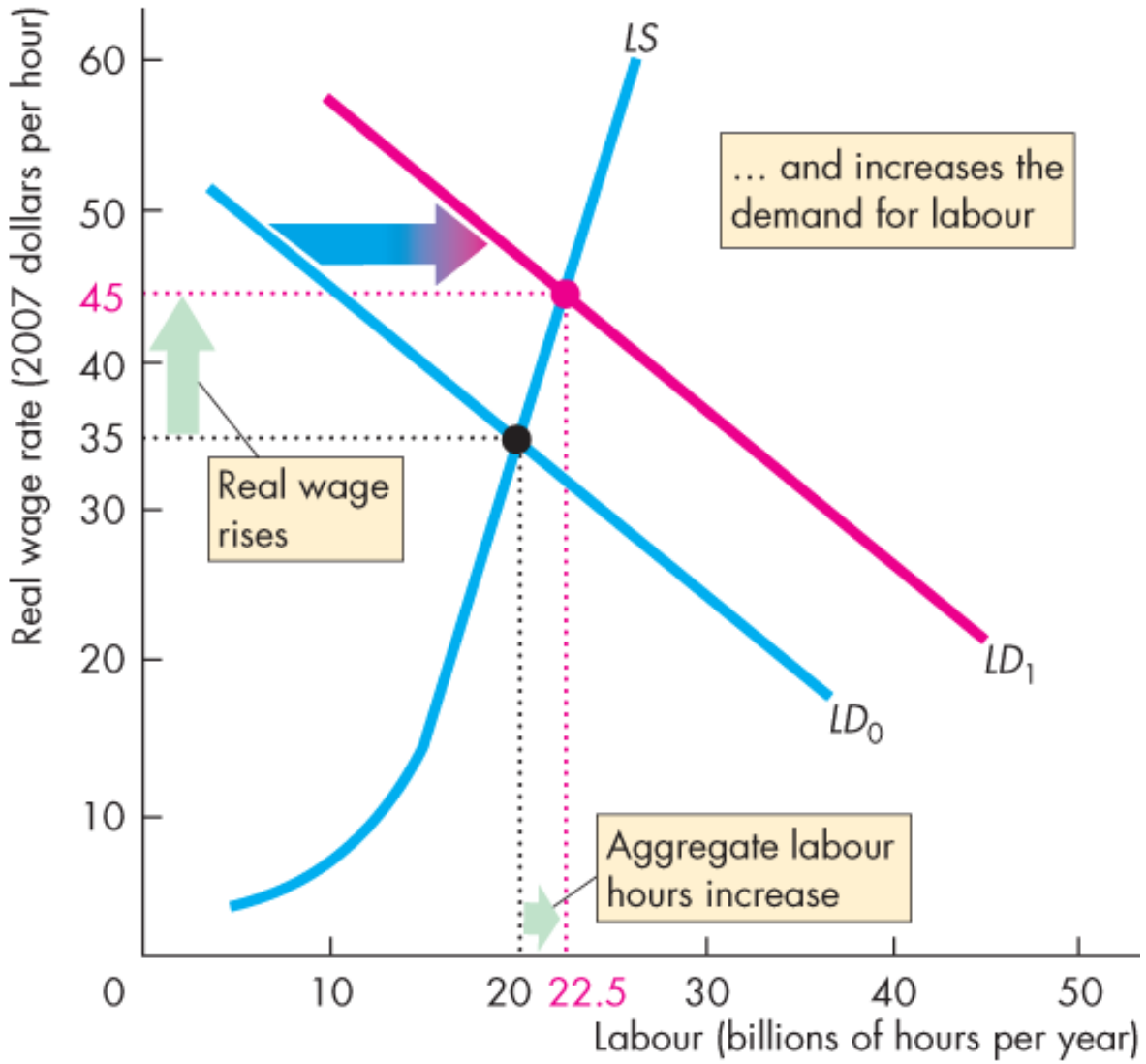
(a) Potential GDP

How Potential GDP Grows

In the labour market:
An increase in labour productivity increases the demand for labour.
With no change in the supply of labour, the real wage rate rises …
and aggregate hours increase.



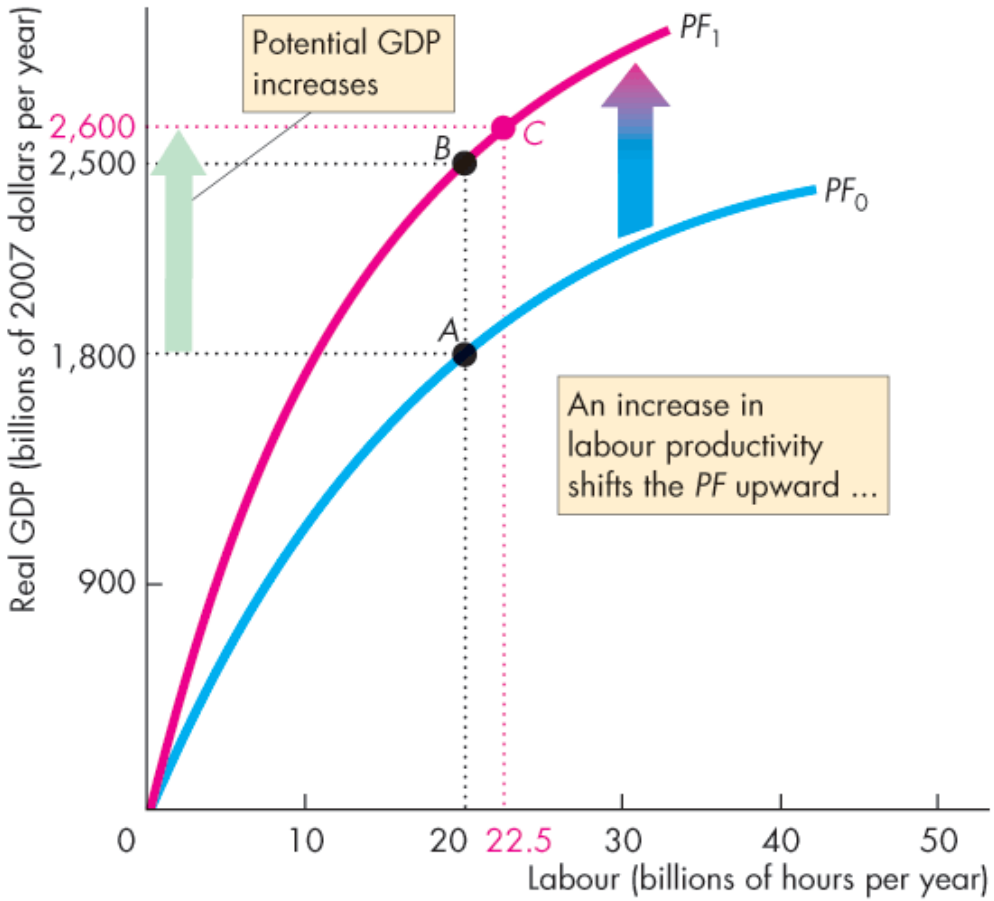
(b) The labour market



(b) The labour market

How Potential GDP Grows

And with the increase in aggregate hours, potential GDP increases.



(a) Potential GDP

Pearson

Why Labour Productivity Grows

Preconditions for Labour Productivity Growth

The fundamental precondition for labour productivity growth is the incentive system created by firms, markets, property rights, and money.

The growth of labour productivity depends on

- Physical capital growth
- Human capital growth
- Technological advances

Why Labour Productivity Grows

Physical Capital Growth

The accumulation of new capital increases capital per worker and increases labour productivity.

Human Capital Growth

Human capital acquired through education, on-the-job training, and learning-by-doing is the most fundamental source of labour productivity growth.

Why Labour Productivity Grows

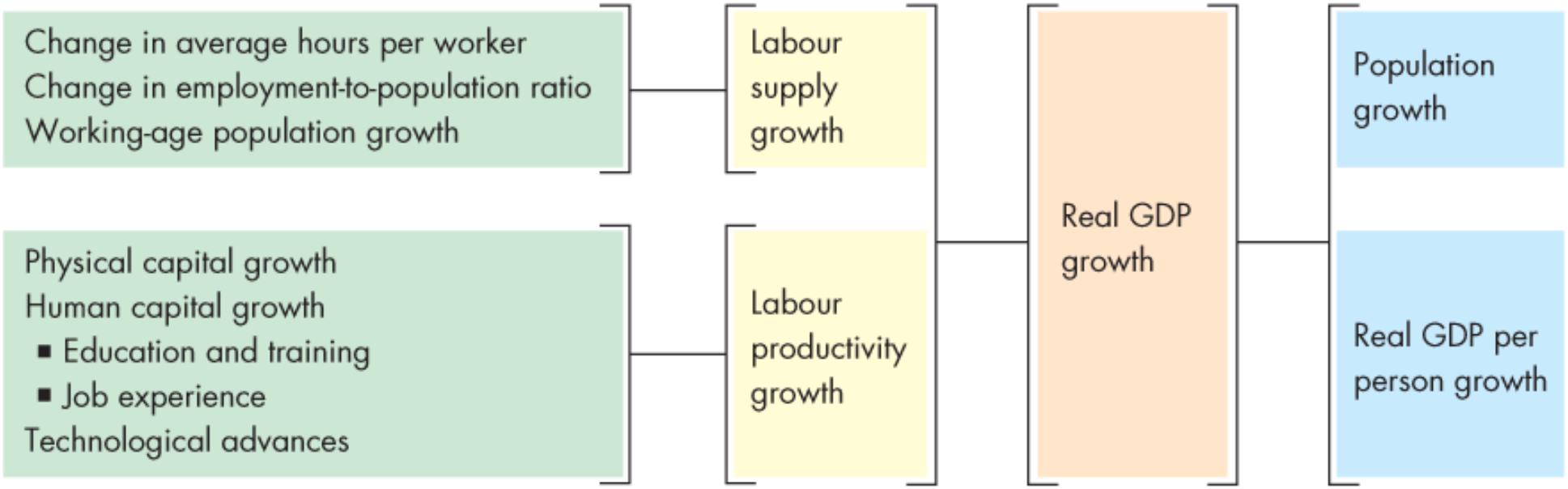
Technological Advances

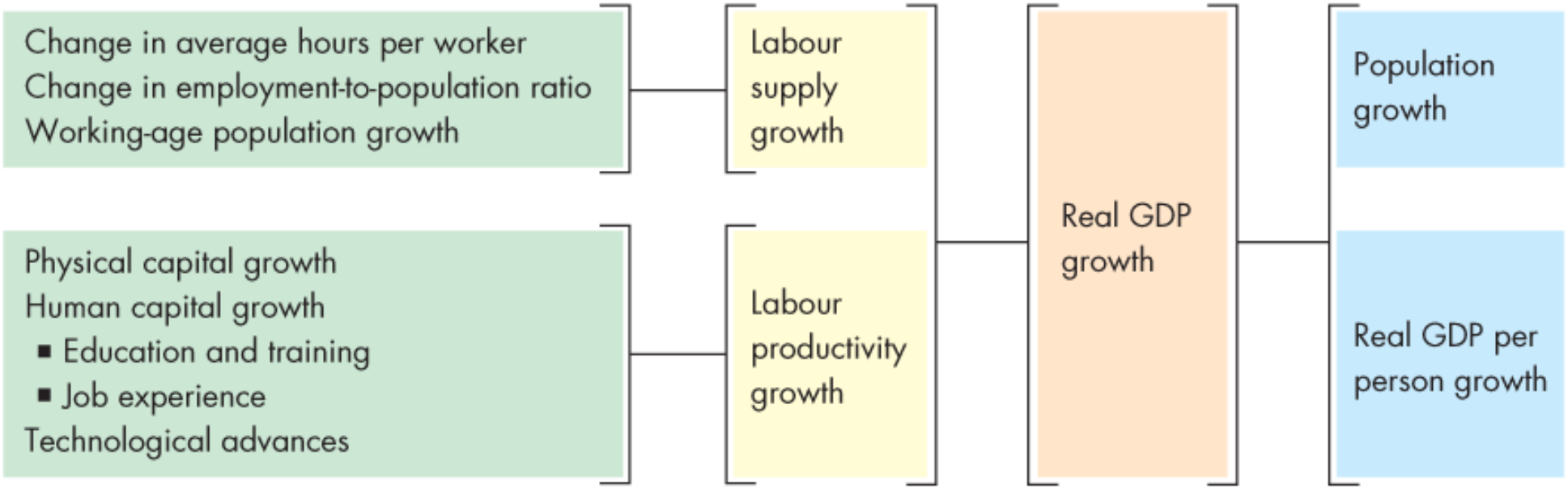
Technological change—the discovery and the application of new technologies and new goods—has contributed immensely to increasing labour productivity.

Figure 6.11 on the next slide summarizes the process of growth.

It also shows that the growth of real GDP per person depends on real GDP growth and the population growth rate.

Why Labour Productivity Grows





Is Economic Growth Sustainable? Theories, Evidence, and Policies

We study three growth theories:

- Classical growth theory
- Neoclassical growth theory
- New growth theory

Classical Growth Theory

Classical growth theory is the view that the growth of real GDP per person is temporary and that when it rises above the subsistence level, a population explosion eventually brings real GDP per person back to the subsistence level.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

Modern-Day Malthusians

Many people today are Malthusians.

They say that if today's global population of 7.2 billion explodes to 11 billion by 2050 and perhaps 35 billion by 2300, we will run out of resources, …

real GDP per person will decline and we will return to a primitive standard of living.

We must, say Malthusians, contain population growth.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

As the population increases the real wage rate falls.
The population continues to grow until the real wage rate has been driven back to the subsistence real wage rate.
At this real wage rate, both population growth and economic growth stop.
Contrary to the assumption of the classical theory, the historical evidence is that population growth rate is not tightly linked to income per person, and population growth does not drive incomes back down to subsistence levels.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

Neoclassical Growth Theory

Neoclassical growth theory is the proposition that real GDP per person grows because technological change induces a level of saving and investment that makes capital per hour of labour grow.

Growth ends only if technological change stops because of diminishing marginal returns to both labour and capital.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

The Neoclassical Theory of Population Growth

The neoclassical view is that the population growth rate is independent of real GDP and the real GDP growth rate.

Technological Change and Diminishing Returns

In the neoclassical theory, the rate of technological change influences the economic growth rate but economic growth does not influence the pace of technological change.

It is assumed that technological change results from chance.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

The Basic Neoclassical Idea

Technology begins to advance at a more rapid pace.

New profit opportunities arise and investment and saving increase.

As technology advances and the capital stock grows, real GDP per person increases.

Diminishing returns to capital lower the real interest rate and eventually economic growth slows and just keeps up with population growth.

Capital per worker remains constant.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

A Problem with Neoclassical Growth Theory

All economies have access to the same technologies and capital is free to roam the globe, seeking the highest available real interest rate.

These facts imply that economic growth rates and real GDP per person across economies will converge.

Figure 6.5 shows some convergence among rich countries , but convergence doesn't appear imminent for all countries.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

New Growth Theory

New growth theory holds that real GDP per person grows because of choices that people make in the pursuit of profit and that growth can persist indefinitely.

The theory begins with two facts about market economies:

Discoveries result from choices.

Discoveries bring profit and competition destroys profit

.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

Two further facts play a key role in the new growth theory:

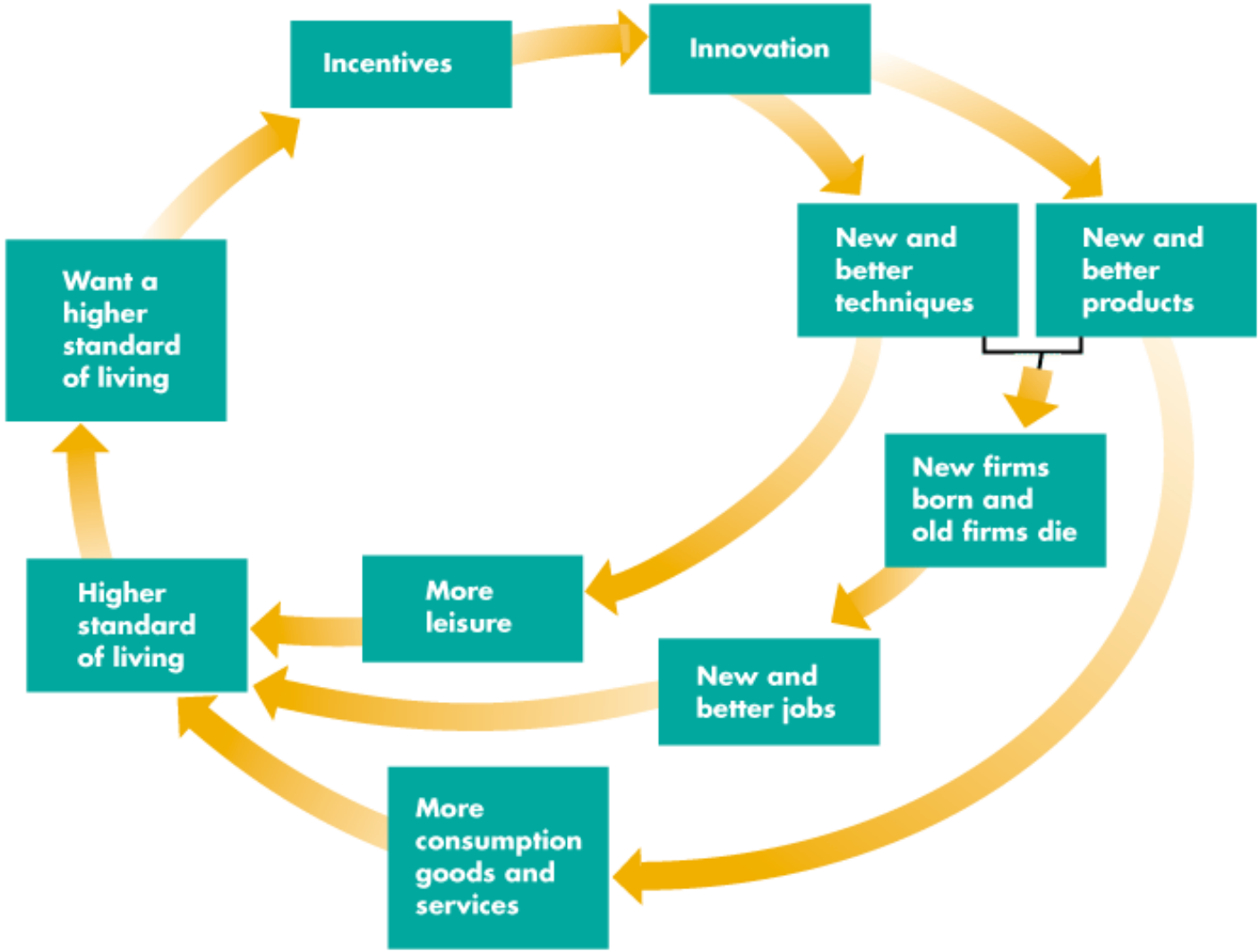
- Discoveries are a public capital good.
- Knowledge is not subject to diminishing returns.

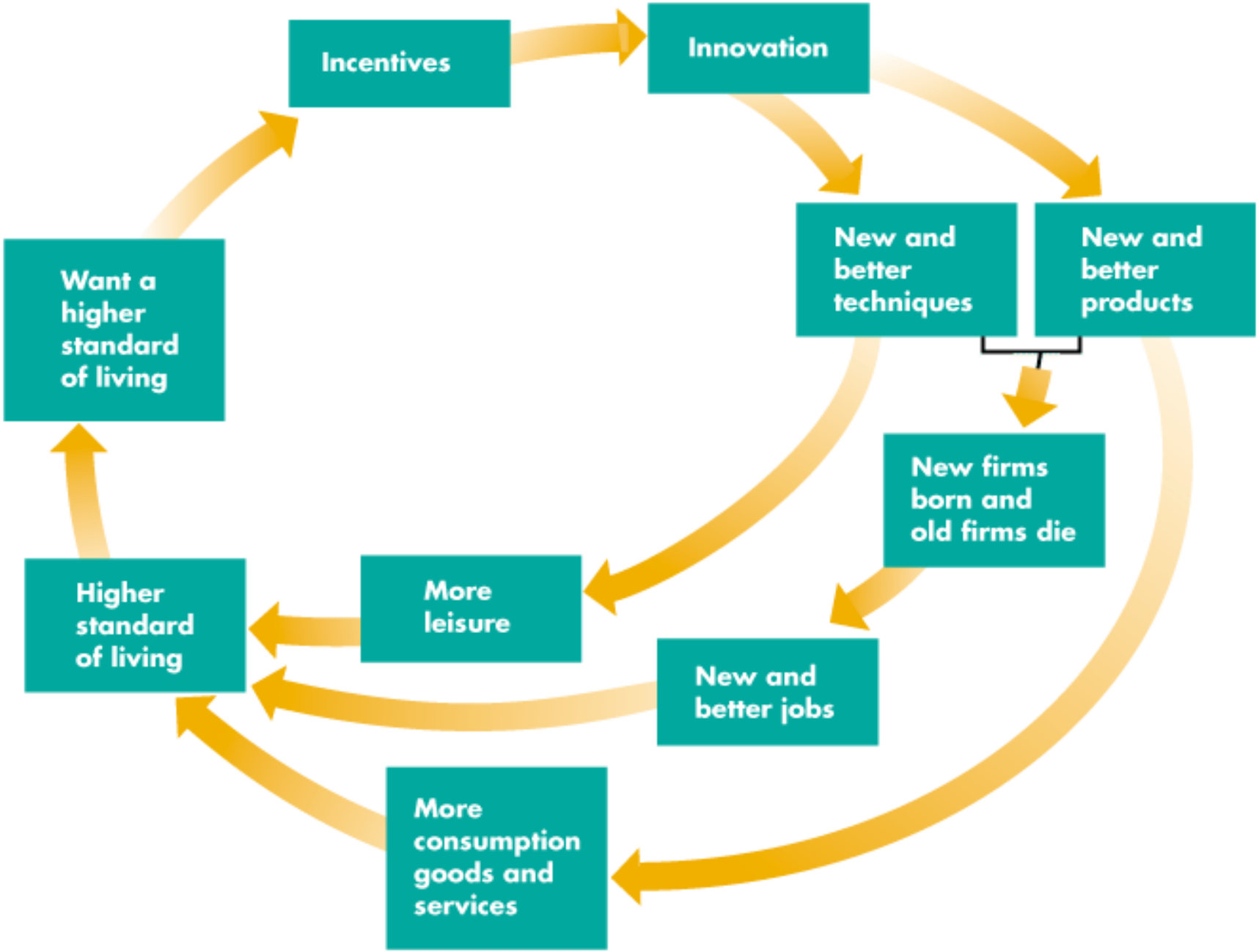
Increasing the stock of knowledge makes capital and labour more productive.

Knowledge capital does not experience diminishing returns is the central proposition of new growth theory.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

Figure 6.12 summarizes the ideas of new growth theory as a perpetual motion machine.





Is Economic Growth Sustainable? Theories, Evidence, and Policies

Sorting Out the Theories

Each theory teaches us something of value but not the whole story.

Classical theory reminds us that our physical resources are limited and we need technological advances to grow.

Neoclassical theory emphasizes diminishing returns to capital which means we need technological advances to grow.

New theory emphasizes the capacity of human resources to innovate at a pace that offsets diminishing returns.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

The Empirical Evidence on the Causes of Economic Growth

Economic growth makes progress through the interplay of theory and empirical evidence.

Theory makes predictions about what we will observe if it is correct.

Empirical evidence provides the data for testing the theory.

Table 6.1 on the next slide summarizes the more robust influences on growth that economists have discovered.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

TABLE 6.1 The Influences on Economic Growth

Influence	Good for Economic Growth	Bad for Economic Growth
Region	■ Far from equator	■ Sub-Saharan Africa
Politics	■ Rule of law	■ Revolutions
	■ Civil liberties	■ Military coups
		■ Wars
Economic system	■ Capitalist	
Market distortions		■ Exchange rate distortions
		■ Price controls and black markets
Investment	■ Human capital	
	■ Physical capital	
International trade	■ Open to trade	

Source of data: Xavier Sala-i-Martin, "I Just Ran Two Million Regressions," *The American Economic Review*, Vol. 87, No. 2 (May 1997), pp. 178–183.

Pearson

Is Economic Growth Sustainable? Theories, Evidence, and Policies

Policies for Achieving Faster Growth

Growth accounting tell us that to achieve faster economic growth we must either increase the growth rate of capital per hour of labour or increase the pace of technological change.

The main suggestions for achieving these objectives are

Stimulate Saving

Saving finances investment. So higher saving rates might increase physical capital growth.

Tax incentives might be provided to boost saving.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

Stimulate Research and Development

Because the fruits of basic research and development efforts can be used by everyone, not all the benefit of a discovery falls to the initial discoverer.

So the market might allocate too few resources to research and development.

Government subsidies and direct funding might stimulate basic research and development.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

Improve the Quality of Education

The benefits from education spread beyond the person being educated, so there is a tendency to under invest in education.

Provide International Aid to Developing Countries

If rich countries give financial aid to developing countries, investment and growth will increase.

But data on the effect of aid shows that it has had zero or a negative effect.

Is Economic Growth Sustainable? Theories, Evidence, and Policies

Encourage International Trade

Free international trade stimulates growth by extracting all the available gains from specialization and trade.

The fastest growing nations are the ones with the fastest growing exports and imports.