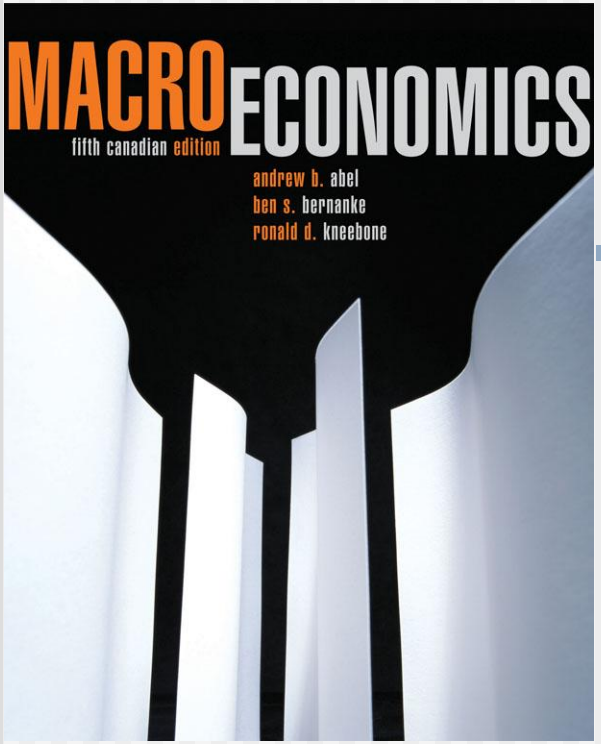


Chapter 8

Business Cycles

Introduction to Business Cycles

- The business cycle is a central concern in macroeconomics, because business cycle fluctuations have such profound effects.
- The two basic questions are:
  - *What causes business cycles?*
  - *How policymakers should respond to cyclical fluctuations?*
- The answer depends on one's view of how quickly the economy adjusts to shocks; i.e., a Keynesian or classists view.

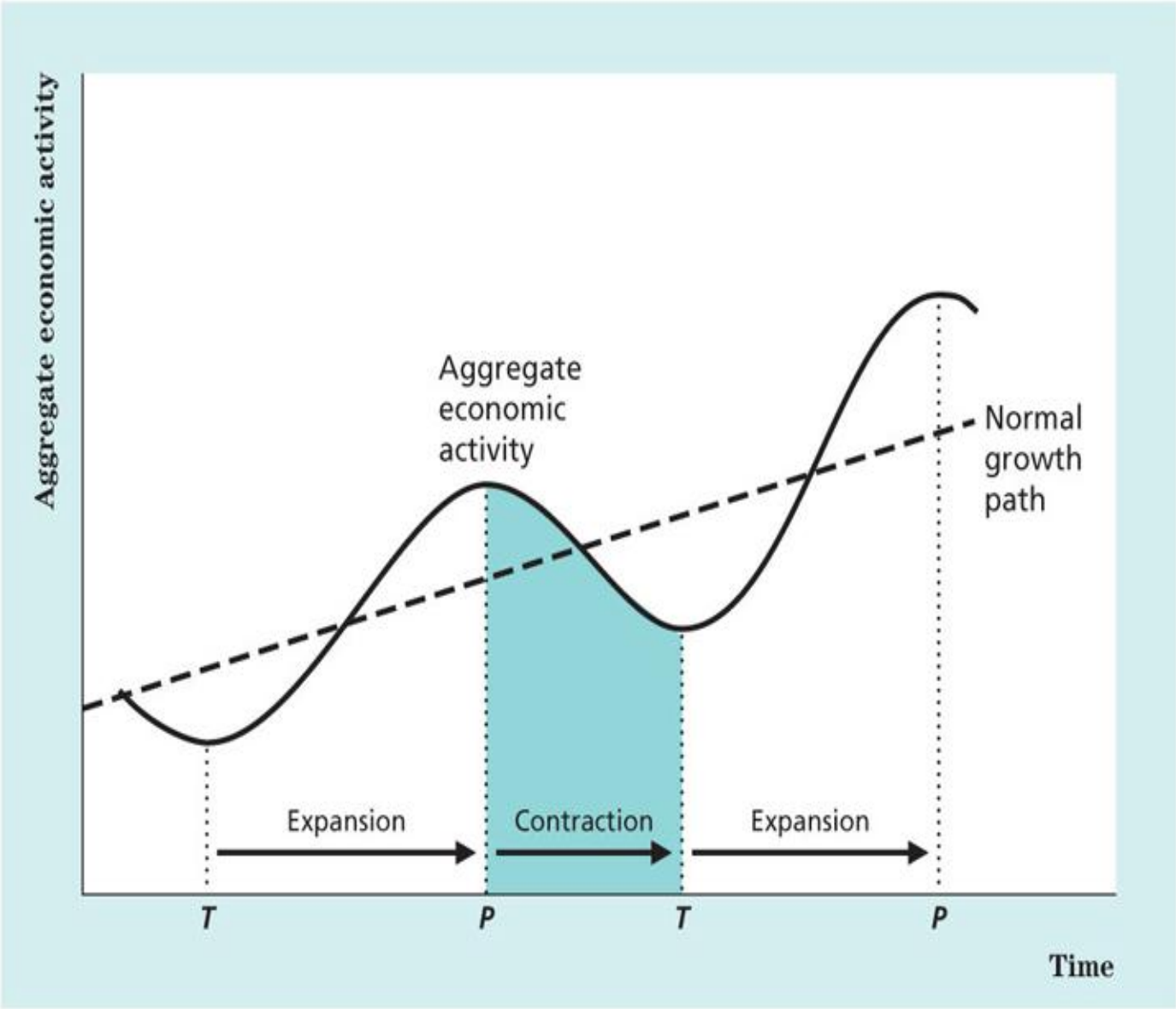
Introduction to Business Cycles (continued)

- Classical economists view business cycles as representing the economy's best response to disturbances in production and spending.
- The modern version is called the Real Business Cycle theory (RBC).
- Keynesian economists argue that because wages and prices adjust slowly, disturbances in production and spending may drive the economy away from its most desirable level of output and employment for long periods of time.
- We need some facts here. That is what this Chapter is about.

FIGURE 8.1

A BUSINESS CYCLE

The solid curve graphs the behaviour of aggregate economic activity over a typical business cycle. The dashed line shows the economy's normal growth path. During a contraction, aggregate economic activity falls until it reaches a trough, *T*. The trough is followed by an expansion during which economic activity increases until it reaches a peak, *P*. A complete cycle is measured from peak to peak or trough to trough.



What is a Business Cycle?

1. Fluctuation of "aggregate economic activity" – so not just GDP.
2. Expansions and contractions.
   - Contraction (recession or depression)
   - Trough (a turning point)
   - Expansion (boom)
   - Peak (a turning point)
3. Co-movement.
   - Prices, productivity, investment and unemployment have regular patterns of behaviour.

What is a Business Cycle? (continued)

4. Recurrent but not periodic.
   - It does not occur at regular, predictable intervals and does not last for fixed, predetermined length of time.
5. Persistence.
   - Once an expansion or contraction begins it tends to continue for a period of time.

TABLE 8.1

Canadian Business Cycle Turning Points and Durations

Trough	Expansion (Months from Trough to Peak)	Peak	Contraction (Months from Peak to Next Trough)
		Nov. 1873	66
May 1879	38	July 1882	32
Mar. 1885	23	Feb. 1887	12
Feb. 1888	29	July 1890	9
Mar. 1891	23	Feb. 1893	13
Mar. 1894	17	Aug. 1895	12
Aug. 1896	44	Apr. 1900	10
Feb. 1901	22	Dec. 1902	18
June 1904	30	Dec. 1906	19
July 1908	20	Mar. 1910	16
July 1911	16	Nov. 1912	26
Jan. 1915	36 (WWI)	Jan. 1918	15
Apr. 1919	14	June 1920	15
Sep. 1921	21	June 1923	14
Aug. 1924	56	Apr. 1929	47 (Depression)
Mar. 1933	52	July 1937	15 (Depression)
Oct. 1938	80 (WWII)	June 1945	8
Feb. 1946	33	Oct. 1948	11
Sep. 1949	44 (Korean War)	May 1953	14
July 1954	31	Feb. 1957	12
Feb. 1958	26	Apr. 1960	10
Feb. 1961	160	June 1974	10
Apr. 1975	58	Feb. 1980	6
July 1980	12	July 1981	16
Nov. 1982	89	Apr. 1990	24
Mar. 1992			

Source: 1873–1897: Edward J. Chambers, "Late Nineteenth Century Business Cycles in Canada," *Canadian Journal of Economics and Political Science*, August 1964, pp. 391–412; 1900–1919: Keith A. J. Hay, "Early Twentieth Century Business Cycles in Canada," *Canadian Journal of Economics and Political Science*, August 1966, pp. 354–365; 1919–1954: Edward J. Chambers, "Canadian Business Cycles since 1919: A Progress Report," *Canadian Journal of Economics and Political Science*, May 1958, pp. 166–189; 1952–1982: Philip Cross and Francine Roy-Mayrand, "Statistics Canada's New System of Leading Indicators," *Canadian Economic Observer*, February 1989, pp. 3.1–3.37; 1982–1992: Philip Cross, "Alternative Measures of Business Cycles in Canada: 1947–1992," *Canadian Economic Observer*, February 1996, pp. 3.1–3.40; 1992–2007: Economic Cycle Research Institute, *www.businesscycle.com*. The ECRI attempts to identify business cycle turning points using an approach based on the same methodology used to establish the official business cycle dates for the United States by the NBER. In the judgment of the ECRI, to this date (October 2007) Canada has enjoyed an unbroken expansion since the trough identified in March 1992.

The Canadian Business Cycle

- In 1873-1914 there were almost as many months of contraction as months of expansion.
- In 1945-2001 the number of months of expansion outnumbered the month of contraction by more than five to one.
- The worst economic contraction in the history of Canada was the Great Depression of the 1930s.
- Strong economic recoveries are associated with World War I and World War II.

Have Business Cycles Become Less Severe?

- This is an important question and goes to the heart of the Keynesian-Classical debate – has policy been effective in limiting fluctuations?
- Real GDP growth and the unemployment rate are measured to be less volatile after 1945.
- The volatility may look lower due to poor quality of pre-1929 data and more volatile sectors were over-represented (Romer).
- Further studies seem to confirm that cycles have been significantly moderated in the postwar period, due to good policy, technical change and good luck (fewer adverse shocks).

Are Business Cycles Made in Canada?

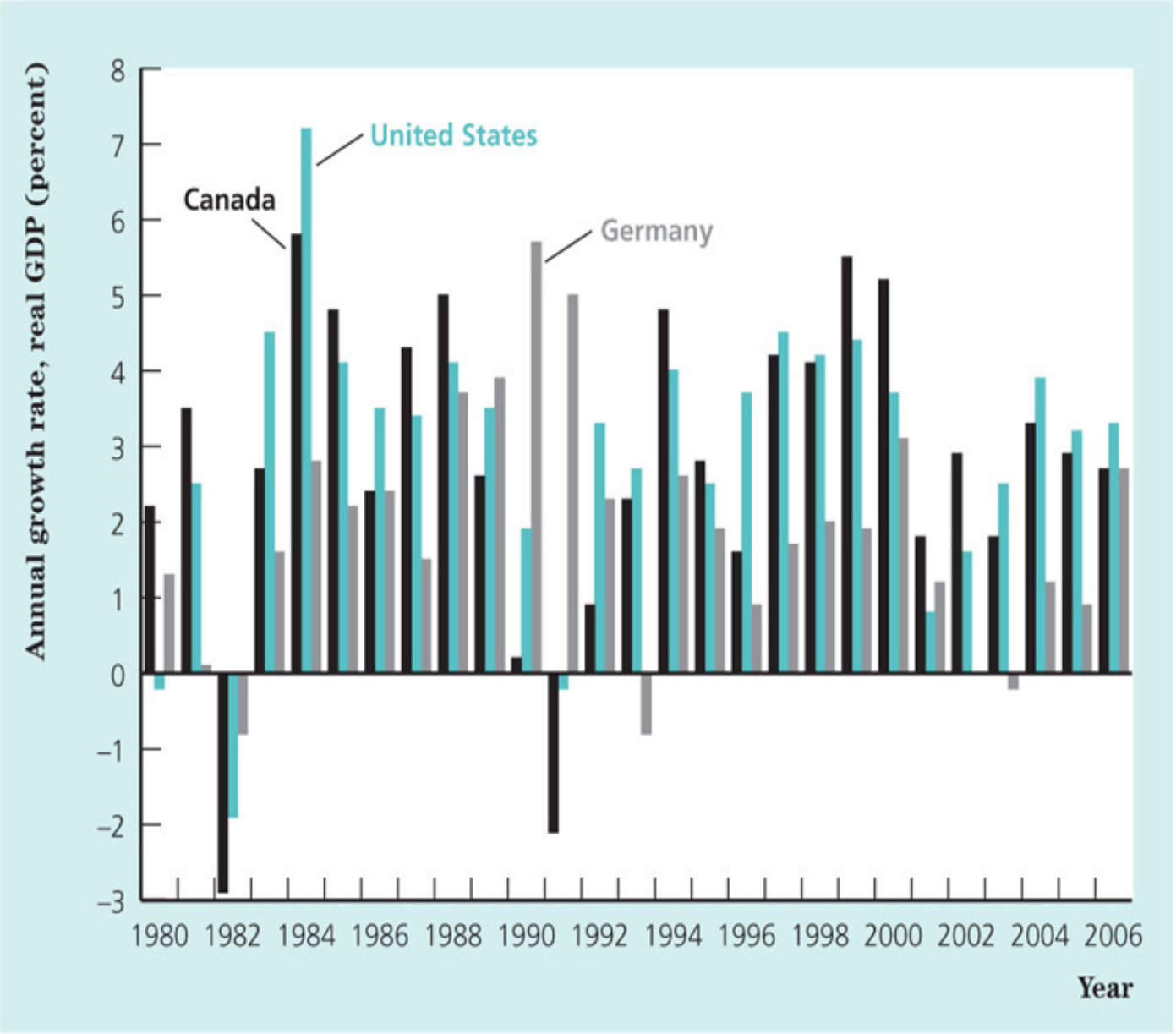
- Another important question, especially for macroeconomic policy.
- The historical data show a strong coincidence between cycle turning points in Canada and the US.
- A study of business cycles in six major countries (Gregory, Head and Raynauld) shows that a significant component of the business cycle does seem to be made in Canada.
- A flexible exchange rate has been important.
- The role of free trade.

Figure 8.2

Real GDP growth rates in Canada, Germany, and the US

The figure shows annual growth rates in real GDP for Canada, Germany, and the United States from 1980 to 2006. The three countries have over this period experienced growth rates that are similar during some periods but significantly different in others. This suggests that a significant component of the business cycle is unique to each country.

Source: International Monetary Fund, World Economic Outlook Database, April 2007.



The Business Cycle Facts

- Knowing the business cycle facts is useful for interpreting economic data and evaluating the state of the economy.
- They provide guidance and discipline for developing economic theories of the business cycle – this is how the theories are evaluated.
- The facts also have important policy implications.

The Business Cycle Facts (continued)

- Two important characteristics of the cyclical behaviour:
  - the direction in which a macroeconomic variable moves relative to the direction of aggregate economic activity;
  - the timing of the variable's turning points relative to the turning points of the business cycle.

The Business Cycle Facts (continued)

On direction:

- A pro-cyclical variable moves in the same direction as aggregate economic activity.
- A countercyclical variable moves in the opposite direction to aggregate economic activity.
- An acyclical variable does not display a clear pattern over the business cycle.

The Business Cycle Facts (continued)

On timing:

- A leading variable's turning points occur before those of the business cycle.
- A coincident variable's turning points occur around the same time as those of the business cycle.
- A lagging variable's turning points occur later than those of the business cycle.

Production

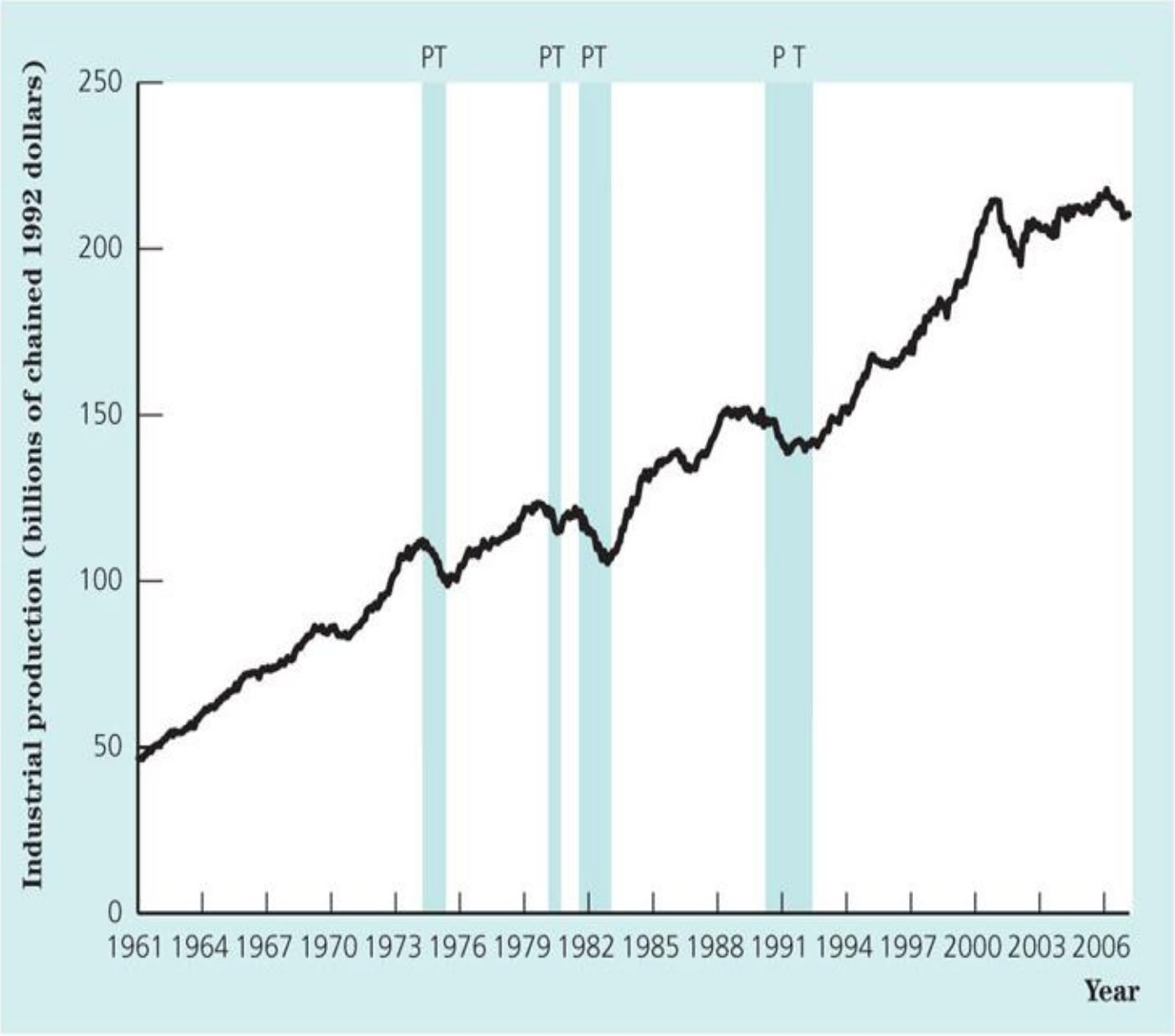
- Production is a coincident and pro-cyclical variable.
- Industries that produce more durable, long-lasting goods or capital goods are more sensitive to the business cycle than the industries producing nondurable goods or services – think of them as producing “want” products versus “need” products.

FIGURE 8.4

CYCLICAL BEHAVIOUR OF INDUSTRIAL PRODUCTION

Industrial production, an aggregate of production in all industries, is procyclical and coincident with the business cycle. The peaks and troughs of the business cycle are shown by the vertical lines *P* and *T*. The shaded areas represent recessions.

Source: Monthly industrial production, seasonally adjusted: Adapted from Statistics Canada CANSIM II series v329828 and v2044343.



Expenditure

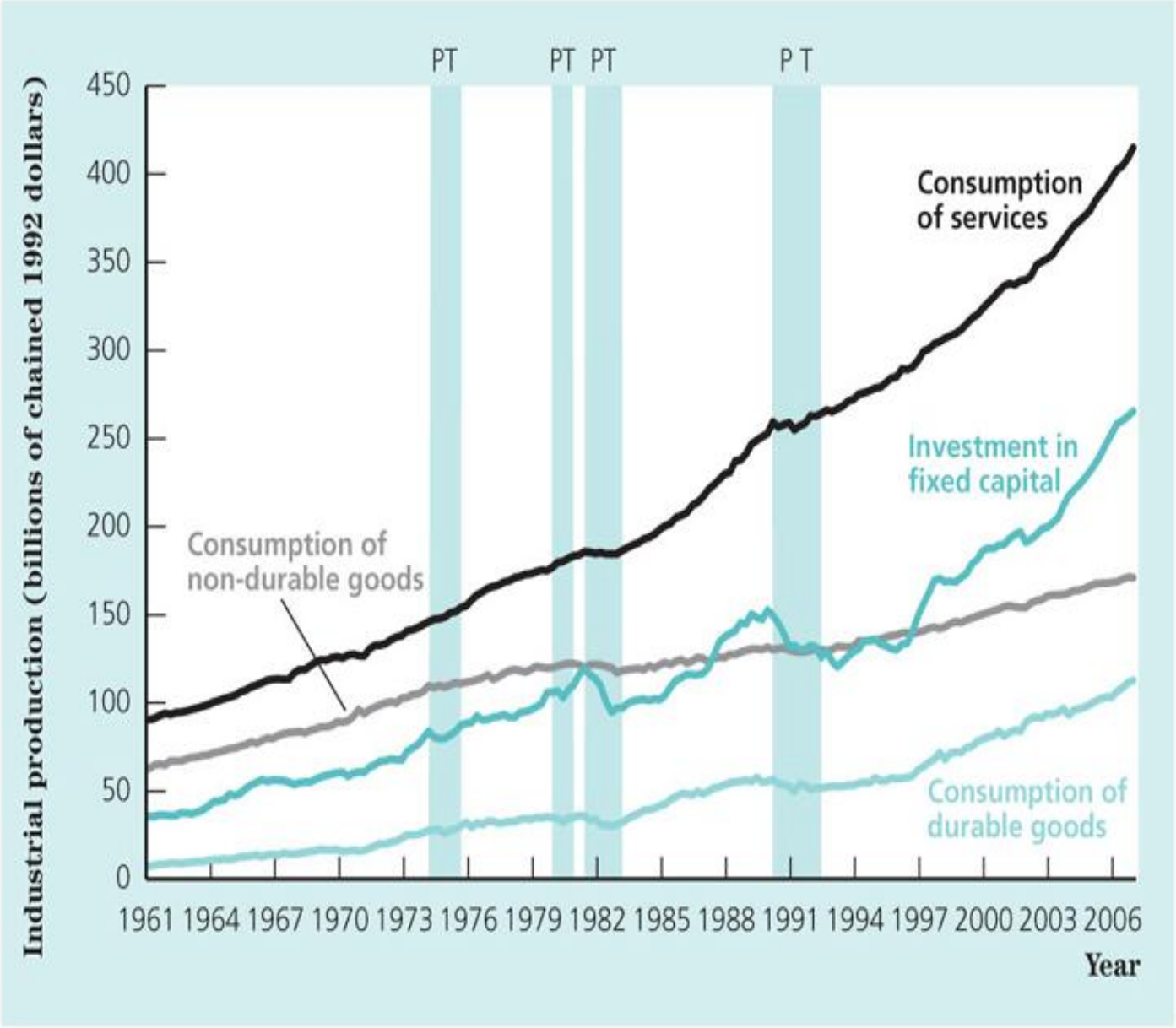
- Consumption and fixed investment expenditures are pro-cyclical and coincident.
- Inventory investment is pro-cyclical, leading, and strongly volatile.
- Consumption of durable goods, fixed investment, and residential investment are strongly pro-cyclical.
- Like types of production goods, durability is the key to determining cyclical sensitivity.

FIGURE 8.5

CYCLICAL BEHAVIOUR OF CONSUMPTION AND INVESTMENT

Both consumption and investment are procyclical. However, investment is more sensitive than consumption to the business cycle, reflecting the fact that durable goods are a larger part of investment spending than they are of consumption spending.

Source: Consumption and business fixed investment, real, quarterly, and seasonally adjusted: Adapted from Statistics Canada CANSIM II series v1992057 and v1992052.



Expenditure (continued)

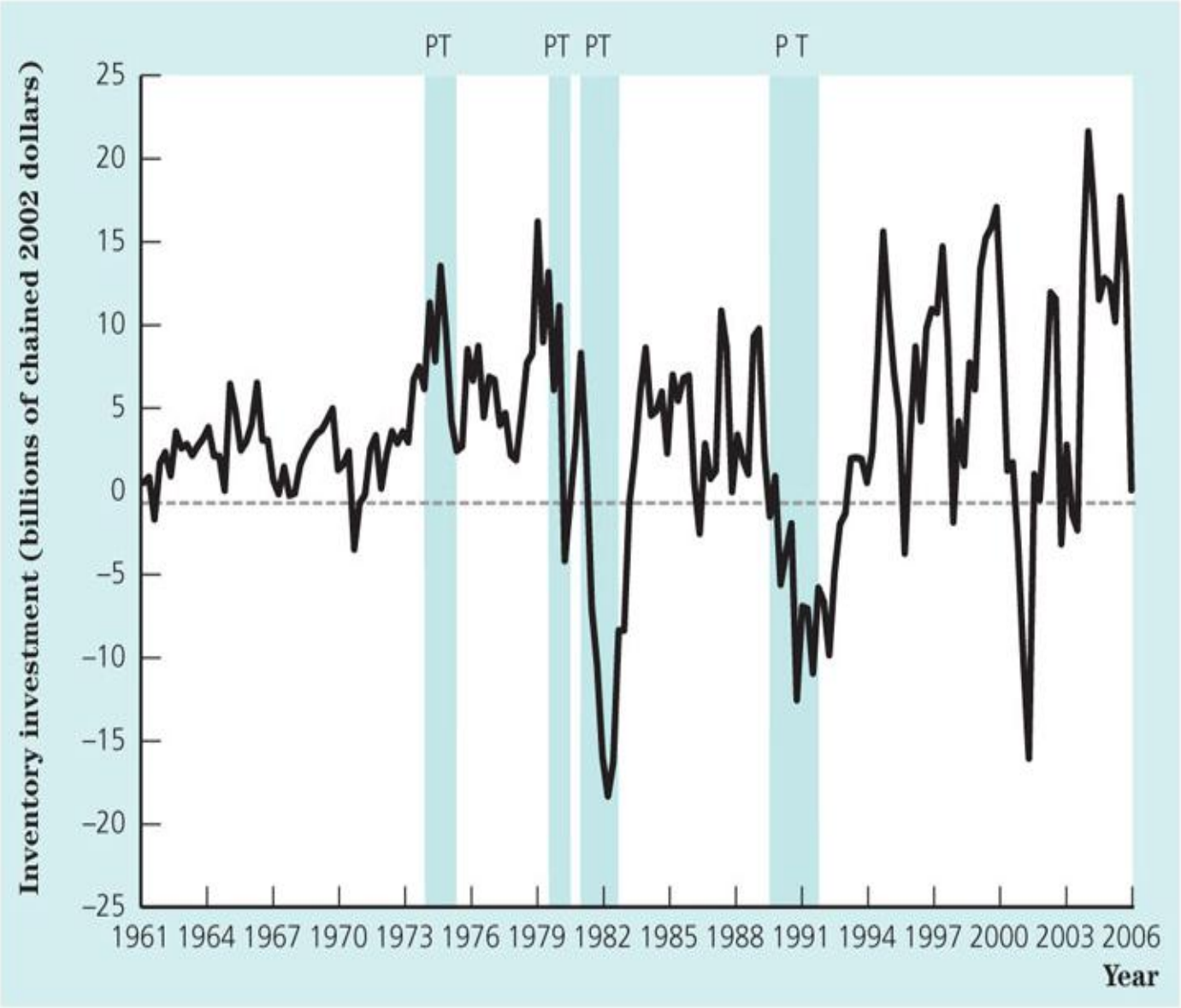
- Inventory investment seems to follow its own rules.
- This category tends to be pro-cyclical and volatile.
- While its share in total GDP is small (about 1%), the size of its changes has had large effects.

FIGURE 8.6

CYCLICAL BEHAVIOUR OF CHANGES IN BUSINESS INVENTORIES

Inventory investment, or changes in business inventories, is procyclical and leading but also extremely volatile. For example, between 1992 and 2006, inventory investment fluctuated sharply despite the fact that the economy was continually in expansion.

Source: Real, quarterly inventory investment, seasonally adjusted: Adapted from Statistics Canada, CANSIM II series v1992057.



Expenditure (continued)

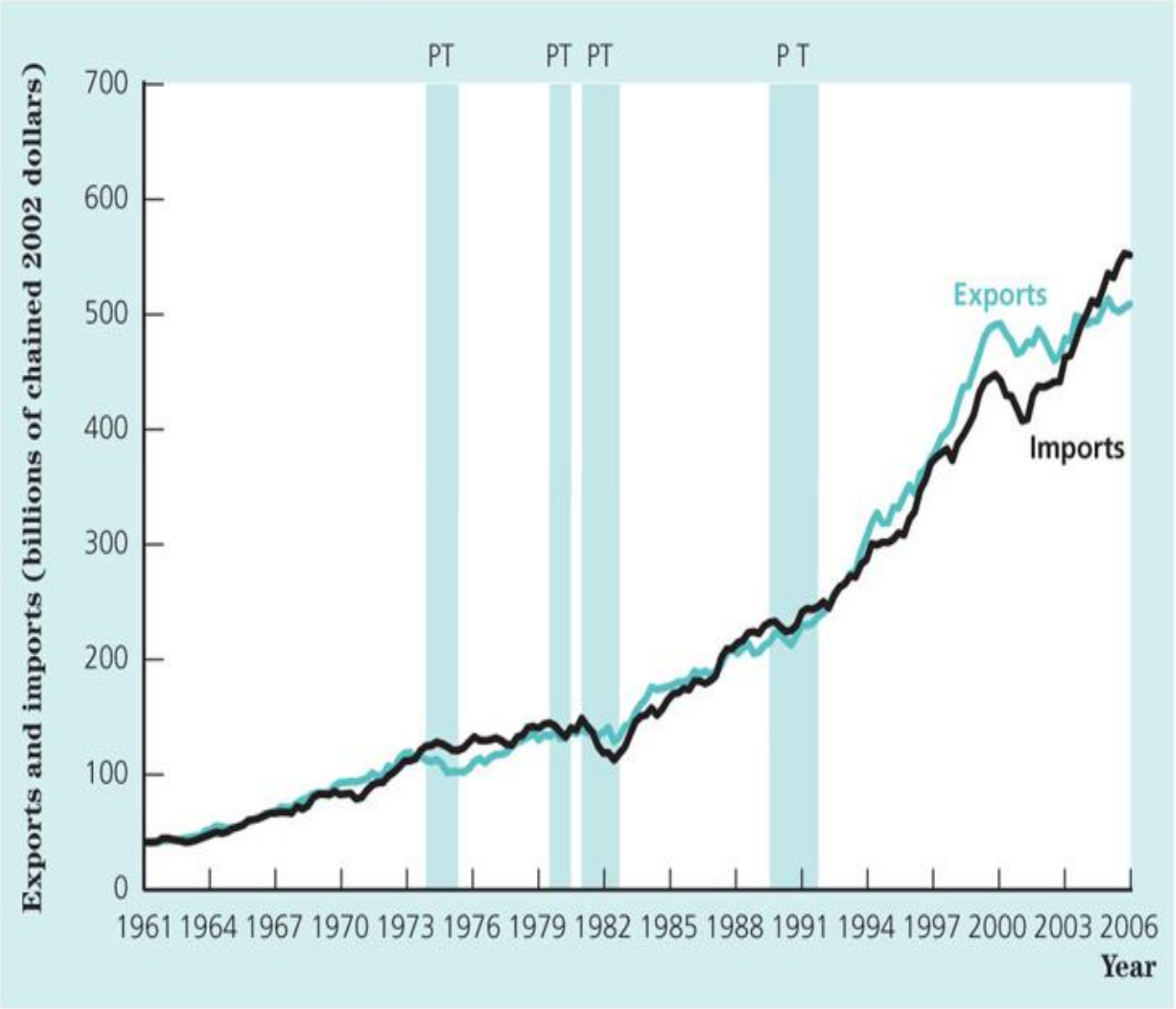
- Import expenditures are procyclical and coincident. Export expenditures are a reflection of foreign business cycles, not Canada's.
- Business cycles are often transmitted between countries through the trade balance – the foreign trade multiplier.

FIGURE 8.7

CYCLICAL BEHAVIOUR OF EXPORTS AND IMPORTS

Expenditures on imports tend to be coincident with the business cycle. Expenditures on exports are reflective of foreign rather than Canadian business cycles.

Source: Real quarterly exports and imports, seasonally adjusted: Adapted from Statistics Canada, CANSIM II series v1992060 and v1992063.



Employment, Unemployment and Labour Productivity

- Employment is strongly pro-cyclical and coincident.
- The unemployment rate is strongly counter-cyclical and coincident.
- Average labour productivity tends to be pro-cyclical and to lead the business cycle.

FIGURE 8.8

CYCLICAL BEHAVIOUR OF EMPLOYMENT

Employment is procyclical and coincident with the business cycle.

Source: Total employment, monthly, seasonally adjusted. 1966–1975: *Canadian Economic Observer, Statistical Summary*; 1976–2006: Statistics Canada CANSIM II database, series v2062811.

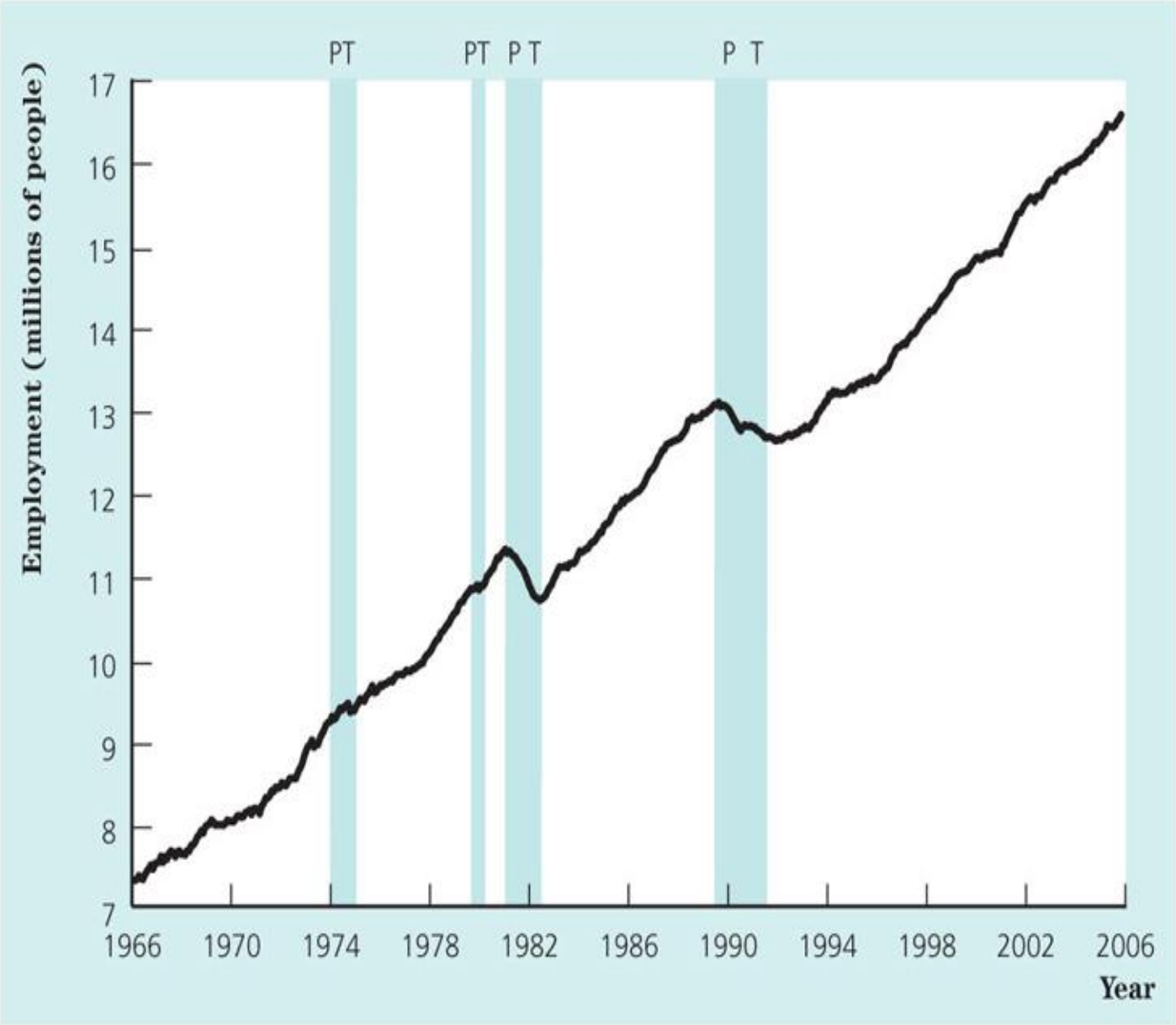


FIGURE 8.9

CYCLICAL BEHAVIOUR OF THE UNEMPLOYMENT RATE

The unemployment rate is countercyclical and very sensitive to the business cycle. It rises rapidly in contractions but falls more slowly in expansions.

Source: Monthly unemployment rate, seasonally adjusted. 1966–75: *Canadian Economic Observer, Statistical Summary*; 1976–2006: Statistics Canada CANSIM II database, series v2062815.

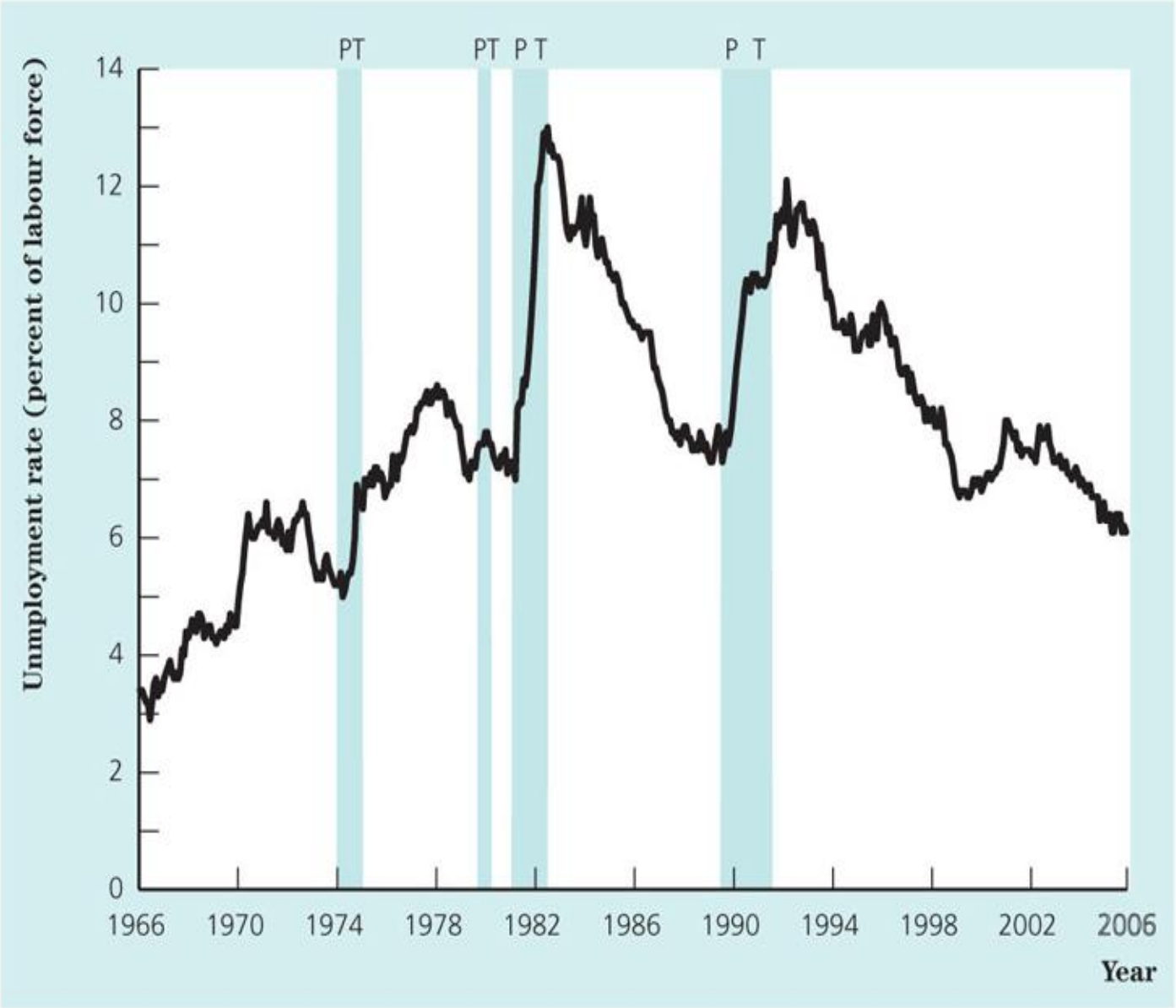
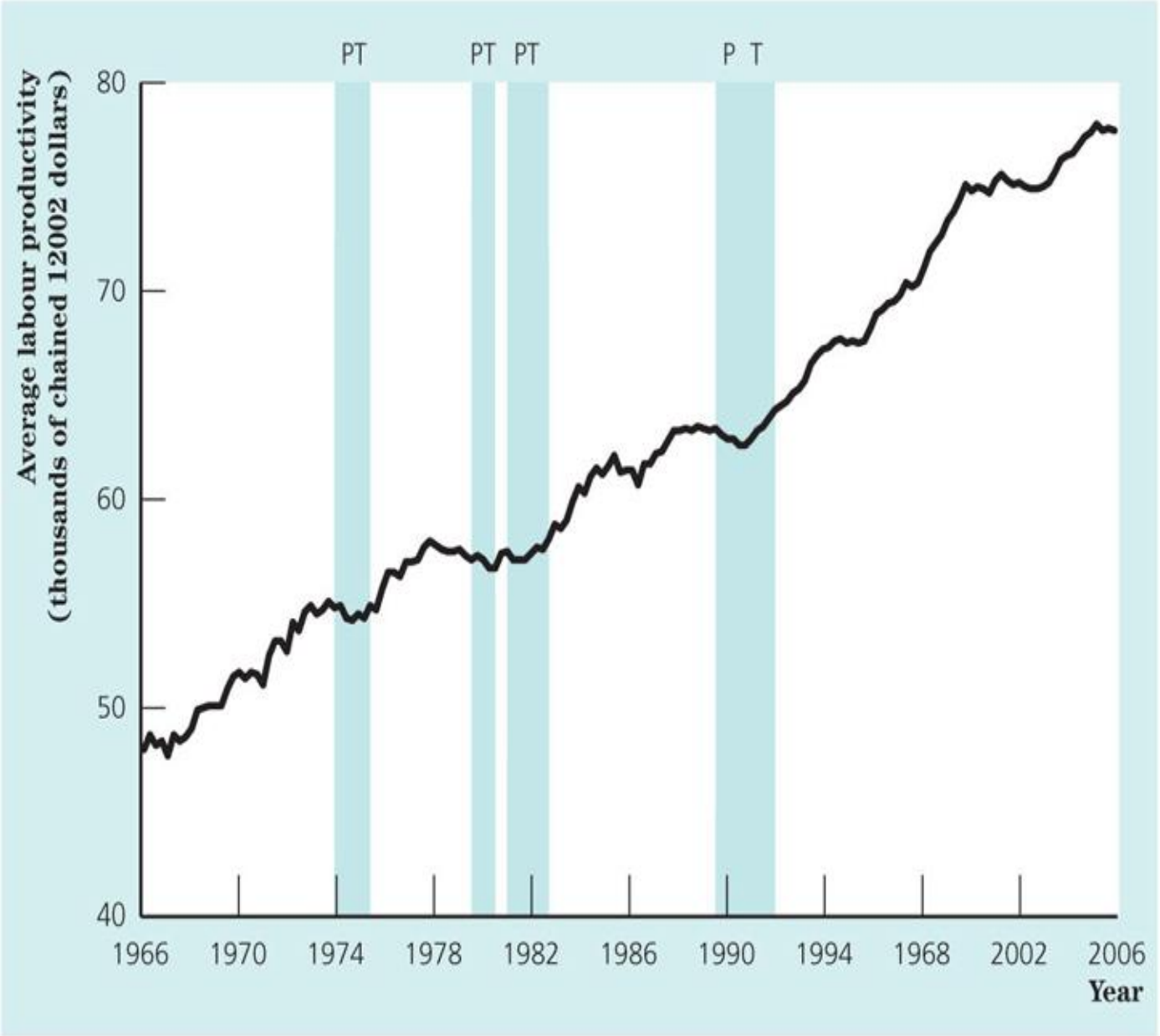


FIGURE 8.10

CYCLICAL BEHAVIOUR OF AVERAGE LABOUR PRODUCTIVITY

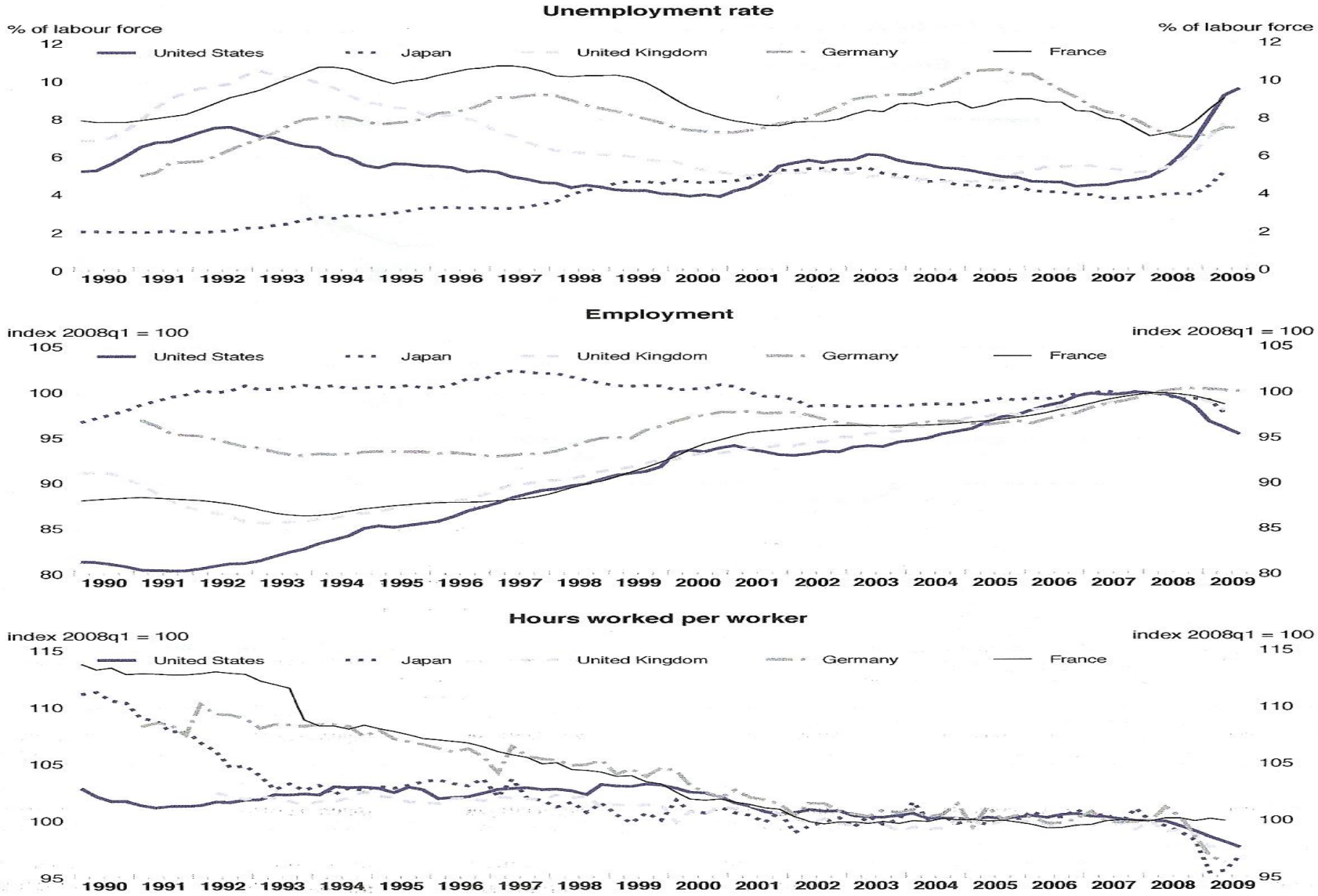
Average labour productivity, measured as real output per person employed, is pro-cyclical and leading.

Source: Adapted from quarterly real GDP, seasonally adjusted, CANSIM II series v1992067. Employment, both sexes, 15 years and above: *Canadian Economic Observer, Statistical Summary* and Statistics Canada, CANSIM II series v2062811.



Box 1.3. **The labour market in the economic downturn** (continued)

Labour market indicators



Note: Hours worked estimates are calculated from various national statistics.

Source: OECD Economic Outlook 86 database; and Datastream.

Real Wage

- The real wage is important as it is one of the main determinants of labour supplied and demanded.
- In Canada, the average real wage for the economy is acyclical or mildly pro-cyclical.
- A study based on disaggregated data finds that the real wage, adjusted for composition effects, is pro-cyclical.
- The conclusions about cyclicality of real wage remain elusive.

Money Growth and Inflation

- The rate of monetary growth is pro-cyclical and leads the cycle as well as it leads CPI inflation.
- Inflation is pro-cyclical, but with some lag.

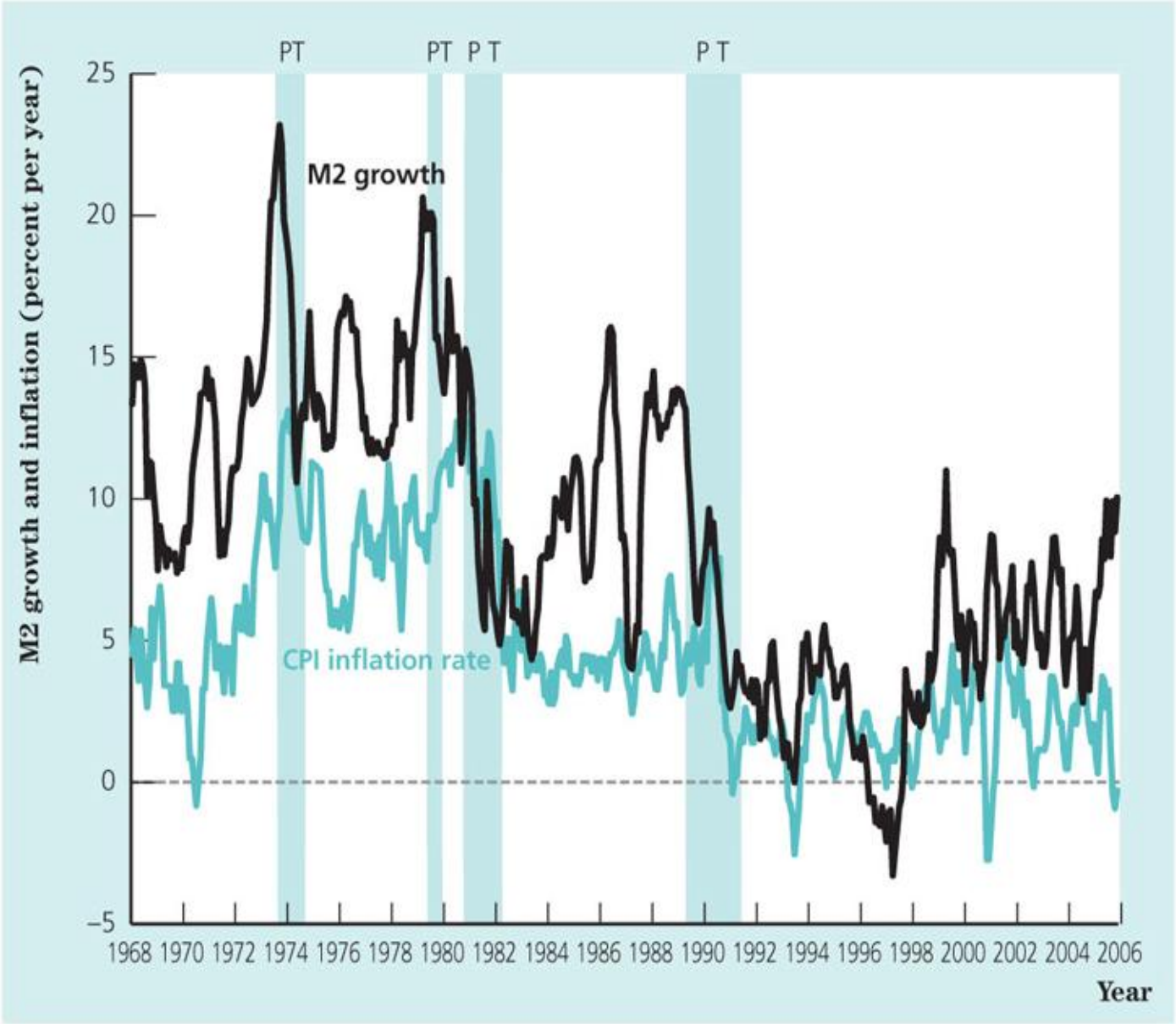
FIGURE 8.11

CYCLICAL BEHAVIOUR OF NOMINAL MONEY GROWTH AND INFLATION

Nominal money growth, here measured as the six-month moving average of monthly growth rates in M2 (expressed in annual rates), is volatile. However, the figure shows that money growth often falls at or just before a cyclical peak. Generally, money growth is procyclical and leading.

Inflation, here measured as the six-month moving average of monthly growth rates of the CPI (expressed in annual rates), is procyclical and lags the business cycle. A typical pattern is for inflation to build up during the expansion and then to fall after the cyclical peak.

Source: M2 monthly, seasonally adjusted: Statistics Canada, CANSIM II series v37128; monthy CPI, all items: Statistics Canada, CANSIM II series v735319.



Financial Variables

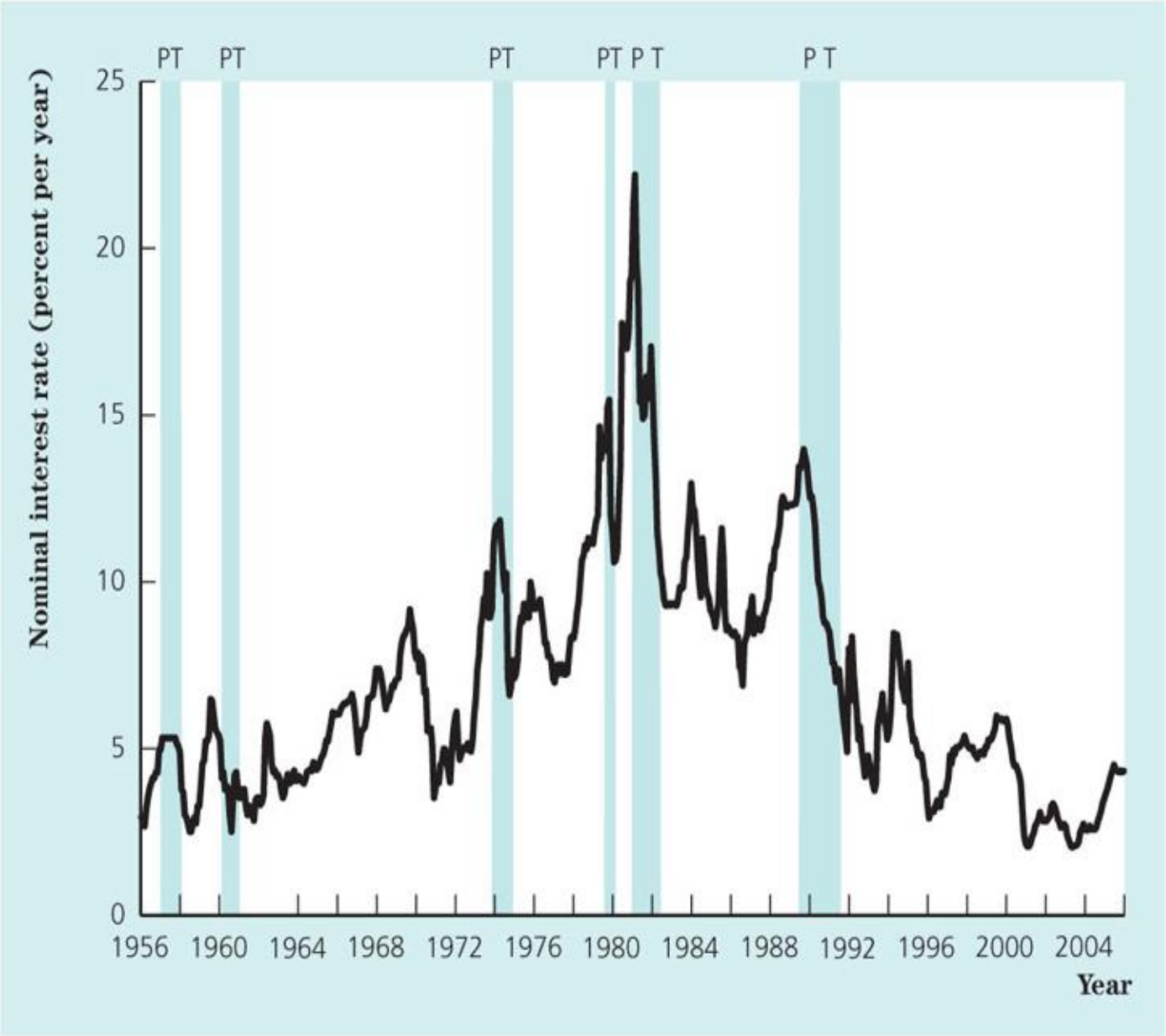
- Stock prices are generally pro-cyclical and leading the cycle.
- Nominal interest rates are pro-cyclical and lagging.
- The real interest rate is acyclical. It may reflect the fact that individual business cycles have different sources of cycles.

FIGURE 8.12

CYCLICAL BEHAVIOUR OF THE NOMINAL INTEREST RATE

The nominal interest rate, measured here as the interest rate on 90-day corporate paper, is procyclical and recently has lagged the business cycle.

Source: Monthly average, 90-day corporate paper rate: Adapted from Statistics Canada, CANSIM II series v122491.



Business Cycle Analysis Preview

- Now we go a step further and try to understand what explains the patterns we have been looking at.
- Economic shocks are typically unpredictable forces hitting the economy (e.g. new inventions, weather, government policy).
- An economic model describes how the economy responds to various economic shocks.

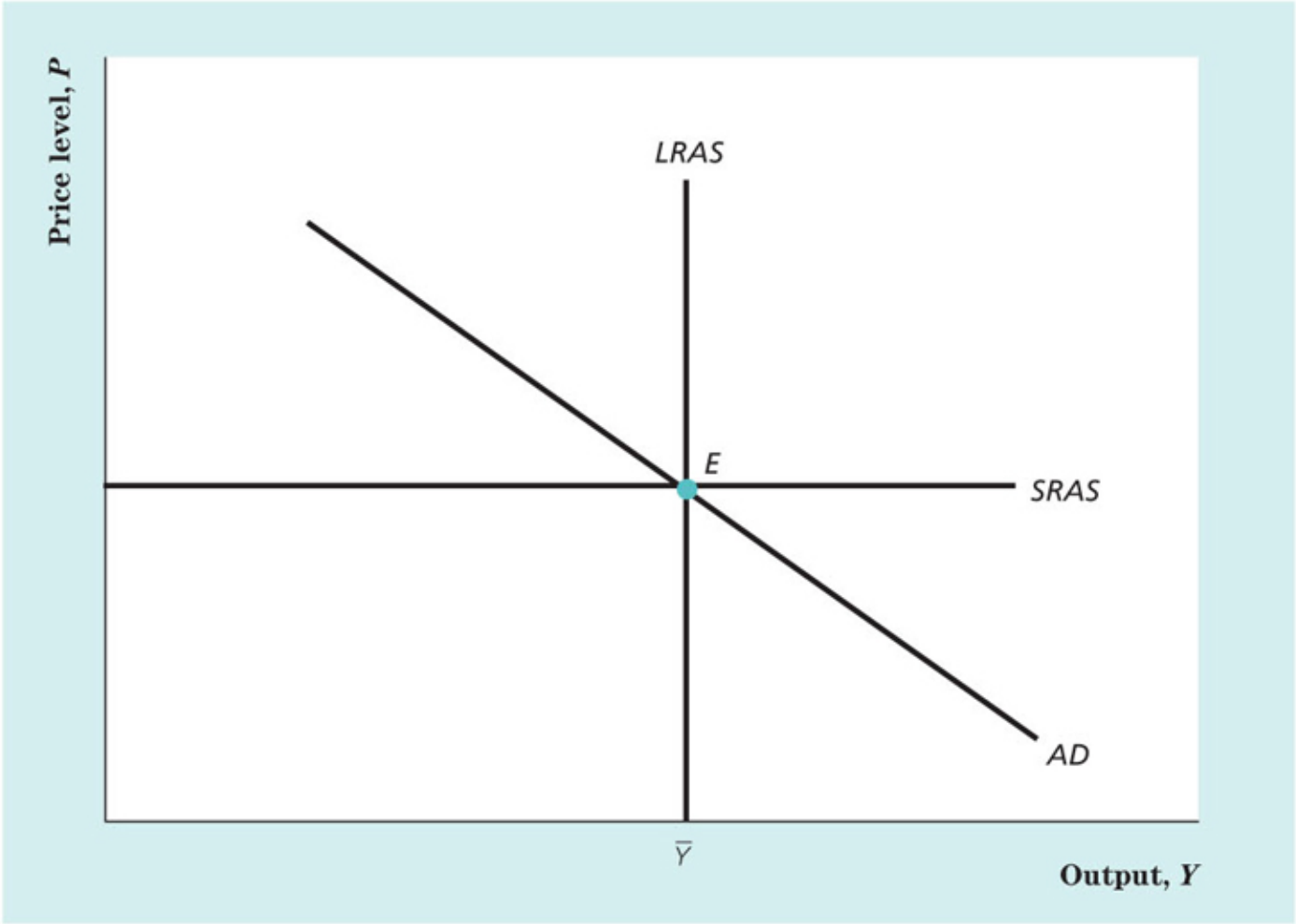
Aggregate Demand and Aggregate Supply Model

- Both classical and Keynesian theories can be presented within a single aggregate demand – aggregate supply (AD-AS) model.
- The components of the AD-AS model are:
  - the aggregate demand curve;
  - the short-run aggregate supply curve;
  - the long-run aggregate supply curve.

FIGURE 8.13

THE AGGREGATE DEMAND–AGGREGATE SUPPLY MODEL

The aggregate demand (*AD*) curve slopes downward, reflecting the fact that the aggregate quantity of goods and services demanded, *Y*, falls when the price level, *P*, rises. The short-run aggregate supply (*SRAS*) curve is horizontal, reflecting the assumption that in the short run, prices are fixed and firms simply produce whatever quantity is demanded. In the long run, firms produce their normal levels of output, so the long-run aggregate supply (*LRAS*) curve is vertical at the full-employment level of output, $\bar{Y}$. The economy's short-run equilibrium is at the point where the *AD* and *SRAS* curves intersect, and its long-run equilibrium is where the *AD* and *LRAS* curves intersect. In this example, the economy is in both short-run and long-run equilibrium at point *E*.



The AD Curve

- The AD curve slopes downward.
- When the price level is higher, people demand less goods. But it is not because of the income effect of a change in the price level.
- We have to wait for Chapter 9 for the explanation.
- The AD shifts when, for a specific price level, non-price factors change the aggregate demand for goods.
- These could include:
  - A rise in the stock market;
  - An increase in desired investment; or
  - A change in government spending.

The SRAS Curve

- The SRAS is a horizontal line.
- It captures the idea that in the short run, the price level is fixed and firms are willing to supply any amount of output at that price.

The LRAS Curve

- The LRAS is a vertical line. In the long run all firms will adjust their prices so that they can produce at their normal level of output.
- For the economy as a whole it will be a the full-employment level of output, $\bar{Y}$.

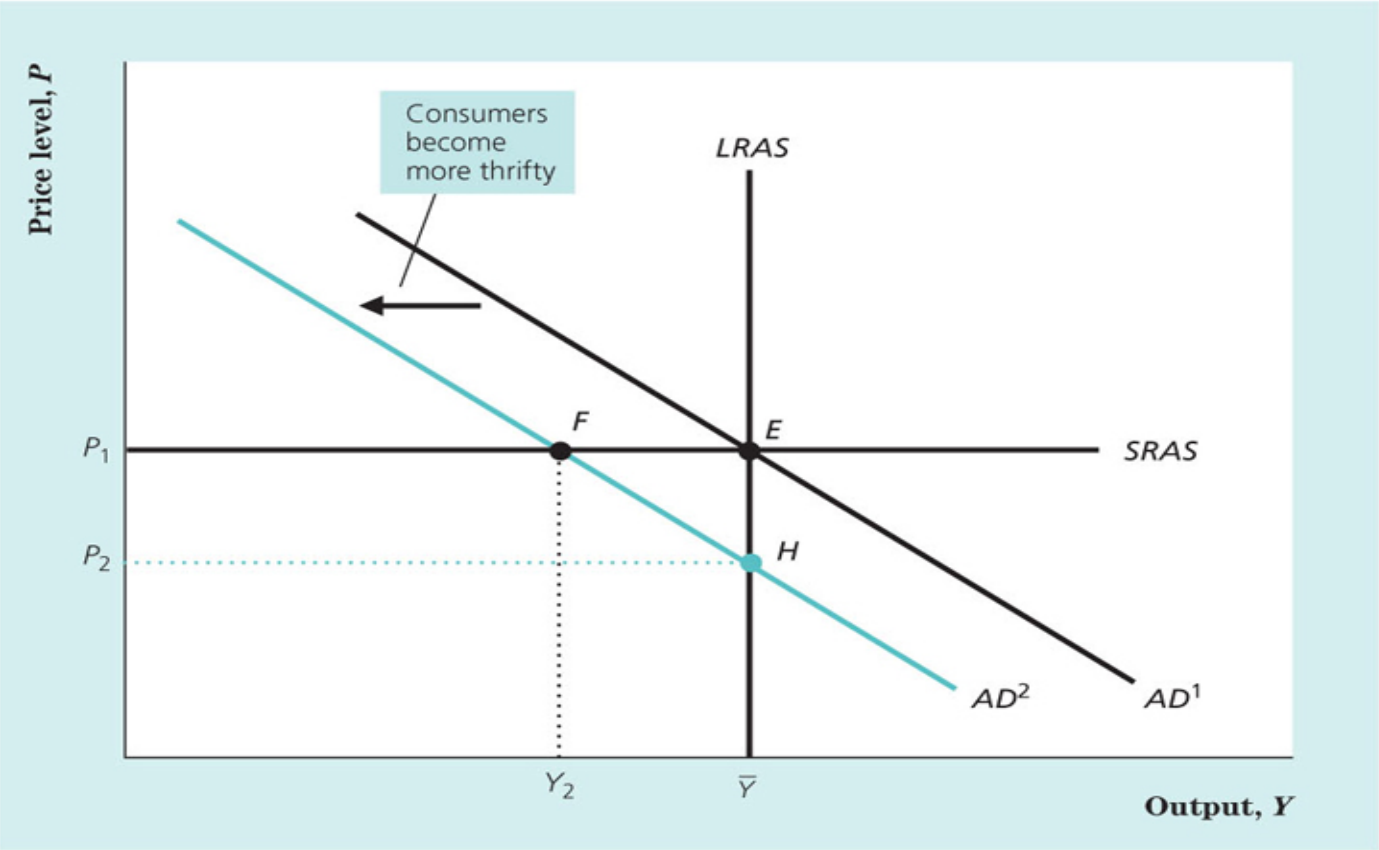
Aggregate Demand Shocks

- Any theory that wants to explain the business cycle must have a story of how shocks affect activity.
- An aggregate demand shock is a change in the economy that shifts the AD curve.
- An adverse AD shock shifting the AD curve down will cause output to fall in the SR, but not in the LR.

FIGURE 8.14

AN ADVERSE AGGREGATE DEMAND SHOCK

An adverse aggregate demand shock reduces the aggregate quantity of goods and services demanded at a given price level; for example, consumers become more pessimistic and, thus, reduce their spending. This shock is represented by a shift to the left of the aggregate demand curve from AD^1 to AD^2. In the short run, the economy moves to point *F*. At this short-run equilibrium, output has fallen to Y_2 and the price level is unchanged. Eventually, price adjustment causes the economy to move to the new long-run equilibrium at point *H*, where output returns to its full-employment level, $\overline{Y}$, and the price level falls to P_2. In the strict classical view, the economy moves almost immediately to point *H*, so the adverse aggregate demand shock essentially has no effect on output in both the short run and the long run. Keynesians argue that the adjustment process takes longer so that the adverse aggregate demand shock may lead to a sustained decline in output.



Aggregate Demand Shocks (continued)

- The key question is: how long will this process take?
- Classical economists think that the long-run equilibrium will be restored quickly. Little is gained by the government trying to fight recessions – in fact the situation could be made worse by government action.

Aggregate Demand Shocks (continued)

- Keynesians argue that prices do not adjust quickly, so that recessions may be prolonged, and the government can help to fight it.
- Indeed, without this action, the situation could be made worse as a prolonged slump may follow.

Aggregate Supply Shocks

- Classical economists view aggregate supply shocks as the major force behind changes in output and employment – almost by definition, AD shocks do not matter as the economy is self-correcting.
- An adverse AS shock shifts the LRAS curve to the left thus reducing long-run output and increasing long-run price level.
- Keynesians agree with the long-run effects that supply shocks can have, but view the adjustment process to the new equilibrium differently.

FIGURE 8.15

AN ADVERSE AGGREGATE SUPPLY SHOCK

An adverse aggregate supply shock, such as a drought, reduces the full-employment level of output from $\bar{Y}_1$ to $\bar{Y}_2$. Equivalently, the shock shifts the long-run aggregate supply curve from the left, from $LRAS^1$ to $LRAS^2$. As a result of the adverse supply shock, the long-run equilibrium moves from point E to point F. In the new long-run equilibrium, output has fallen from $\bar{Y}_1$ to $\bar{Y}_2$ and the price level has increased from P_1 to P_2.