Chapter 21
Short-Term Economic Fluctuations
短期經濟波動

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課名: 經濟學(二)
上課時間/地點: 週三上午9:10-12:00/海3006
Learning Objectives

1. Identify business cycles and explain the primary characteristics of contractions and expansions
2. Use potential output and the output gap to analyze an economy's position in the business cycle
3. Define the natural rate of unemployment and show how it is related to cyclical unemployment
4. Apply Okun's law to analyze the relationship between the output gap and cyclical unemployment
5. Discuss the differences between how the economy operates in the short run and the long run
Short-Term Economic Fluctuations

- **Economy’s productive capacity (long-run)**
- **Fluctuations in demand, or shocks to demand (short-run)**
- **Growth trend**
- **Potential Output (Y*)**
- **Actual output (Y)**
- **Output Gaps (Y-Y*)**
- **Cyclical Unemployment**

Growth policy

Stabilization policy

Okun’s law
Learning Objective 1

什麼是景氣循環 (business cycles)? 其典型事實 (stylized facts) 有哪些?
What Is a Business Cycle?

- **Business Cycles** 景氣循環 are **short-term fluctuations in aggregate economic activity** (總合經濟活動，如：生產、消費、投資等的短期波動)
- A **contraction** (or recession) 經濟緊縮(或衰退) is a period in which the economy is growing at a rate significantly below normal
  - A period during which real GDP falls for two or more consecutive quarters (非正式定義)
  - A period during which **real GDP growth is well below normal**, even if not negative (正式定義)
  - A **depression** 蕭條 is a particularly severe recession
What Is a Business Cycle?

- An **expansion** 經濟擴張 is a period in which the economy is growing at a rate significantly above normal
  - A **boom** 經濟繁榮 is a strong and long lasting expansion
- A **peak** 高峰 is the beginning of a contraction
  - High point of the business cycle
- A **trough** 低谷 is the end of a contraction
  - Low point of the business cycle
What Is a Business Cycle?

- The sequence from one peak to the next, or from one trough to the next, is a *business cycle*
  - Peaks and troughs are *turning points*
- U.S. research on cycles began in 1920 at the National Bureau of Economic Research (NBER)
  - NBER maintains detailed history of business cycles
  - NBER sponsors business cycle studies
What Is a Business Cycle?

Aggregate economic activity (通常找實質GDP)

Business cycle

Actual Growth

Growth Trend

TIME

What is a Business Cycle?

Aggregate economic activity

Business cycle

Actual Growth

Growth Trend

TIME

其他說法: Four phases of a business cycle
Recovery (a→b); Prosperity or Boom (b→c);
Recession (c→d); Depression (d→e)

What is a Business Cycle?

Aggregate economic activity

Business cycle

Actual Growth

Growth Trend

TIME

其他說法: Four phases of a business cycle
Recovery (a→b); Prosperity or Boom (b→c);
Recession (c→d); Depression (d→e)
Fluctuations in US Real GDP, 1920-2010
美國從1929年以來的經濟衰退/蕭條

<table>
<thead>
<tr>
<th>Peak (月/年)</th>
<th>Trough (月/年)</th>
<th>Duration (months)</th>
<th>Highest unemployment rate</th>
<th>Change in real GDP</th>
<th>Next Expansion</th>
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<td>8/29</td>
<td>3/33</td>
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<td>24.9%</td>
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<td>50 months</td>
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<td>5/38</td>
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<td>6/09</td>
<td>18</td>
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What Is a Business Cycle?

• Burns and Mitchell (*Measuring Business Cycles*, 1946) makes five main points about business cycles:

1. Business cycles are fluctuations of *aggregate economic activity*, not a specific variable
2. There are expansions and contractions
3. Economic variables show *comovement* (聯動)
4. The business cycle is *recurrent* (週而復始), but not periodic
5. The business cycle is *persistent* (一致性)
What Is a Business Cycle?

• The business cycle is **recurrent**, but not periodic
  
  – Recurrent means the pattern of *contraction*—*trough*—*expansion*—*peak* occurs again and again
  
  – Not being periodic means that it doesn't occur at regular, predictable intervals

• Contractions and expansions are irregular in their length and severity
What Is a Business Cycle?

- The business cycle is **persistent**
  - Declines are followed by further declines; growth is followed by more growth
  - Because of persistence, forecasting turning points is quite important
  - Turning points are officially designated by the NBER Business Cycle Dating (BCD) Committee
What Is a Business Cycle?

- NBER BCD committee waits a long time to make a decision
  - July 1990 peak announced April 1991 (9 months)
  - March 1991 trough announced December 1992 (21 months)
  - March 2001 peak announced November 2001 (8 months)
  - November 2001 trough announced July 2003 (20 months)

- Why? Data revisions; need to be sure of turning point, not temporary movement
Business Cycle Facts

• All business cycles have features in common
  – The cyclical behavior of economic variables: direction and timing
  – What direction does a variable move relative to aggregate economic activity (real GDP)?
    • *Procyclical*: in the same direction (順景氣)
    • *Countercyclical*: in the opposite direction (反景氣)
    • *Acyclical*: with no clear pattern (和景氣無關)
Business Cycle Facts

• All business cycles have features in common
  – The cyclical behavior of economic variables: \textit{direction} and \textit{timing}
  – What is the \textit{timing} of a variable's movements relative to aggregate economic activity?
    • \textit{Leading}: in advance (領先)
    • \textit{Coincident}: at the same time (同時)
    • \textit{Lagging}: after (滯後)
Business Cycle Facts

- In touch with data and research—coincident and leading indexes
  - Coincident indexes are designed to help figure out the current state of the economy
  - Leading indicators are designed to help predict peaks and troughs
  - The first index was developed by Mitchell and Burns of the NBER in the 1930s
Business Cycle Facts

• Cyclical behavior of key macroeconomic variables
  – Procyclical
    • Coincident: *industrial production, consumption*, business fixed investment, *employment*
    • Leading: residential investment, inventory investment, average labor productivity, money growth, stock prices
    • Lagging: *inflation*, nominal interest rates
    • Timing not designated: government purchases, real wage
Business Cycle Facts

- Cyclical behavior of key macroeconomic variables
  - Countercyclical: *unemployment* (timing is unclassified)
    - *Cyclical unemployment* 循環性失業
    - Real wages grow more slowly for those employed
    - New labor market entrants have difficulty finding work
  - Acyclical: real interest rates (timing is not designated)
Business Cycle Facts

• Cyclical behavior of key macroeconomic variables
  – Volatility 波動
    • durable goods (e.g. cars, houses, capital equipment) production is more volatile than nondurable goods (e.g. food) and services;
    • Investment spending is more volatile than consumption
International Business Cycle Facts

• International aspects of the business cycle
  – The cyclical behavior of key economic variables in other countries is similar to that in the United States
  – Major industrial countries frequently have recessions and expansions at about the same time
  • Fig. 21.2 illustrates common cycles for Japan, Canada, the United States, Germany, and the United Kingdom
  – Each economy faces small fluctuations that aren't shared with other countries
Real GDP Growth, 2002 – 2010
Learning Objective 2

什麼是潛在產出 (potential output)?
什麼是產出缺口 (output gap)?
Potential Output

• Potential output, Y*, is the maximum sustainable (可持續的) amount of output that an economy can produce
  – Also called full-employment output (充分就業下的產出)
• Potential output grows over time
  – increases in the amount of available K or/and L
  – Increases in productivity of K or/and L
• Potential output is smoother than actual output
  – Compare Figure 21.4 with Figure 21.1
Potential Output

• Why actual output, Y, grows at a variable rate?
  – Reflects changes in the growth rate of Y* (Chapter 18)
    • Changes in weather conditions
    • Changes in rates of technical innovation (A)
      – Internet
    • Changes in rates of capital formation (K)
    • A surge in immigration (L)
  – Actual output does not always equal potential output (even when Y* grows normally)
    • Under/overutilization of economic resources (e.g. K & L)
Output Gaps

- The **output gap** is the difference between the economy’s actual output and its potential output, relative to potential output, at a point in time.

  \[
  \text{Output gap} = \left[ \frac{(Y - Y^*)}{Y^*} \right] \times 100
  \]

  - **Recessionary gap** is a negative output gap; \( Y^* > Y \)
  - **Expansionary gap** is a positive output gap; \( Y^* < Y \)

- Policy makers consider **stabilization policies** when there are output gaps.
  - Recessionary gaps mean output and employment are less than their sustainable level.
  - Expansionary gaps lead to inflation (Chapter 25)
Learning Objective 3

什麼是自然失業率(natural rate of unemployment)? 什麼是失業缺口(unemployment gap)?
Natural Rate of Unemployment

• Recessionary gaps have high unemployment rates
  – Expansionary gaps have low unemployment rates
• The natural rate of unemployment, $u^*$, is the sum of frictional and structural unemployment
  – Unemployment rate when cyclical unemployment is 0
  – Occurs when $Y$ is at $Y^*$ (i.e. output gap=0)
• Full-employment employment (充分就業下的就業量/自然就業量)
  – 定義: $L^* = (1-u^*) \times \text{labor force}$
  – 指長期，對應$Y^*$
Cyclical unemployment

• Cyclical unemployment is the difference between total unemployment, \( u \), and \( u^* \):

\[
\text{Cyclical unemployment} = u - u^* \\
u - u^* \text{ 又稱 unemployment gap}
\]

– Recessionary gaps have \( u > u^* \)
– Expansionary gaps have \( u < u^* \)
U.S. Natural Rate of Unemployment

• From 6.3% in 1979 to 4.8% in 2007
  – Unemployment stayed close to 4% for several years
  – Natural rate of unemployment could be 4.5% or less

• Possible explanations
  – Frictional unemployment decreased
  – Structural unemployment decreased
U.S. Natural Rate of Unemployment

• Age structure of the population has changed
  – Share of working age population ages 16 – 24 has declined from 25% to 15%
  • This group has higher unemployment than older workers
    – Short-term jobs
    – Career shopping
    – Interrupt work for school or military service
• Frequent job changes increases frictional unemployment
• Lower skills means more structural unemployment
U.S. Natural Rate of Unemployment

• Labor markets may be more efficient at matching job openings and workers
  – Reduces frictional and structural unemployment
    • Temporary agencies
      – Temp work can lead to permanent position
    • Online job boards
    • Less time between jobs
Learning Objective 4

奧肯定律(Okun’s law): 產出缺口與循環性失業
Okun’s Law

• Okun's law relates cyclic unemployment changes to changes in the output gap

\[
\text{Output gap} = -2 \times \text{unemployment gap}
\]

\[
\frac{(Y - Y^*)}{Y^*} = -2 \times (u - u^*)
\]

– 指是統計關係，時空與國家不同其參數-2 會變

• Suppose the economy begins with 1% cyclical unemployment and an recessionary gap of 2% of potential GDP

– If cyclical unemployment increases to 2%, the recessionary gap increases to 4% of Y*
**U.S. Output Gap**

*Example 21.3*

<table>
<thead>
<tr>
<th>Year</th>
<th>u</th>
<th>u*</th>
<th>Y* ($B)</th>
<th>Y- Y* ($B)</th>
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<tr>
<td>1995</td>
<td>5.6%</td>
<td>5.3%</td>
<td>$9,216.4</td>
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<tr>
<td>2000</td>
<td>4.0</td>
<td>5.0</td>
<td>10,880.7</td>
<td>271.6</td>
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<td>2005</td>
<td>5.1</td>
<td>5.0</td>
<td>12,576.3</td>
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<td>2010</td>
<td>9.6</td>
<td>5.2</td>
<td>14,017.1</td>
<td>-1,233.5</td>
</tr>
</tbody>
</table>
Learning Objective 5

經濟體在短期與長期的運作方式有何不同?
Short-Term Fluctuations

• Output gaps arise because
  1. Markets *require time* to reach equilibrium price and quantity
     • Firms change prices infrequently
     • *Quantity produced* is not at equilibrium during the adjustment period
     • Firms produce to *meet the demand at current prices*

短期價格僵固，廠商作數量調整以滿足需求
Short-Term Fluctuations

• Output gaps arise because
  2. Changes in total spending at preset prices affects output levels
    • When spending is low, output will be below potential output
    • Changes in economy-wide spending are the primary causes of output gaps

• Stabilization policy 穩定/反景氣政策: adjust government spending to close the output gap

在短期價格不變的情況下，GDP需求(支出)改變，就會影響產出。
Causes of Short-Term Fluctuations

• The economy has self-correcting mechanisms
  – Firms eventually adjust to output gaps
    • If spending is less than potential output, firms will slow the increase of their prices or even cut prices
    • If spending is more than potential output, firms increase prices
      – Potential inflationary pressure

長期下，經濟體系的內在調整/自我修正機制：廠商最終會調整價格以消去產出缺口
Causes of Short-Term Fluctuations

• The economy has self-correcting mechanisms
  – Eventually, prices reach equilibrium and eliminate output gaps
  – In the long run, actual output is at potential output level, so that output is determined by productive capacity

長期下，經濟體會自我修正使實際產出等於潛在產出。而潛在產出只受產能高低影響 (18章: 產能取決於生產函數)。因此政府的角色為長期讓$Y^*$增加，短期讓$Y-Y^*$變小。
A conceptual example:

Al’s Ice Cream – Production Capacity

- Daily output of the store is determined by
  - Production capacity ($Y^*$)
    - Amount of capital
    - Labor employed (includes hours worked)
    - Productivity of capital and labor
Al’s Ice Cream –
Demand Fluctuations (短期)

• Predictable changes hour by hour
  – Day of the week patterns
  – Annual cycles of demand

• Unpredictable changes in demand
  – Weather
  – Community events
    • Increase sales or divert customers elsewhere
  – Demand for specific flavors
Al's Ice Cream – Setting Prices

• Fully flexible prices are unrealistic
  – Minute-by-minute pricing is confusing to customers
  – Costs of an auction exceed Al's benefits
    • Continuous purchases in low volumes by different customers

• Al sets prices
  – Survey of competitors
  – Product strengths and weaknesses
  – Analyzes sales over time to see if adjustments are needed
  – Al meets demand in the short run
Al’s Ice Cream – Long Run (長期)

• Al observes consistently strong demand for his products
  – Waiting lines
  – Low inventory
  – Fully utilized production capacity
• Al's first response is to raise prices
  – Implemented quickly
Al's Ice Cream – Macroeconomic Lessons

• In the short run, producers meet demand at existing prices
  – Total spending drives output levels
  – Gather data and analyze business opportunities

• In the long-run, prices reach equilibrium levels
  – Output is at its potential level