Chapter 22
Spending, Output, and Fiscal Policy
支出、產出與財政政策

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上課時間/地點: 週三上午9:10-12:00/海3006
Learning Objectives

1. Identify the key assumptions of the basic Keynesian model and explain how this affects the production decisions made by firms

2. Discuss the determinations of planned investment and aggregate consumption spending and how these concepts are used to develop a model of planned aggregate expenditure

3. Analyze, using graphs, how an economy reaches short-run equilibrium in the basic Keynesian model

4. Show how a change in planned aggregate expenditure can cause a change in short-run equilibrium output and how this is related to the income-expenditure multiplier

5. Explain why the basic Keynesian model suggests that fiscal policy is useful as a stabilization policy, and discuss the qualifications that arise in applying fiscal policy in real-world situations
Learning Objective 1

凱因斯基本模型 (Basic Keynesian model) 與其重要假設
Recessionary Gap

• Great Depression (1929-1933)
  – Available resources are unemployed
  – Public’s willingness or ability to spend declines

• A decrease in spending leads to lower production
  – Laid-off workers reduce their spending
  – Insufficient spending to support the normal level of production

• Conventional economic policy of the 1920s and 1930s would not solve this problem
  – John Maynard Keynes revolutionized economic thought and public policy
John Maynard Keynes (1883 – 1946)

- *The General Theory of Employment, Interest, and Money* (1936) is his best-known work
  - See an introduction video [https://www.youtube.com/watch?v=RqihKq7F_xI](https://www.youtube.com/watch?v=RqihKq7F_xI)

- Why learn basic Keynesian model?
  - 解釋了大蕭條原因: 自發性消費與投資下降使產出減少
  - 提出解決辦法: 增加政府支出或減稅以拉動總合需求
Keynesian Model

- In the short run, firms meet demand at preset prices
  - Firms typically set a price and meet the demand at that price in the short run
  - **Menu costs** are the costs of changing prices
    - Determining the new price (做市場調查)
    - Incorporating prices into the business (印新的價目表)
    - Informing consumers of new prices

- 這意謂支出(需求)的短期波動會影響實質GDP

- 成本效益分析:
  - 廠商只有在調價的好處(使銷售回到正常產能)大於調價成本(上述菜單成本)時才會調價。
Technology of Changing Prices

- Technology has reduced menu costs
  - Bar codes and scanners reduce costs of changing prices in the store
  - Online surveys
- Highly segmented airline pricing
- Internet mechanisms for setting price
  - eBay
  - Priceline
- BUT other costs remain
  - 還需投入大量時間與精力蒐集資料才能定出一個價格使廠商利潤最大
Learning Objective 2

預擬投資、總合消費支出
與預擬總合支出 (planned aggregate expenditure)
Planned Aggregate Expenditure

- **Planned aggregate expenditure (PAE)** is total planned spending on final goods and services
  - 又簡稱為 Planned spending (預擬或計畫性支出)
- Four components of PAE: C, I, G, NX
- PAE 衡量 Y 的支出面 (需求面)
- 在假設產能都能滿足需求的情況下，凱恩斯基本模型中，PAE 決定短期均衡產出。亦即短期需求決定短期供給
Planned Aggregate Expenditure

• PAE is the sum of planned spending by households, firms, governments and foreigners

\[ \text{PAE} \equiv C^P + I^P + G^P + NX^P \]

– where \( I^P \) is the planned investment expenditure

• Assume planned spending equals actual spending for households, government, and foreigners (所以課本168頁C, G, NX 均省去上標 “p”)
Planned Investment

• 投資支出 = 固定投資支出 + 居住性投資支出 + 存貨變動 (inventory changes)

• 實際 (actual)投資 (I) = 預擬 (planned)投資 + 非預擬 (unplanned)投資

• 實際存貨變動 = 預擬存貨變動 (=0) + 非預擬存貨變動

• 廠商根據預測需求 (即預擬總合支出)，決定生產數量。

• 產出減去實際銷售的 C, G, NX, 固定投資支出, 居住性投資支出等各項支出的總和後就等於實際存貨變動

• 實際存貨變動 (=非預擬存貨變動) 是調整項 (residual)，不是事先計畫的
Planned Investment

• 非預擬存貨變動=實際存貨變動
  • When a firm’s actual sales are less than expected，非預擬存貨變動>0，實際存貨比預擬存貨多(l>l^p)，
  • When a firm’s actual sales are more than expected，非預擬存貨變動<0，實際存貨比預擬存貨少(l<l^p)，

• 非預擬存貨變動的數量調整機制:
  • 非預擬存貨變動大(小)於0時,表示供過於求(供不應求),廠商會減少(增加)生產直到非預擬存貨變動等於0(此時實際存貨=預擬存貨).
Consumption Expenditures

• Consumption ($C$) accounts for two-thirds of total spending
  – Powerful determinant of planned aggregate expenditure
  – Includes purchases of goods, services, and consumer durables, but not new houses
    • Rent is considered a service

• Main determinant of $C$ is disposable income, $(Y - T)$ 可支配所得或稅後所得
  • $T$ 是淨稅額: 政府稅收-移轉支付-政府付出去的利息
Consumption, 1960 - 2010
Consumption Function

- The *consumption function* (凱恩斯)消費函數 is an equation relating planned consumption (C) to its determinants, notably disposable income (Y – T)

\[ C = \bar{C} + (mpc) (Y - T), \]  where

\( \bar{C} \) is autonomous consumption spending;

自發性消費 (截距)

\( mpc \) is marginal propensity to consume.

邊際消費傾向 (斜率)

- 因稅後所得改變引起的消費變動，稱誘發性消費 (induced consumption)
Consumption Function

\[ C = \bar{C} + (\text{mpc}) (Y - T) \]

- Marginal propensity to consume (mpc) is the increase in consumption spending when disposable income increases by $1.
- mpc is between 0 and 1 for the economy.
  - If households receive an extra $1 in income, they spend part (mpc) and save part.
  - mpc大小會影響政策效果
Consumption Function

\[ C = \bar{C} + (mpc) (Y - T) \]

- Autonomous consumption (\( \bar{C} \)) is spending not related to the level of disposable income.

- \( \bar{C} \) 變動，消費函數就會上下移動(截距改變)
Consumption Function

\[ C = \bar{C} + (\text{mpc}) (Y - T) \]

- **Autonomous consumption** \((\bar{C})\) is spending not related to the level of disposable income. 自發性消費和(當期)可支配所得大小無關

- **Wealth**
  - human wealth (指discounted labor earnings, 現在到未來勞動所得的折現合)
  - Nonhuman wealth (指金融與實體資產)
Consumption Function

• $\tilde{C}$ 抓住了 $(Y-T)$ 外，其它所有影響消費的因素，如 asset prices, real interests rates, 未來勞動所得
  – 金融或實體資產價格上升，家戶財富增加後，會使 $\tilde{C}$ 增加。
    <財富效果 wealth effect>
  – 實質利率上升後，消費的機會成本增加，會使 $\tilde{C}$ 減少。
    <替代效果>。(r 變動的所得效果見19章)
  – 當民眾對未來變得樂觀後，可能會增加消費 ($\tilde{C}$ 增加)，減少儲蓄 (即使在當期稅後所得不變的情況下)
Consumption Function

\[
C = \bar{C} + \text{mpc} \cdot (Y - T) + \Delta (Y - T)
\]

Intercept

Slope = \frac{\Delta C}{\Delta (Y - T)}
Planned Aggregate Expenditure

• Two dynamic patterns in the economy
  1. Declines in production (implies declines in income received by producers) lead to reduced spending
  2. Reductions in spending lead to declines in production and income

• Consumption is the largest component of PAE
  – Consumption depends on output, Y
  – PAE depends on Y

\[
\text{PAE} = C + I^P + G + NX = [\bar{C} + mpc(Y-T)] + I^P + G + NX
\]
Planned Spending Example

Suppose that planned spending components have the following values:

\[
\begin{array}{ccc}
\bar{C} &=& 620 \\
\text{mpc} &=& 0.8 \\
T &=& 250 \\
I^p &=& 220 \\
G &=& 330 \\
NX &=& 20
\end{array}
\]

\[
\text{PAE} = 620 + 0.8 (Y - 250) + 220 + 330 + 20
\]

\[
\text{PAE} = 960 + 0.8 \ Y
\]
Planned Spending Example

\[ C = 620 + 0.8 (Y - 250) \]
\[ PAE = 960 + 0.8 Y \]

- If \( Y \) increases by $1, \( C \) will increase by $0.80
  - \( PAE \) increases by 80 cents
- Planned aggregate expenditure has two parts
  - **Autonomous expenditure**, the part of spending that is independent of output
    - $960 in our example
  - **Induced expenditure**, the part of spending that depends on output \( (Y) \)
    - 0.8 \( Y \) in our example
Planned Expenditure Graph

PAE = 960 + 0.8Y

Slope = 0.8
Learning Objective 3

經濟體短期均衡(Short-run equilibrium output)與非預擬存貨變動的數量調整機制
Short-Run Equilibrium

- Short-run equilibrium is the level of output at which planned spending is equal to output
  
  \[ Y = PAE \]
  
  - 短期均衡產出就是產出水準剛好等於預擬總合支出
    （透過廠商在既定價格下，不斷調整產出使供給=需求）
  - No change in output as long as prices are constant

- \( Y = PAE \) 表示產品市場均衡 (供給=需求)
  - 在短期價格不變的情況下。
  - 且無利率。假設需求不受利率影響。
Short-Run Equilibrium

• 如何找到短期均衡产出？
  - 数学代数求解 $Y$
  - 凯恩斯基本模型图解：称 Keynesian cross (凯恩斯 45 度交叉线)

• 代数求解: Using our previous example,
  
  $\text{PAE} = 960 + 0.8 \ Y$
  
  $Y = \text{PAE}$ (短期均衡条件)
  
  
  $Y = 960 + 0.8 \ Y$

  $0.2 \ Y = 960$

  $Y = $4,800
## Short-Run Equilibrium Search

<table>
<thead>
<tr>
<th>Output (Y)</th>
<th>$PAE = 960 + 0.8Y$</th>
<th>$Y - PAE$</th>
<th>$Y = PAE?$</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,000</td>
<td>4,160</td>
<td>−160</td>
<td>No</td>
</tr>
<tr>
<td>4,200</td>
<td>4,320</td>
<td>−120</td>
<td>No</td>
</tr>
<tr>
<td>4,400</td>
<td>4,480</td>
<td>−80</td>
<td>No</td>
</tr>
<tr>
<td>4,600</td>
<td>4,640</td>
<td>−40</td>
<td>No</td>
</tr>
<tr>
<td><strong>4,800</strong></td>
<td><strong>4,800</strong></td>
<td>0</td>
<td>Yes</td>
</tr>
<tr>
<td>5,000</td>
<td>4,960</td>
<td>40</td>
<td>No</td>
</tr>
<tr>
<td>5,200</td>
<td>5,120</td>
<td>80</td>
<td>No</td>
</tr>
</tbody>
</table>

- Only when $Y = 4,800$ does planned spending equal output
Short-Run Equilibrium

• 為什麼 $Y = PAE$ 每一期都會成立？
  因為 假設 非預擬存貨變動的數量調整機制！

• 當 $Y > PAE$，實際存貨大於預擬存貨，廠商就會減產，使 $Y \downarrow$ (直到 $Y = PAE$)

• 當 $Y < PAE$，實際存貨小於預擬存貨，廠商就會增產，使 $Y \uparrow$ (直到 $Y = PAE$)
Keynesian cross

\[ \text{PAE} = 960 + 0.8Y \]

Slope = 0.8

45°

\[ Y = \text{PAE} \]

960

4,800

Output (Y)

Planned aggregate expenditure (PAE)
Output Greater than Equilibrium

- Suppose output reaches 5,000
  - Planned spending is less than total output
  - Unplanned inventory increases
  - Businesses slow down production
  - Output goes down

\[
PAE = 960 + 0.8Y
\]
Output Less than Equilibrium

- Suppose output is only 4,500
  - Planned spending is more than total output
  - Unplanned inventory decreases
  - Businesses speed up production
  - Output goes up

\[ \text{PAE} = 960 + 0.8Y \]
Learning Objective 4

自發性與政策性預擬支出改變如何影響產出缺口(景氣循環)? 何謂收入支出乘數 (income-expenditure multiplier)?
Planned Spending and Output Gap

• From the Keynesian basic model, we can derive the following two conclusions:
  - When planned spending is too low (demand deficiency), it will cause economic contraction, i.e., a negative output gap.
  - On the contrary, when planned spending is too high (supply shortage), it will cause economic expansion, i.e., a positive output gap.

• Continuing the previous example: $PAE = 960 + 0.8Y; Y = PAE = 4800$
  - Now add a new assumption: Potential output $Y^* = 4800$
  - Therefore, the original state $Y = Y^*$, the economy is at full employment output, the output gap is zero.
A Fall in Planned Spending Leads to a Recession

Planned aggregate expenditure (PAE) = 960 + 0.8Y

Recessionary gap

Full employment output

Output Y

Part of the graph shows the relationship between planned aggregate expenditure (PAE) and output (Y), with equations PAE = 960 + 0.8Y and PAE = 950 + 0.8Y. The graph illustrates the recessionary gap and the full employment output level.
New Equilibrium

• Autonomous consumption, $\bar{C}$, decreases by 10
  – Causes a downward shift in the planned aggregate expenditure curve
  – The economy eventually adjusts to a new lower level of equilibrium spending and output, $4,750

• Suppose that the original equilibrium level, $4,800$, represented potential output, $Y^*$
  – A recessionary gap develops
  – Size of the recessionary gap is $4,800 - 4,750 = $50$
  – Entire decrease is in consumption spending

• Same process applies to a decrease in $I^p$, $G$, or $NX$
## New Short-Run Equilibrium Search

<table>
<thead>
<tr>
<th>Output (Y)</th>
<th>PAE = 950 + 0.8 Y</th>
<th>Y – PAE</th>
<th>Y = PAE?</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,600</td>
<td>4,630</td>
<td>-30</td>
<td>No</td>
</tr>
<tr>
<td>4,650</td>
<td>4,670</td>
<td>-20</td>
<td>No</td>
</tr>
<tr>
<td>4,700</td>
<td>4,710</td>
<td>-10</td>
<td>No</td>
</tr>
<tr>
<td><strong>4,750</strong></td>
<td><strong>4,750</strong></td>
<td><strong>0</strong></td>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td>4,800</td>
<td>4,790</td>
<td>10</td>
<td>No</td>
</tr>
<tr>
<td>4,850</td>
<td>4,830</td>
<td>20</td>
<td>No</td>
</tr>
<tr>
<td>4,900</td>
<td>4,870</td>
<td>30</td>
<td>No</td>
</tr>
<tr>
<td>4,950</td>
<td>4,910</td>
<td>40</td>
<td>No</td>
</tr>
<tr>
<td>5,000</td>
<td>4,950</td>
<td>50</td>
<td>No</td>
</tr>
</tbody>
</table>

- Housing price bubble burst summer 2006
  - House prices increased an average of 8.2% per year from 2001 - 2006
  - Last period of high increase was 1976 – 1979
    - 4.9% per year increase on average
    - Using the rule of 72, house prices would double in 10 years as compared to 15-19 years

- Housing prices declined 6% 2006 – 2007 and over 20% 2007 – 2009

- Financial market crisis
What Caused the U.S. Recession 2007 - 2009

• Decline in spending by businesses and households
  – Difficult to borrow ($\bar{C} \downarrow$)
  – Uncertainty about the state of the economy (I $\downarrow$)

• Decline in planned aggregate expenditure
  – Downward shift of the PAE line

• Recessionary gap
Japan's Recession and East Asia

• Japanese recession in 1990s reduced Japanese imports

• East Asian economies developed by promoting exports
  – The decrease in exports to Japan decreased planned aggregate expenditure in these countries
  – The decrease in planned spending caused the economies to contract to a new, lower level of planned spending and output
    • Japan exported its recession to its neighbors

• U.S. recessions have similar effects on our major trading partners
Income-Expenditure Multiplier

• The income–expenditure multiplier 收入支出乘數 (簡稱 expenditure multiplier) shows the effect of a one-unit increase in autonomous expenditure on short-run equilibrium output

\[ \text{expenditure multiplier} = \frac{1}{1 - mpc} \]

(見課本Appendix P.647-648)

– The larger the mpc, the greater the multiplier
– 文字定義永遠正確。但收入支出乘數在其他模型不一定等於 \(1/(1-mpc)\)
Income-Expenditure Multiplier

- 延續前例
  - Initial PAE = 960 + 0.8 Y
  - New PAE = 950 + 0.8 Y
  - The 10-unit drop in C implied a 10 unit drop in autonomous expenditure
  - Equilibrium changed from $4,800 to $4,750
  - A $10 change in autonomous expenditures caused a $50 change in output
  - Multiplier = 5
Learning Objective 5

財政政策做為一種穩定政策: 效果與實際運用
Stabilization Policy

- Stabilization policies 穩定政策 are government policies that are used to affect planned aggregate expenditure, with the objective of eliminating output gaps
  - Expansionary policies 擴張政策 increase planned expenditure
  - Contractionary policies 緊縮政策 decrease planned expenditure
  - Fiscal policy 財政政策 uses changes in government spending, transfers, or taxes
  - Monetary policy 貨幣政策 uses changes in the money supply
Government Spending

• Government spending is part of planned spending
  – Changes in government spending will directly affect planned aggregate expenditures

• Suppose autonomous expenditure decreases $10 from $Y = 960 + 0.8Y$ to $Y = 950 + 0.8Y$
  – Equilibrium Y decreases from $4,800$ to $4,750$
    • Recessionary gap is $50$

• Stabilization policy indicates a $10$ increase in government spending will restore the economy to $Y^*$ at $4,800$
$10 Fiscal Stimulus

\[ \text{Planned aggregate expenditure (PAE)} = 960 + 0.8Y \]

\[ Y = \text{PAE} \]

\[ \text{PAE} = 950 + 0.8Y \]

Graph showing the planned aggregate expenditure (PAE) and output (Y) relationships with an increase in fiscal stimulus from PAE = 960 + 0.8Y to PAE = 950 + 0.8Y.
Taxes and Transfers

• Net tax ($T$) = total taxes – transfer payments – government interest payments

• Planned aggregate expenditures are influenced by changing total taxes and/or transfer payments
  – The effect is indirect, channeled through the effects on disposable income
    • Lower taxes or higher transfers increase disposable income
    • Increases in disposable income lead to higher $C$
Using Tax Cuts to Close a Recessionary Gap – An Example

• Original planned spending  \( Y = 960 + 0.8 \ Y \)

• Autonomous spending decreases (因 \( C \) 下降10單位)  
  \( Y = 950 + 0.8 \ Y \)

• Recessionary gap is $50

• Tax cut to close the gap must be bigger than $10
  • Taxes will have to go down by $12.5 (=10/0.8)，C才會上升10單位

<table>
<thead>
<tr>
<th>Output (Y)</th>
<th>Net Taxes (T)</th>
<th>Disposable Income (Y – T)</th>
<th>Consumption 610 + 0.8 (Y – T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,750</td>
<td>250</td>
<td>4,500</td>
<td>4,210</td>
</tr>
<tr>
<td>(see p.621)</td>
<td>(=4750-250)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4,750</td>
<td>237.5</td>
<td>4,512.5</td>
<td>4,220</td>
</tr>
</tbody>
</table>
Fiscal Policy During the 2007 – 2009 Recession

• Economic Stimulus Act of 2008 (小布希)
  – $100 billion in tax cuts √
  – $60 billion government spending increase

• American Recovery and Reinvestment Act of 2009 (歐巴馬)
  – $200 billion in tax cuts
  – $600 billion government spending increase √

• Both were effective at raising consumption spending
Supply-Side Effects of Fiscal Policy

• Fiscal policy may affect potential output as well as PAE
  – Investment in infrastructure increases $Y^*$ (18章)
  – Taxes and transfers affect incentives and can change potential output, $Y^*$

• Current thinking is more moderate
  – Demand-side effects of spending matter
  – Supply-side effects also matter
Fiscal Policy and Deficit Spending

• Government deficit is the difference between government spending and net taxes, \((G - T)\)
  – Large and persistent budget deficits reduce national saving
    • Less saving means less investment which means less growth

• Managing the impact of the deficit limits the government's ability to use fiscal policy as a stimulus
Fiscal Policy Flexibility

• Two limits to fiscal policy flexibility
  – The legislative process requires time
    從制訂、通過到實施政策有時間落差(1年以上)
    • Change in fiscal policy may be slow
  – Competing political objectives 政策目標衝突
    • National defense
    • Entitlements such as Medicare and income support
Fiscal Policy Can Be Effective

- **Automatic stabilizers** increase government spending or decrease taxes when real output declines.
  - Built into laws so no decision is required
  - Unemployment compensation, progressive income tax

- Fiscal policy may be useful to address prolonged periods of recession
  - Monetary policy is more often used to stabilize the economy.