Chapter 23

The Keynesian Framework and the ISLM Model
Determination of Output

Keynesian ISLM Model assumes price level is fixed

Aggregate Demand
\[ Y^{ad} = C + I + G + NX \]

Equilibrium
\[ Y = Y^{ad} \]

Consumption Function
\[ C = a + (mpc \times Y_D) \]

Investment
1. Fixed investment
2. Inventory investment
Only planned investment is included in \( Y^{ad} \)
Consumption Function

Table 1  Consumption Function: Schedule of Consumer Expenditure $C$ When $mpc = 0.5$ and $a = 200$ ($\text{\$ billions}$)

<table>
<thead>
<tr>
<th>Point in Figure 1</th>
<th>Disposable Income $Y_D$ (1)</th>
<th>Change in Disposable Income $\Delta Y_D$ (2)</th>
<th>Change in Consumer Expenditure $\Delta C$ ((0.5 \times \Delta Y_D)) (3)</th>
<th>Consumer Expenditure $C$ (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>0</td>
<td>---</td>
<td>---</td>
<td>$200 (= a)$</td>
</tr>
<tr>
<td>F</td>
<td>400</td>
<td>400</td>
<td>200</td>
<td>400</td>
</tr>
<tr>
<td>G</td>
<td>800</td>
<td>400</td>
<td>200</td>
<td>600</td>
</tr>
<tr>
<td>H</td>
<td>1,200</td>
<td>400</td>
<td>200</td>
<td>800</td>
</tr>
</tbody>
</table>
Keynesian Cross Diagram

Assume $G = 0$, $NX = 0$, $T = 0$

\[ Y_{ad} = C + I = 500 + 0.5Y \]

\[ C = 200 + 0.5Y \]

Equilibrium:
1. When $Y > Y^*$, $I^u > 0$ \(\Rightarrow\) $Y \downarrow$ to $Y^*$
2. When $Y < Y^*$, $I^u < 0$ \(\Rightarrow\) $Y \uparrow$ to $Y^*$
Expenditure Multiplier

\[ Y = Y_{ad} \]

\[ Y_{2}^{ad} = C + I_2 = 600 + 0.5Y \]

\[ Y_{1}^{ad} = C + I_1 = 500 + 0.5Y \]
Analysis of Figure 3: Expenditure Multiplier

\[ \Delta I = +100 \Rightarrow \Delta Y/\Delta I = 200/100 = 2 \]

\[ Y = (a + I) \times \frac{1}{1 - mpc} \]

\[ A = a + I = \text{autonomous spending} \]

**Conclusions:**

1. Expenditure multiplier = \( \Delta Y/\Delta A = 1/(1 - mpc) \)
   whether change in \( A \) is due to change in \( a \) or \( I \)

2. Animal spirits change \( A \)
The Great Depression and the Collapse of Investment

\[
\Delta l = -182
\]

\[
\Delta Y = -330
\]

\[
Y = Y^{ad}
\]

\[
Y_1
\]

\[
Y_2
\]
Role of Government

Aggregate Demand, $Y^{ad}$
($\text{billions}$)

$G = 400$

$Y = Y^{ad}$

$Y_1^{ad} = C + I = 500 + 0.5Y$

$Y_2^{ad} = C + I + G = 900 + 0.5Y$

$Y_3^{ad} = C + I + G = 700 + 0.5Y$

$-mpc \times T = -200$

Aggregate Output, $Y$ ($\text{billions}$)

$0 \quad 200 \quad 600 \quad 1,000 \quad 1,400 \quad 1,800$

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Analysis of Figure 5: Role of Government

$\Delta G = + 400, \Delta T = + 400$

1. With no $G$ and $T$, $Y^d = C + I = 500 + mpc \times Y = 500 + .5Y, Y_1 = 1000$

2. With $G$, $Y = C + I + G = 900 + .5Y, Y_2 = 1800$

3. With $G$ and $T$, $Y^d = 900 + mpc \times Y - mpc \times T = 700 + .5Y, Y_3 = 1400$

Conclusions:
1. $G \uparrow Y \uparrow; \quad T \uparrow Y \downarrow$
2. $\Delta G = \Delta T = + 400, \quad Y \uparrow 400$
Role of International Trade

\[ \Delta NX = +100, \]
\[ \frac{\Delta Y}{\Delta NX} = \frac{200}{100} = 2 \]
\[ = \frac{1}{1 - mpc} = \frac{1}{1 - 0.5} \]

\[ Y = Y^{ad} \]
\[ Y_{2}^{ad} = C + I + G + NX_{2} = 600 + 0.5Y \]
\[ Y_{1}^{ad} = C + I + G + NX_{1} = 500 + 0.5Y \]
## Summary: Factors that Affect Y

<table>
<thead>
<tr>
<th>Variable</th>
<th>Change in Variable</th>
<th>Response of Aggregate Output, Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autonomous consumer expenditure, $a$</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Investment, $i$</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Government spending, $G$</td>
<td>↑</td>
<td>↑</td>
</tr>
<tr>
<td>Taxes, $T$</td>
<td>↑</td>
<td>↓</td>
</tr>
<tr>
<td>Net exports, $NX$</td>
<td>↑</td>
<td>↑</td>
</tr>
</tbody>
</table>

*Note: Only increases (↑) in the variables are shown; the effects of decreases in the variables on aggregate output would be the opposite of those indicated in the "Response" column.*
IS Curve

1. $i \uparrow I \downarrow NX \downarrow$, $Y^{ad} \downarrow$, $Y \downarrow$
   Points 1, 2, 3 in figure
2. Right of IS: $Y > Y^{ad} \Rightarrow Y \downarrow$ to IS
   Left of IS: $Y < Y^{ad} \Rightarrow Y \uparrow$ to IS
**LM Curve**

1. **Points 1, 2, 3 in figure**
   - $Y \uparrow$, $M^d \uparrow$, $i \uparrow$

2. **Right of LM:** excess $M^d$, $i \uparrow$ to LM  
   **Left of LM:** excess $M^s$, $i \downarrow$ to LM
**ISLM Model**

Point E, equilibrium where $Y = Y^{ad}$ (IS) and $M^d = M^s$ (LM).

At other points like A, B, C, D, one of two markets is not in equilibrium and arrows mark movement towards point E.