A simple Keynesian model of the economy

Macroeconomic theory

• Macroeconomic theory vs. measurement (national accounts)

• *Macroeconomic theory*: purpose
  – explanation
  – prediction
  – policy

• *Keynesian model*: John Maynard Keynes (“Canes”)
  – emphasis on importance of aggregate demand
Macroeconomic equilibrium

• Total production, income and spending

• Production and income two sides of same coin
  – but will spending be equal to production and income?

• Three possibilities
  – when spending > production, production (and income) will tend to increase
  – when spending < production, production (and income) will tend to decrease
  – when spending = production and income, there is equilibrium (ie. no tendency to change)
• In symbols

A > Y → Y will tend to increase

A < Y → Y will tend to decrease

A = Y → equilibrium (no tendency to change)

Assumptions of basic model

• Households and firms only: no government or foreign sector

• Prices, wages and interest rates are given

• Spending (demand) is the driving force
Components of spending

\[ C = \text{consumption spending (households)} \]

\[ I = \text{investment spending (firms)} \]

\[ C + I = A = \text{aggregate (total) spending (expenditure)} \]

Consumption function

- Relationship between consumption spending \((C)\) and income \((Y)\)
  
- \(C = f(Y)\); positive relationship; \(C\) increases as \(Y\) increases
  
- \(C\) positive, even if \(Y = 0\) (due to influence of other factors that determine \(C)\)
  
- When \(Y\) increases, \(C\) increases, but by less than the increase in \(Y\)
- **Autonomous C**
  - independent of $Y$
  - reflected in position of $C$ function
  - position of $C$ function determined by factors other than income (e.g., interest rates, wealth, expectations)
• **Induced C**
  - changes as $Y$ changes
  - reflected in slope of $C$ function
  - slope equal to marginal propensity to consume ($c$)
  - $c = \Delta C/\Delta Y = \text{slope of } C \text{ function}$

*Autonomous and induced consumption*
Equation for consumption function

• \( C = \overline{C} + cY \), where

• \( C \) = consumption spending by households

• \( \overline{C} \) = autonomous \( C \) (not related to \( Y \))

• \( c \) = marginal propensity to consume

• \( Y \) = income

• \( cY \) = induced consumption

---

Investment spending (\( I \))

• \( I \) = spending on capital goods by firms

• \( I \) depends on expected profitability (rather than \( Y \))

• \( I \) is thus autonomous with regard to (wrt) \( Y \)

• Equation:
  \( I = \bar{I} \) (autonomous wrt \( Y \))

*Investment and the level of income*
Aggregate spending ($A$)

- $A$ represents total or aggregate demand in the economy
- $A = C + I$

*The aggregate spending function*

---

The basic Keynesian model

\[
A = C + I\\
C = \bar{C} + cY\\
I = \bar{I}
\]

- Equilibrium where $Y = A$
• 45° line represents all possible equilibrium points

The 45-degree line

• Equilibrium illustrated where \( Y = A \), ie where \( A \) intersects 45° line

The equilibrium level of income
The equilibrium level of income

Equilibrium level of income

- Equilibrium where \( Y = A \)
  \[
  A = C + I \\
  C = \bar{C} + cY \\
  I = \bar{I}
  \]

\[
Y = C + I = \bar{C} + cY + \bar{I} = \bar{C} + \bar{I} + cY
\]
\[ ... \ Y - cY = \bar{C} + \bar{I} \]
\[ Y(1-c) = \bar{C} + \bar{I} \]
\[ Y = (1/1-c)(\bar{C}+\bar{I}) \text{ (equilibrium level of } Y) \]
\[ = \alpha \bar{A}, \text{ where} \]
\[ \alpha = 1/1-c \text{ (the multiplier)} \]
\[ \bar{A} = \bar{C} + \bar{I} \text{ (autonomous spending)} \]

---

**Equilibrium: numerical example**

- Suppose \(C = 500 + 0.8Y\) and \(I = 300\)
- At equilibrium: \(Y = A\)
  \[Y = C + I\]
  \[= 500 + 0.8Y + 300\]
  \[= 800 + 0.08Y\]
  \[\Rightarrow 0.2Y = 800\]
  \[0.2Y = 800\]
  \[Y = 800/0.2\]
  \[= 4000\]
The impact of a change in investment spending: the multiplier

The multiplier process

<table>
<thead>
<tr>
<th>Round number</th>
<th>Additional spending and income in this round (R millions)</th>
<th>Cumulative total (R millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12.0</td>
<td>12.0</td>
</tr>
<tr>
<td>2</td>
<td>7.2</td>
<td>19.2</td>
</tr>
<tr>
<td>3</td>
<td>4.32</td>
<td>23.52</td>
</tr>
<tr>
<td>4</td>
<td>2.592</td>
<td>26.112</td>
</tr>
<tr>
<td>5</td>
<td>1.5552</td>
<td>27.6672</td>
</tr>
<tr>
<td>6</td>
<td>0.93312</td>
<td>28.60032</td>
</tr>
<tr>
<td>7</td>
<td>0.559872</td>
<td>29.160192</td>
</tr>
<tr>
<td>8</td>
<td>0.3359232</td>
<td>29.4961152</td>
</tr>
<tr>
<td>9</td>
<td>0.2015539</td>
<td>29.6976691</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>n</td>
<td>...</td>
<td>30.0</td>
</tr>
</tbody>
</table>

The multiplier chain of spending and income
The multiplier: a summary

[Diagram showing aggregate spending and total production, income with labeled points and variables.]