The GAPS & The Multiplier

Chapter 12

The Multiplier and Its Applications

- Any change in spending (C, I, or G) will set off a chain reaction, leading to a multiplied change in GDP

\[ \Delta GDP = C' + I + G + Xn \]

How much the multiplied change is depends on the MPC and MPS

Calculating the Multiplier

- Remember
  \[ MPC + MPS = 1, \text{ therefore, } MPS = 1 - MPC \]

Multiplier = \[ \frac{1}{1 - MPC} \]  

Because the multiplier (like C) deals with spending, \[ \frac{1}{1/(1-MPC)} \] is a more appropriate formula
Calculating the Multiplier

• The MPC is .5. Find the multiplier

\[
\text{Multiplier} = \frac{1}{1 - \text{MPC}} = \frac{1}{1 - .5} = \frac{1}{.5} = 2
\]

Calculating the Multiplier (Continued)

• The MPC is .5. Find the multiplier

Calculating the Multiplier

Step-by-Step Working of the Multiplier When MPC is .5

<table>
<thead>
<tr>
<th>Amount</th>
<th>Cumulative Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,000.00</td>
<td>$1,000.00</td>
</tr>
<tr>
<td>$ 500.00</td>
<td>$1,500.00</td>
</tr>
<tr>
<td>$ 250.00</td>
<td>$1,750.00</td>
</tr>
<tr>
<td>$ 125.00</td>
<td>$1,875.00</td>
</tr>
<tr>
<td>$ 62.50</td>
<td>$1,937.50</td>
</tr>
<tr>
<td>$ 31.25</td>
<td>$1,968.75</td>
</tr>
<tr>
<td>$ 7.813</td>
<td>$2,006.563</td>
</tr>
<tr>
<td>$ 3.906</td>
<td>$2,010.469</td>
</tr>
<tr>
<td>etc.</td>
<td>etc.</td>
</tr>
<tr>
<td>$2,000.00</td>
<td>$2,002,002.00</td>
</tr>
</tbody>
</table>

It is surely much easier to use the multiplier of 2 (2 X $1,000 = $2000) than to go through this process and add up all the figures.
Calculating the Multiplier (Continued)

• The MPC is .75. Find the multiplier

\[
\text{Multiplier} = \frac{1}{1 - \text{MPC}} = \frac{1}{1 - .75} = \frac{1}{.25} = 4
\]

Applications of the Multiplier

• The Multiplier is used to calculate the effect of changes in C, I, or G on GDP

GDP = 2,500; Multiplier = 3; C rises by 10

What is the new level of GDP?

\[
\text{GDP}_{\text{New}} = \text{GDP}_{\text{Initial}} + (\text{Change in spending} \times \text{Multiplier})
\]

\[
\text{GDP}_{\text{New}} = 2500 + (10 \times 3)
\]

\[
\text{GDP}_{\text{New}} = 2500 + 30
\]

\[
\text{GDP}_{\text{New}} = 2530
\]
Applications of the Multiplier

• The Multiplier is used to calculate the effect of changes in C, I, or G on GDP

GDP = X; Multiplier = 3; C rises by 10

What happens to GDP?

\[ \text{GDP}_{\text{New}} = \text{GDP}_{\text{Initial}} + (\text{Change in spending} \times \text{Multiplier}) \]

\[ \text{GDP}_{\text{New}} = X + (10 \times 3) \]

\[ \text{GDP}_{\text{New}} = X + 30 \]

GDP increases by 30

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Applications of the Multiplier

• The Multiplier is used to calculate the effect of changes in C, I, or G on GDP

GDP = X; Multiplier = 7; G falls by 5

What happens to GDP?

\[ \text{GDP}_{\text{New}} = \text{GDP}_{\text{Initial}} + (\text{Change in spending} \times \text{Multiplier}) \]

\[ \text{GDP}_{\text{New}} = X + (-5 \times 7) \]

\[ \text{GDP}_{\text{New}} = X + (-35) \]

GDP decreases by 35

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Applications of the Multiplier

• How big is the multiplier (M)?

\[ M = \frac{\text{distance between the equilibrium GDP and the full-employment GDP}}{\text{by the gap}} \]

\[ M = \frac{2}{2} = 1 \]

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Applications of the Multiplier

- How big is the multiplier (M)?

\[ M = \frac{\text{distance between the equilibrium GDP and the full-employment GDP}}{\text{the gap}} \]

\[ M = \frac{500}{200} = 2.5 \]

Removing the Deflationary Gap

To remove the deflationary gap we raise aggregate demand from \( C + I + G + X \) to \( C + I + G + X \).

This pushes equilibrium GDP to $7 trillion and removes the deflationary gap.

Removing the Inflationary Gap

To remove the inflationary gap we lower aggregate demand from \( C + I + G + X \) to \( C + I + G + X \).

This pushes equilibrium GDP down to 1,000 and removes the inflationary gap.