Learning Objectives (cont.)

- Define and explain the fiscal policy multipliers
  - Explain the effects of fiscal policy in both the short run and the long run
  - Distinguish between and explain the demand-side and supply-side effects of fiscal policy
why study fiscal multiplications?

\[ \frac{dY}{dG} > 0 \]

\[ \frac{dY}{dT} < 0 \]

discretionary fiscal policy can stabilize RGDP; create near full employment

\[ \Delta G : \text{a discretionary (autonomous) change in govt. expenditure} \]

\[ \Delta T : \text{a discretionary (autonomous) change in tax revenue (rate: not tax rate)} \]
Fiscal Policy Multipliers

- We will assume, in the model we build, that all taxes are lump-sum taxes.

- Lump-sum taxes are taxes that do not vary with real GDP (e.g., property taxes)

\[
Y = c + I + G \\
C = \bar{c} + b(Y - T) \\
I = I \\
G = G
\]

\[
(1 - b)Y = \bar{c} - b\bar{T} + \bar{I} + \bar{G}
\]
Fiscal Policy Multipliers

- The Government Purchases Multiplier

- The government purchases multiplier is the magnification effect of a change in government purchases of goods and services on equilibrium expenditure and real GDP.

\[ \text{Government purchase multiplier} = \frac{1}{1 - MPC} > 0 \]
Fiscal Policy Multipliers

• The Lump-Sum Transfer Payments Multiplier
  • Transfer payments are like negative taxes
  • An increase in transfer payments works like a decrease in taxes

\[
\frac{\Delta Y}{\Delta TR} = \frac{1}{1-c} = \frac{MPC}{1-MP}
\]
Fiscal Policy Multipliers

- The Lump-Sum Tax Multiplier

Furthermore, since a change in lump-sum taxes changes aggregate expenditure initially by only \( MPC \) multiplied by the tax change, the lump-sum tax multiplier is:

\[
\frac{\Delta Y}{\Delta T} = \text{Lump-sum tax multiplier} = \frac{-MPC}{1 - MPC} < 0
\]
Fiscal Policy Multipliers

- The Lump-Sum Transfer Payments Multiplier
- Therefore, the multiplier is positive:

\[
\frac{\text{Lump-sum transfer payments multiplier}}{\text{MPC}} = \frac{MPC}{1 - MPC} > 0
\]
Fiscal policy and national output

From Table 7 we have

(1) \[ Y = C + I + G + (E - M) \]

Assume that exports (E) and imports (M) are equal to zero. Public expenditure is greater than zero, i.e. we have a mixed economy consistency of a private and public sector. Therefore

(2) \[ Y = C + I + G \]

Assume that public sector expenditure (G) is financed exclusively by personal income taxes (T). Because of this, Personal Disposable Income (PDI) will equal Disposable Income (Y) minus personal income taxes (T). Therefore

(3) \[ PDI = Y - T \]

Assume that the level of consumption expenditures is determined by the level of Personal Disposable Income, as in figure 9.2. Therefore

(4) \[ C = b(Y - T) \]

where \[ b = \frac{C}{Y} - T = APC = MPC \]

Assume as before that the level of investment (I) is not influenced by the level of disposable income (Y). Therefore

(5) \[ I = \bar{I} = \text{constant} \]

Assume that the level of personal income taxes (T) is not influenced by the level of disposable income. Therefore

(6) \[ T = \bar{T} = \text{constant} \]

Assume that the level of public sector expenditure (G) does not depend on the level of disposable income (Y) or the level of personal income taxes (T). Therefore

(7) \[ G = \bar{G} = \text{constant} \]

The foregoing may be summarized as a macro model consisting of five linear equations (2, 4, 5, 6, 7) in five variables (Y, C, I, G, T).

Table A: The basic fiscal policy model.

<table>
<thead>
<tr>
<th>Equation</th>
<th>Relationship</th>
<th>In symbols</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>equilibrium condition</td>
<td>( Y = C + I + G )</td>
</tr>
<tr>
<td>4</td>
<td>consumption function</td>
<td>( C = b(Y - T) )</td>
</tr>
<tr>
<td>5</td>
<td>investment function</td>
<td>( I = \bar{I} )</td>
</tr>
<tr>
<td>6</td>
<td>tax revenue function</td>
<td>( T = \bar{T} )</td>
</tr>
<tr>
<td>7</td>
<td>govt. exp. function</td>
<td>( G = \bar{G} )</td>
</tr>
</tbody>
</table>
Determination of national output, income, and expenditure

a) The model in Table A contains five variables (Y, C, I, G, T).

b) Of these five variables, three variables are assumed known (I, T, G) and two variables are not initially known (Y, C).

c) by substituting the values ($\bar{I}, \bar{T}, \bar{G}$) for the known variables in equations 2, 4, we can solve for the unknown variables (Y, C).

Proof: \[ Y = C + \bar{I} + \bar{G} \]
\[ C = b(Y - \bar{T}) \]

hence: \[ Y = b(Y - \bar{T}) + \bar{I} + \bar{G} \]
\[ (1-b)Y = -b\bar{T} + \bar{I} + \bar{G} \]
\[ Y = \frac{-b}{1-b} \bar{T} + \frac{1}{1-b} \bar{I} + \frac{1}{1-b} \bar{G} \]

d) Equation 2 implies that aggregate expenditures (C + I + G) equal national income (or output) Y. Consequently, the economy is in equilibrium.

e) Consequently, the last equation in section c) shows how the equilibrium level of national output (= national income = national expenditure) depends on the level of tax revenue (T), investment (I), and government expenditure (G).

Multipliers

Observe that \[ \Delta Y = \frac{-b}{1-b} \Delta T + \frac{1}{1-b} \Delta I + \frac{1}{1-b} \Delta G \]

From this, follow seven conclusions

1) An increase in T, with G and I constant, will decrease Y.

2) The tax multiplier equals \[ \frac{-b}{1-b} < -1 \]. An increase in T by $1 will decrease national output Y by more than $1.

3) An increase in government expenditure G with T and I constant, will increase Y.

4) The government expenditure multiplier equals \[ \frac{1}{1-b} > 1 \]. An increase in G by $1 will increase national output Y by more than $1.

5) An increase in investment with T and G constant, will increase Y.

6) The government expenditure multiplier and the investment multiplier both equal \[ \frac{1}{1-b} \].

7) The balanced budget multiplier theorem:

   If tax revenue (T) is increased by $1, and if simultaneously government expenditure (G) is increased by $1, with investment (I) constant, then national output will increase by $1.

Proof:

\[ \Delta Y = \text{tax increase effect} + \text{exp. increase effect} \]
\[ \Delta Y = \frac{-b}{1-b} \cdot 1 + \frac{1}{1-b} \cdot I \]
\[ \Delta Y = 1 \]