The Government Purchases Multiplier

A $0.5 trillion increase in government purchases shifts the AE curve upward by $0.5 trillion.

...and increases real GDP by $2 trillion. The government purchases multiplier is

\[
\frac{1}{1 - 0.75} = 4
\]
with autonomous taxes, $\tau$

$$AD = a + b(y - \bar{Y}) + \bar{I} + \bar{G}$$

- what happens to AD if $\tau$ increases $\bar{Y}$ holding $Y, \bar{I}, \bar{G}$ constant?

$$\Delta AD = a + b \Delta y - b \Delta \bar{Y} + \Delta \bar{I} + \Delta \bar{G}$$

$$\Delta AD = 0 + 0 - b \Delta \bar{Y} + 0 + 0$$

the AD schedule shifts down by $-b \Delta \bar{Y}$
Fiscal Policy Multipliers

- Automatic Stabilizers
- Mechanisms that stabilize real GDP without explicit action by the government.

\[ \frac{\partial Y}{\partial AE} \]

Automatic stabilizers decrease autonomous expenditure efforts with automatic stabilizers.
### Basic Keynesian Model

<table>
<thead>
<tr>
<th>Model</th>
<th>no trade</th>
<th>with public sector</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>constant tax revenue $T$</td>
<td>constant tax rate $t$</td>
</tr>
<tr>
<td>$Y = C + I + G$</td>
<td>$Y = C + I + G$</td>
<td></td>
</tr>
<tr>
<td>$C = a + b(Y - T)$</td>
<td>$C = a + b(Y - T)$</td>
<td></td>
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<tr>
<td>$G = \bar{G}$</td>
<td>$G = \bar{G}$</td>
<td></td>
</tr>
<tr>
<td>$T = \bar{T}$</td>
<td>$T = t \cdot Y$</td>
<td></td>
</tr>
<tr>
<td>Solve for $Y^{eq}$</td>
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<td></td>
</tr>
<tr>
<td>$Y = a + b(Y - \bar{T}) + \bar{I} + \bar{G}$</td>
<td>$Y = a + b(Y - t \cdot Y) + \bar{I} + \bar{G}$</td>
<td></td>
</tr>
<tr>
<td>$Y^{eq} = \frac{a - b\bar{T} + \bar{I} + \bar{G}}{1 - b}$</td>
<td>$Y^{eq} = \frac{a + \bar{I} + \bar{G}}{1 - (1 - t)b}$</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Conclusion</th>
<th>Investment Multiplier ( \Delta Y^{eq}/\Delta I )</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\Delta Y^{eq}/\Delta I = 1/(1 - b)$</td>
<td>$\Delta Y^{eq}/\Delta I = \frac{1}{1 - (1 - t)b}$</td>
</tr>
</tbody>
</table>

**Automatic Stabilizers**

\[
\frac{\Delta Y^{eq}}{\Delta I} = \frac{1}{1 - b} \quad \frac{1}{\Delta I} = \frac{1}{1 - (1 - t)b}
\]

If $t > 0$, then $\frac{\Delta Y^{eq}}{\Delta I} > \frac{1}{\Delta I}$.

If $t = 0$, then $\frac{\Delta Y^{eq}}{\Delta I} = \frac{1}{\Delta I}$. 
### Tax Function

\[ T = \bar{T} + t \cdot Y \]

↑ \quad ↑ \quad \rightarrow \text{induced}

autonomous

### Automatic Stabilizer

- with \( t \) large
- an increase in autonomous spending (\( \Delta C, \Delta I, \Delta G; \Delta T \))
- will proportionately have a small effect on \( \Delta Y^{eq} \)
- the fluctuations in GNP become smaller the larger the importance of automatic stabilizers.

\[
\frac{\Delta Y}{\Delta G} = \frac{1}{1 - (1 - t) \cdot b} < \frac{1}{1 - b}
\]

<table>
<thead>
<tr>
<th>( b )</th>
<th>0.75</th>
<th>0.75</th>
</tr>
</thead>
<tbody>
<tr>
<td>( t )</td>
<td>0.20</td>
<td>1.0</td>
</tr>
</tbody>
</table>

\[
\text{sensitivity analysis} \quad \Rightarrow \quad \frac{\Delta Y_{eq}}{\Delta G} = \frac{1}{1 - 0.1} = 2.5 \quad \frac{1}{1 - 0.75} = 1.0
\]
tax function

\[ T = T + \text{e. } Y \]

a automatic stabilizer

import function

\[ M = \bar{M} + m.Y \]

a automatic stabilizer

"unemployment benefit function"

\[ UB = \frac{1}{h} (\text{GDP}^{\text{act.}} - \text{GDP}^{\text{pot.}}) \]

a automatic stabilizer
The Lump-Sum Tax Multiplier:

\[
\frac{\Delta Y}{\Delta T} = \frac{1}{1 - b}
\]

and decreases real GDP by $3 trillion. The tax multiplier is

\[
\frac{-0.75}{1 - 0.75} = -3
\]

Real GDP (trillions of 1992 dollars):

\[
\Delta Y = -3
\]

A $1 trillion tax increase shifts the AE curve downward by $0.75 trillion.

Aggregate expenditure (trillions of 1992 dollars):