Chapter 9: The Government and Fiscal Policy

Week 5

Presenter: Zheng Zhang

February 16, 2013
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Figure 2: Fiscal Cliff? (G falls and T rises)
Motivation

Given \( C = 200 + 0.75Y \) and \( I = 100 \) we know the level of equilibrium income is \( Y^* = 1200 \).

What if "Full employment level" is 1800? Look at \(|PQ| = \text{Savings}(S) - \text{Planned Investment}(I) > 0\) (\(|PQ|\) is called Recessionary Gap).

Keynes considers \( S > I \) (disequilibrium in capital market) as a serious problem under the assumption that interest rate is STICKY in the short run!

Solution in Chapter 9: The government borrows excess private savings to purchase remaining output neither firms or household wants? \((G = 50)\).

How does the government finance itself? Balance Budget? Consumption is reduced by \( MPC \times T \). \((G = T = 200)\).
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Solution in Chapter 9: The government borrows excess private savings to purchase remaining output neither firms or household wants? ($G = 50$)

How does the government finance itself? Balance Budget? Consumption is reduced by $\text{MPC} \times T$. ($G = T = 200$).
Every now and then, *excess saving* may be created (low expectation on the future by the businesses, etc).

Classicals claimed that price adjustment would restore the equilibrium and thus this is not a big deal.

But Keynesians argued when interest rate is *STICKY*, *excess savings* could persist. Under this assumption, quantity adjustment may replace price adjustment in the short run, so a fall in savings to meet investment would restore equilibrium but lead to a recession.
Every now and then, excess saving may be created (low expectation on the future by the businesses, etc).

Classicals claimed that price adjustment would restore the equilibrium and thus this is not a big deal.

But Keynesians argued when interest rate is sticky, excess savings could persist. Under this assumption, quantity adjustment may replace price adjustment in the short run, so a fall in savings to meet investment would restore equilibrium but lead to a recession.
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Classicals claimed that price adjustment would restore the equilibrium and thus this is not a big deal.

But Keynesians argued when interest rate is *STICKY*, *excess savings* could persist. Under this assumption, quantity adjustment may replace price adjustment in the short run, so a fall in savings to meet investment would restore equilibrium but lead to a recession.
Basic Assumptions in Aggregate Expenditure (Keynesian Cross) Model

(a) **Vision:** Short run

(b) **Prices:** Wages, Interests, Rents, Prices are **STICKTY** or fixed

(c) **Agents:** Households, Businesses, and Government Sectors.

(d) **Scope:** Closed Economy, No Trade (thus no export and import)

(e) **Variables:** Planned Investment (I), Net Taxes (T) and Government Spending (G)* are all **exogenous** but C, Y are **endogenous**.

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* T and G are **ENDOGENOUS** when we deal with automatic stabilizers.
Keynesian Cross in Circular Flow Diagram

Figure 3: The Circular Flow Diagram with Households and Firms
Learning Objectives

- Understanding Equilibrium level of income after government sector (G and T) is added.
  (2012Mid1 M36; E1)

- Understanding Multiplier effects: Spending Multiplier/Tax Multiplier/Balanced Budget Multiplier
  (PEQ 5 Part 2 and 3 M38 Page 199)

- Understanding Automatic Stabilizers: Government Spending or Taxes may be correlated with equilibrium level of income (Cyclical Deficit/Structural Deficit)
Aggregate Expenditure Line with T and G

- $AE = C + I + G = a + b(Y - T) + I + G = (a - bT + I + G) + bY$, so Y-intercept is $a - bT + I + G$ and slope is b(MPC).

Note the intercept of consumption function is $a - bT$.

Refer to motivation

- Equilibrium: $Y_3 = AE = C_3 + I + G \Rightarrow S_3 + T = I + G(|FK| = |F'K'|)$
  (no unplanned inventories or no change in inventories)
  e.g. $M36; E1$

- Disequilibrium $Y_2 < C_2 + I + G \Rightarrow S_2 + T(|MN| = |M'N'|) < I + G(|FG|)$
  (unplanned inventories $< 0$ or inventories are falling)

- Disequilibrium $Y_4 > C_4 + I + G \Rightarrow S_4 + T(|PQ| = |P'Q'|) > I + G(|FG|)$
  (unplanned inventories $> 0$ or inventories are rising)
Aggregate Expenditure Line with $T$ and $G$

- $AE = C + I + G = a + b(Y - T) + I + G = (a - bT + I + G) + bY$, so Y-intercept is $a - bT + I + G$ and slope is $b(MPC)$.

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- Equilibrium: $Y_3 = AE = C_3 + I + G \Rightarrow S_3 + T = I + G(\lvert FK \rvert = \lvert F'K' \rvert)$
  
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- Disequilibrium $Y_2 < C_2 + I + G \Rightarrow S_2 + T(\lvert MN \rvert = \lvert M'N' \rvert) < I + G(\lvert FG \rvert)$
  
  (unplanned inventories $< 0$ or inventories are falling)

- Disequilibrium $Y_4 > C_4 + I + G \Rightarrow S_4 + T(\lvert PQ \rvert = \lvert P'Q' \rvert) > I + G(\lvert FG \rvert)$
  
  (unplanned inventories $> 0$ or inventories are rising)
Equilibrium with Government Sector
Automatic Stabilizer
Past Exam Questions
PEQ5
Midterm I FAQs

Agree the Expenditure Line with T and G

\[ AE = C + I + G = a + b(Y - T) + I + G = (a - bT + I + G) + bY, \]
so Y-intercept is \( a - bT + I + G \) and slope is b(MPC).

\textbf{Note the intercept of consumption function is } a-bT

\textbf{Refer to motivation}

\textbullet Equilibrium: \( Y_3 = AE = C_3 + I + G \Rightarrow S_3 + T = I + G(|FK| = |F'K'|) \)
(no unplanned inventories or no change in inventories)
e.g \( M36; E1 \)

\textbullet Disequilibrium \( Y_2 < C_2 + I + G \Rightarrow S_2 + T(|MN| = |M'N'|) < I + G(|FG|) \)
(unplanned inventories < 0 or inventories are falling)

\textbullet Disequilibrium \( Y_4 > C_4 + I + G \Rightarrow S_4 + T(|PQ| = |P'Q'|) > I + G(|FG|) \)
(unplanned inventories > 0 or inventories are rising)

Zheng Zhang
Chapter 9: The Government and Fiscal Policy
**Equilibrium with Government Sector**

**Automatic Stabilizer**

**Past Exam Questions**

**PEQ5**

**Midterm I FAQs**

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**Aggregates Expenditure Line with T and G**

\[
AE = C + I + G = a + b(Y - T) + I + G = (a - bT + I + G) + bY,
\]

so Y-intercept is \(a - bT + I + G\) and slope is \(b\) (MPC).

**Note the intercept of consumption function is \(a - bT\)**

**Refer to motivation**

- **Equilibrium:** \(Y_3 = AE = C_3 + I + G \Rightarrow S_3 + T = I + G(|FK| = |F'K'|)\)
  
  (no unplanned inventories or no change in inventories)

  e.g. \(M36;E1\)

- **Disequilibrium** \(Y_2 < C_2 + I + G \Rightarrow S_2 + T(|MN| = |M'N'|) < I + G(|FG|)\)
  
  (unplanned inventories < 0 or inventories are falling)

- **Disequilibrium** \(Y_4 > C_4 + I + G \Rightarrow S_4 + T(|PQ| = |P'Q'|) > I + G(|FG|)\)
  
  (unplanned inventories > 0 or inventories are rising)
## Comparison of Chapter 8 and 9 on equilibrium conditions

<table>
<thead>
<tr>
<th></th>
<th>Chapter 8 (No T and G)</th>
<th>Chapter 9 (With T and G)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agg. Income (Y)</td>
<td>( Y = C + S )</td>
<td>( Y - T = C + S ) ((Y - T = Y_d))</td>
</tr>
<tr>
<td>Consumption (C)</td>
<td>( C = a + \text{MPC} \times Y )</td>
<td>( C = a + \text{MPC} \times Y_d )</td>
</tr>
<tr>
<td>Savings (S)</td>
<td>( S = -a + \text{MPS} \times Y )</td>
<td>( S = -a + \text{MPS} \times Y_d )</td>
</tr>
<tr>
<td>Agg. Expenditure (AE)</td>
<td>( AE = C + I )</td>
<td>( AE = C + I + G )</td>
</tr>
<tr>
<td>Dynamic version AE</td>
<td>( \Delta AE = \Delta C + \Delta I )</td>
<td>( \Delta AE = \Delta C + \Delta I + \Delta G )</td>
</tr>
<tr>
<td>Equilibrium condition 1</td>
<td>( Y = C + I )</td>
<td>( Y = C + I + G )</td>
</tr>
<tr>
<td>Dynamic Equil. 1</td>
<td>( \Delta Y = \Delta C + \Delta I )</td>
<td>( \Delta Y = \Delta C + \Delta I + \Delta G )</td>
</tr>
<tr>
<td>Equilibrium condition 2</td>
<td>( S = I )</td>
<td>( S + T = I + G^\dagger )</td>
</tr>
<tr>
<td>Dynamic Equil. 2</td>
<td>( \Delta S = \Delta I )</td>
<td>( \Delta S + \Delta T = \Delta I + \Delta G )</td>
</tr>
</tbody>
</table>

^ Note: with government \( S \neq I \) so \( \Delta S \neq \Delta I \).
Comparative Statics II: Fiscal Policy

Remember in Chapter 8, we addressed comparative statics with regard to autonomous consumption (a), MPC and planned investment (I). With government sector (G and T) added in Chapter 9, we need to investigate how a change in G or T would affect the level of equilibrium income \( Y^* \) as well as Consumption (Saving).

- All else equal, Government Spending (G) ↑ ⇒ AE Line shifts up parallel ⇒ Equilibrium \( Y \) ↑; Equil. C ↑; Equil. \( S \) ↑ (\( S \uparrow + T = I + G \uparrow \)) and vice versa. *Graphics;* (Government Spending Multiplier = \(-\frac{1}{MPS} = -\frac{1}{1-MPC}\)), e.g. *PEQ5 Part 2 (b) Part 3 (c) and (d)*

- All else equal, Net Taxes (T) ↓ ⇒ AE Line shifts up parallel ⇒ Equilibrium \( Y \) ↑; Equil. C ↑ (\( C \uparrow = Y \uparrow = I - G \)); Equil. \( S \uparrow \) (\( S \uparrow + T \downarrow = I + G \)) and vice versa. *Graphics;* (Tax Multiplier = \(-\frac{MPC}{MPS} = -\frac{MPC}{1-MPC}\)), e.g. *PEQ5 Part 2 (b) Part 3 (c) and (d)*

- \( G \uparrow \) or \( T \downarrow \) or both is called **expansionary fiscal policy** while \( G \downarrow \) or \( T \uparrow \) or both is called **contractionary fiscal policy**.
What if Government Spending (G) and Taxes (T) are changed at the same time?

- All else equal, G and T ↑ by the same amount e.g. Budget is kept the same. ⇒ AE Line shifts up parallel ⇒ Equil. Y ↑; Equil. C ↑; Equil. S ↔ (S ↔ + T ↑ = I + G ↑) and vice versa.
- Budget Balanced Multiplier is 1 ⇒ ΔY = ΔG = ΔT, e.g. 2012Mid1 M38

- G and T increase by different amounts ↑⇒
  the change in Y is ambiguous depending on the magnitude of the changes in G and T. Also note that ΔY = Spending Multiplier × ΔG + Tax Multiplier × ΔT. If ΔG ≥ ΔT, we are certain that ΔY > 0.
Comparative Statics II: Fiscal Policy

Comparative Statics with or without Government
Notation: \( \mu_S = \text{Spending(Investment) Multiplier} = \frac{1}{MPS} = \frac{1}{1-MPC} > 0 \)
\( \mu_T = \text{Tax Multiplier} = -\frac{MPC}{MPS} = -\frac{MPC}{1-MPC} < 0 \)

Table 1: Comparison of Changes in Different Parameters

<table>
<thead>
<tr>
<th>Changed Parameter</th>
<th>Chapter 8 ( \mu_S \times (a + I) )</th>
<th>Chapter 9 ( \mu_S \times (a + I) + (\mu_S G + \mu_T T) ) §</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \Delta a )</td>
<td>( \mu_S \Delta a ) ( \leftrightarrow ) ( \mu_S \Delta a )</td>
<td>( \mu_S \Delta a ) ( \leftrightarrow ) ( \mu_S \Delta a )</td>
</tr>
<tr>
<td>( \Delta I )</td>
<td>( \mu_S \Delta I ) ( (\mu_S - 1) \Delta I ) ( \Delta I )</td>
<td>( \mu_S \Delta I ) ( (\mu_S - 1) \Delta I ) ( \Delta I )</td>
</tr>
<tr>
<td>( \Delta T )</td>
<td></td>
<td>( \mu_T \Delta T ) ( \mu_T \Delta T = \Delta Y ) ( -\Delta T )</td>
</tr>
<tr>
<td>( \Delta G )</td>
<td></td>
<td>( \mu_S \Delta G ) ( (\mu_S - 1) \Delta G ) ( \Delta G )</td>
</tr>
<tr>
<td>( \Delta G = \Delta T )</td>
<td></td>
<td>( \Delta G ) ( \leftrightarrow ) ( \leftrightarrow )</td>
</tr>
</tbody>
</table>

‡ notice \( \mu_S + \mu_T = 1 \) or \( \mu_S - |\mu_T| = 1 \)
§ Refer to PEQ5 Part 1
Comparative Statics II: Fiscal Policy

Comparative Statics with or without Government

\[ \mu_S = \text{Spending(Investment) Multiplier} = \frac{1}{MPS} = \frac{1}{1-MPC} > 0 \]

\[ \mu_T = \text{Tax Multiplier} = -\frac{MPC}{MPS} = -\frac{MPC}{1-MPC} < 0 \]

\[ \mu_S + \mu_T = 1 \text{ or } \mu_S - |\mu_T| = 1 \]

\[ \mu_T = \frac{\mu_S}{\mu_S - 1} \]

Table 2: Frequently Used MPC and Corresponding Multipliers

<table>
<thead>
<tr>
<th>MPC</th>
<th>MPS</th>
<th>(\mu_S)</th>
<th>(\mu_T)</th>
<th>B.B. Multiplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9</td>
<td>0.1</td>
<td>10</td>
<td>-9</td>
<td>1</td>
</tr>
<tr>
<td>0.8</td>
<td>0.2</td>
<td>5</td>
<td>-4</td>
<td>1</td>
</tr>
<tr>
<td>0.75</td>
<td>0.25</td>
<td>4</td>
<td>-3</td>
<td>1</td>
</tr>
<tr>
<td>0.5</td>
<td>0.5</td>
<td>2</td>
<td>-1</td>
<td>1</td>
</tr>
<tr>
<td>0.25</td>
<td>0.75</td>
<td>(\frac{4}{3})</td>
<td>(-\frac{1}{3})</td>
<td>1</td>
</tr>
</tbody>
</table>

\[ \mu_T = \frac{\mu_S}{\mu_S - 1} \]
The change to AE line with a change in $G$

\((G_3 > G_2 \text{ and } G_1 < G_2)\)

The change to AE line with a change in $T$

\((T_3 < T_2 \text{ and } T_1 > T_2)\)
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Automatic Stabilizer

- T and G are assumed to be exogenous at the front but what happens if parts of them are correlated with the level of income \( Y \)?

- Considering Net Taxes \( T = \text{Taxes} - \text{Transfer payments} \), first, there are some parts in transfer payments that vary inversely with the level of income \( Y \) such as unemployment benefits, food stamp allotments etc; second, there are also some parts in Taxes that vary positively with the level of income \( Y \), for example, corporate or personal income taxes increase as \( Y \) increase because more people have moved into higher tax rate brackets (Fiscal Drag).

- With these concerns, T should be modeled as \( T = T_0 + tY \) which means that net taxes \( T \) is positively correlated with \( Y \).(e.g. Homework Q21) \( t \) can be interpreted as average fixed tax rate, then given the same MPC, Consumption function with higher \( t \) is flatter. In other words, higher \( t \) weakens the consumption demand from households.
Automatic Stabilizer

- If economy is in a recession, $Y \downarrow \Rightarrow T \downarrow \Rightarrow$ More deficit (cyclical deficit) and $Y \uparrow$. This is equivalent to automatically implementing an expansionary fiscal policy to alleviate the pain of recession, but the government does not have to change any laws for this to happen.

- If economy is in a boom, $Y \uparrow \Rightarrow T \uparrow \Rightarrow$ Less deficit and $Y \downarrow$. This is equivalent to automatically implementing an contractionary fiscal policy to cool down an otherwise over-heated economy, but the government does not have to do extra work for this to happen.

- In algebra, plugging $T = T_0 + tY$ into equilibrium equation, we have $Y = \frac{1}{1-b+bt} (a + I - bT_0)$ (Refer to Page 187 in the textbook). We can see the absolute value of new tax multiplier $\frac{b}{1-b+bt}$ is smaller, which reflects the fact that the introduced "stabilizer effects" partially offset the original tax multiplier effect where we assume $T$ are independent of income $Y$. 

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Automatic Stabilizer: example

Homework Question 10

**Automatic Stabilizer** are mechanisms built in the economy that tend to reduce the multiplier effect. Which of the following items act as automatic stabilizer?

A. Budget deficit
B. Social Security Benefits
C. Private investment spending
D. Unemployment compensation
Homework Question 10

**Automatic Stabilizer** are mechanisms built in the economy that tend to reduce the multiplier effect. Which of the following items act as automatic stabilizer?

A. Budget deficit
B. Social Security Benefits
C. Private investment spending
D. Unemployment compensation
38. You are hired by the Bureau of Economic Analysis (BEA) as an economic consultant. The chairperson of the BEA tells you that he believes the current unemployment rate is too high. The unemployment rate can be reduced if aggregate output increases. He wants to know what policy to pursue to increase aggregate output by $300 billion. The best estimate he has for the MPC is .8. Which of the following policies should you recommend?

A Reduce government spending by $300 billion and reduce taxes by $300 billion.
B Increase both government spending and taxes by $300 billion.
C Increase government spending by $300 billion and reduce taxes by $300 billion.
D Increase government spending by $150 billion and reduce taxes by $150 billion.

Back
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A  Reduce government spending by $300 billion and reduce taxes by $300 billion.
B  Increase both government spending and taxes by $300 billion.
C  Increase government spending by $300 billion and reduce taxes by $300 billion.
D  Increase government spending by $150 billion and reduce taxes by $150 billion.

> Back
36. Refer to the information provided in Figure 9.1 below to answer the question that follows.
Refer to Figure 9.1. At equilibrium, injections

A can be greater than $1,000 billion.
B equal $1,500 billion.
C equal leakages.
D equal $2,000 billion.

Back
36. Refer to the information provided in Figure 9.1 below to answer the question that follows. Refer to Figure 9.1. At equilibrium, injections

A can be greater than $1,000 billion.
B equal $1,500 billion.
C equal leakages.
D equal $2,000 billion.

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Injections: $I + G$, the non-consumption expenditure on total output. Leakages: $S + T$, the non-consumption use of total income. Keynes argues that injections equal leakages when the economy is at equilibrium.

Let’s check (A), notice that the intercept of AE line is $1000, we know that the intercept is also $a - bT + I + G$, thus $a - bT + I + G = 1000$. Normally, we assume that $a - bT > 0$ which is the intercept of consumption. so $I + G < 1000$.

Obviously, (B) and (D) are incorrect.
Professor Petry discussed four conditions that will always be present in the goods and services market when there is equilibrium. What are they (maximum 3 points)?

Describe the dynamic involved in moving this economy to equilibrium when $Y > AE$ (2 points). Assume the economy is comprised of households, firms and the government.
Professor Petry discussed four conditions that will always be present in the goods and services market when there is equilibrium. What are they (maximum 3 points)? Describe the dynamic involved in moving this economy to equilibrium when $Y > AE$ (2 points). Assume the economy is comprised of households, firms and the government.

1. $Y = AE$
2. Leakages = Injections ($T + S = G + I$)
3. No unplanned inventory changes ($Y - AE = 0$)
4. $Y = C + I + G$

If $Y > AE$, then there is excess production or excess inventories in the economy or actual inventories are greater than planned inventories. Therefore producers will decrease output to reach equilibrium.

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Part 1. [Equilibrium with Taxes] Refer to the information provided in Figure 1 below to answer the question that follows.

If planned investment is $50 billion and government spending is $30 billion, at equilibrium, consumption equals \( \underline{\underline{}} \) billion.
A: Step 1: From the consumption curve from the graph, we know that: At \( Y = 0; C = 170 \)
A: Step 1: From the consumption curve from the graph, we know that: At $Y = 0; C = 170$

Step 2: Then we plug this info into consumption function:

\[
C = 200 + 0.6 \times (0 - T)
\]  

(1)

\[
170 = 200 + 0.6 \times (-T)
\]  

(2)

\[
T = 50
\]  

(3)

Step 3: Therefore, using the equilibrium condition:

\[
Y = C + I + G
\]  

(4)

\[
Y = 200 + 0.6 \times (Y - 50) + 50 + 30
\]  

(5)

\[
\frac{0.4}{0.4} Y = 250
\]  

(6)

\[
Y = 625
\]  

(7)

Step 4: Plugging $Y$ back into consumption function, we get

\[
C = 200 + 0.6 \times (625 - 50) = 545
\]
A: *Step 1*: From the consumption curve from the graph, we know that: At $Y = 0; C = 170$

*Step 2*: Then we plug this info into consumption function:

$$C = 200 + 0.6 \times (0 - T) \quad (1)$$
$$170 = 200 + 0.6 \times (-T) \quad (2)$$
$$T = 50 \quad (3)$$

*Step 3*: Therefore, using the equilibrium condition:

$$Y = C + I + G \quad (4)$$
$$Y = 200 + 0.6 \times (Y - 50) + 50 + 30 \quad (5)$$
$$0.4Y = 250 \quad (6)$$
$$Y = 625 \quad (7)$$
A: *Step 1:* From the consumption curve from the graph, we know that: At $Y = 0; C = 170$

*Step 2:* Then we plug this info into consumption function:

\[
C = 200 + 0.6 \times (0 - T) \\
170 = 200 + 0.6 \times (-T) \\
T = 50
\]

*Step 3:* Therefore, using the equilibrium condition:

\[
Y = C + I + G \\
Y = 200 + 0.6 \times (Y - 50) + 50 + 30 \\
0.4Y = 250 \\
Y = 625
\]

*Step 4:* Plugging $Y$ back into consumption function, we get

\[
C = 200 + 0.6 \times (625 - 50) = 545
\]
Further Thoughts I
Actually, given the plot of consumption line, we can immediately figure out consumption function $C = 170 + 0.6Y$ by using the intercept and slope. So without solving for $T$, plugging this equation into equilibrium equation $Y = C + I + G$ leaves us with one unknown $Y$ to be solved for. This is a shortcut.
Further Thoughts II
Changing specific numbers into general parameters, we get an equilibrium equation
\[ Y = a + MPC \times (Y - T) + I + G \]
and solving for \( Y \) gives
\[ Y = \frac{a + I + G}{MPS} - \frac{MPC}{MPS} T \]
where \( \frac{1}{MPS} \) is government spending(investment) multiplier and \( -\frac{MPC}{MPS} \) is tax multiplier so the level of equilibrium income can be written as
\[ Y = \text{Spending Multiplier} \times (a + I + G) + \text{Tax Multiplier} \times T \]
Recall that in Chapter 8 (No T and G), we derive formula for \( Y^* \) as
\[ Y^* = \text{Spending Multiplier} \times (a + I) \]
Here, after adding two more components T and G, we have an additional part \( \text{spending Multiplier} \times G + \text{Tax Multiplier} \times T \)
This part can be interpreted as the income supported by government activities.

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Part 2 [Equilibrium and the MPC] The MPC in Macroville is .75. Given this information, answer the following questions:
a. If taxes were reduced by $1,000 in Macroville, by how much would equilibrium output change?
Part 2 [Equilibrium and the MPC] The MPC in Macroville is .75. Given this information, answer the following questions:

a. If taxes were **reduced by** $1,000 in Macroville, by how much would equilibrium output change?

A: We are given MPC = 0.75

Invoking the formula for Tax multiplier, we get

Tax multiplier = $-\frac{MPC}{1-MPC}$ = $-\frac{0.75}{1-0.75}$ = $-3$.

Then $\Delta Y = \Delta Y \times \text{Tax multiplier}$

$\Delta Y = (-1000) \times (-3) = 3000$

*Back*
b. If government spending were increased by $1,000 in Macroville, by how much would equilibrium output change?
b. If government spending were **increased by** $1,000 in Macroville, by how much would equilibrium output change?

A: We are given \( MPC = 0.75 \)

Using formula for Government spending multiplier

\[
\Delta Y = \Delta G \times \text{Government spending multiplier} = 1000 \times 4 = 4000 .
\]

\( Y \) will increase by $4,000.

*Back*
c. Explain why a tax cut of $1,000 would have less effect on the economy of Macroville than an increase in government spending of $1,000.
c. Explain why a tax cut of $1,000 would have less effect on the economy of Macroville than an increase in government spending of $1,000.

A: When government spending increases, the initial increase in aggregate expenditure equals the increase in government spending, but when taxes are cut, the initial increase in aggregate expenditure is only $MPC \times$ the change in taxes.

Back
3. [Equilibrium with Government] You are given the following income-expenditures model for the economy of Vulcan:

\[ C = 200 + 0.8Y_d \]
\[ T = 50 \]
\[ G = 100 \]
\[ I = 140 \]

(Note: Be careful with \( Y_d \) not \( Y \) since \( Y_d = Y - T \), this is a mistake students often made!).
a. What is the equilibrium level of income in Vulcan?
a. What is the equilibrium level of income in Vulcan?

A: Using the equilibrium condition: \textbf{National Income} = \textbf{Aggregate Expenditure}

\begin{align*}
Y &= 200 + 0.8 \times (Y - 50) + 140 + 100 \quad (8) \\
Y &= 440 + 0.8Y - 40 \quad (9) \\
Y &= 400 + 0.8Y \quad (10) \\
0.2Y &= 400 \quad (11) \\
Y &= 2000 \quad (12)
\end{align*}

the equilibrium level of income is 2000.

\textit{Back}
b. At the equilibrium level of income, what is the amount of consumption?
b. At the equilibrium level of income, what is the amount of consumption?

A: Pluggin equilibrium level of income into consumption equation, we have

\[ C = 200 + 0.8 \times (Y - 50) \]  \hspace{1cm} (13)
\[ C = 200 + 0.8Y - 40 \]  \hspace{1cm} (14)
\[ C = 160 + 0.8 \times 2000 \]  \hspace{1cm} (15)
\[ C = 1760 \]  \hspace{1cm} (16)

the amount of consumption is 1760.

Back
c. What is the value of the government spending multiplier in this economy?
c. What is the value of the government spending multiplier in this economy?
A: Using the formula for Government spending multiplier = $\frac{1}{1-MPC}$

$=\frac{1}{1-0.8} = \frac{1}{0.2} = 5$. Therefore, Multiplier = 5.
d. If government spending **increases** to 150, what is the new level of equilibrium income?
d. If government spending increases to 150, what is the new level of equilibrium income?

A: \[ \Delta G = G' - G = 150 - 100 = 50 \]
\[ \Delta Y = \Delta G \times \text{Government spending multiplier} = 50 \times 5 = 250 \]
\[ Y' = Y + \Delta Y = 2000 + 250 = 2250. \]

The new level of equilibrium income is 2250.
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A: 7:00-9:00 on Monday February 18.
Q2: Where is it?
A: Foellinger Auditorium where you take your lectures. See compass2g for more information.
Q3: Is there a conflict midterm I?
A: Yes, there is one for students who has registered for it in the first week.
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Q5: What does the Midterm I look like?
A: It consists of 40 Multiple choices and 4 free response questions that each may have some sub-questions.

Q6: What do I have to bring to the Midterm I?
A: Pen, pencil, eraser, ruler, calculator with basic functions and your student ID. No cell phone is allowed to use during the exam because it’s a closed-book closed-notes exam.
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