

(Triple the Awesomeness!!!)



## Module 21 - Multipliers

Mr. Hess  
AP Macroeconomics

1

1

---

---

---

---

---

---

---

---

## Disposable Income

◆ This is also known as your:

- ◆ Net Income
- ◆ Paycheck
- ◆ After tax income

2

2

---

---

---

---

---

---

---

---

## Marginal Propensity to Consume (MPC)

◆ The fraction of any change in disposable income that is consumed.

◆  $MPC = \frac{\text{Change in Consumption}}{\text{Change in Disposable Income}}$

◆  $MPC = \frac{\Delta C}{\Delta DI}$

3

3

---

---

---

---

---

---

---

---

## Marginal Propensity to Save (MPS)

◆ The fraction of any change in disposable income that is saved.

◆  $MPS = \frac{\text{Change in Saving}}{\text{Change in Disposable Income}}$

◆  $MPS = \frac{\Delta S}{\Delta DI}$

4

4

---

---

---

---

---

---

---

---

## Marginal Propensities

◆  $MPC + MPS = 1$

∴  $MPC = 1 - MPS$

∴  $MPS = 1 - MPC$

- ◆ Remember, people do two things with their disposable income, consume or save!

5

5

---

---

---

---

---

---

---

## The Spending Multiplier

- ◆ The Spending Multiplier can be calculated from the MPC or the MPS.

◆  $\text{Multiplier} = 1 / (1 - MPC)$  or  $1 / MPS$

- ◆ Multipliers are (+) when there is an increase in spending and (-) when there is a decrease.

6

6

---

---

---

---

---

---

---

## The Spending Multiplier Effect

- ◆ An initial change in spending ( $C$ ,  $I_G$ ,  $G$ ,  $X_N$ ) causes a larger change in aggregate spending, or Aggregate Demand (AD).

◆  $\text{Multiplier} = \frac{\text{Change in AD}}{\text{Change in Spending}}$

◆  $\text{Multiplier} = \frac{\Delta AD}{\Delta C, I_G, G, \text{ or } X_N}$

7

7

---

---

---

---

---

---

---

## The Spending Multiplier Effect

- ◆ Why does this happen?

- ◆ Expenditures and income flow continuously which sets off a spending increase in the economy.

8

8

---

---

---

---

---

---

---

## Spending Multiplier Example

9

- ◆ Ex. If the government increases infrastructure spending by \$10 Billion, then contractors will hire and pay more workers, which will increase aggregate spending by more than the original \$10 Billion.

9

---

---

---

---

---

---

---

---

## The Tax Multiplier

10

- ◆ When the government taxes, the multiplier works in reverse
- ◆ Why?
  - ◆ Because now money is leaving the circular flow
- ◆ Tax Multiplier (note: it's **NEGATIVE**)

$$= -MPC / 1 - MPC \text{ OR } -MPC / MPS$$

- ◆ If there is a tax **CUT**, then the multiplier is +, because there is now more money in the circular flow.

10

---

---

---

---

---

---

---

---

## Tax Multiplier Example

11

- ◆ Ex. If the government decides to increase taxes by \$500 Billion, then disposable income will fall, which will decrease short-run aggregate supply by more than the original \$500 Billion.

11

---

---

---

---

---

---

---

---

## MPC, MPS, & Multipliers

12

- ◆ Ex. Assume U.S. citizens spend 95¢ for every extra \$1 they earn. Further assume that the real interest rate ( $r$ ) decreases, causing a \$100 billion increase in gross private investment. Calculate the effect of a \$50 billion increase in  $I_G$  on U.S. Aggregate Demand (AD).

-Step 1: Calculate the MPC and MPS

- $MPC = \frac{\Delta C}{\Delta Y} = \frac{95}{100} = .95$

- $MPS = 1 - MPC = .05$

-Step 2: Determine which multiplier to use, and whether it's + or -

- The problem mentions an increase in  $\Delta I_G$ ; use a (+) spending multiplier

-Step 3: Calculate the Spending and/or Tax Multiplier

- $\frac{1}{MPS} = \frac{1}{.05} = 20$

-Step 4: Calculate the Change in AD

- $(\Delta C, I_G, G, \text{ or } X_N) * \text{Spending Multiplier}$

- $(\$100 \text{ billion } \Delta I_G) * (20) = \$2000 \text{ billion } \Delta AD = \text{AKA} = \$2 \text{ trillion } \Delta AD$

12

---

---

---

---

---

---

---

---

# MPC, MPS, & Multipliers

◆ Ex. Assume France raises taxes on its citizens by €500 billion. Furthermore, assume that the French save 25% of the change in their disposable income. Calculate the effect the €500 billion change in taxes on the French economy.

-Step 1: Calculate the MPC and MPS

• MPC = 25% (given in the problem) = **.25**

• MPC = 1 - MPS = 1 - .25 = **.75**

-Step 2: Determine which multiplier to use, and whether it's + or -

• The problem mentions an increase in T.: use (-) tax multiplier

-Step 3: Calculate the Spending and/or Tax Multiplier

•  $\frac{\Delta Y}{\Delta T} = \frac{1}{MPS} = \frac{1}{.25} = \mathbf{-4}$

-Step 4: Calculate the Change in AD

•  $(\Delta \text{Tax}) \times \text{Tax Multiplier}$

•  $(€500 \text{ billion } \Delta T) \times (-4) = \mathbf{-€1,500 \text{ billion } \Delta \text{ in AD} = \text{AKA} = \mathbf{-€1.5 \text{ trillion } \Delta \text{ in AD}}$

13

13

# MPC, MPS, & Multipliers

◆ Ex. Assume the British spend  $\frac{1}{3}$  of their disposable income. Furthermore, assume that the British government increases its spending by £50 billion and in order to maintain a balanced budget simultaneously increases taxes by £50 billion. Calculate the effect the £50 billion change in government spending and £50 billion change in taxes on British Aggregate Demand.

-Step 1: Calculate the MPC and MPS

• MPC =  $\frac{1}{3}$  (given in the problem) = **.33**

• MPS = 1 - MPC = 1 - .33 = **.67**

-Step 2: Determine which multiplier to use, and whether it's + or -

• The problem mentions an increase in G and an increase in T.: combine a (+) spending with a (-) tax multiplier

-Step 3: Calculate the Spending and Tax Multipliers

• Spending Multiplier =  $\frac{1}{MPS} = \frac{1}{.67} = \mathbf{1.5}$

• Tax Multiplier =  $\frac{1}{MPC} = \frac{1}{.33} = \mathbf{-3}$

-Step 4: Calculate the Change in AD

•  $[\Delta G \times \text{Spending Multiplier}] + [\Delta T \times \text{Tax Multiplier}]$

•  $[(€50 \text{ billion } \Delta G) \times 1.5] + [(€50 \text{ billion } \Delta T) \times -3]$

•  $[€75 \text{ billion}] + [€150 \text{ billion}] = \mathbf{€225 \text{ billion } \Delta \text{ AD}}$

14

14

# The Balanced Budget Multiplier

◆ That last problem was a pain, huh?

◆ Remember when Government Spending increases are matched with an equal size increase in taxes, that the change ends up being = to the change in Government spending.

◆ Why?

$$\frac{1}{MPS} + \frac{-MPC}{MPS} = \frac{1 - MPC}{MPS} = \frac{MPS}{MPS} = 1$$

◆ The balanced budget multiplier always = 1

15

15

# Summary

◆ An initial change in spending ( $C, I_G, G, X_N$ ) causes a larger change in aggregate spending, or Aggregate Demand (AD).

◆ When the government taxes, the multiplier works in reverse because now money is leaving the circular flow.

◆ If Government Spending increases are matched with an equal size increase in taxes, that the change ends up being = to the change in Government spending.

$$\frac{1}{MPS} + \frac{-MPC}{MPS} = \frac{1 - MPC}{MPS} = \frac{MPS}{MPS} = 1$$

16

16