Fun!!! With the MPC, MPS, and Multipliers

Disposable Income

- Net Income

- Paycheck

- After-tax income

Marginal Propensity to Consume (MPC)

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

- MPC= <u>Change in Consumption</u>
                Change in Disposable Income

- MPC = $\Delta C / \Delta DI$

Marginal Propensity to Save (MPS)

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

- MPS= <u>Change in Savings</u>

    Change in Disposable Income

- MPS = $\Delta S / \Delta DI$

Marginal Propensities

- MPC + MPS = 1
  - .: MPC = 1 – MPS
  - .: MPS = 1 – MPC
- Remember, people do two things with their disposable income, consume it or save it!

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).

- Multiplier = <u>Change in AD</u>

  Change in Spending

- Multiplier = $^{\Delta\ AD}/_{\Delta\ C,\ I,\ G,\ or\ X}$

The Spending Multiplier Effect

- Why does this happen?

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

The Spending Multiplier Effect

–Ex. If the government increases defense spending by $1 Billion, then defense contractors will hire and pay more workers, which will increase aggregate spending by more than the original $1 Billion.

Calculating the Spending Multiplier

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

- Multiplier = $\frac{1}{1\text{-MPC}}$ or $\frac{1}{\text{MPS}}$

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

Calculating the Tax Multiplier

- When the government taxes, the multiplier works in reverse
- Why?
  - Because now money is leaving the circular flow
- Tax Multiplier (note: it's negative)
  - $= \frac{-MPC}{1-MPC}$ or $\frac{-MPC}{MPS}$
- If there is a tax-CUT, then the multiplier is +, because there is now more money in the circular flow

MPS, MPC, & Multipliers

- Ex. Assume U.S. citizens spend 90¢ for every extra $1 they earn. Further assume that the real interest rate (r%) decreases, causing a $50 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
    - $MPC = \frac{\Delta C}{\Delta DI} = \frac{.9}{1} = \underline{.9}$
    - $MPS = 1 - MPC = \underline{.10}$
  - Step 2: Determine which multiplier to use, and whether it's + or -
    - The problem mentions an increase in ΔI_G .: use a (+) spending multiplier
  - Step 3: Calculate the <u>Spending</u> and/or Tax Multiplier
    - $\frac{1}{MPS} = \frac{1}{.10} = \underline{10}$
  - Step 4: Calculate the Change in AD
    - $(\Delta C, I_G, G, \text{ or } X_N) *$ Spending Multiplier
    - ($50 billion ΔI_G) * (10) = <u>*$500 billion ΔAD*</u>

MPS, MPC, & Multipliers

- Ex. Assume Germany raises taxes on its citizens by €200 billion . Furthermore, assume that Germans save 25% of the change in their disposable income. Calculate the effect the €200 billion change in taxes on the German economy.
    - Step 1: Calculate the MPC and MPS
        - MPS = 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
        - $^{-MPC}/_{MPS} = {^{-.75}}/_{.25} = $ *-3*
    - Step 4: Calculate the Change in AD
        - (Δ Tax) * Tax Multiplier
        - (€200 billion Δ T) * (-3) = *-€600 billion Δ in AD*

MPS, MPC, & Multipliers

- Ex. Assume the Japanese spend $^4/_5$ of their disposable income. Furthermore, assume that the Japanese government increases its spending by ¥50 trillion and in order to maintain a balanced budget simultaneously increases taxes by ¥50 trillion. Calculate the effect the ¥50 trillion change in government spending and ¥50 trillion change in taxes on Japanese Aggregate Demand.
  - Step 1: Calculate the MPC and MPS
    - MPC = $^4/_5$ (given in the problem) = *.80*
    - MPS = 1 – MPC = 1 - .80 = *.20*
  - 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 <u>Spending and Tax</u> Multipliers
    - Spending Multiplier = $^1/_{MPS}$ = $^1/_{.20}$ = *5*
    - Tax Multiplier = $^{-MPC}/_{MPS}$ = $^{-.80}/_{.20}$ = *-4*
  - Step 4: Calculate the Change in AD
    - [Δ G * Spending Multiplier] + [Δ T * Tax Multiplier]
    - [(¥50 trillion Δ G) * 5] + [(¥50 trillion Δ T) * -4]
    - [¥250 trillion   ] + [- ¥200 trillion   ] = *¥50 trillion Δ AD*

The Balanced Budget Multiplier

- That last problem was a pain, wasn't it?

- 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?

  - $^1/_{MPS} + {}^{-MPC}/_{MPS} = {}^{1-MPC}/_{MPS} = {}^{MPS}/_{MPS} = 1$

- The balanced budget multiplier always = 1

2008 FRQ

1. Assume the United States economy is operating at full-employment output and the government has a balanced budget. A drop in consumer confidence reduces consumption spending, causing the economy to enter into a recession.

(a) Using a correctly labeled graph of the short-run Phillips curve, show the effect of the decrease in consumption spending. Label the initial position "A" and the new position "B".

(b) What is the impact of the recession on the federal budget? Explain.

(c) Assume that current real gross domestic product falls short of full-employment output by $500 billion and the marginal propensity to consume is 0.8.

(i) Calculate the minimum increase in government spending that could bring about full employment.

(ii) Assume that instead of increasing government spending, the government decides to reduce personal income taxes. Will the reduction in personal income taxes required to achieve full employment be larger than or smaller than the government spending change you calculated in part (c)(i) ? Explain why.

(d) Using a correctly labeled graph of the loanable funds market, show the impact of the increased government spending on the real interest rate in the economy.

(e) How will the real interest rate change in part (d) affect the growth rate of the United States economy? Explain.

2008 FRQ Rubric

One point is earned for correctly calculating the increase in government purchases:

Change in G = Recessionary gap/Multiplier = ($500/5) = $100.

One point is earned for stating that a larger reduction in personal income taxes is required than the $100 billion increase in government spending.

One point is earned for explaining that households do not spend all of the initial increase in disposable income caused by a tax reduction, or that the tax multiplier is smaller than the government spending multiplier.