



## Macroeconomics: MPC, MPS & Multiplier Effect

There are four values used to assess the saving and spending of household disposable income: average propensity to consume (APC), marginal propensity to consume (MPC), average propensity to save (APS) and marginal propensity to save (MPS).

APC and APS are easy to understand – the average money amount saved or spent over a year. MPC and MPS are ratios. Remember that marginal opportunity cost meant the opportunity cost associated with consuming one additional unit of good? MPC and MPS have to do with how much money is saved or spent per one additional dollar of disposable income.

$$MPS = \frac{\text{Change in Savings}}{\text{Change in Disposable Income}} = \frac{S_{new} - S_{old}}{Y_{d,new} - Y_{d,old}}$$

$$MPC = \frac{\text{Change in Consumption}}{\text{Change in Disposable Income}} = \frac{C_{new} - C_{old}}{Y_{d,new} - Y_{d,old}}$$

The only two things a household can do with its money are spend or save. Whatever ratio (fraction) of your money is not saved, will be spent on consumption. In other words:

$$MPS + MPC = 1$$

*Example:* If your disposable income increases from \$50,000 to \$57,500 a year, and your savings increases from \$25,000 a year to \$28,000 a year, calculate your MPS.

*Solution:* The change in savings is: \$28,000 – \$25,000 = \$3,000  
The change in income is: \$57,500 – \$50,000 = \$7,500

$$MPS = \frac{\$3,000}{\$7,500} = 0.40$$

When a change in one of the AD demand sectors increases or decreases AD, then we know GDP changes as well. But the amount of change in GDP is always greater than the change in AD. It turns out the quantity change in GDP is a multiple of the change in AD and is inversely proportional to MPS (and hence MPC). This is called the **multiplier effect**. Like the butterfly effect, an initial increase in AD will have a trickle-down effect that is amplified through the economy. The equation below shows how to calculate the change in GDP (not a percentage, this is a \$ amount).

$$\text{Change in GDP} = \frac{\text{Change in AD}}{MPS} = \frac{\text{Change in AD}}{1 - MPC}$$

You should test the equation to prove to yourself that the higher the MPC of a country, the greater the multiplier effect for changes in GDP!

The equation can also be rewritten as:  $\text{Change in } GDP = \text{Change in } AD \times \left(\frac{1}{1-MPC}\right)$

The factor  $1/(1 - MPC)$  is called the **multiplier**. If a question tells you that the multiplier is 2.5, that means:  $\text{Change in } GDP = 2.5 \times \text{Change in } AD$ .

### **Practice Problems**

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1. If your consumption increases from \$30,000/yr to \$40,000/yr when your disposable income increases from \$84,000 to \$96,500/yr, calculate your MPC.
2. Kari received a raise in salary from \$72,000/yr to \$77,000/yr. Her savings increased from \$21,000 to \$23,000 per year. Calculate her MPC.
3. Dari had hours cut from his job so that his disposable income decreased from \$59,500/yr to \$51,000/yr. His consumption dropped from \$46,000/yr to \$40,000/yr. Calculate his MPS.
4. If aggregate demand increased by \$4,500 and MPC is 0.60, find the change in GDP.
5. If real GDP decreased by \$10 billion and the multiplier is 2.5, find the change in aggregate demand.
6. If aggregate demand increased by \$7,980 and MPS is 0.35, find the change in GDP.
7. Real GDP increased by \$600,000 and MPC is 0.45. Find the original change in aggregate demand.
8. If an \$8 million increase in one sector of aggregate demand results in a \$13.8 million increase in GDP, find MPC.
9. Find the multiplier if a \$425,000 decrease in investment expenditure resulted in a \$2 million decrease in real GDP.

### **Solutions**

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1. 0.80
2. 0.60
3. 0.29
4. \$11,250
5. decrease of \$4 billion
6. \$22,800
7. \$330,000
8. 0.42
9. 4.7