

ECON 2301-3 Principles of Macroeconomics

Saving and Investment

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1 Introduction

Recall our GDP accounting identity:

$$Y = C + I + G + NX \quad (1)$$

where Y is total income (or total expenditure), C is consumption, G are government purchases, and NX are net exports. Equation (1) is an identity because every dollar of expenditure that shows up on the left side also shows up in one of the four components on the right side.

Assume a **closed economy**, so $NX = 0$. It's true that most economies are open. However, the closed economy case is easier to learn, and we can still learn a lot about how the world works by studying the closed economy case.

Rearranging terms in equation (1) and substituting $NX = 0$, we have:

$$I = Y - C - G \quad (2)$$

Notice that the right hand side of equation (2) is just total income in the economy that remains after paying for consumption and government purchases. This is the definition of **national savings** (S). Then, by definition:

$$S = Y - C - G \quad (3)$$

Then, it follows that for the economy as a whole (closed economy):

$$S = I \quad (4)$$

equation (4) implies that savings in the economy are equal to investment. Or, that one person's savings can finance another person's investment.

Now, define T = net taxes = taxes minus transfer payments. Then, add T in both sides of equation (3), and rearrange terms, so equation (3) can be rewritten as:

$$S = \underbrace{(Y - T - C)}_{\text{Private Saving}} + \underbrace{(T - G)}_{\text{Public Saving}}$$

Thus, national savings (S) are equal to private saving plus public saving. **Private saving** is income that households have left after paying for taxes and consumption. **Public saving** is tax revenue that the government has left after paying for its spending.

The government can have a budget surplus or deficit.

- **Budget surplus:** If $T - G > 0$, there is excess of tax revenue over government spending.
- **Budget deficit:** If $T - G < 0$, there is a shortfall of tax revenue from government spending.

2 Example

You have the following information for Country A: $GDP = \$19$ trillion, $C = \$13$ trillion, $G = \$2.5$ trillion, and Budget deficit = \$1.2 trillion.¹

1. Find public saving, net taxes, private saving, national saving, and investment.
2. Now assume that government cuts taxes by \$300 billion. Find new budget deficit and answers to 1 if:
 - (a) Consumers save the entire tax cut
 - (b) Consumers save 1/3 and spend the other 2/3 of the tax cut

2.1 Solution

Budget deficits is $T - G = -1.2$, so substitute $G = 2.5$, and solve for T .

$$\begin{aligned} T - 2.5 &= -1.2 \\ T &= 2.5 - 1.2 = 1.3 \end{aligned}$$

Now, we can find private savings:

$$Y - C - T = 19 - 13 - 1.3 = 4.7$$

¹Recall one trillion is 1 followed by 12 zeroes, and one billion is 1 followed by 9 zeroes.

National savings, and Investment are:

$$S = I = Y - C - G = 19 - 13 - 2.5 = 3.5$$

or

$$S = I = \text{Private saving} + \text{Public Saving} = 4.7 - 1.2 = 3.5$$

2.2 Solution: When Government Cut Taxes

If government cut taxes by \$300 billion (or \$0.3 trillion). Then, using T we found initially:

$$T = 1.3 - 0.3 = 1$$

Scenario (a): If consumers save the entire tax cut, then consumption doesn't change.

- Budget deficit is: $T - G = 1 - 2.5 = -1.5$.
- Private saving: $19 - 13 - 1 = 5$
- National savings and Investment: $19 - 13 - 2.5 = 3.5$

Scenario (b): Because consumers spend 2/3 of tax cut, then new consumption is:

$$C = 13 + \frac{2}{3} * 0.3 = 13.2$$

- Budget deficit is: $T - G = 1 - 2.5 = -1.5$.
- Private saving: $19 - 13.2 - 1 = 4.8$
- National savings and Investment: $19 - 13.2 - 2.5 = 3.3$

Table 1: Summary of the Effects of a Tax Cut in National Saving and Investment

	Consumers save all the tax cut	Consumers save 1/3 and spend 2/3 of tax cut
Change in C:	0	↑ \$0.2 tn
Net taxes, T	\$1 tn, it ↓ by \$0.3 tn	
Budget deficit	\$-1.5 tn, ↑ by the tax cut of \$0.3 tn	
Public saving	\$5 tn, it ↑ by \$0.3 tn	\$4.8 tn, it ↑ by \$0.1 tn
$S = I$	\$3.5 tn, unchanged	\$3.3 tn, it ↓ by \$0.2 tn