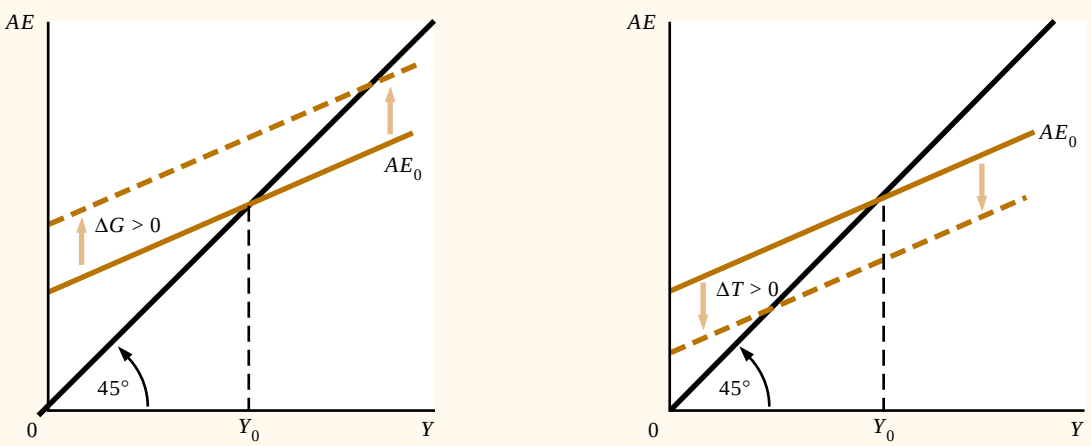
What Is the Balanced Budget Multiplier?

In Chapter 22 we examine the effects on equilibrium GDP of changing the level of government purchases or changing the level of tax revenues. In this web-based section, we examine the effects of a policy whereby the government increases its purchases of goods and services and *simultaneously* increases its tax revenues to keep the budget deficit or surplus unchanged. This kind of policy is referred to as a *balanced budget* change in government purchases.

A Two-Part Policy Package

Figure 1 shows the two separate halves of this policy. In part (i), the increase in G increases the level of autonomous desired aggregate spending and therefore causes the AE function to shift upwards. This part of the policy package, if taken by itself, would

FIGURE 1 A Balanced Budget Increase in Government Purchases



(i) Increase in G (i) Increase in T

A balanced budget increase in government purchases will increase the equilibrium level of GDP. Part (i) shows the effect of an increase in (autonomous) government purchases, ΔG. Taken by itself, this policy would shift the AE function upward and lead to an increase in equilibrium GDP above Y_0. Part (ii) shows the effect of an increase in autonomous taxes, ΔT. Taken by itself, this policy would shift the AE function downward and reduce equilibrium GDP below Y_0. If the policy is designed so that $\Delta G = \Delta T$, the government's budget deficit (or surplus) will be initially unaffected by the policy. In this case, the expansionary effect from part (i) will be stronger than the contractionary effect from part (ii). The net result will be an increase in equilibrium GDP.

The expansion in GDP from such a policy will, however, increase induced tax revenues, thus increasing the government's budget surplus (or reducing its deficit). However, the government can choose a value of ΔT that is smaller than ΔG so that the *initial* change in government purchases is exactly equal to the *eventual* change in net tax revenues. In this case, as shown by the algebra in the text, the balanced budget multiplier is precisely one—that is, an \$X increase in G will result in an \$X increase in equilibrium GDP (and an \$X increase in net tax revenues).

clearly have the effect of increasing the equilibrium level of GDP. Part (ii) of Figure 1 shows the second half of the policy, an increase in the autonomous level of taxes. The increase in (autonomous) T leads to a reduction in households' disposable income, for any given level of Y, and thus leads to a decline in desired aggregate spending. This decline in desired spending causes the AE function to shift down. This part of the policy package, if taken by itself, would cause a reduction in equilibrium GDP.

Now suppose the government enacts both parts off this policy simultaneously, and suppose further that both G and T initially increase by $5 billion. What is the net effect on desired aggregate spending and on the equilibrium level of GDP? It may be tempting to conclude that the two changes will exactly offset each other, leave the AE function in its initial position, and have no net effect on equilibrium GDP. But this is not true in our simple model of national income determination. Let's see why.

When autonomous taxes increase by $5 billion, the private sector's level of desired spending will decline by *less than* the full $5 billion because the marginal propensity to consume out of disposable income is less than one. For example, if the MPC out of disposable income is 0.8, the $5-billion increase in taxes will reduce disposable income by $5 billion and thus lead to a decline in desired consumption spending of only $4 billion (there will also be a reduction in desired saving of $1 billion). In contrast, changes in the government's purchases of goods and services lead to an equal change in desired aggregate spending. The $5-billion increase in government purchases will lead to an increase in desired aggregate expenditure equal to the full $5 billion. Thus, the combination of increasing the autonomous levels of G and T by the same amount will actually lead to a net *increase* in desired aggregate spending, an upward shift of the AE function, and an increase in the equilibrium level of GDP.

An equal increase in autonomous government purchases and autonomous taxes will shift the AE function upwards and lead to an increase in the equilibrium level of GDP. An equal decrease in autonomous government purchases and autonomous taxes will shift the AE function downwards and lead to a decrease in the equilibrium level of GDP.

There is one slight problem with the previous analysis, however, and it relates to the overall effect on the government's budget deficit or surplus. Even though the two-part policy involves a combination of autonomous spending and tax increases that *initially* leaves the government's budget deficit (or surplus) unchanged, we just saw that the overall effect of the policy is to increase the level of GDP. And, as GDP increases, we know that the government's net tax revenues will rise. Thus, after the initial increases in autonomous purchases and taxes, the induced increase in government net tax revenues implies that the government's budget surplus will rise (or the deficit will fall). So, the policy that we initially described as a balanced budget change actually *does* affect the budget deficit (or surplus).

Could the government adjust its policy package so that the *initial* change in autonomous government purchases is just equal to the *eventual* change in net tax revenues, thus leaving the budget deficit (or surplus) unchanged? The answer is yes. To determine the ultimate effect on equilibrium GDP of a genuinely balanced budget change in purchases requires a little algebra.

Algebraic Derivation of the Balanced Budget Multiplier

First, suppose the government's net tax revenues are given by

$$T = \tau + tY \qquad (1)$$

where τ is the level of autonomous net tax revenues and t is the net tax rate. If the government policy is to leave the budget deficit (or surplus) unchanged, the total change in purchases must equal the total change in net tax revenues,

$$\Delta G = \Delta T = \Delta\tau + t \cdot \Delta Y \tag{2}$$

Now consider the condition that determines the equilibrium level of GDP. We let A be the level of autonomous spending. The equilibrium condition is that GDP equals desired aggregate expenditure, or

$$Y = A + \text{MPC}(1 - t)Y \tag{3}$$

(We have simplified the model by assuming a closed economy so that the marginal propensity to import does not appear in the aggregate expenditure function.) Following the change in government policy, the change in equilibrium GDP is given by

$$\Delta Y = \Delta A + \text{MPC}(1 - t) \cdot \Delta Y \tag{4}$$

The change in autonomous desired spending, ΔA, has two components. First, there is an increase in government purchases, ΔG. Second, the increase in autonomous taxes, $\Delta\tau$, reduces disposable income by the same amount and leads to a reduction in desired consumption equal to MPC times $\Delta\tau$. Thus, the total change in autonomous desired expenditure is given by

$$\Delta A = \Delta G - \text{MPC} \cdot \Delta\tau \tag{5}$$

Substituting equation (5) into equation (4), we see that the total change in GDP is given by

$$\Delta Y = \Delta G - \text{MPC} \cdot \Delta\tau + \text{MPC}(1 - t) \cdot \Delta Y \tag{6}$$

Finally, if the government's budget deficit (or surplus) is to remain unchanged, we know from equation (2) that

$$\Delta\tau = \Delta G - t \cdot \Delta Y \tag{7}$$

Putting equation (7) into equation (6) our expression for the total change in GDP becomes

$$\Delta Y = \Delta G - \text{MPC}(\Delta G - t \cdot \Delta Y) + \text{MPC}(1 - t) \cdot \Delta Y \tag{8}$$

Now we collect terms in ΔG and ΔY on the right-hand side to get:

$$\Delta Y = \Delta G(1 - \text{MPC}) + \text{MPC} \cdot \Delta Y$$

$$\rightarrow \quad \Delta Y(1 - \text{MPC}) = \Delta G(1 - \text{MPC})$$

$$\rightarrow \quad \Delta Y = \Delta G \tag{9}$$

The change in GDP generated by this *balanced budget change* in government purchases is determined by what is called the *balanced budget multiplier*. In this simple model of national income determination (and assuming a closed economy), the balanced budget multiplier is exactly equal to one. If the government increases its purchases by \$X and also increases its autonomous taxes so that the *total* change in taxes (both autonomous and induced) equals \$X, the level of equilibrium GDP will increase by precisely \$X.