

The Effect of a Cut in the Tax Rate

We have analyzed the effects in the sticky-price model of many different shifts in the economic environment and in economic policy on the equilibrium level of real GDP and national income, but we have not analyzed the effect of a change in tax rates—largely because the analysis is slightly more complex than other changes.

First, begin with our standard sticky-price model expression for the equilibrium level of real GDP, Y :

$$Y = \frac{A}{1 - MPE}$$

where A is the level of *autonomous spending*, and MPE is the *marginal propensity to expend* income on domestic products, equal to:

$$MPE = C_y(1 - t) - IM_y$$

the marginal propensity to consume C_y , times one minus the tax rate t , minus the marginal propensity to import IM_y .

Second, recognize that a change Δt in the tax rate is a proportional change of:

$$\frac{C_y \Delta t}{1 - (C_y(1 - t) - IM_y)}$$

in the denominator 1 - MPE of our expression for real GDP, Y. (An increase in the tax rate *increases* the denominator because it *decreases* the MPE.)

Third, use our rule of thumb for calculating the proportional rate-of-change of a quotient—that it is equal to minus the proportional rate-of-change of the denominator—to recognize that the change Δt in the tax rate and the proportional change in the denominator 1-MPE that it produces will generate a proportional change in real GDP of:

$$\frac{\Delta Y}{Y} = - \frac{C_y \Delta t}{1 - (C_y(1 - t) - IM_y)}$$

We can rearrange this equation to isolate the change in real GDP ΔY on the left-hand side:

$$\Delta Y = - \left(\frac{1}{1 - (C_y(1 - t) - IM_y)} \right) \times C_y \times (Y \Delta t)$$

Interpreting the Formula

In this form, it is clear that the effect of a change in tax rates depends on three factors:

- The multiplier μ , for the first term in the equation above is simply the standard multiplier:

$$\mu = \frac{1}{1 - MPE} = \left(\frac{1}{1 - (C_y(1 - t) - IM_y)} \right)$$

- The marginal propensity to consume C_y .
- The amount of tax revenue raised by the change in tax rates, for the product of national income Y and the change in the tax rate Δt is simply ΔT , the change in total tax collections T .

Or, if we simply rewrite the equation:

$$\Delta Y = -\mu \times C_y \times \Delta T$$

where the initial minus sign appears because an *increase* in taxes *reduces* equilibrium real GDP and national income.

Comparing a Tax Change and a Spending Change

It is instructive to compare this equation with the analogous equation for the effect on equilibrium real GDP and national income of a change in government purchases ΔG :

$$\Delta Y = -\mu \times \Delta G$$

Comparing these two equations immediately suggests a general rule: other things being equal, a change in government purchases is a better way of affecting equilibrium real GDP—produces more output bang for the fiscal buck—than does a change in taxes. Only if the tax change is very carefully crafted to ensure a marginal propensity to consume C_y will it be about as good as the spending change, and if the associated marginal propensity to consume is much less than one the

tax change will be far worse considered as a stimulus or a cooling-off program.

Other Considerations

Of course, other things may not be equal. A well-crafted tax cut that quickly delivers money to households that are liquidity constrained—a tax cut focused on the unemployed, say—may well work more quickly than an increase in spending on, say, government infrastructure projects, and speed may well be important.

Moreover, we must consider the utility of the goods and services bought as a result of the change in fiscal policy. What households buy with the money they receive from a tax cut is what they want and value most: we know that the stimulus from a tax cut will have the accompanying effect of spending society's resources on goods and services that the households that receive the tax cut value. As long as the tax cut is directed toward households whose marginal purchases are important contributions to social welfare, these accompanying effects will be strong and beneficial.

With a spending increase, by contrast, what the government spends money on depends on the political process. Increased government purchases may be spent on very high-value public goods, if the political process works well. They may be spent on very low-value "pork-barrel" spending, if the political process is not working well.

