Introductory Macroeconomics

In-Tutorial #3
Week Starting 22rd March 2021

Questions.

1. Consider a simple closed economy without government spending or taxation

$$C = 3000 + 0.5Y$$

$$\bar{I} = 1500$$

$$Y^* = 12000$$

   For this economy, calculate exogenous expenditure, short-run equilibrium output, and the output gap. By how much would exogenous expenditure have to change to eliminate the output gap?

2. Now consider an economy with a government sector

$$C = 1850 + 0.6(Y - \bar{T})$$

$$\bar{I} = 900$$

$$\bar{T} = 100$$

$$\bar{G} = 100$$

   (a) Solve for the equilibrium level of output in this economy.

   (b) Suppose taxation increases by 50 units and government spending increases by 50 units at the same time. What happens to the equilibrium level of output? Define the budget surplus as $\bar{T} - \bar{G}$. What happens to the budget surplus?

Solutions to In-Tutorial Work.

1. First we solve for the equilibrium level of output. The equilibrium condition is $PAE = AE = Y$ which gives
$$3000 + 0.5Y + 1500 = Y$$
which simplifies to
$$4500 + 0.5Y = Y$$
or
$$4500 = 0.5Y$$
Hence the short-run equilibrium level of output is given by
$$Y = \frac{4500}{0.5} = 9000$$
Potential output is given as $Y^* = 12000$ so the output gap is
$$\text{Output Gap} = \frac{Y - Y^*}{Y^*} \times 100 = \frac{9000 - 12000}{12000} \times 100 = -25 \text{ percent}$$
To eliminate the output gap we need an additional 3000 units of output. The multiplier here is $1/(1 - 0.5) = 2$ so to get 3000 units of extra output we need 1500 units of extra expenditure.

2. With government spending and taxation, planned aggregate expenditure is
$$PAE = \bar{C} + c(Y - \bar{T}) + \bar{I} + \bar{G}$$
which here is
$$PAE = 1850 + 0.6(Y - 100) + 900 + 100 = 2790 + 0.6Y$$
   (a) The equilibrium condition is $PAE = AE = Y$ which gives
   $$2790 + 0.6Y = Y$$
   Hence the short-run equilibrium level of output is given by
   $$Y = \frac{2790}{0.4} = 6975$$
   (b) If both $\bar{G}$ and $\bar{T}$ increase by 50 the new PAE line is given by
   $$PAE = 1850 + 0.6(Y - 150) + 950 + 100 = 2810 + 0.6Y$$
   (notice this is a parallel shift up of the PAE line). Hence the new short-run equilibrium level of output is
   $$Y = \frac{2810}{0.4} = 7025$$
   Notice that Y increased by exactly 50, from 6975 to 7025, i.e., a one-for-one effect. This is an example of the *balanced-budget multiplier*. That is, an increase in government spending financed by an equivalent increase in taxes produces a change in equilibrium output equal to the change in spending (the multiplier is 1). The budget surplus was originally $\bar{T} - \bar{G} = 100 - 100 = 0$ and remains zero.