

Dr. Barry Haworth
University of Louisville
Department of Economics
Economics 202

Solving for Y*, step by step

Our starting point is to assume that we have a set of equations which describes spending within a given country. This set of equations reflects that, except for Consumption, each expenditure variable, expenditure in all areas of this economy is constant in that expenditure does not vary with changes in real GDP (i.e. changes in Y).

$C = 0.8(DI) + 4800$	(C = Consumption Expenditure, DI = Disposable Income)
$I = 5000$	(I = Investment Expenditure)
$G = 4000$	(G = Government Expenditure)
$X = 1000$	(X = Expenditure on Exports)
$M = 1000$	(M = Expenditure on Imports)
$T = 1000$	(T = Tax Revenues)
$DI = Y - T$	(Y = real GDP)

Finding equilibrium

In order to solve for equilibrium, we need the aggregate expenditure equation.:

$$(1) \quad AE = C + I + G + (X - M)$$

Step 1: substitute the equations/values for C, I, G, X and M into AE equation (1):

$$(2) \quad AE = [0.8(DI) + 4800] + 5000 + 4000 + (1000 - 1000)$$

Step 2: substitute Y - T for DI:

$$(3) \quad AE = [0.8(Y - T) + 4800] + 5000 + 4000 + (1000 - 1000)$$

Step 3: since T = 1000, substitute the values of 1000 for T:

$$(4) \quad AE = [0.8(Y - 1000) + 4800] + 5000 + 4000 + (1000 - 1000)$$

Step 4: simplify (4) to get: $AE = 0.8Y + 13000$

Step 5: Since $AE = Y$ at equilibrium, we can substitute the variable Y for AE in the previous equation as follows:

$$(5) \quad Y = 0.8Y + 13000$$

Step 6: in the process of solving for Y^* , we begin by subtracting $0.8Y$ from both sides of (5)

$$(6) \quad Y - 0.8Y = 0.8Y + 13000 - 0.8Y$$

Step 7: simplify (6) to get: $Y - 0.8Y = 13000$

Step 8: given that $Y - 0.8Y = 1Y - 0.8Y$, we can factor out the Y on the left side of the equation above:

$$(7) \quad (1 - 0.8)Y = 13000$$

Step 9: simplify (7) to get: $0.2Y = 13000$

Step 10: take the equation from step 9, and divide both sides by 0.2

$$(8) \quad \frac{0.2Y}{0.2} = \frac{13000}{0.2}$$

Step 11: simplify (8) to get $Y = 65000$

Our resulting value for Y is Y^* , our equilibrium real GDP.

That is, we have shown that $Y^* = 65000$