

THE KEYNESIAN-CROSS DIAGRAM

Keynesian model of income determination is called Keynesian cross-diagram.

$$C = a + b \times Y$$

$$E = C + I + G$$

$$Y = E$$

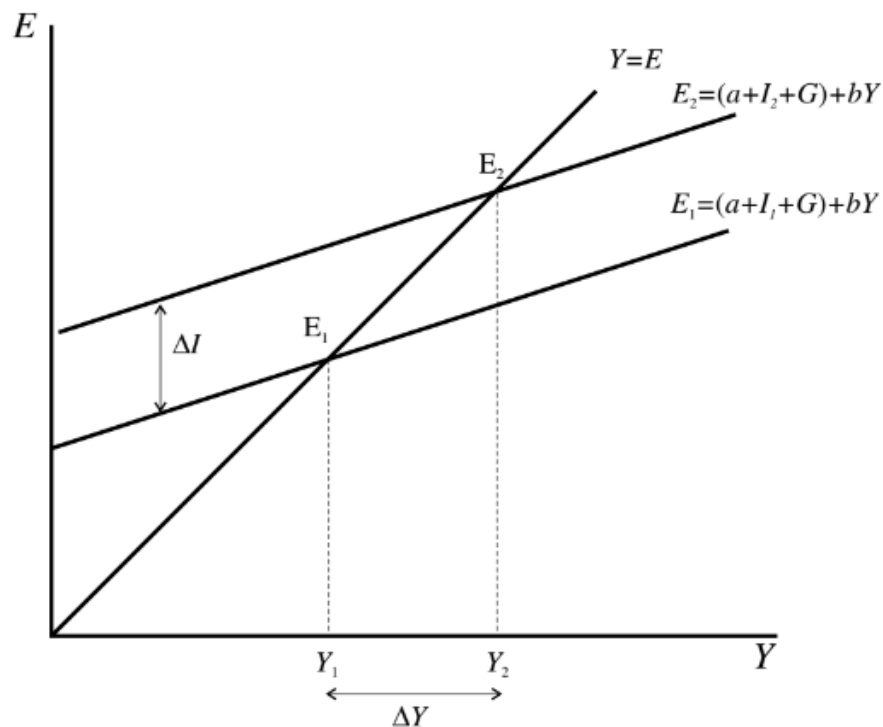


Figure 1. Keynesian cross-diagram

In equilibrium of national income, total expenditure is equal to total income:

$$E = a + b \times Y + I + G ,$$

$$Y = a + b \times Y + I + G ,$$

$$Y^* = \frac{a+I+G}{1-b} .$$

Let's consider the model in dynamic context. We assume that income is adjusted relatively to excess of demand is $E(t) - Y(t)$ with adjustment coefficient λ . The dynamic model is presented by equations:

$$C(t) = a + b \times Y(t) ,$$

$$E(t) = C(t) + I + G ,$$

$$\Delta Y(t + 1) = \lambda(E(t) - Y(t)) , \quad \lambda > 0 .$$

This dynamic model has the same equilibrium as the static model. In equilibrium, $\Delta Y(t + 1) = 0$, so

$$0 = \lambda(a + I + G) - \lambda(1 - b)Y^*$$

or

$$Y^* = a + I + G / (1 - b)$$

The result is the same as for the static model. The value of λ does not affect the equilibrium condition.

We consider the dynamics of this model. The recursive equation can be described by cobweb representation of the dynamic model with $\lambda = 1$. If $b < 1$ the line has a negative slope and passes through the horizontal axis at the equilibrium level of income (Fig. 2-3).

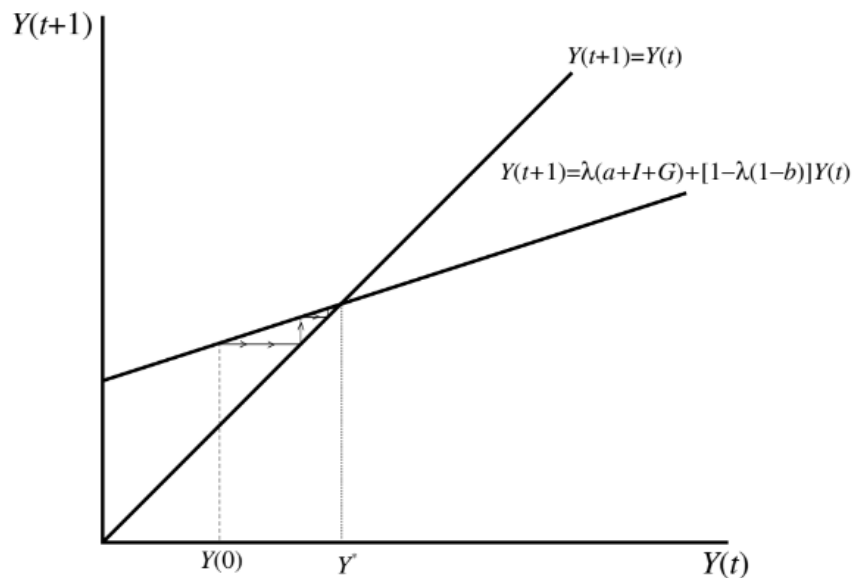


Figure 2. The convergence to equilibrium

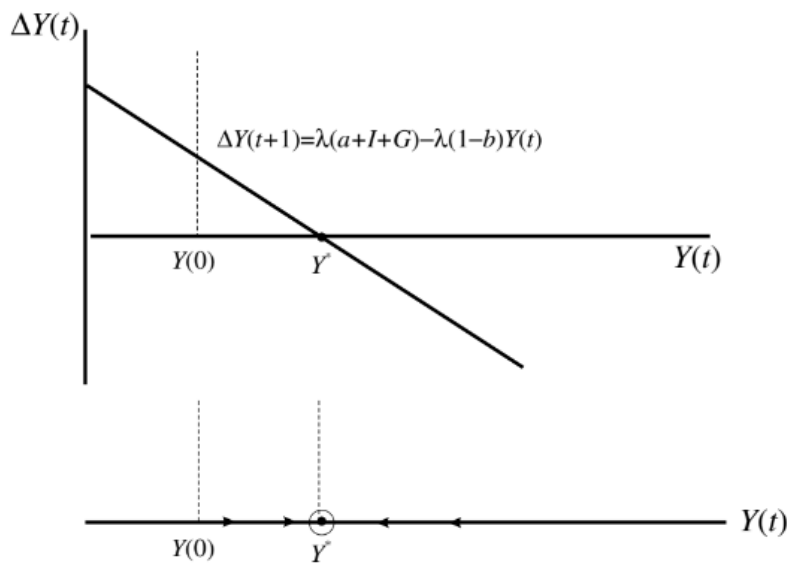


Figure 3. Structural graph of convergence to equilibrium

Take any initial value for income, denote $Y(0)$, which is measured on the horizontal axis. Let it be below the equilibrium level. In this case, $E(0) - Y(0) > 0$, and the change of income in period 1 is a proportion λ of this difference. Since $\lambda > 0$, the income in period 1 is higher than in period 0. Therefore, income grows and moves towards the equilibrium level (Fig. 4).

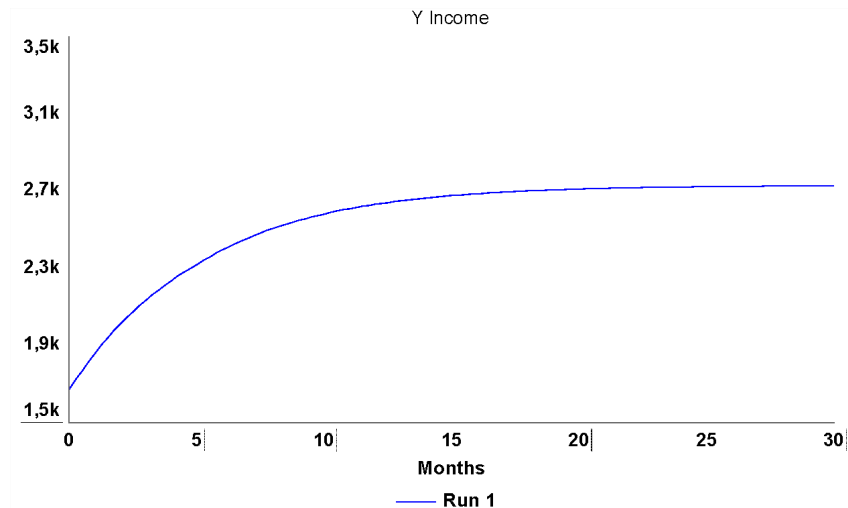


Figure 4. Dynamics of income

In case if initial level of income is above the equilibrium level $E(0) - Y(0) < 0$, thus, income falls.

References

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