

THE KEYNESIAN MODEL: THREE SECTOR NATIONAL MODEL AND EQUILIBRIUM PRODUCT

Model assumptions for economy with 3 sectors:

1. Stable price level (no inflation) -> all nominal values are actually real values
2. Economy does not operate on full-employment level nor full-capital level (there's enough labor and capital supply)
3. The economy does not take part in international trade (there's no export or import)

The principle of determining the equilibrium product is the same as in the two sector economy. Thus:

$$Y_{(E)} = AE$$

Because in the three sector economy there's also government beside households and firms, there's another type of expenditure we need to take into account: the government expenditure on goods and services which is considered to be autonomous.

$$AE = C + I + G$$

$$AE = Ca + c \cdot Y_D + I + G$$

The presence of government sector however affects also level of disposable income in consumption function (C). While in two sector economy, the national income Y was equal to disposable income Y_D , in three sector economy government collects taxes (autonomous taxes T_a and income taxes $t \cdot Y$) which lower the disposable income. Government also gives transfer payments (TR) to the households which increase their disposable income:

$$Y_D = Y + TR - T_T$$

$$T_T = T_a + t \cdot Y$$

Function of total taxes:

Thus the very final form of the equilibrium in three sector is:

$$Y_{(E)} = Ca + c \cdot (Y + TR - (T_a + t \cdot Y)) + I + G$$

- a) If $Y > AE$: The product in the economy is higher than the expenditure of firms and households which means that the economy produced more than the subjects bought and hence, there are unplanned inventories in the economy ($UI > 0$).
- b) If $Y < AE$: The product in the economy is lower than the expenditure of firms and households which means that the economy produced less than the subjects bought and hence, the unplanned inventories from previous years are decreasing ($IU < 0$).
- c) If economy is in equilibrium and $Y = AE$, no unplanned inventories are made nor used ($IU = 0$).



Other useful formulas for the topic:

Simple multiplier formula: $\alpha = \frac{1}{1-c(1-t)}$

Transfer payments multiplier formula: $\alpha_{TR} = \frac{c}{1-c(1-t)}$

Tax multiplier formula: $\alpha_{Ta} = \frac{c}{1-c(1-t)}$

Autonomous Expenditure formula: $A = C_a + c \cdot TR - c \cdot T_a + I + G$

Change in the equilibrium product: $\Delta Y_E = \alpha \cdot \Delta A$

$$\Delta Y = \alpha_{TR} \cdot \Delta TR$$

$$\Delta Y = \alpha_{T_a} \cdot \Delta T_a$$



QUESTIONS AND PROBLEMS:

Problem 1: Calculate the value of simple multiplier and tax multiplier if $c = 0.80$ and tax rate is 8%.

Problem 2: The description of the economy is following: tax rate is 19%, transfer payments are 40 mil. CZK, consumption is 80% of disposable income. Investments and government expenditure are both autonomous ($I=78$ mil. and $G=70$ mil. CZK). The product (Y) in the economy has reached 550 mil. CZK.

- a) Calculate the value of Y_D .
- b) Calculate the value of collected total taxes.
- c) Calculate the value of autonomous expenditure.
- d) Is the economy currently in equilibrium? If not, calculate the Y_E .
- e) Draw the equilibrium.