THE KEYNESIAN MODEL: FOUR SECTOR NATIONAL MODEL AND EQUILIBRIUM PRODUCT

Model assumptions for economy with 4 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** take part in international trade

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

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

However, in the four sector economy the country does trade with foreign countries and therefore when estimating the production of the economy we need to take in account so called net export NX (difference between exports EX and imports IM) as in following manner:

$$AE = C + I + G + NX$$
$$NX = EX - IM$$

Export of goods and services (EX) is depended on the income and product of foreign economies, relative prices and exchange rate and international trade protection and support tools as set by the foreign countries. **The export is therefore an autonomous variable** (not influenced by the income and demand in the home economy but the purchase power and demand in the other countries)!

On the other hand, the import of goods and services (IM) is depended on the income and product of home economy, relative prices and exchange rates and thus we can speak about the function of import based on the formula:
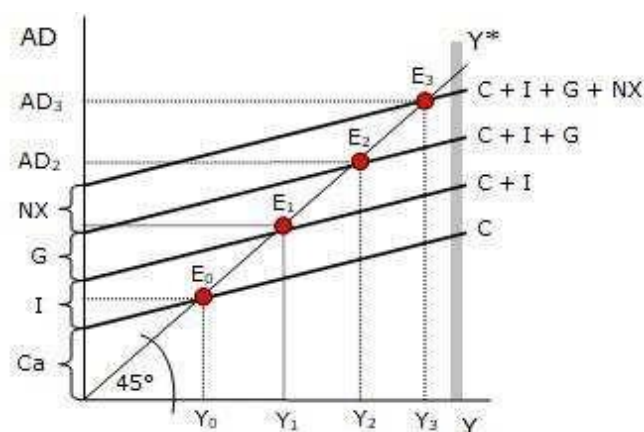
$$IM = Ma + m*Y$$

Ma = autonomous part of import
m = marginal propensity to import

Thus the very final form of the equilibrium in four sector is:
$$Y_{(E)} = Ca + c*(Y + TR - (Ta + t.Y)) + I + G + EX - (Ma + m*Y)$$

Other useful formulas for the topic of four sector economy:

Multiplier of open economy formula: $\alpha_4 = \dfrac{c}{1-c(1-t)+m}$

Autonomous Expenditure formula: A = Ca + c*TR - c*Ta + I + G + EX - Ma
Change in the equilibrium product: $\Delta Y_E = \alpha_4 * \Delta A$

QUESTIONS AND PROBLEMS:
Problem 3: The description of the economy is following Ca=200 mil. USD, investments reached the value of 70 mil. USD, government spending is 55 mil. USD, transfer payments are 25 mil. USD, tax rate is 25%, indirect tax has reached the value of 30 mil. USD and marginal propensity to save is 0,4.
   a) note down the consumption function: C =
   b) note down the value of simple multiplier α =
   c) calculate the value of autonomous expenditure A =
   d) what is the production in the equilibrium state? Y_E =
   e) government aims to raise the product in the economy by 250 mil. USD. How much should the government raise its government spending to meet that goal?
   f) draw the graph.

Problem 4: Consider the same economy as in the problem 3 which participates in the international trade. The economy exports the goods and services in total value of 60 mil. USD and imports the goods and services based on the function: IM = 20 + 0,15Y.
   a) note down the value of multiplier α =
   b) calculate the value of autonomous expenditure A =
   c) what is the production in the equilibrium state? YE =
   d) note down the value of net exports in case of equilibrium: NX =
   e) draw how the graph from problem 3 changes if the economy is open.
   f) draw how the graph from problem 4 e) changes if m = 0,20.

Test yourself:

1. Note down the purpose and the general assumptions of the Keynesian model:

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2. Calculate the simple multiplier value and tax multiplier value if you know c = 0,95 and t = 0,5.

(1) _____

(2) _____

3. The economy is described by the following data: S = -100+0,2YD, total taxes T = 200 + 0,3Y, transfers TR = 50, government expenditures G = 250 and investments I = 300. Find out:

a) value of tax rate, marginal propensity to save, marginal propensity to consume;

b) note down consumption function;

c) note down the disposable income function;

d) the economy equilibrium (based on the relationship AE=Y);

e) the value of autonomous expenditure;

f) simple multiplier value for this 3sector economy;

g) verify if the result from e) is correct with the use of multiplier and autonomous expenditure formula, then for the equilibrium calculate:

        I) the exact value of disposable income;

        II) the exact level of savings and consumption;

        III) is the identity of $Y_D = C + S$ true?

        IV) is assumption that $Y = C + I + G$ true in the equilibrium?

        V) find out the volume of income taxes;

        VI) find out the volume of total taxes;

        VII) find out the volume of net taxes;

      VIII) find out the value of tax multiplier and multiplier of transfer payments;

        IX) find out the change in the equilibrium product if government spending raises by 50;

        X) find out the change in the equilibrium product if transfer payments decrease to 20;

        XI) find out the change in the equilibrium product if autonomous taxes decrease by 1.