

## THE IS-LM MODEL (closed economy)

The model examines the combined equilibrium of two markets: the market of goods and services ( $I=S$ ) and the money market ( $L=M$ ). Examining the joint equilibrium in these two markets allows us to determine two variables: output  $Y$  and the interest rate  $i$ .

The general assumptions of this model are:

1. All prices (including wages) are fixed.
2. There exists excess production capacity in the economy.
3. The economy is closed.

### 1) IS CURVE (MARKET OF GOODS AND SERVICES)

From Keynesian model (and also from AS-AD model), you already know that equilibrium output ( $Y$ ) in closed economy is determined by aggregate demand  $Y = C(Y-T) + I + G$ .

While in these models the investment level was considered autonomous, in IS-LM model the investments are the function:  $I = \bar{I} - b \cdot i$

$\bar{I}$  ..... autonomous investments  
 $b$  ..... interest sensitivity  
 $i$  ..... interest rate

And thus the aggregate demand  $AD = A + c(1-t)Y - b \cdot i$  and  $Y = \alpha \cdot (A - b \cdot i)$ .

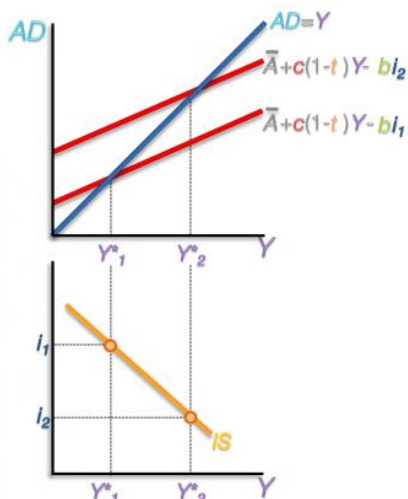
Considering different interest rates  $i$ , the different levels of output ( $Y$ ) are determined -> hence, we can construct the IS curve as a relationship between the interest rates ( $i$ ) and the equilibrium output ( $Y$ ).

### 2) LM CURVE (MONEY MARKET)

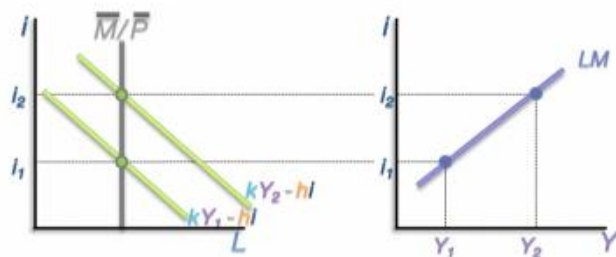
In money market equilibrium, the real money supply ( $M/P$ ) is equal to the real money demand ( $L = k \cdot Y - h \cdot i$ ).

$k$  ..... income sensitivity of demand for real money  
 $h$  ..... interest sensitivity of demand for real money

IS CURVE CONSTRUCTION



LM CURVE CONSTRUCTION



**Other useful formulas for the topic:**

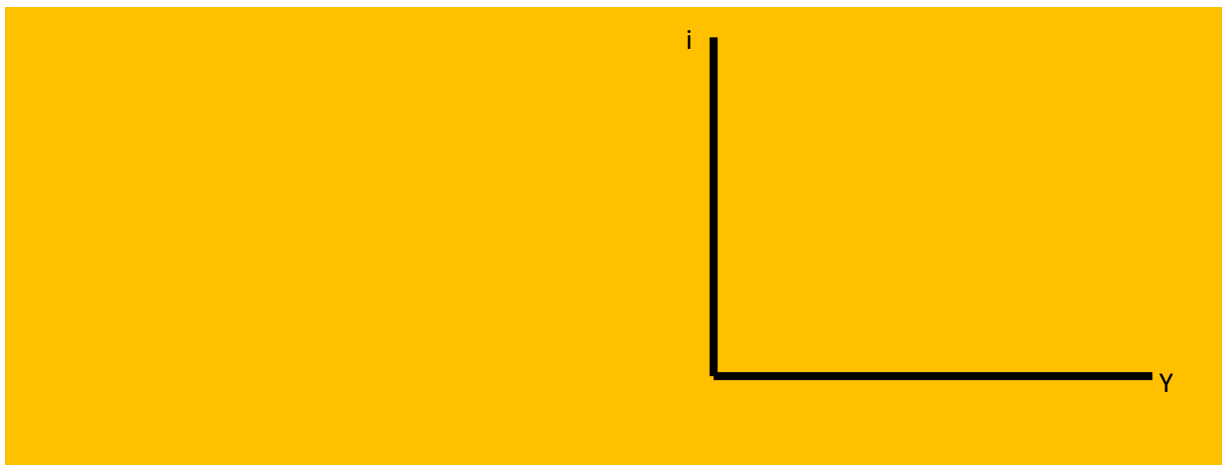
Multiplier of fiscal policy:  $\gamma = \frac{\alpha}{1 + \frac{\alpha b k}{h}}$

Multiplier of monetary policy:  $\beta = \gamma * \frac{b}{h}$

Change in equilibrium output:  $\Delta Y_E = \gamma * \Delta G$                        $\Delta Y_E = \beta * \Delta \frac{M}{P}$

**PROBLEM 1:** The economy is described by following variables and functions (in mld. CZK):  $C = 170 + 0.6(Y-T)$ ;  $T = 200$ ;  $I = 100 - 4i$ ,  $G = 350$ ;  $L = 0.75Y - 6i$ ;  $M/P = 735$ .

- a) Figure out the IS curve equation.
- b) Figure out the LM curve equation.
- c) Draw both curves in a graph.
- d) Find out the value of equilibrium product and equilibrium interest rate.



**PROBLEM 2:** Aggregate demand consists of following components (in mld. CZK):  $C = C_a + 0,8Y_d$ ,  $C_a = 300$ ,  $G = 250$ ,  $I = 250 - 30i$ ,  $T_a = 80$ ,  $TR = 50$ ,  $t = 0,15$ . The demand for real money is described as  $L = 0,3Y - 40i$  and real money supply is  $(M/P)=400$ .

- a) Write down the IS curve equation.
- b) Write down the LM curve equation.
- c) What is the real product ( $Y_e$ ) and real interest rate ( $i_e$ ) in equilibrium?
- d) What happens to the equilibrium in the case of fiscal expansion policy when government raises its spending by 50 mld. CZK? Draw it.
- e) What happens to the previous equilibrium in the case of monetary expansion policy when central bank increases the money supply by 47 mld. CZK? Draw it.

