UNIWERSYTET WARSZAWSKI
Wydział Nauk Ekonomicznych

Macroeconomics 1
Keynsian cross model.
We add a governamt and open our economy.

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Keynsian cross model.
We add a Government.

- Fiscal (budget) policy – state decisions regarding expenditures and taxes.
- Budget deficit – the difference between revenues (taxes) and government expenditure.
- Public debt – the sum of outstanding state loans (the government borrows by issuing bonds).

Keynsian cross model.
We add a Government.

- Model assumptions:
- Consumption depends on disposable income
  - TR – transfers,
  - T - Specyfic taxes (ZUS, VAT) and income taxes (t) depending on income (Y),

$$C = a + cY_D = a + c(Y + TR - T)$$

$$C = a + c\left(Y + \overline{TR} - tY\right),\ \mathrm{C} = \mathrm{a} + \mathrm{c}\overline{\mathrm{TR}} + c(1-t)Y$$

$$MPC' = c(1-t)$$

Keynsian cross model.
We add a Government.

- G – government spendings, $G = \overline{G}$
- I – Investments, $I = \overline{I}$

$$AD = C + I + G$$

$$AD = \underbrace{\left(a + \overline{I} + \overline{G}\right)}_{\overline{A}} + c\overline{TR} + c(1-t)Y$$

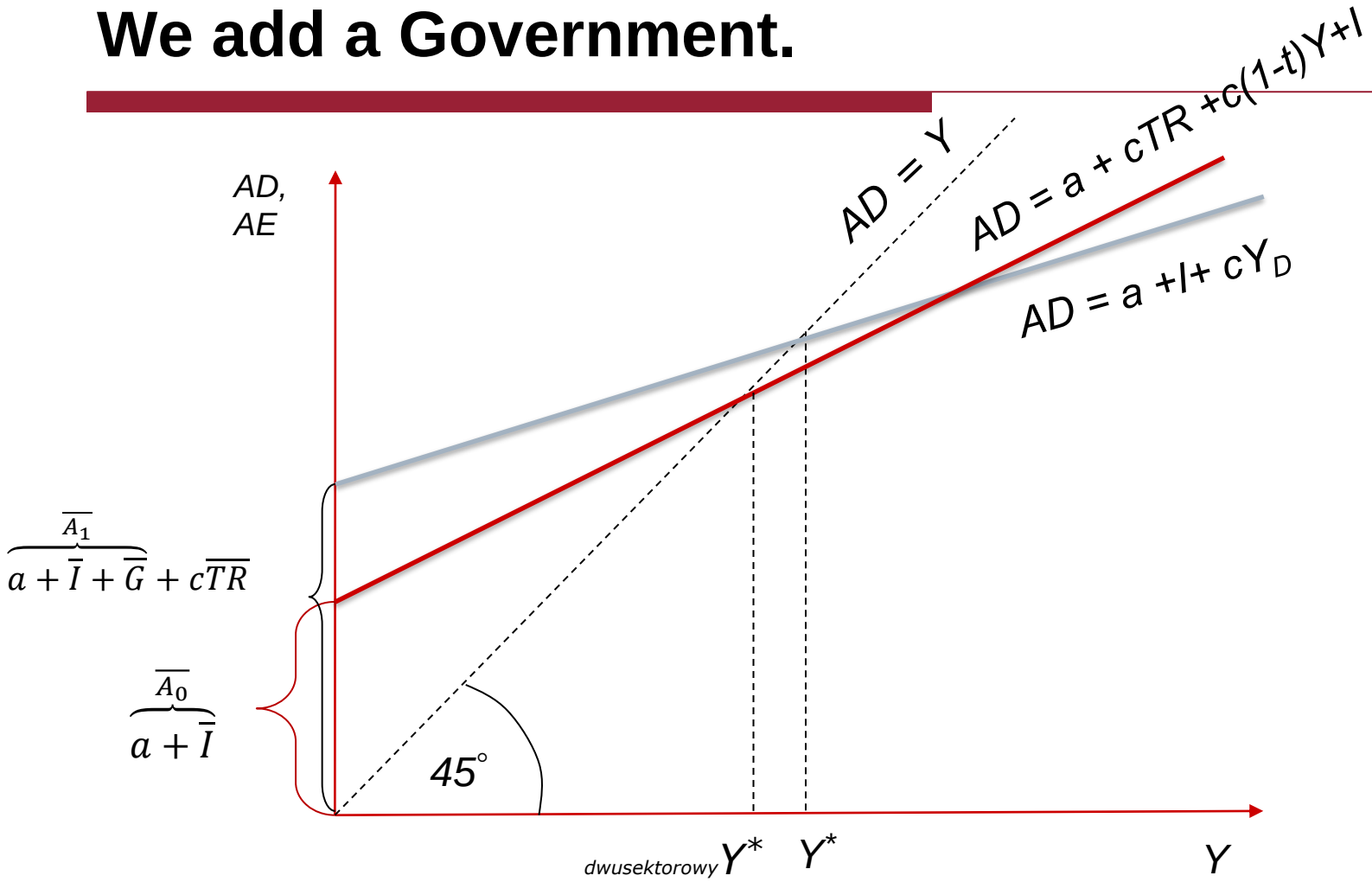
$$AD = \overline{A} + c\overline{TR} + c(1-t)Y$$

In the equilibrium:

$$AD = Y^* = \overline{A} + c\overline{TR} + c(1-t)Y^* \rightarrow Y^* = \frac{1}{1-c(1-t)}\overline{A} + \frac{1}{1-c(1-t)}c\overline{TR}$$

$$\alpha' = \frac{1}{1-c(1-t)}$$

Keynsian cross model.
We add a Government.



Keynsian cross model.
We add a Government..

Compering the two approaches:

$$\alpha' = \frac{1}{1 - c(1-t)} < \frac{1}{1-c} = \alpha$$

$$\Rightarrow tg(\beta') < tg(\beta) \Rightarrow \beta' < \beta$$

Keynsian cross model.
We add a Government.

- Budget revenues:
  - T – Tax,

$$T = \overline{T} + tY$$

- Govenment spendings:
  - G – Govenment consumption, TR – Transfers,

- SB – Budget balance (SB<0 - deficit, SB>0 - surplus):
  - T_N – net tax = T – TR,

$$SB = T_N - G = \overline{T} + tY - TR - G$$

  - Increase of Y decrease deficit/increase surplus
  - There is Y for whichSB = 0,

$$SB = 0 \Rightarrow tY = TR + G - \overline{T} \Rightarrow Y = \frac{TR + G - \overline{T}}{t}$$

Keynsian cross model.
We add a Government.

Balanced budget multiplier – an increase in government spending that increases production is accompanied by an equal increase in taxes.

$$C = a + cY_D = a + c(Y + TR - T) = a + c\left(Y + \overline{TR} - \overline{T} - tY\right) = \mathrm{a} + \mathrm{c}\overline{\mathrm{TR}} - c\overline{T} + c(1-t)Y$$

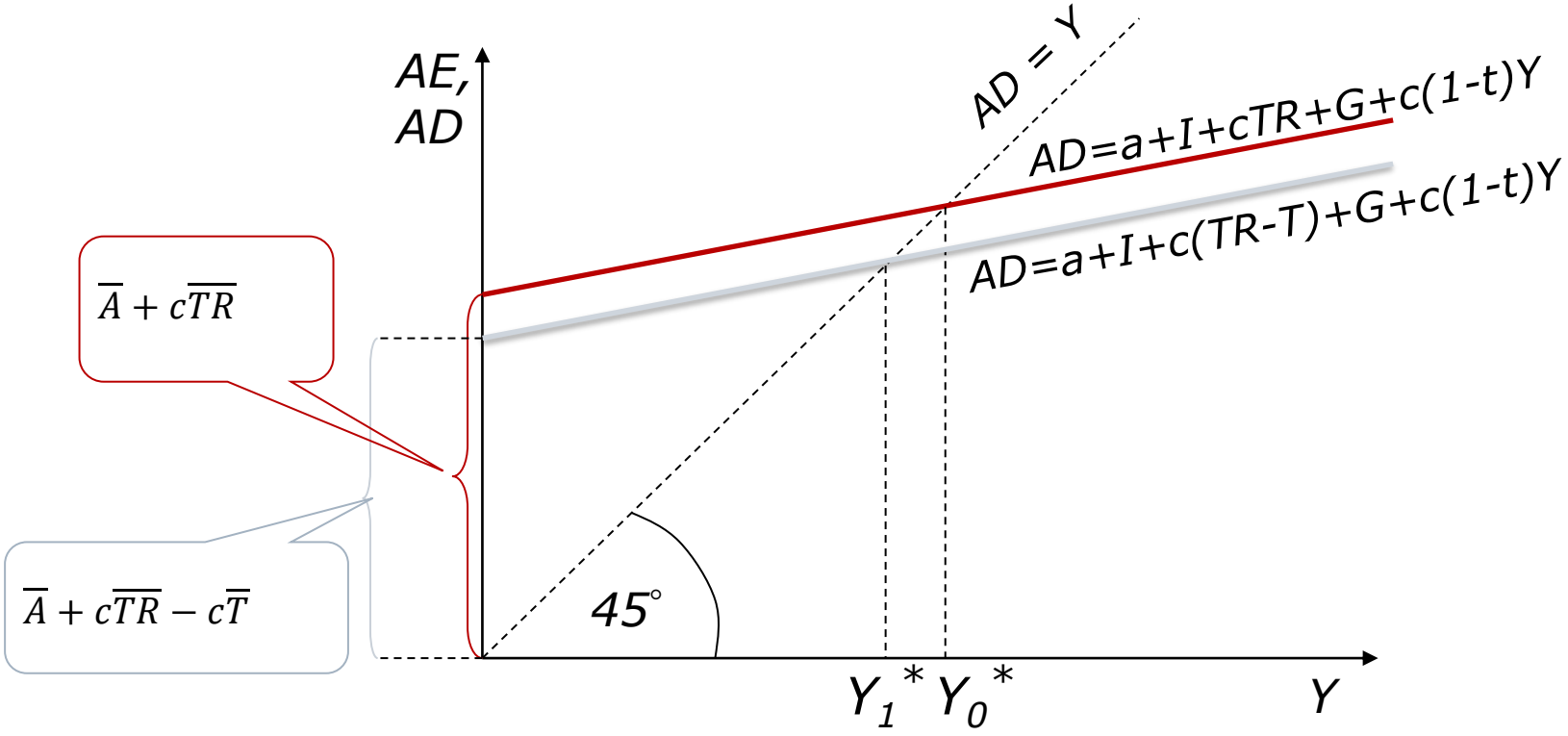
$$AD = \left(a + c\overline{TR} + \overline{I} + \overline{G} - c\overline{T}\right) + c(1-t)Y$$

Change G and T by the same value

$$\Delta AD = \alpha'\left(\Delta\overline{G} - c\Delta\overline{T}\right) = \frac{1}{1-c(1-t)}\left(\Delta\overline{G} - c\overline{\Delta T}\right)$$

$$\Delta\overline{G} = \Delta\overline{T} \Rightarrow \Delta AD = \alpha'(1-c)\Delta\overline{G}$$

Keynsian cross model.
We add a Government.



Keynsian cross model.
We add a Government.

Automatic stabilizers and discretionary stabilization fiscal policy:

The discretionary stabilizing effect of fiscal policy boils down more or less to the fact that the government, observing business cycles, makes decisions regarding the volume of expenditures and taxes and thus tries to smooth out these cycles.

Automatic stabilizers counteract recession regardless of the authorities' decisions and include:

automatic changes in proportional taxes - a decrease in income due to a recession causes a decrease in taxes proportional to income, without changing their rates (the government takes more taxes in times of economic recovery and less in times of recession),

automatic operation of transfers and benefits - in the event of a recession, the social welfare system alleviates the effects of falling income and unemployment (with the occurrence of a recession, social transfers to households increase, which increases consumer demand).

Keynsian cross model. Opening our economy

Model assumptions:

- An open economy,
  - X – eXports, $X = \overline{X}$
  - Z – imports $Z = \overline{Z} + mY$,

    where m – marginal propensity to import (MPI – Marginal Propensity to Import), is how much import will increase when income increases by one unit,

    $$MPI = m = \frac{dZ}{dY}$$

  - NX –Trade balance, $\mathrm{NX} = \mathrm{X} - \mathrm{Z} = \overline{\mathrm{X}} - \overline{\mathrm{Z}} - \mathrm{mY} = \overline{\mathrm{NX}} - \mathrm{mY}$
- The rest of the assumptions are as in the case of the previous model with the government.

Keynsian cross model. Opening our economy

$$C = a + cY_D = a + c(Y + TR - T) = a + c\left(Y + \overline{TR} - \overline{T} - tY\right) = \mathrm{a} + \mathrm{c}\overline{\mathrm{TR}} - c\overline{T} + c(1-t)Y$$

$$AD = C + I + G + NX$$

$$AD = \underbrace{\left(a + \overline{I} + \overline{G} + \overline{NX}\right)}_{\overline{A}} + c\overline{TR} - c\overline{T} + c(1-t)Y - mY = \underbrace{\left(a + \overline{I} + \overline{G} + \overline{NX}\right)}_{\overline{A}} - c\overline{T} + (c(1-t) - m)Y$$

$$AD = \overline{A} + c\overline{TR} - c\overline{T} + (c(1-t) - m)Y$$

W równowadze:

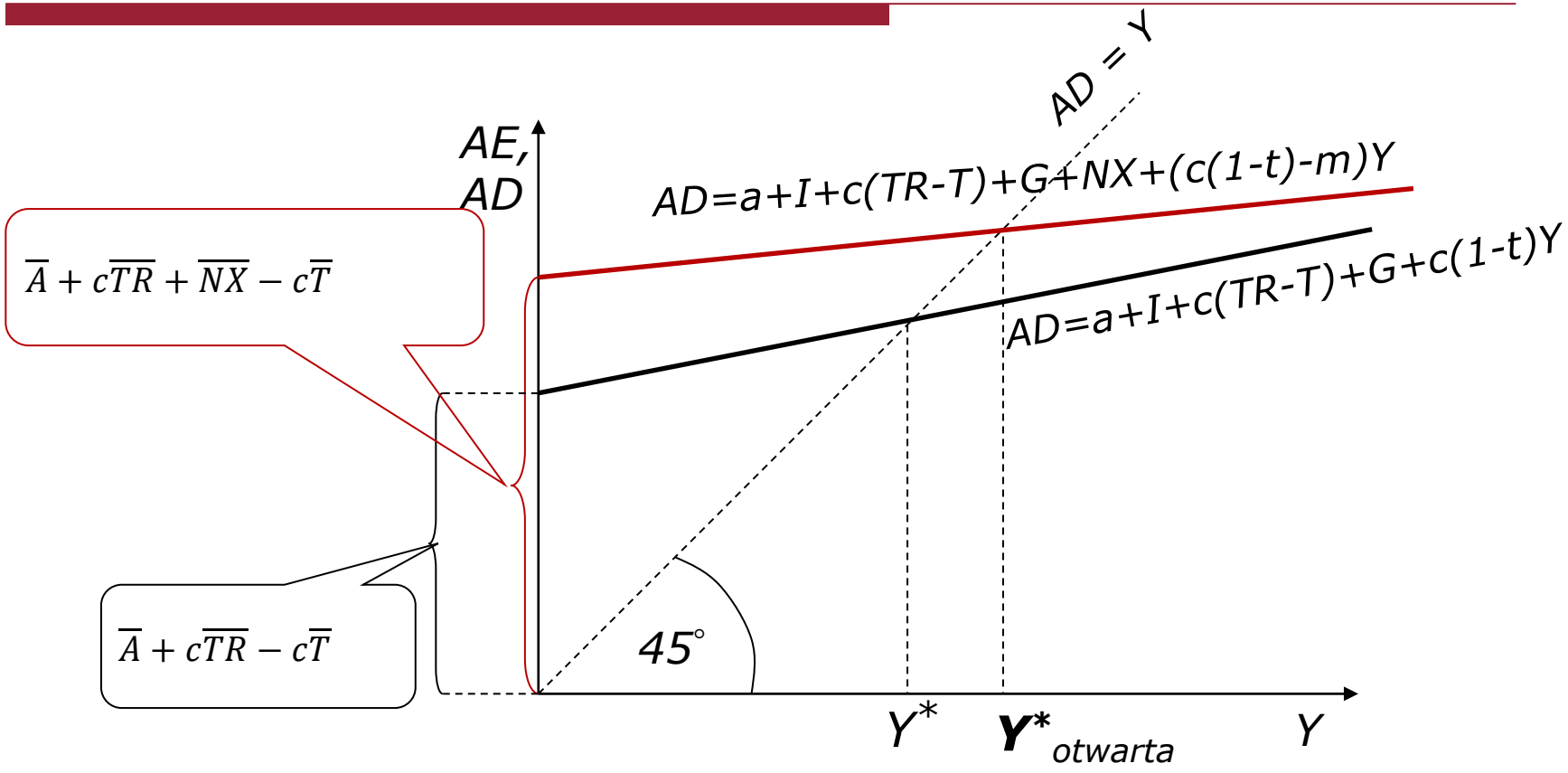
$$AD = Y^* = \overline{A} + c\overline{TR} - c\overline{T} + (c(1-t) - m)Y^*$$

$$\rightarrow Y^*$$

$$= \frac{1}{1 - c(1-t) + m}\overline{A} + \frac{1}{1 - c(1-t) + m}c\overline{TR} - \frac{1}{1 - c(1-t) + m}c\overline{T}$$

$$\alpha'' = \frac{1}{1 - c(1-t) + m}$$

Keynsian cross model. Opening our economy



Keynsian cross model. Opening our economy

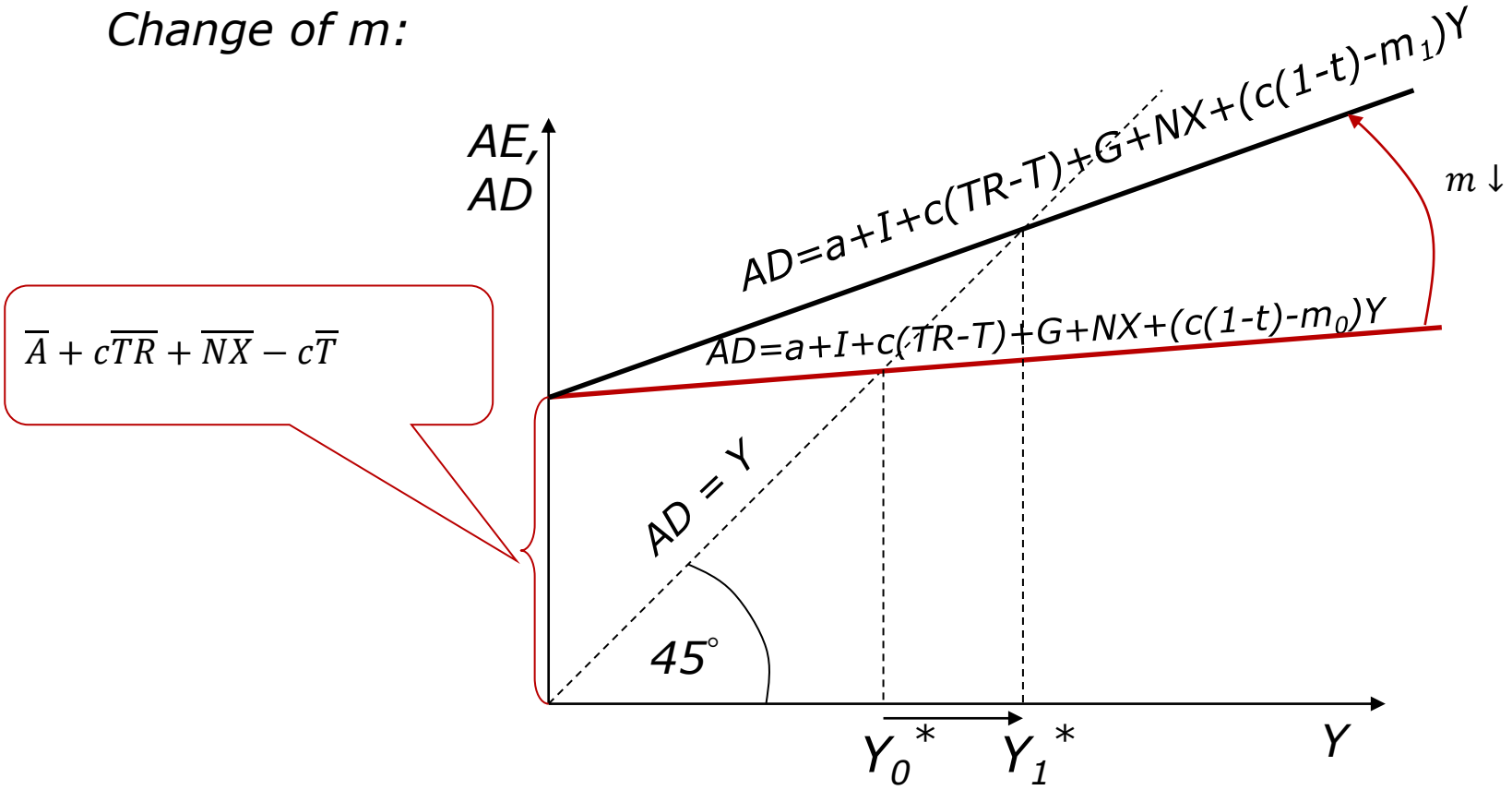
Multiplayers relationship

$$\frac{1}{1-c(1-t)+m} < \frac{1}{1-c(1-t)} < \frac{1}{1-c}$$

$$tg(\beta'') < tg(\beta') < tg(\beta) \Rightarrow \beta'' < \beta' < \beta$$

Keynsian cross model. Opening our economy

Change of m:



The full Keynesian model

Assumptions (difference from the previous ones):

I – investments dependent on the real interest rate,

$$I = \bar{I} - b \cdot r, \text{where} \quad b = \frac{dI}{dr}$$

- NX – net exports dependent on the real interest rate,

$$\mathrm{NX} = \overline{\mathrm{NX}} - \mathrm{mY} - \mathrm{n} \cdot \mathrm{r}\,, \text{where } \mathrm{m} = \frac{dNX}{dY}\,, \mathrm{n} = \frac{\mathrm{dNX}}{d\,r}$$

- We still do not have a money market in the model (we do not analyze the impact of the money supply).

Krzywa LafferaLaffer curve