

Example for IS-LM model that we solved in class:

Assume that the economy is described by the following equations:

$$C = 650 + 0.1 * Y_D$$

$$I = 400 + 0.1 * Y - 800i$$

$$T = 500$$

$$G = 200$$

$$P = 1$$

$$\left(\frac{M}{P}\right)^s = 1800$$

$$\left(\frac{M}{P}\right)^d = 2Y - 10000i$$

1) Solve for equilibrium real output, the interest rate, C and I. Graph the IS and the LM relations and label the equilibrium. (10 points)

IS relation:

$$Y = 650 + 0.1 * (Y - 500) + 400 + 0.1Y - 800i + 200$$

$$Y = 1200 + 0.2Y - 800i$$

$$Y = 1500 - 1000i$$

$$i = (1500 - Y) / 1000$$

LM relation:

$$M^s = M^d$$

$$\left(\frac{M}{P}\right)^s = \left(\frac{M}{P}\right)^d$$

$$1800 = 2Y - 10000i$$

$$Y = 900 + 5000i$$

$$i = (Y - 900) / 5000$$

$$\begin{cases} Y = 900 + 5000i \\ Y = 1500 - 1000i \end{cases}$$

$$900 + 5000i = 1500 - 1000i$$

$$6000i = 600$$

$$6000i = 600$$

$$i = 0.1$$

$$i = 10\%$$

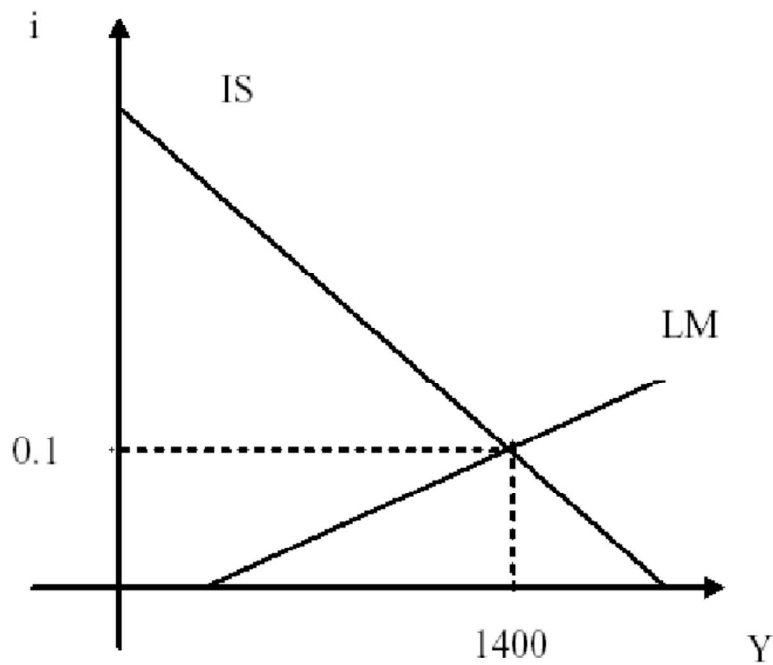
$$Y = 1400$$

$$C = 650 + 0.1 * (1400 - 500)$$

$$C = 740$$

$$I = 400 + 0.1 * 1400 - 800 * 0.1$$

$$I = 460$$



Read the following excerpt from a Financial Times article.

Housing starts slowed in August

Housing starts in the US eased back by 1.3 per cent in August but were still expected to exceed last year's overall number, itself the highest in more than 25 years.

Work began on 2.009m homes at an annualised rate in August, with construction of single-family homes outpacing the decline in multifamily units.

2) How would the increase in housing starts from last year to this year affect the equilibrium you just computed in part 1)? Assume that the increase in new houses is exogenous and worth \$48 billion. Calculate the new equilibrium. Graph and explain. (10 points)

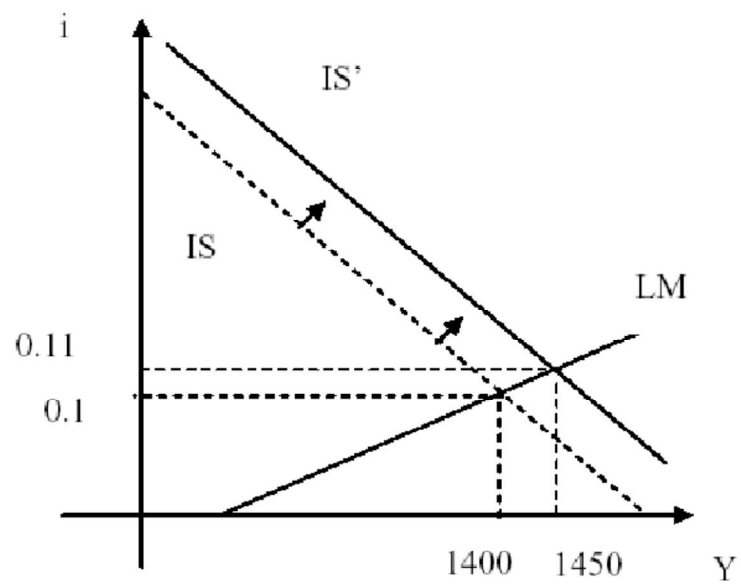
The increase in housing starts represents an increase in I (residential investment) for every level of the interest rate

$$I' = 448 + 0.1 * Y - 800i$$

$$Y = 1248 + 0.2Y - 800i$$

$$Y = 1560 - 1000i$$

IS shifts right, output goes up.



$$\begin{cases} Y = 900 + 5000i \\ Y = 1560 - 1000i \end{cases}$$

$$900 + 5000i = 1560 - 1000i$$

$$6000i = 660$$

$$i = 0.11$$

$$i = 11\%$$

$$Y = 1450$$

3) How if at all might the Federal Reserve react to the increase in housing starts in order to keep Y constant at the level of part 1)? Calculate and draw a graph. (10 points)

$$Y = 1560 - 1000i$$

$$1400 = 1560 - 1000i$$

$$1000i = 160$$

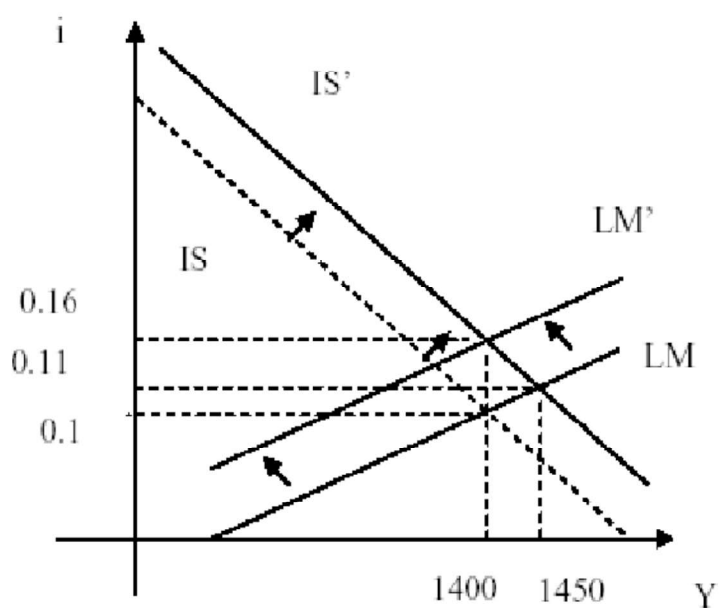
$$i = 16\%$$

$$\frac{M^s}{P} = 2Y - 10000i$$

$$\frac{M^s}{P} = 2800 - 1600 = 1200$$

$$\Delta\left(\frac{M^s}{P}\right) = -600$$

The Federal Reserve can decrease the money supply by 600 through a contractionary open market operation.



4) Starting from the situation in part 2), how could the government restore the equilibrium obtained in part 1) through fiscal policy operations (assuming that the Federal Reserve does not react at all)? Calculate. (10 points)

The government can decrease G by 48 or increase T by 480.

