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Test 2

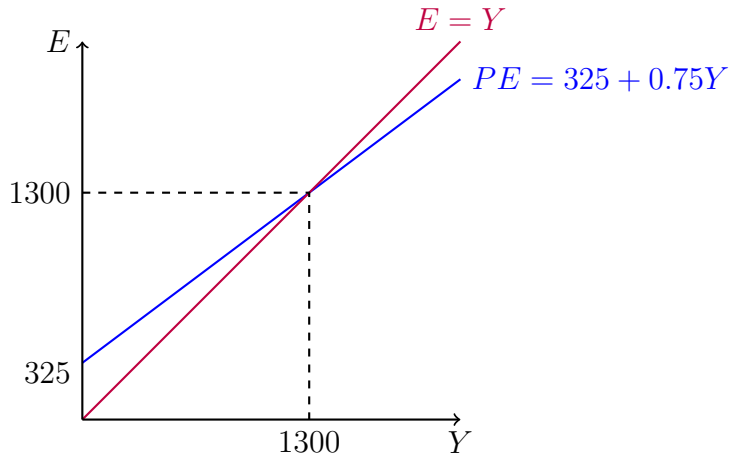
Problem 1

Suppose, consumption function is represented by $C = 200 + c(Y - T)$, $I = 100$ and government budget is balanced $G = T = 100$

A) The Keynesian equilibrium.

1) The expression of the planned expenditure as a function of income:
$PE = C + I + G = 200 + c \cdot (Y - 100) + 100 + 100 = 400 + c \cdot Y - c \cdot 100$

2) The relationship for c = 0.75.



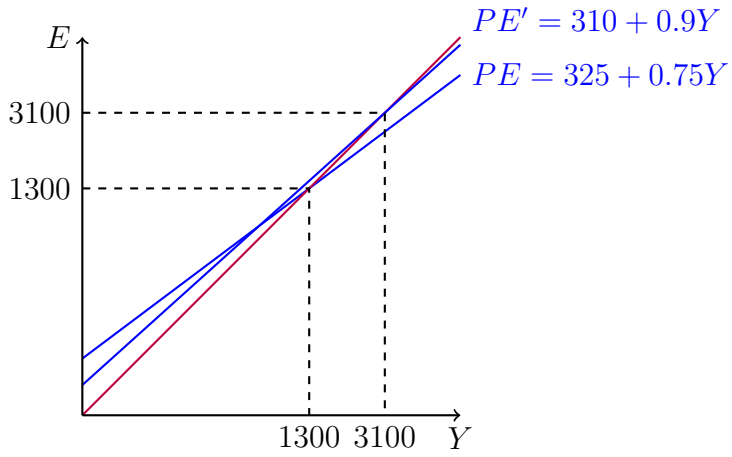
In the Keynesian cross diagram, equilibrium occurs, where planned expenditure curve (shown in blue) intersects a line that represents the equality of total income and output (shown in red). At this point total demand, PE, equals the total amount of national output, Y, so total demand equals total supply.

3) The intersection gives the equilibrium output, 1300.

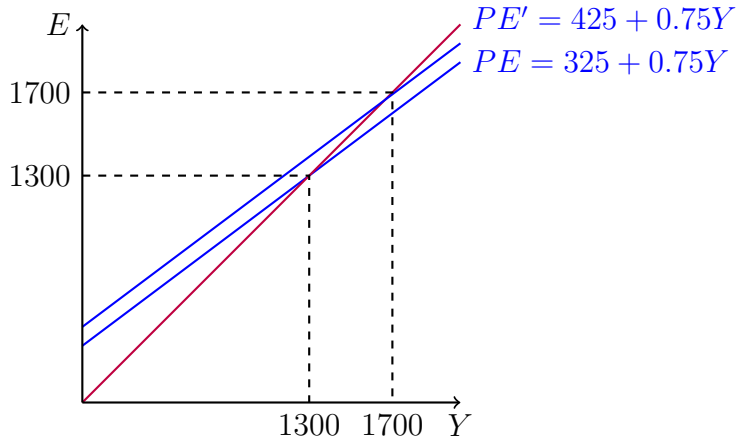
4) Combining that we get:

$$E = C + I + G = 200 + 0.75 \cdot (Y - 100) + 100 + 100 = 325 + 0.75Y$$
$$Y = E$$
$$Y = 325 + 0.75Y$$
$$Y = 1300$$

5) In Keynesian cross we have $E = 400 + c \cdot Y - c \cdot T$. An increase in MPC would shift the PE curve down, because of $-c \cdot T$ term, and make the curve steeper, because of $c \cdot Y$ term.



6) The effect of a 100 increase for public spending:

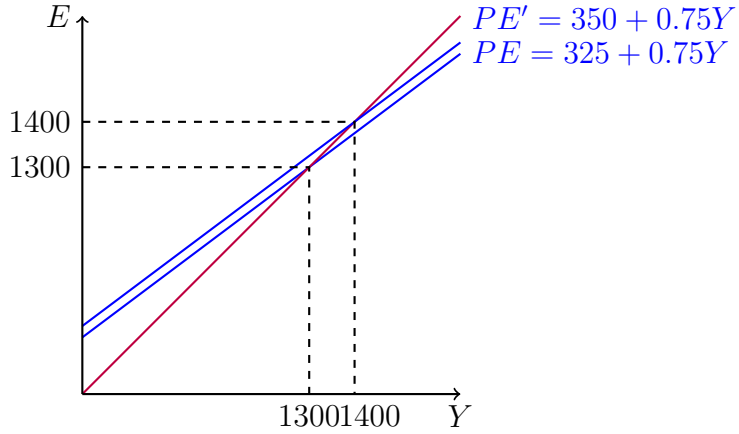


The balanced value for income:

$$E = C + I + G = 200 + 0.75 \cdot (Y - 100) + 100 + 200 = 425 + 0.75Y$$
$$Y = E$$
$$Y = 425 + 0.75Y$$
$$Y' = 1700$$

The effect of a 100 increase for public spending led to 400 increase in equilibrium output.

7) The effect of a 100 increase for public spending with a same tax increase:



The balanced value for income:

$$E = C + I + G = 200 + 0.75 \cdot (Y - 200) + 100 + 200 = 350 + 0.75Y$$
$$Y = E$$
$$Y = 350 + 0.75Y$$
$$Y' = 1400$$

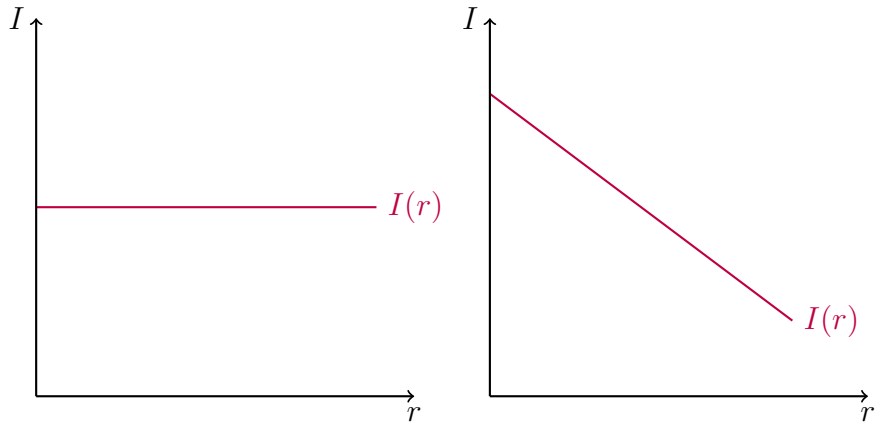
The effect of a 100 increase for public spending with a same tax increase led to 100 increase in equilibrium output.

B) The IS curve.

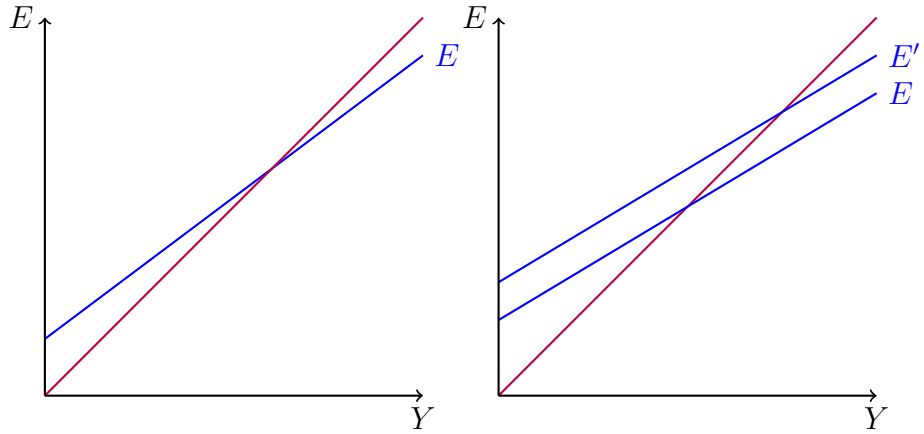
In the economy the macro investment function is given by the equation: $I = 200 - 25r$ where r is the interest rate (in %).

8) In the Keynesian cross model, an increase in interest rate leads to a decrease in investment, which leads to a decrease in equilibrium level of output.

9) Investment functions, one where investment is not affected by changes in interest rate and one where it is:



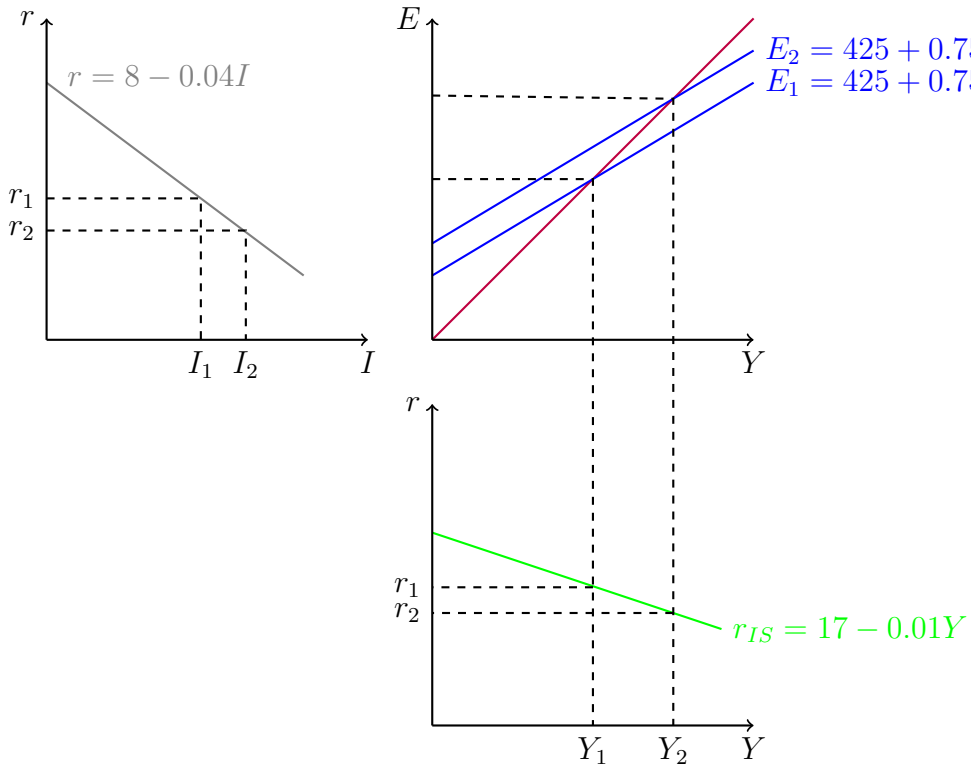
In case, where investment is not affected by changes in interest rate (shown in the left graph), changes in interest rate do not influence the amount of investments and thus do not influence equilibrium level of output. And where investment is affected by changes in interest rate (shown in the right graph), the consequences of higher interest rate are increased level of investments and thus increased level of output. That can be shown using the 45° diagram.



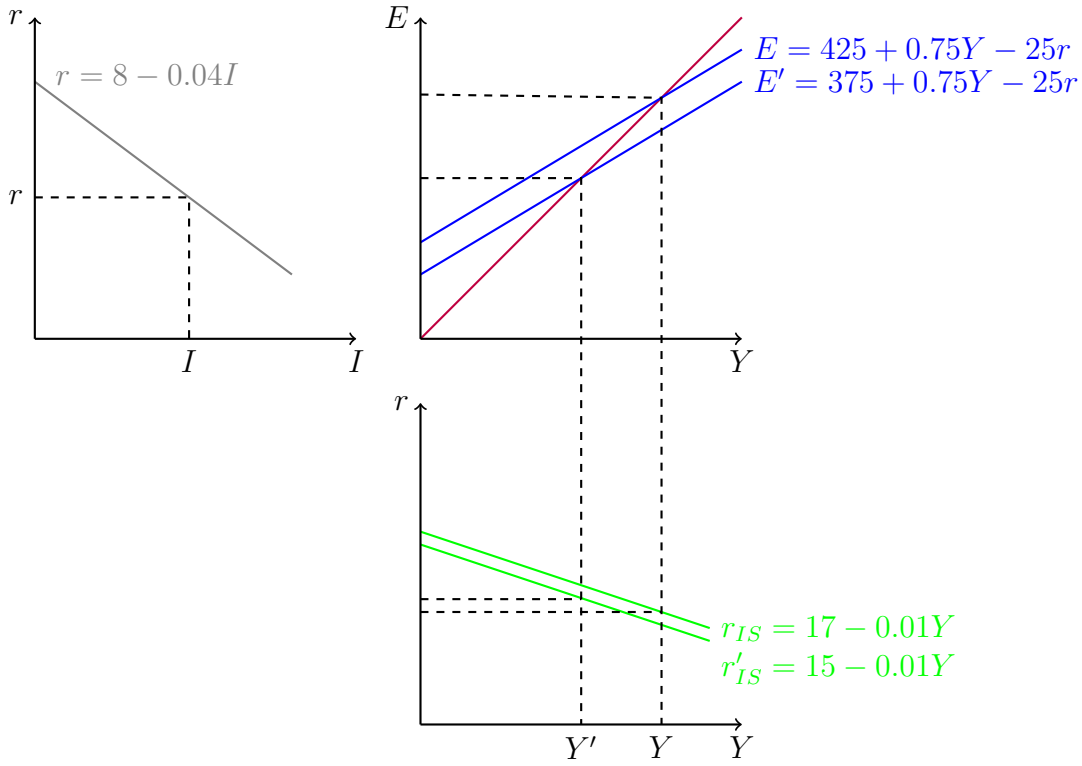
10) The equation of the IS curve for this economy:

$$E = C + I + G = 200 + 0.75 \cdot (Y - 100) + 200 - 25r + 100 = 425 + 0.75Y - 25r$$
$$Y = E$$
$$Y = 425 + 0.75Y - 25r$$
$$r = 17 - 0.01Y$$

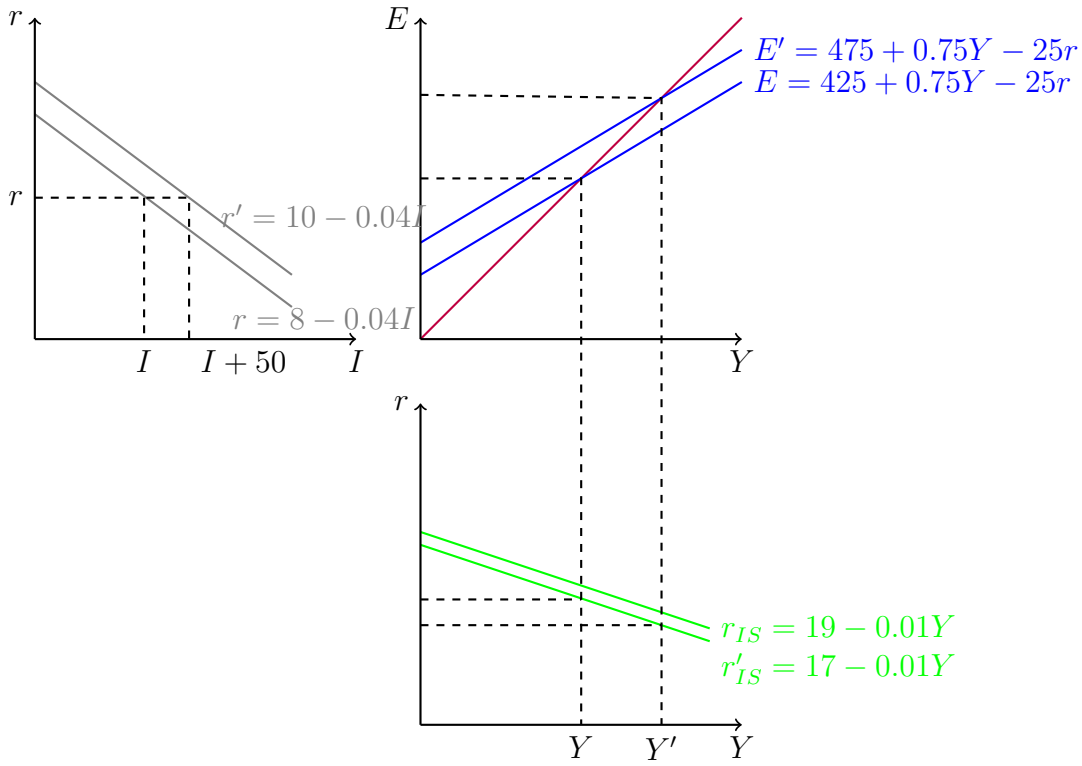
11) A graph for the IS curve:



12) The effect of a 50 cut in public spending.



13) The effect of 50 increase in the available quantity of money:



C) The LM curve.

In the economy the function of money demand is $\frac{M^d}{P} = Y - 100r$ with r the interest rate (in %), nominal money supply $M = 1000$ and the price level is $P = 2$.

14) The money supply is $\frac{M^s}{P} = \frac{1000}{2} = 500$, and since $\frac{M^d}{P} = \frac{M^s}{P}$ the value of real money balances available in the economy equals 500.

15) Equilibrium on the money market will be:

$$\frac{M^d}{P} = \frac{M^s}{P}$$
$$Y - 100r = 500$$

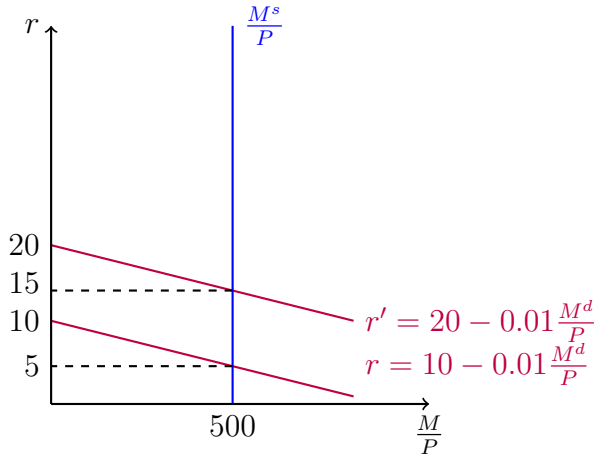
If global income is equal to 1000, the equilibrium interest rate:

$$Y_1 = 1000$$
$$1000 - 100r = 500$$
$$r_1 = 5$$

If global income is equal to 2000, the equilibrium interest rate:

$$Y_1 = 2000$$
$$2000 - 100r = 500$$
$$r_2 = 15$$

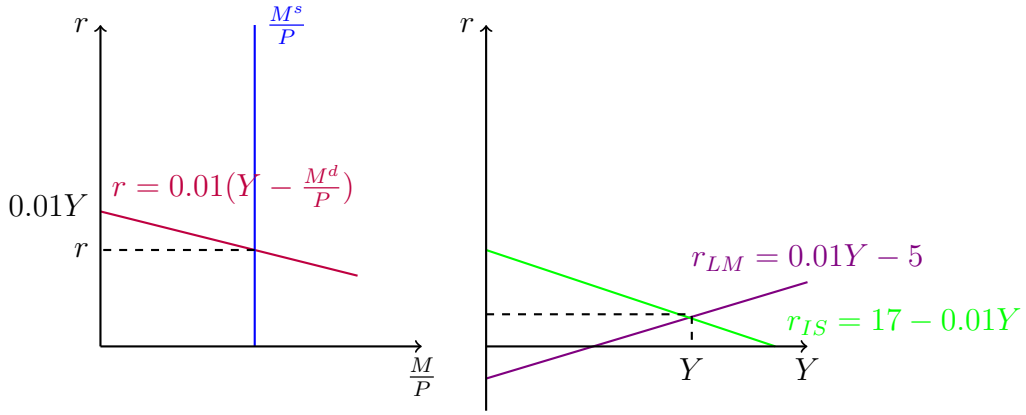
16) The money market diagram:



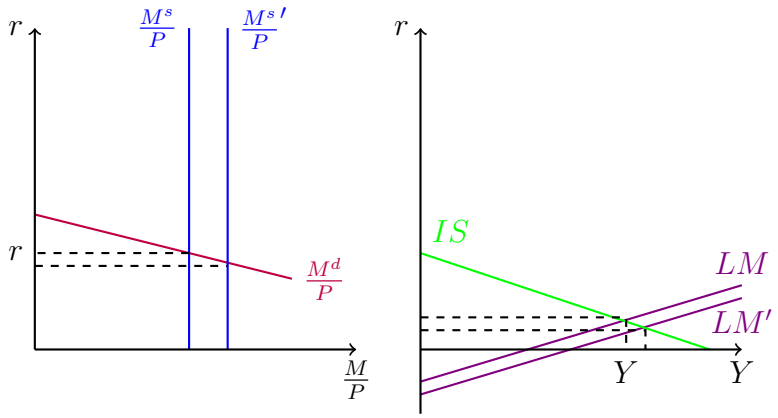
17) LM curve for this economy:

$$\frac{M^d}{P} = \frac{M^s}{P}$$
$$Y - 100r = 500$$
$$r = 0.01Y - 5$$

18) A graph for the LM curve:



19) The effect of an increase in the quantity of money on the money market is a shift of money supply curve to the right, LM curve will also be shifted to the right (with lower equilibrium interest rate and higher output):

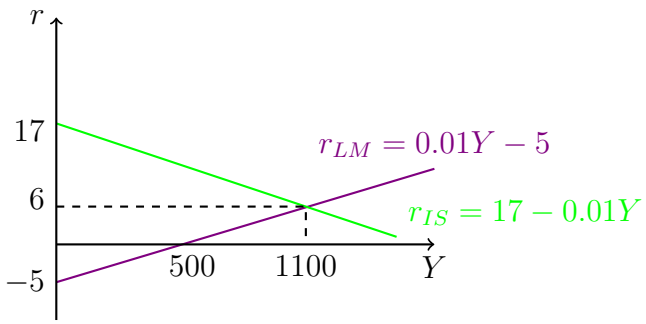


20) An increase in government spending will not affect LM curve, but IS curve will shift to the right (which will lead to higher equilibrium interest rate and output)

D) IS-LM and the aggregate demand.

The economy we have can be described by the following equations: the consumption function $C = 200 + 0.75(Y - T)$, the government budget is balanced, so $G = T = 100$, the investment function $I = 200 - 25r$, the real money demand $\frac{M^d}{P} = Y - 100r$, the real money supply $\frac{M^s}{P} = \frac{1000}{2} = 500$.

21) IS-LM diagram:



22) IS-LM system of equations give the following values of income Y and interest rate r in a situation of balanced markets for goods and services and for money (for IS equation derivation see 10, for LM - see 17).

$$IS : r = 17 - 0.01Y$$
$$LM : r = 0.01Y - 5$$
$$17 - 0.01Y = 0.01Y - 5$$
$$Y = 1100 \Rightarrow r = 6$$

This result is also graphically represented (see 21).

23) The government spending increases from 100 to 150, as a result both the new income and interest rate values rise:

$$IS : Y = E \Rightarrow Y = C + I + G \Rightarrow Y = 200 + 0.75 \cdot (Y - 100) + 200 - 25r + 150$$
$$Y = 475 + 0.75Y - 25r$$
$$r = 19 - 0.01Y$$
$$LM : r = 0.01Y - 5$$
$$19 - 0.01Y = 0.01Y - 5$$
$$Y = 1200 \Rightarrow r = 7$$

24) The value of the, for instance, government spending multiplier is:

$$IS : Y = C + I + G \Rightarrow Y = C_0 + MPC \cdot (Y - T) + I_0 - b \cdot r + G$$
$$LM : \frac{M^d}{P} = \frac{M^s}{P} \Rightarrow Y - c \cdot r = \frac{M^s}{P} \Rightarrow Y = \frac{M^s}{P} + c \cdot r$$
$$\frac{-Y + C_0 + MPC \cdot Y - MPC \cdot T + I_0 + G}{b} = \frac{Y - \frac{M^s}{P}}{c}$$
$$Y = \frac{b(C_0 - MPC \cdot T + I_0 + G) + c\frac{M^s}{P}}{c + b - MPC}$$
$$\frac{\partial Y}{\partial G} = \frac{b \cdot G}{c + b - MPC}$$

This value is different from the one obtained with the Keynesian cross model, since investment function depend on interest rate and balanced value of output depend on equilibrium on money market. The parameters which make the results different are b - sensitivity coefficient of investment level to interest rate and c - sensitivity coefficient of money demand to interest rate.

25) The government is maintaining its budget policy and the central bank decides to increase the money supply from 1000 to 1200. The new situation for the economy:

$$IS : r = 17 - 0.01Y$$
$$LM : \frac{M^d}{P} = \frac{M^s}{P} \Rightarrow Y - 100r = \frac{1000}{2} \Rightarrow r = 0.01Y - 6$$
$$17 - 0.01Y = 0.01Y - 6$$
$$Y = 1150 \Rightarrow r = 5.5$$

26) An inflationary shock increases the price index from 2 to 4. The new situation for the economy:

$$IS : r = 17 - 0.01Y$$
$$LM : \frac{M^d}{P} = \frac{M^s}{P} \Rightarrow Y - 100r = \frac{1000}{4} \Rightarrow r = 0.01Y - 2.5$$
$$17 - 0.01Y = 0.01Y - 2.5$$
$$Y = 975 \Rightarrow r = 7.25$$