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Q1. $\frac{M}{P} = + k(Y - T) - wI$ — LM.

The LM curve comes from the fact that the demand for Money in the market is positively correlated with actual disposable income and negatively correlated with rate of interest.

However, we are given L.

$\frac{M}{P} = L \Rightarrow \frac{1000}{2} = 0.25Y - 62.5i$.

$\Rightarrow Y = 2000 + 250i$

IS curve.

$Y = C + I + G$. } Income = expenditure

$Y = 0.8(Y - 0.25Y) + 900 - 50i + 800$

$Y = \frac{\cancel{8}^{2}}{\cancel{10}_{5}} \times \frac{3}{\cancel{4}} Y + 1700 - 50i$

$\frac{2}{5} Y = -50i + 1700$.

$Y = -125i + 4250$.

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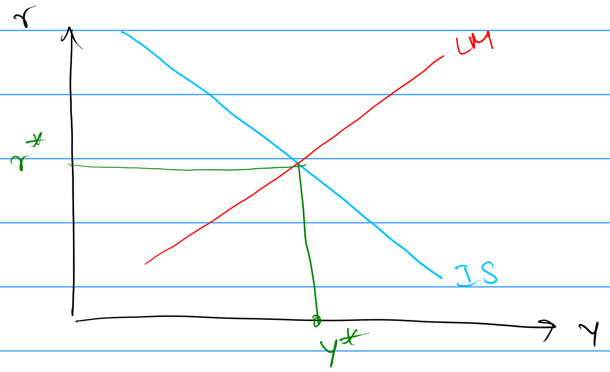
b) For equilibrium rates, we must find the point where LM and IS curve intersect



This can be done by simultaneously solving LM and IS.

$\Rightarrow$ $250\, i^* + 2000 = -125\, i^* + 4250$.

$\Rightarrow$ $325\, i^* = 2250$.

$\Rightarrow$ $i^* = \dfrac{2250}{325} = \dfrac{90}{13}$.

$\Rightarrow$ $Y = 250 \times \dfrac{90}{13} + 2000$

$= 3730.77$.

c) The LM curve tells us how the demand for money changes with Income, tax and rate of interest against real money supply M/P. We see that the income and rate of interest are positively correlated, as having more money allows investors to invest at higher rates for same income. This is a measure of the monetary market.

The IS curve equate expenditure with income. Here, Y and i are negatively correlated as an

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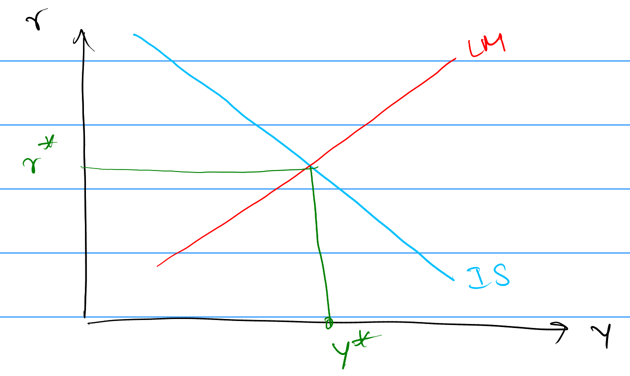
increase in income leads to increased borrowing at the same expenditure. This is a measure of the fiscal market

Hence,



The equilibrium state (y^*, r^*) can be fount where the two lines intersect.

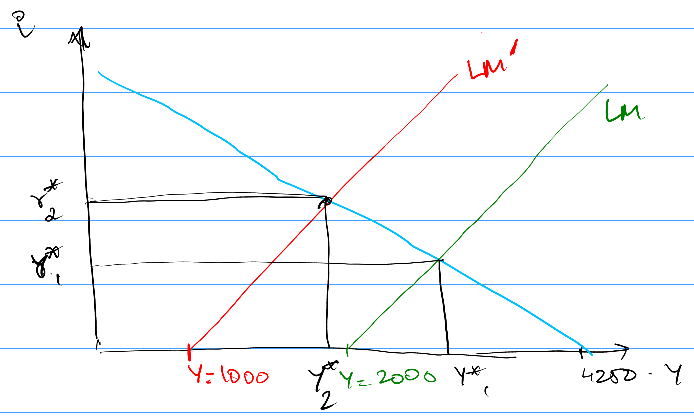
d) We see that increasing P to 4 leaves IS curve unchanged as it does not affect fiscal market.

New equation for LM.

$$\Rightarrow \frac{1000}{\cancel{4}} = \frac{1}{\cancel{4}} Y - \frac{250}{\cancel{4}} i$$

$$\Rightarrow Y = 1000 + 250 i.$$

clearly, this has pushed the LM curve up / left.



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Hence, the Y^* moves left wards and r^* moves upward.

Now, aggregate demand is directly proportional to income, and hence R^t falls.

Q2. When Tax decreases, disposable income increases increasing the consumption.

IS →

$Y = G + I + C$

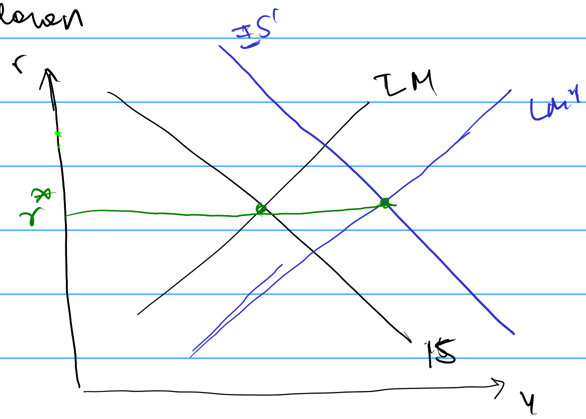
$C = a(1-t)Y$

$\Rightarrow (1-a-at)Y = G + I$

LM curve depends on tax

$$\frac{M}{P} = bY_d - cr = b(Y-T) - cr$$

a) i is constant, so Y is increased to maintain IS equation. IS is pushed to right. To maintain r, LM must be pushed down



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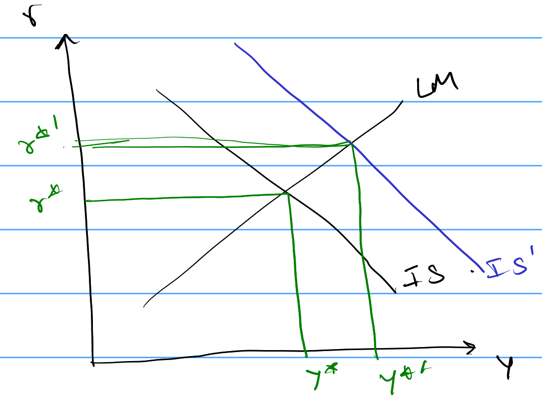
b)



Since money is constant by Y_d increases, r must increase from LM. This pushes IS to the right, but LM remains constant.
This shows the crowd out effect.

c) In (a) rate of interest remains fixed by Y increases. This allows more people to invest in the market. In (b) rate of interest also increases. this can be dangerous as people will not invest and instead hoard money.

Q3.

a) $P = -1.5x + 60$; $P = 15$

$\Rightarrow \quad 15 = -1.5x + 60 \quad \Rightarrow \quad 1.5x = 45 \Rightarrow x = 300.$

$$e_D = \frac{dQ}{dP} \cdot \frac{P}{Q} = \frac{1}{1.5} \times \frac{\cancel{15}}{\underset{20}{\cancel{300}}} = \frac{1}{30}$$

Revenue $= PQ = 15 \cdot 300 = 4500.$

$MR = P + Q\frac{dP}{dQ} \Rightarrow MR = Q\left(1 + \frac{1}{1+e}\right).$

$$= 300\left(1 + \frac{1}{1 - 1/30}\right) = 300\left(1 + \frac{30}{29}\right)$$

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b) $P = \frac{500 - x}{10}$; $P = 30$.

$30 = \frac{500 - x}{10}$.

$300 = 500 - x \Rightarrow x = 200$.

i) $\Rightarrow e_D = \frac{dQ}{dP} \cdot \frac{P}{Q} = -10 \cdot \frac{\cancel{300}^{3}}{\cancel{200}_{2}} = -15$

ii) $\frac{dP}{P} = 0.03$.

$\frac{dQ}{Q} = e_D \cdot \frac{dP}{P} = -15 \times 0.03 = -0.45$.

$\Rightarrow -0.45\%$ is the change in Q

Q4

a $P = K^{\alpha} L^{\beta}$; $\alpha = \beta = 1$

$\Rightarrow MP_L = \frac{dP}{dL} = \beta L^{\beta-1} \cdot K^{\alpha} = 1 \cdot L^{0} \cdot K = K$.

$MP_K = \frac{dP}{dK} = \alpha K^{\alpha-1} L^{\beta} = 1 \cdot K^{0} \cdot L = L$.

Therefore, if K is increased but L fixed then returnes to scale are increasing. Similarly, L increased but K fixed gives us increasing returns to scale

b) $P = L^{\alpha} + K^{\beta}$

$\frac{dP}{dL} = \alpha L^{\alpha-1} = 1$

$\frac{dP}{dK} = \beta K^{\beta-1} = 1$

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Again, keeping one fixed while varying the ~~other~~ other gives constant returns to scale.