WARWICK

EC131 Economics for Business

Steering the macroeconomy

The transmission mechanisms

What is the interest rate transmission mechanism?

What is the exchange rate transmission mechanism?

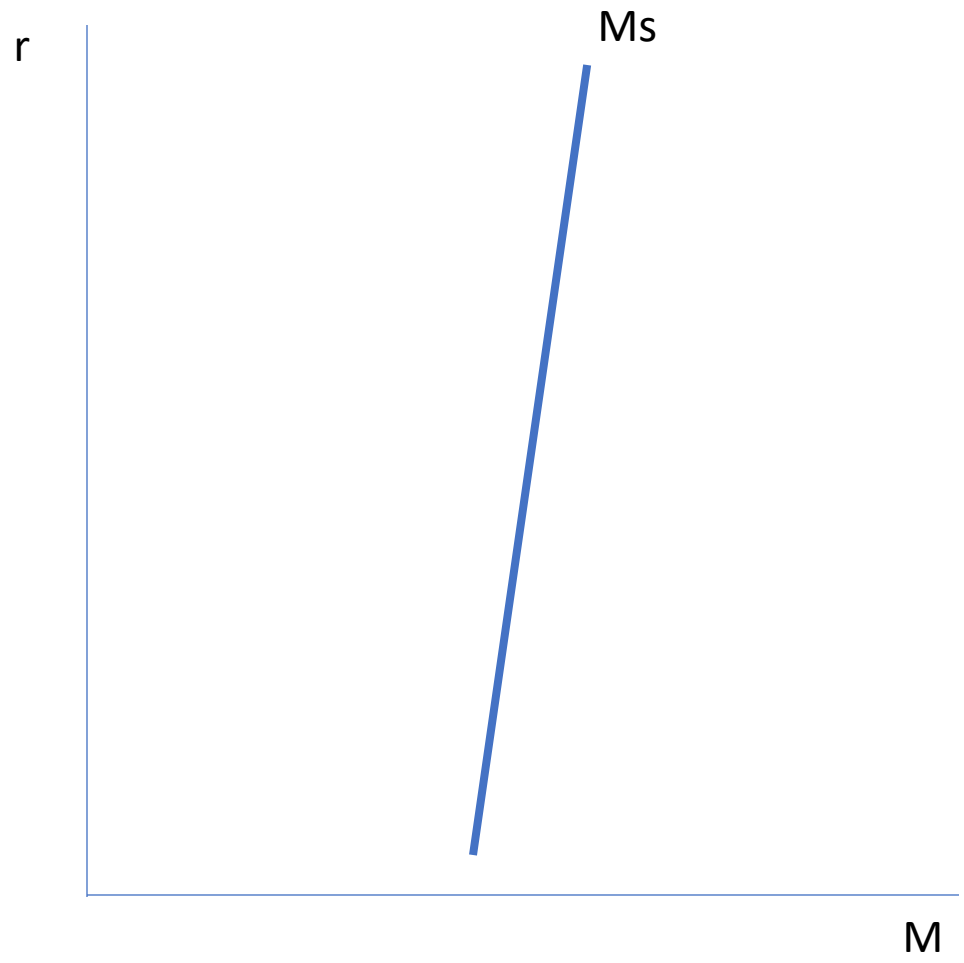
What is the overall effect of these transmission mechanisms on the national output?

The money market

- How are interest rates are determined in the market?
- How are money and goods markets are linked together?
  - Changes in the goods market have effects on the money market
  - Changes in the money market have effects on the goods market

The supply of money

- The horizontal axis is the quantity of money M
- The vertical axis is the rate of interest r
- An exogenous money supply (i.e. money supply determined by the central bank) is vertical in this space
- But the money supply Ms is an upward-sloping curve because individual banks have some degree of control over the money supply (and not just set by the central bank)

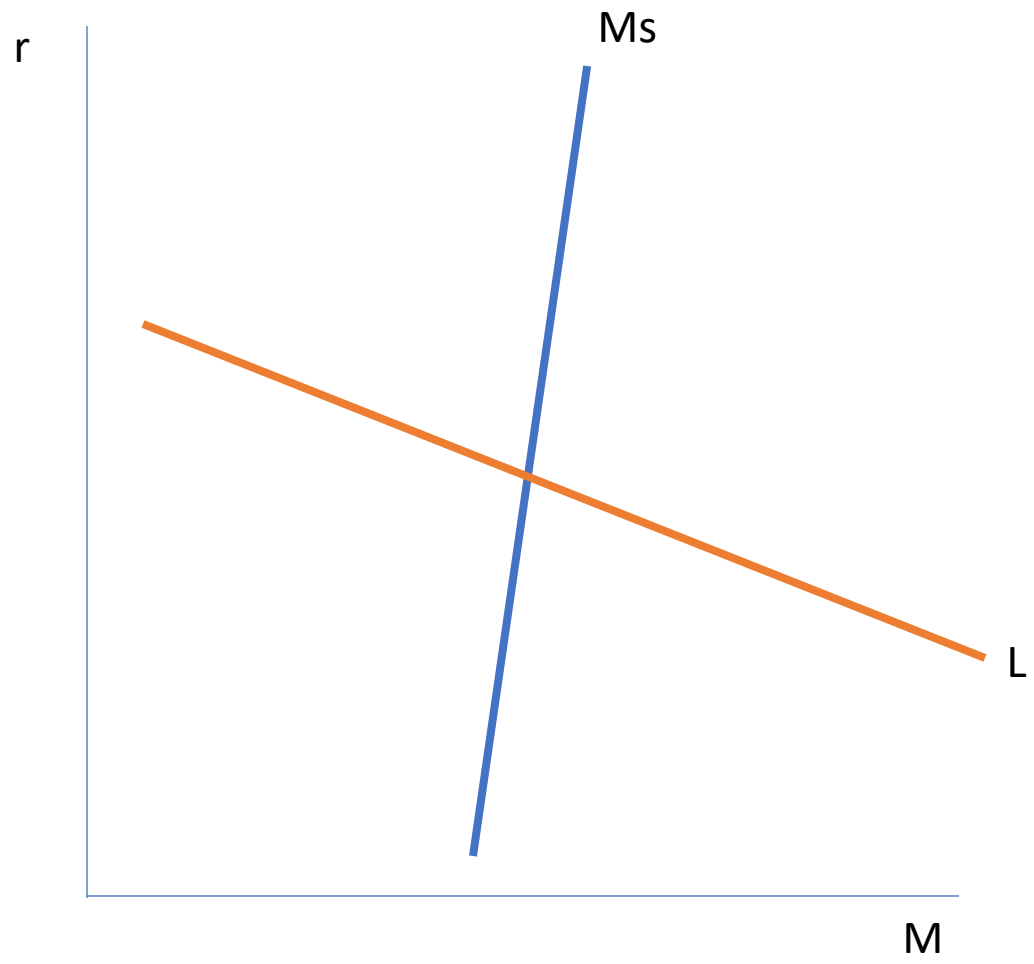


Money supply

- Bank deposits by far are the largest element of broad money (M4)
  - M4 includes cash in circulation with the public plus deposits in banks and building societies
- Banks can create money by lending (e.g. granting overdrafts or loans)
- Say, for example, £10 is deposited in a bank and 10% of the bank's deposits must be cash
  - £1 is held as cash, £9 lent to a customer
  - Customer spent £9 on a shop, who then deposited it to their bank account
  - £0.9 is held as cash, the remaining £8.1 lent to another customer
  - So on and forth
  - Money supply expands to £100; deposit multiplier is 10 (in general, deposit multiplier is the inverse of the cash/liquidity ratio)
- What if banks do not have a pool of approved borrowers?

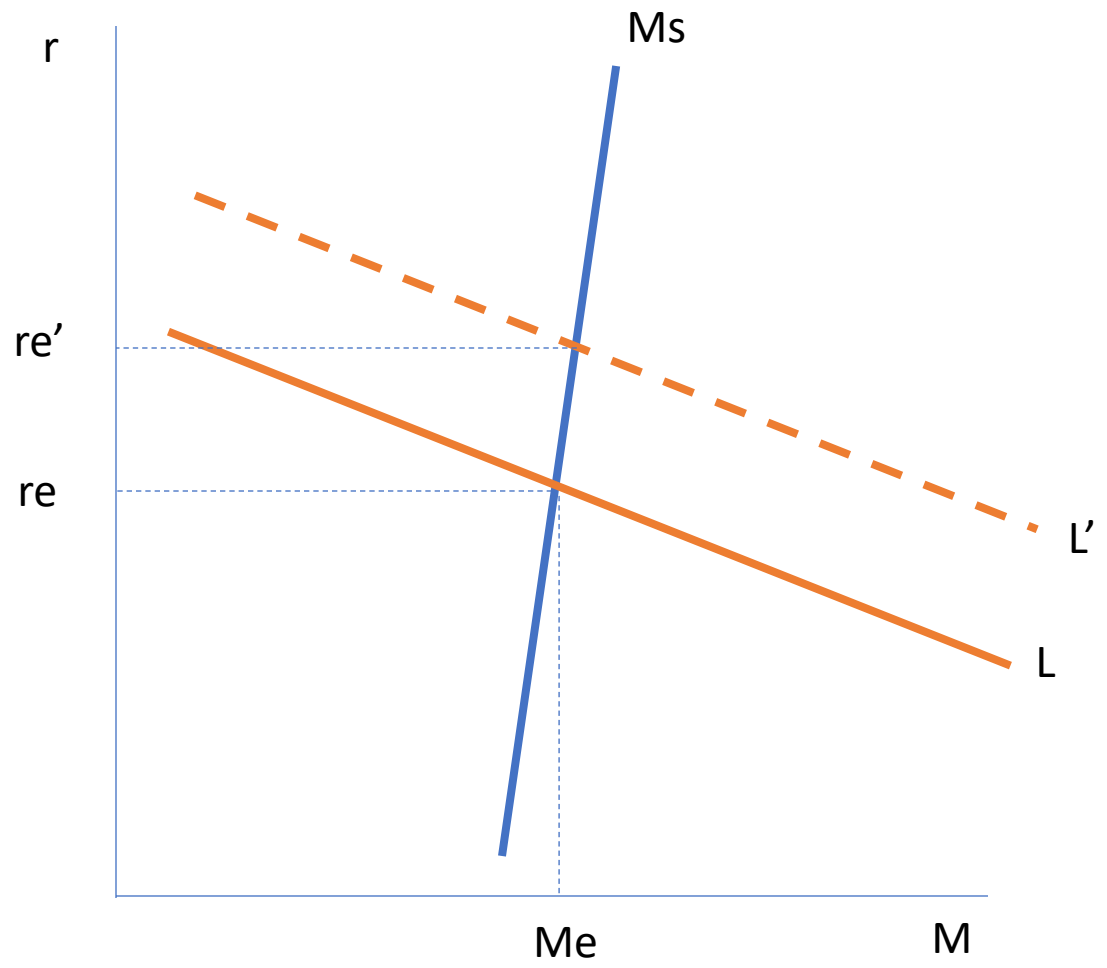
The demand for money

- L stands for liquidity preference and it shows households demand for “liquid” assets (e.g. cash or near cash)
- The demand for money L is a downward-sloping curve in the space because the demand for liquid assets such as cash decreases when interest rate r increases



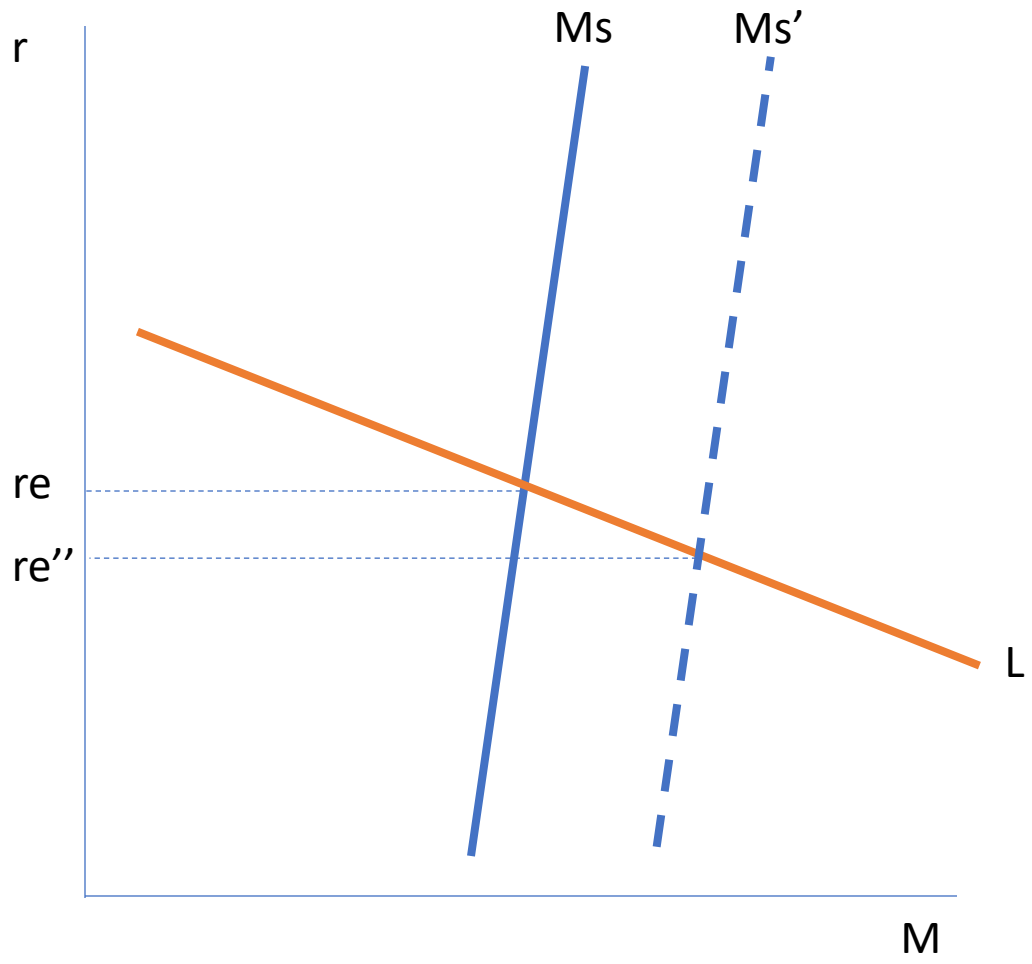
The supply of and demand for money

- The higher the income the higher the transactions (e.g. purchases) and the higher demand for money to support these transactions
- So when disposable income increases money demand shifts to the right from L to L’ and this increases the interest rate from re to re’
- What happened to the demand for money during the Covid-19 pandemic?



The supply of and demand for money

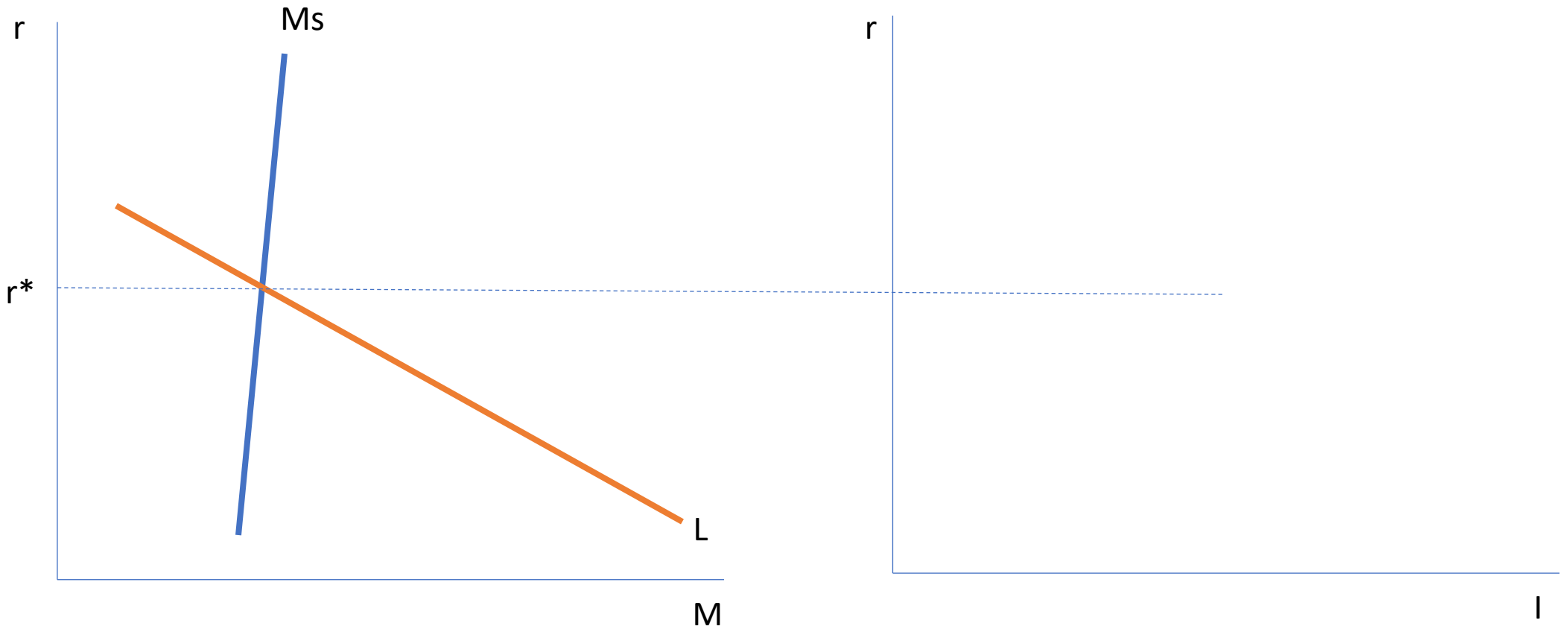
- If the central bank injects cash into the economy, then money supply shifts to the right from Ms to Ms' and interest rate decreases from re to re''
- What happens to money supply when banks choose to hold less money (lower liquidity ratio)?



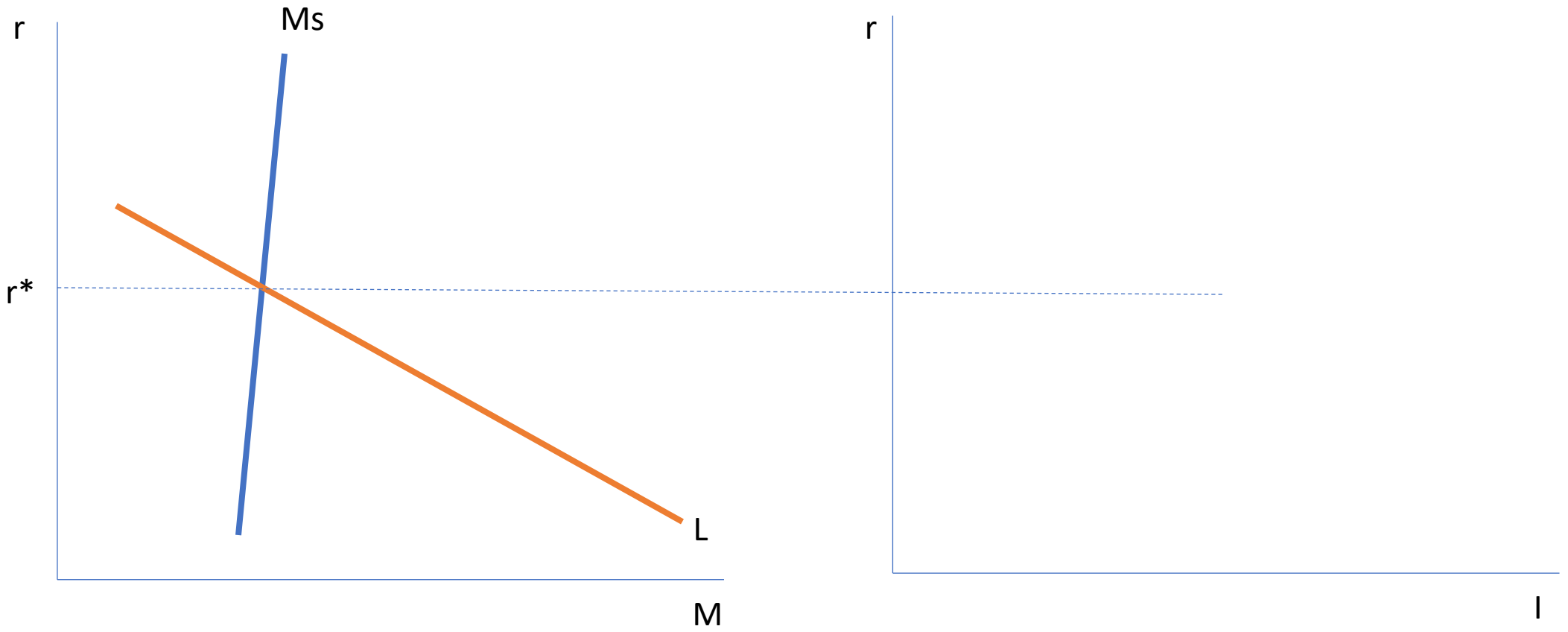
The transmission mechanisms

- We saw equilibrium in the goods market using
  - AS/AD
  - Injections/withdrawals
  - Income/expenditure
- We also saw equilibrium in the money market
- These two markets are connected
- We can explain the link between goods and money markets using
  - The interest rate transmission mechanism
  - The exchange rate transmission mechanism

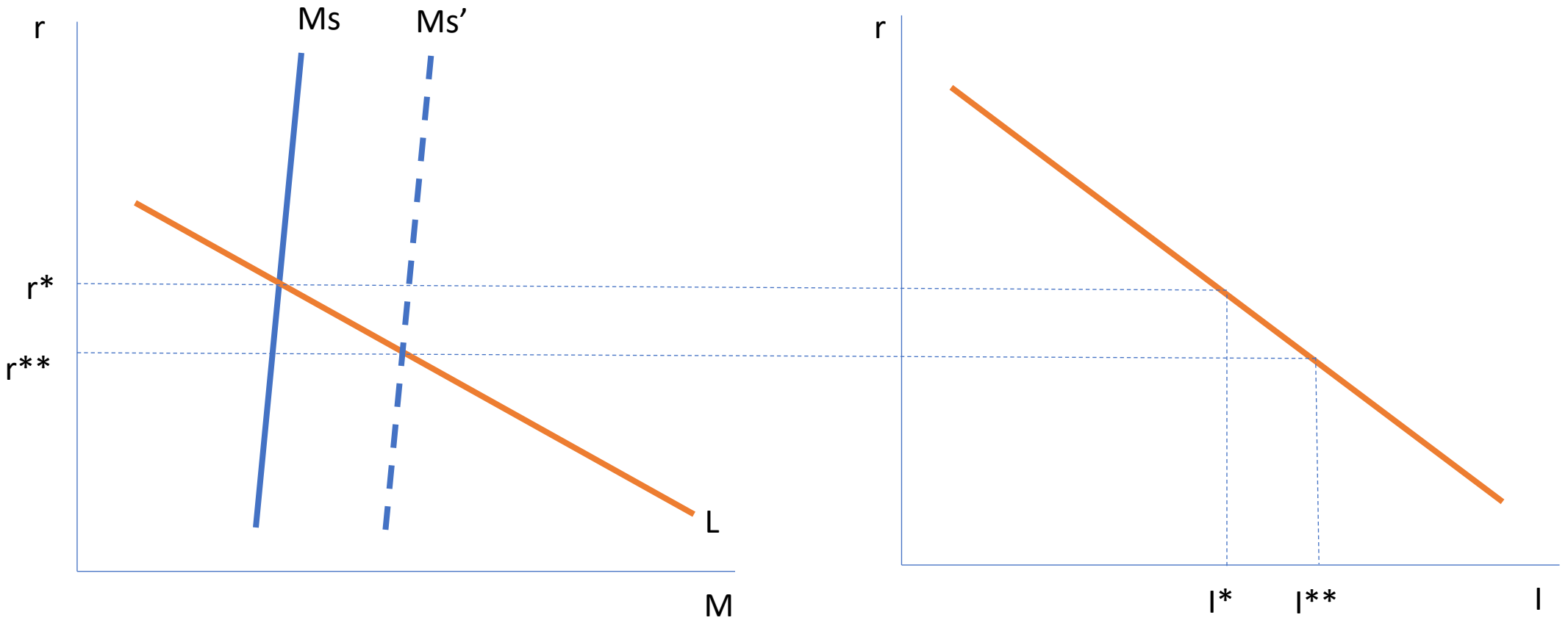
The interest rate transmission mechanism



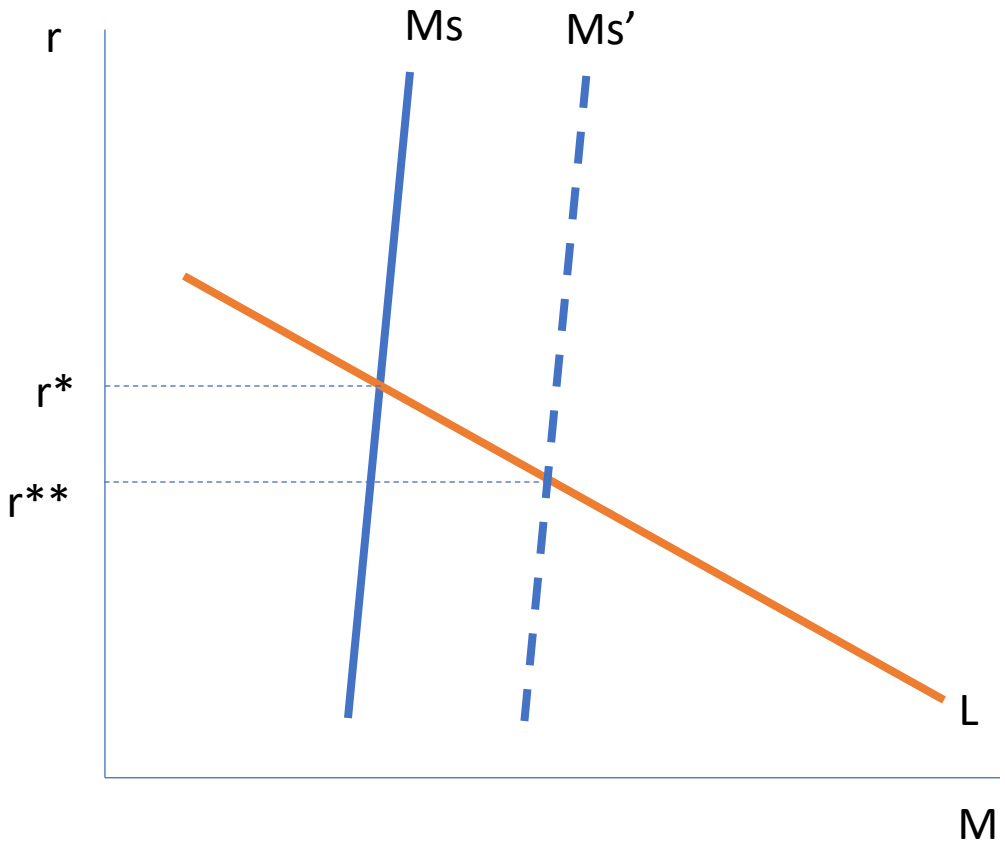
What if money supply increases?

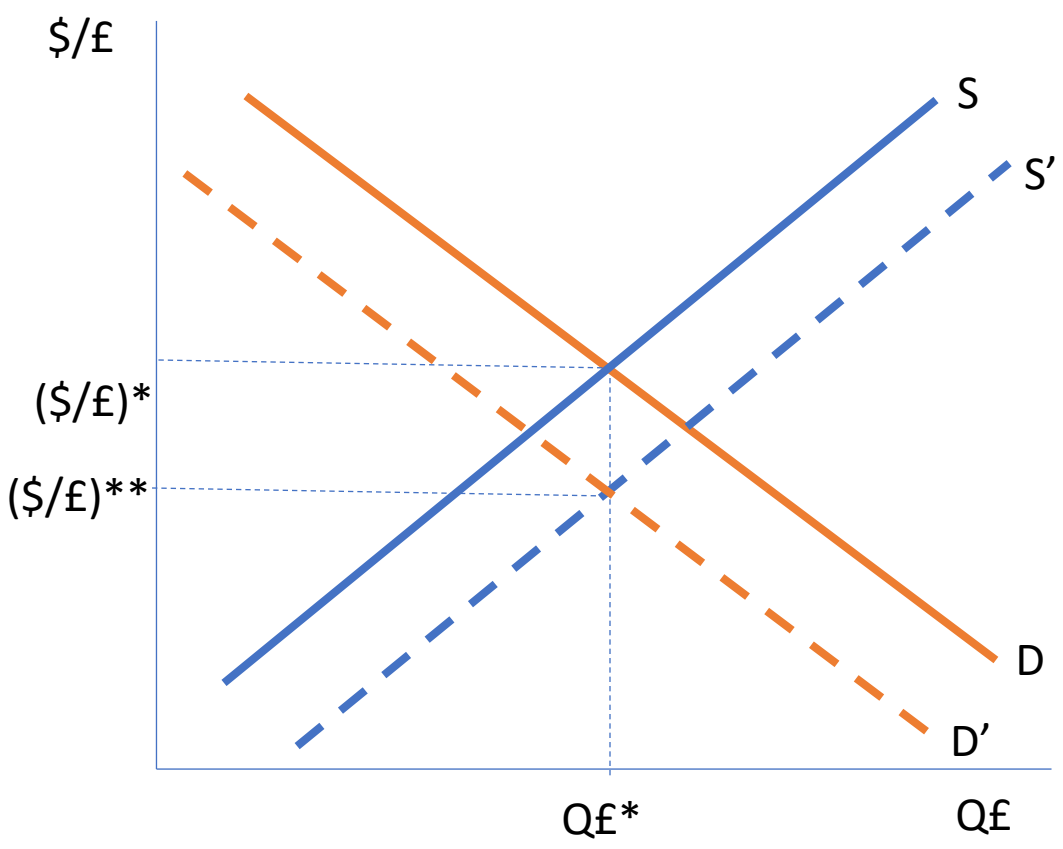


Effect of a rise in money supply

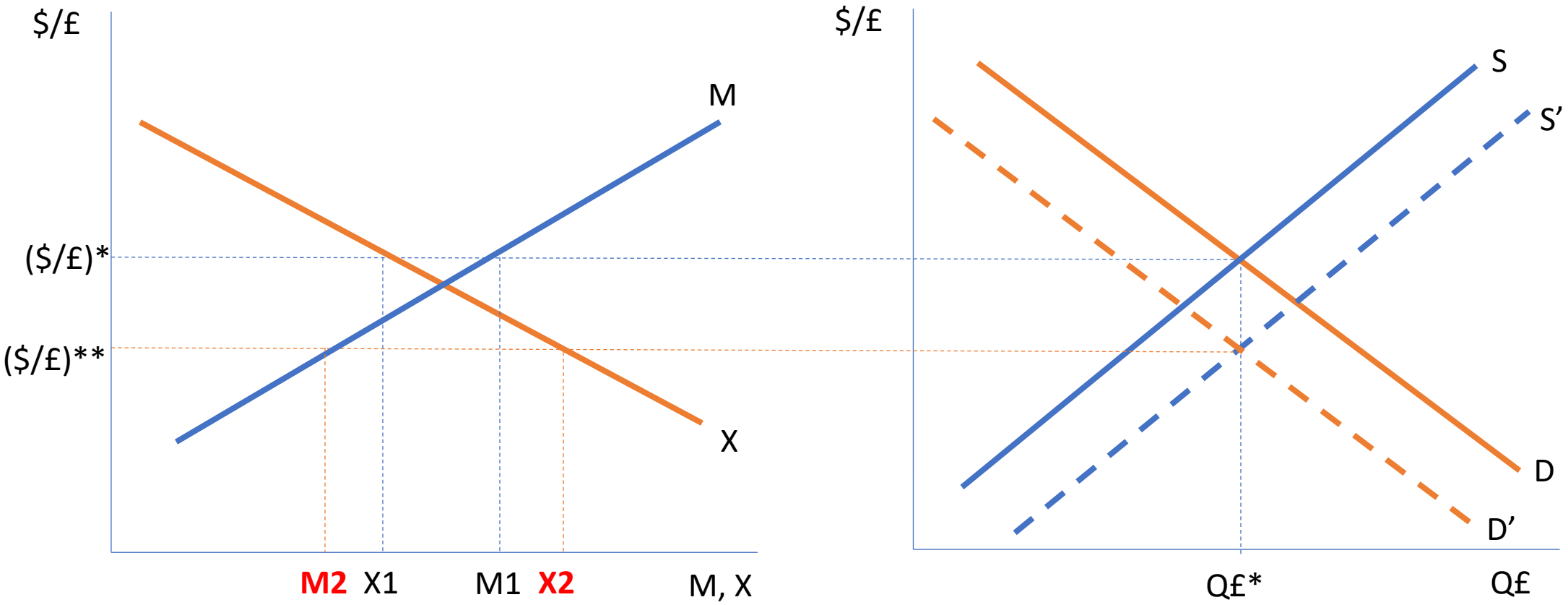


The exchange rate transmission mechanism



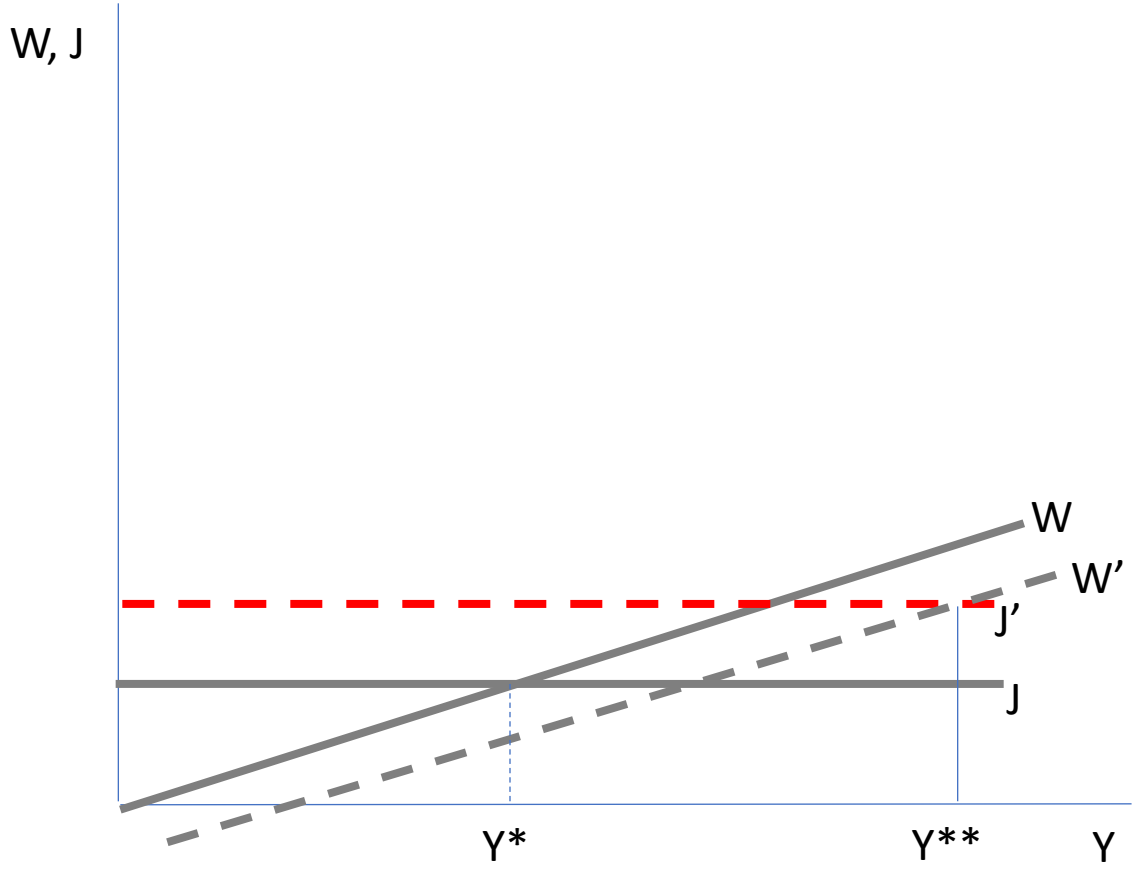


The exchange rate transmission mechanism



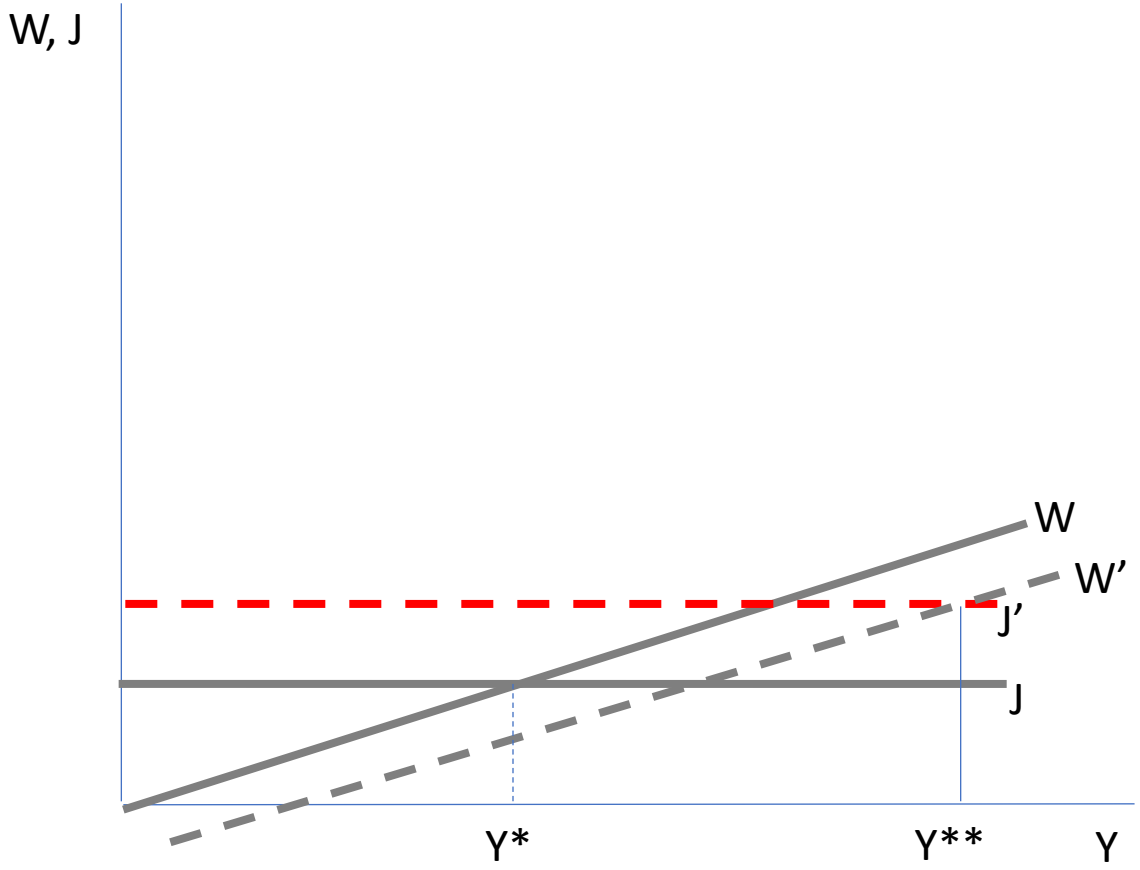
The overall effect of a rise in money supply

- The increase in money supply
  - Reduces interest rate and cuts borrowing costs
  - This then boosts investments
  - At the same time lower interest increases consumption
  - This further boosts investments through the accelerator
  - There is increased injections to the economy (I+G+X)
  - The injection curve shifts up from J to J’



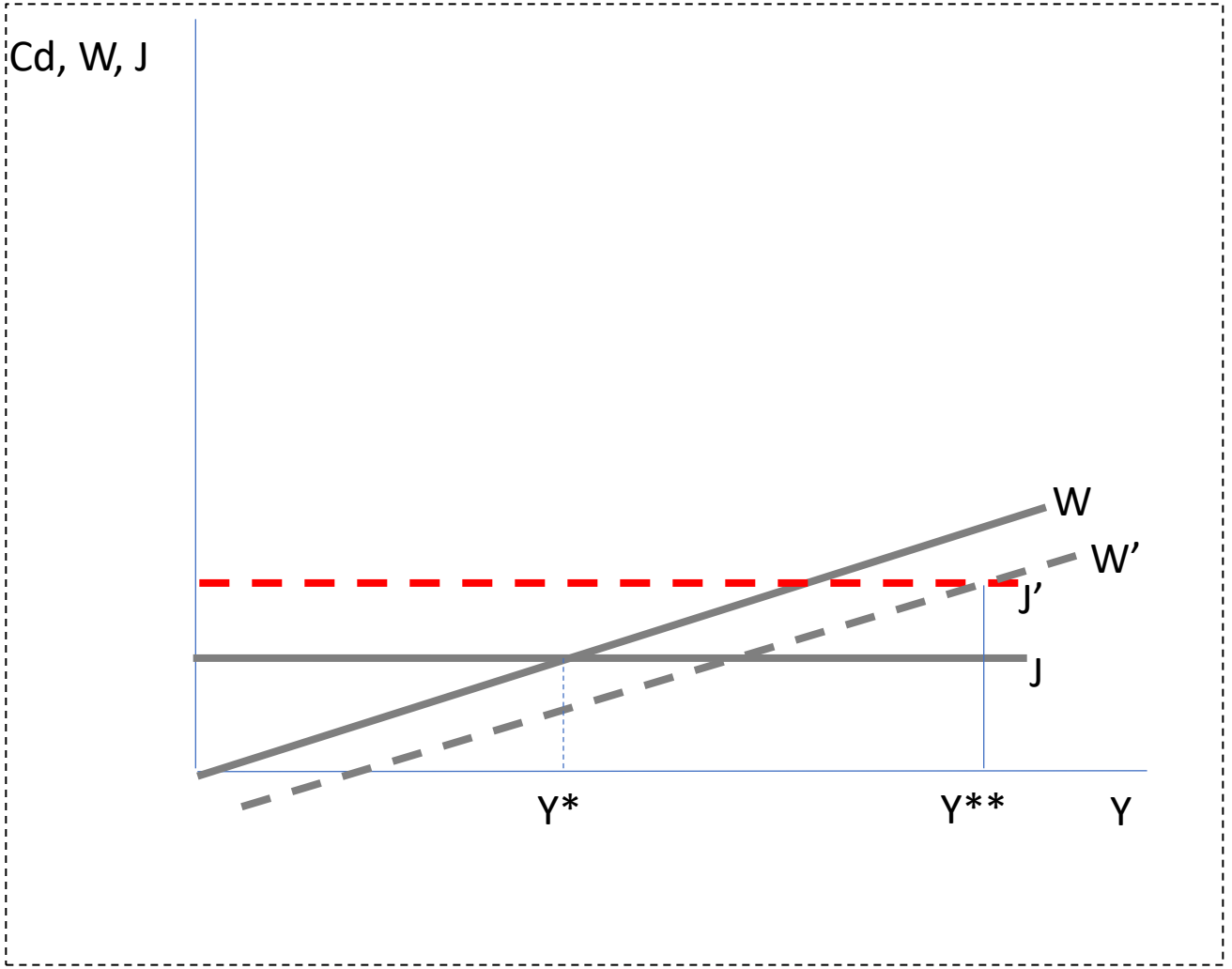
The overall effect of a rise in money supply

- At the same time the increase in money supply
  - Reduces the exchange rate
  - This cuts savings and imports
  - There is decreased withdrawals (S+T+M) from the economy
  - The withdrawals curve shifts to the right from W to W’



The overall effect of a rise in money supply

- An increase in the money supply will work its way through various mechanisms and this will eventually lead to a multiple rise (i.e. multiplier effect) in the national output from Y* to Y**
- There is a clear link between the money market and the goods market
- The increase in the money supply boosts economic growth which then cuts unemployment but increases inflation
- What if money supply falls?



How big is the shift in the national output?

- The interest rate and exchange rate are crucial mechanisms by which the money and goods markets are linked
- The overall impact will depend on many things including
  - How responsive is investment to a change in the interest rate?
  - How responsive is saving to a change in the interest rate?
  - How responsive is the exchange rate to a change in the interest rate?
  - How responsive is exports to a change in the exchange rate?
  - How responsive is imports to a change in the exchange rate?
  - How big is the multiplier effect?

The IS and LM curves

- What is the IS curve?
- How is the IS curve derived?
- What is the LM curve?
- How is the LM curve derived?

- What is the ISLM model?
- How is the IS curve derived?

ISLM model

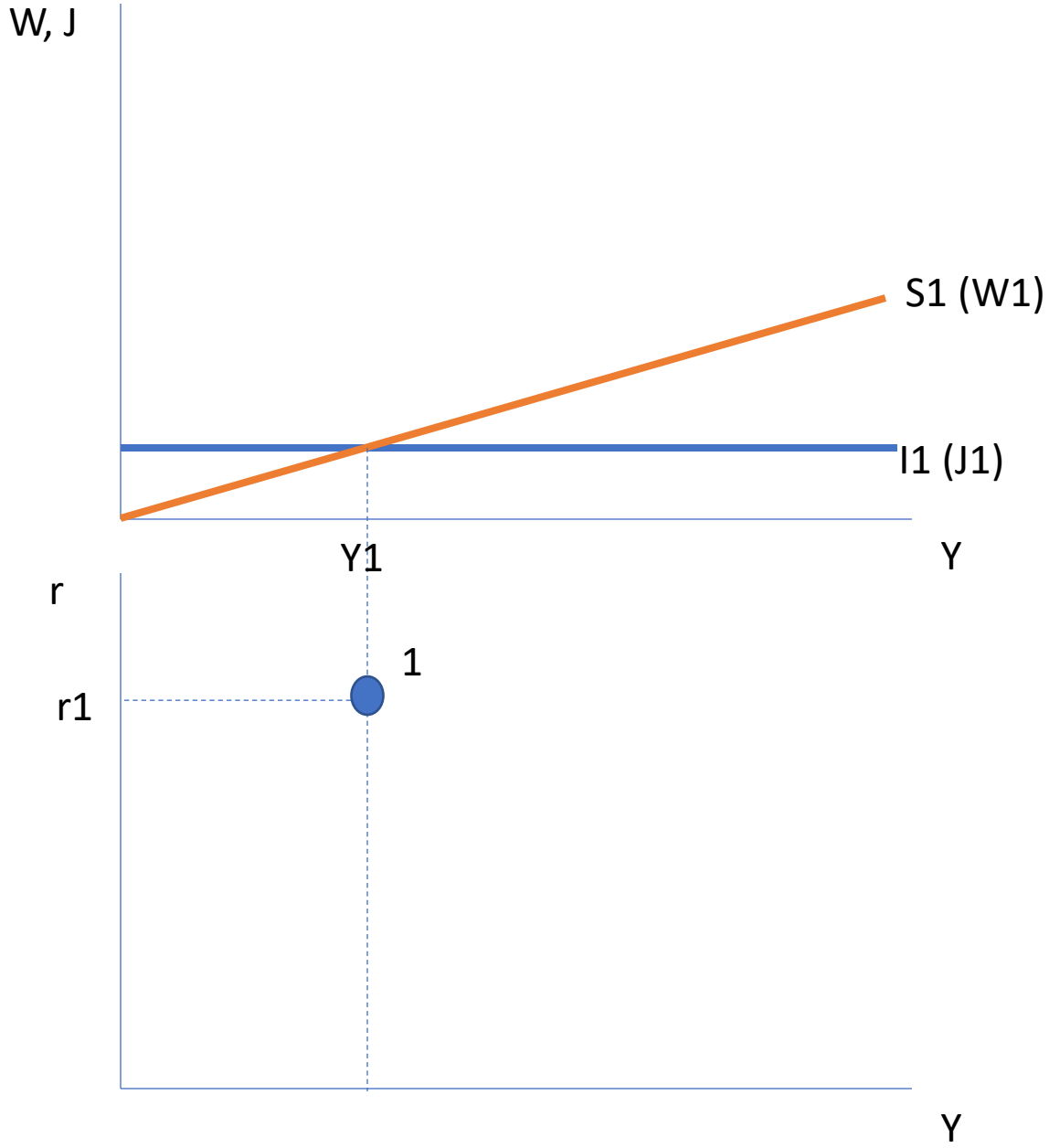
- The goods market does not include interest rates on one of the axis
- The money market does not include national output on one of the axis
- We saw from transmission mechanisms that goods and money markets are linked together
  - We saw multiple different diagrams to trace the effect of a change in interest rate on investment, exchange rate, exports and imports, and on national output
- The ISLM model brings both markets into one diagram
  - IS stands for investment equals savings and this represents the goods market
  - LM stands for liquidity money and this represents the money market

IS curve

- The IS curve shows different combinations of interest rate and national output at which the goods market is in equilibrium
- The goods market is in equilibrium when
  - Y = E
  - J = W
  - I + G + X = S + T + M
- The IS curve focuses on I and S
  - T, M, G, X are assumed to be constant

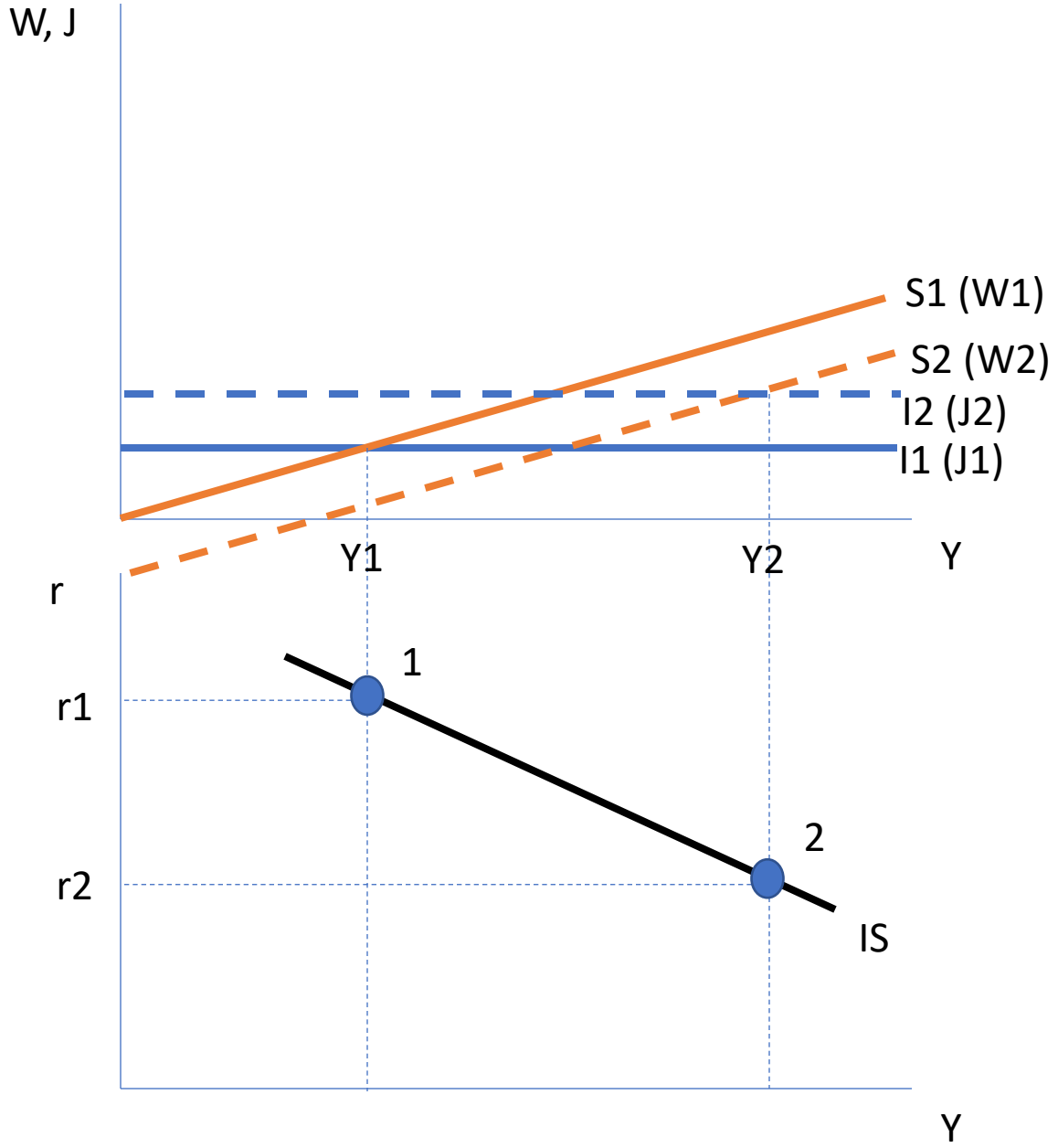
Deriving the IS curve

- Suppose the initial interest rate is r1
- Given r1 we can add the investment function I1 which can be derived from the injections function J1; other injection variables (G, X) are assumed constant
- Given r1 we can add the savings function S1 which can be derived from the withdrawals function; other withdrawals variables (T, M) are assumed constant
- Y1 is the only equilibrium national output associated with the interest rate r1 and this r-Y combination is represented by point 1



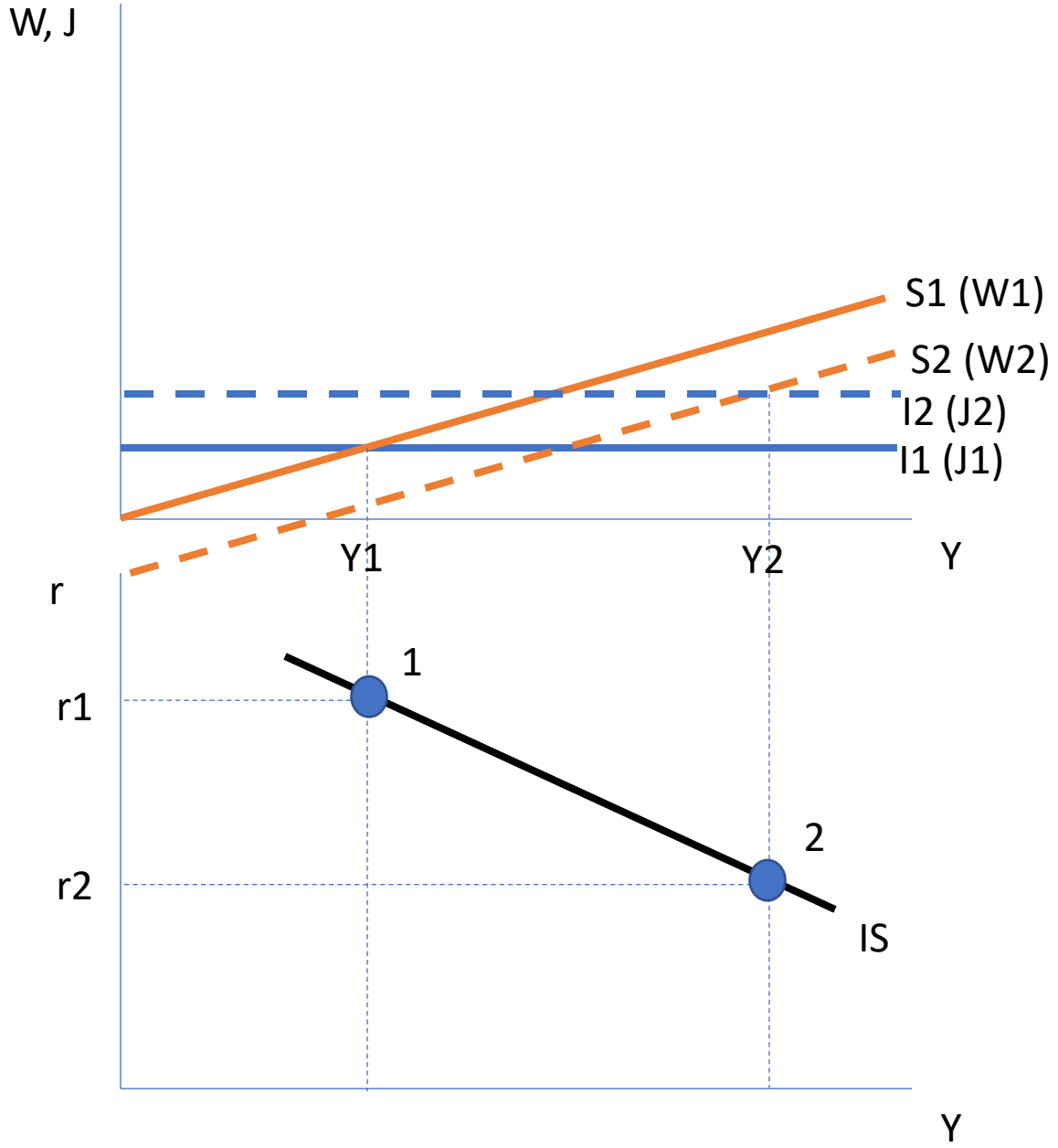
Deriving the IS curve

- Consider a lower interest rate r2
- The lower the interest rate the higher the investment, so the investment function shifts up, from I1 to I2
- At the same time the lower interest rate the lower the savings, so the savings function shifts to the right, from S1 to S2
- Y2 is the only equilibrium national output associated with the interest rate r2 and this r-Y combination is represented by point 2
- Points 1 and 2 are joined together to represent the IS curve



Deriving the IS curve

- What if the interest rate increases?
- We have plotted the IS curve where the interest rate is on the vertical axis and the national output is on the horizontal axis
- The IS curve shows the combinations of interest rate and national output at which the goods market is in equilibrium
- The IS curve is downward sloping in this space because the lower the interest rate the higher the national output



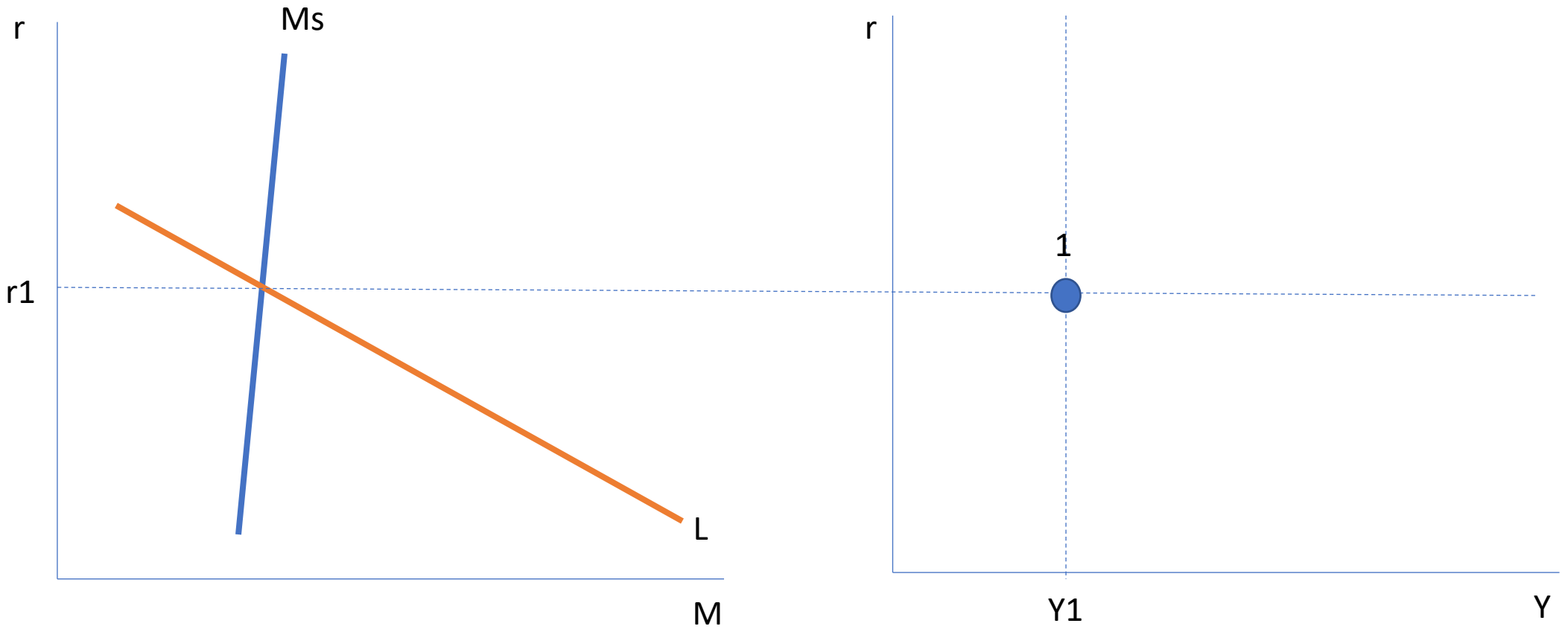
- What is the LM curve?
- How is the LM curve derived?

The LM curve

- The LM curve shows different combinations of interest rate and national output at which the money market is in equilibrium
- The money market is in equilibrium when the demand for money is equal to the supply of money

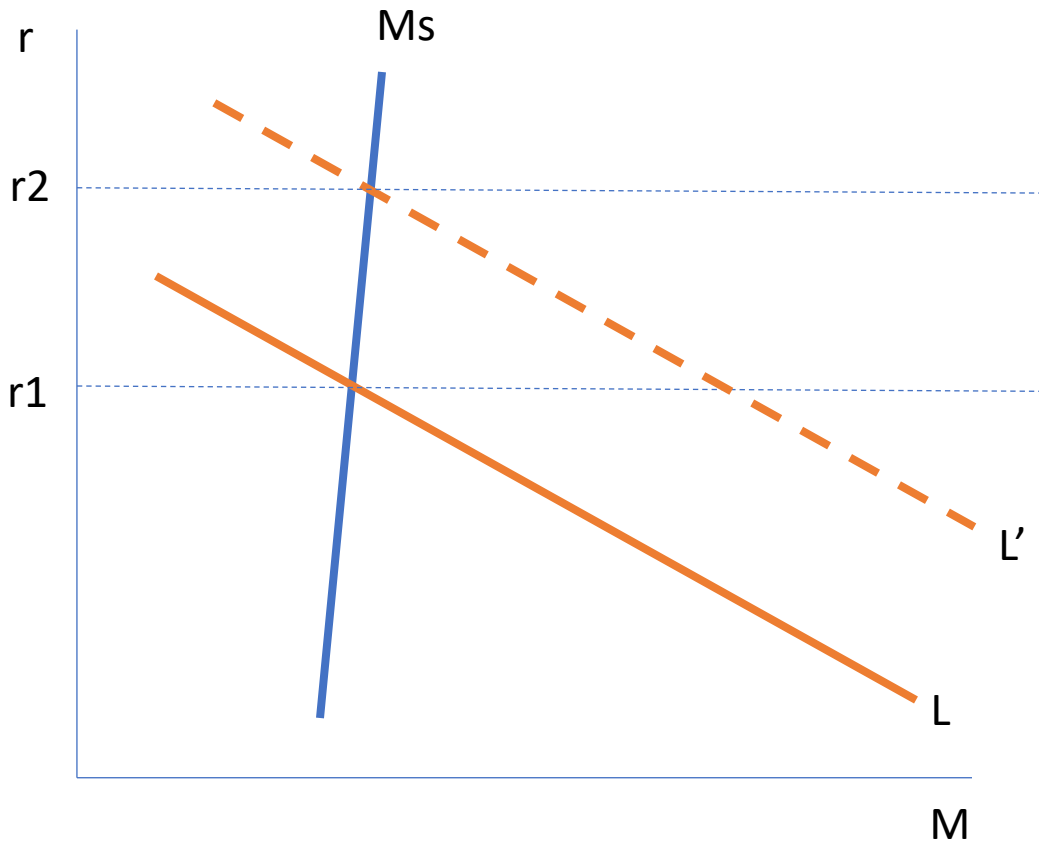
Deriving the LM curve :

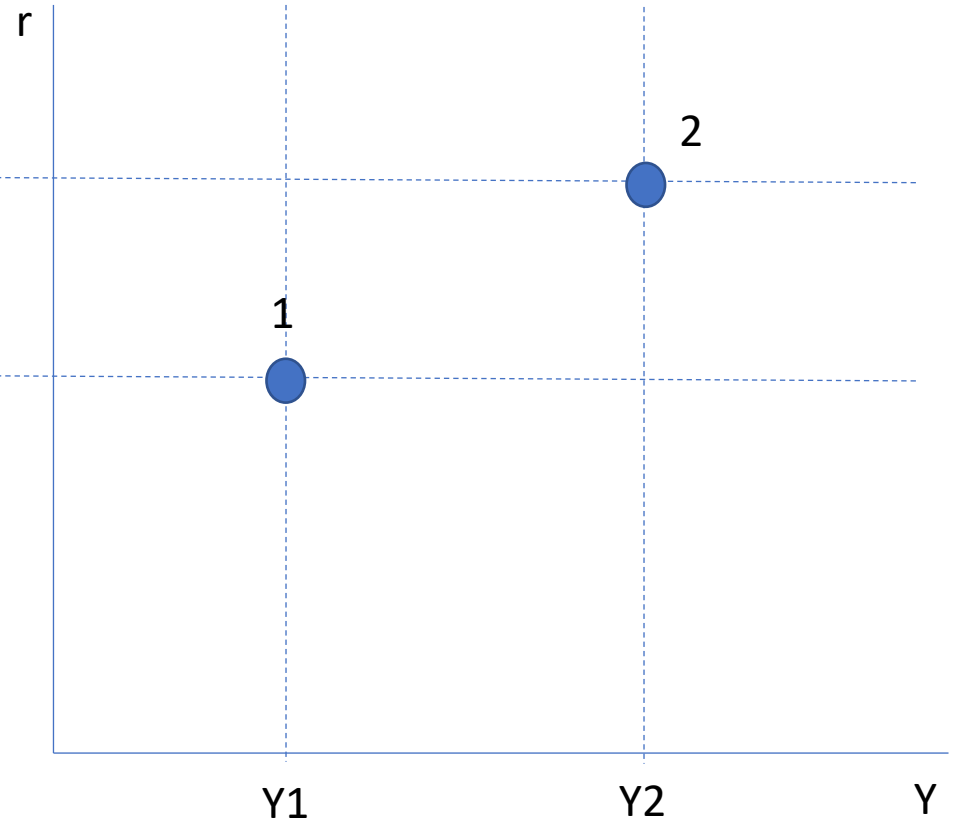
- Suppose the initial national output is Y1
- Point 1 represents the combination of national output and interest rate at which the money market is in equilibrium



Deriving the LM curve

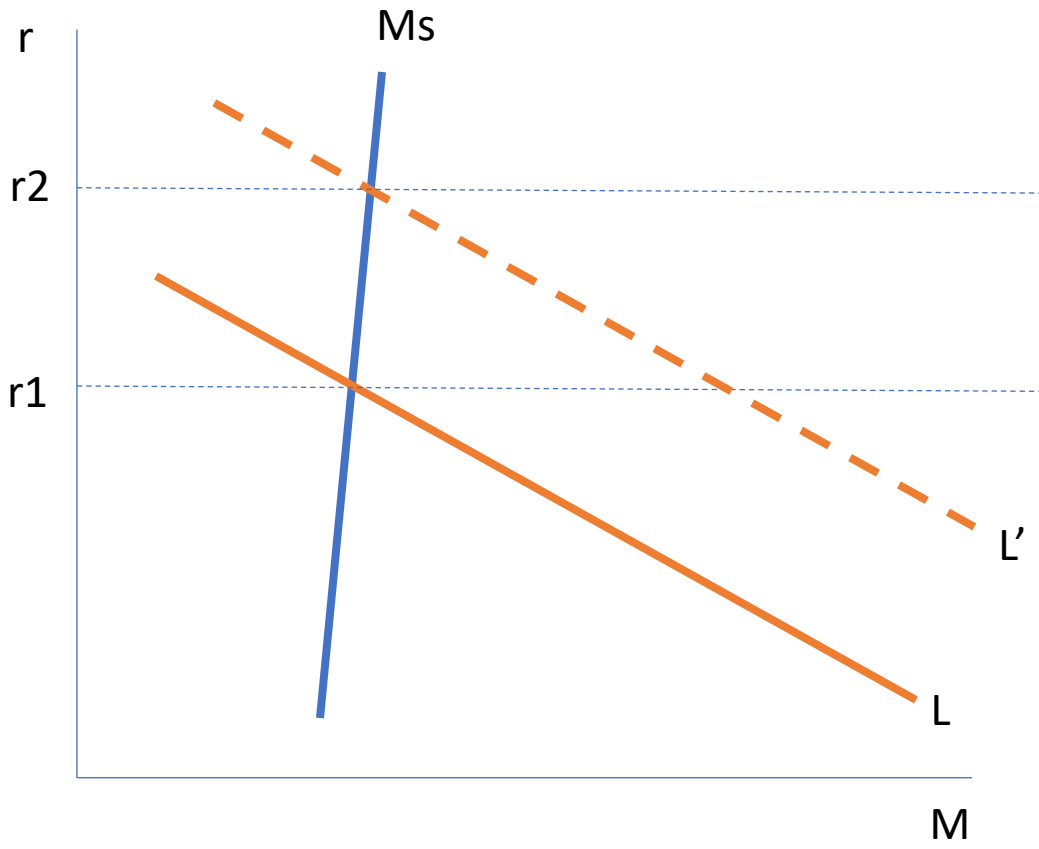
- Suppose the national output increases from Y1 to Y2
- Point 2 represents the combination of national output and interest rate at which the money market is in equilibrium

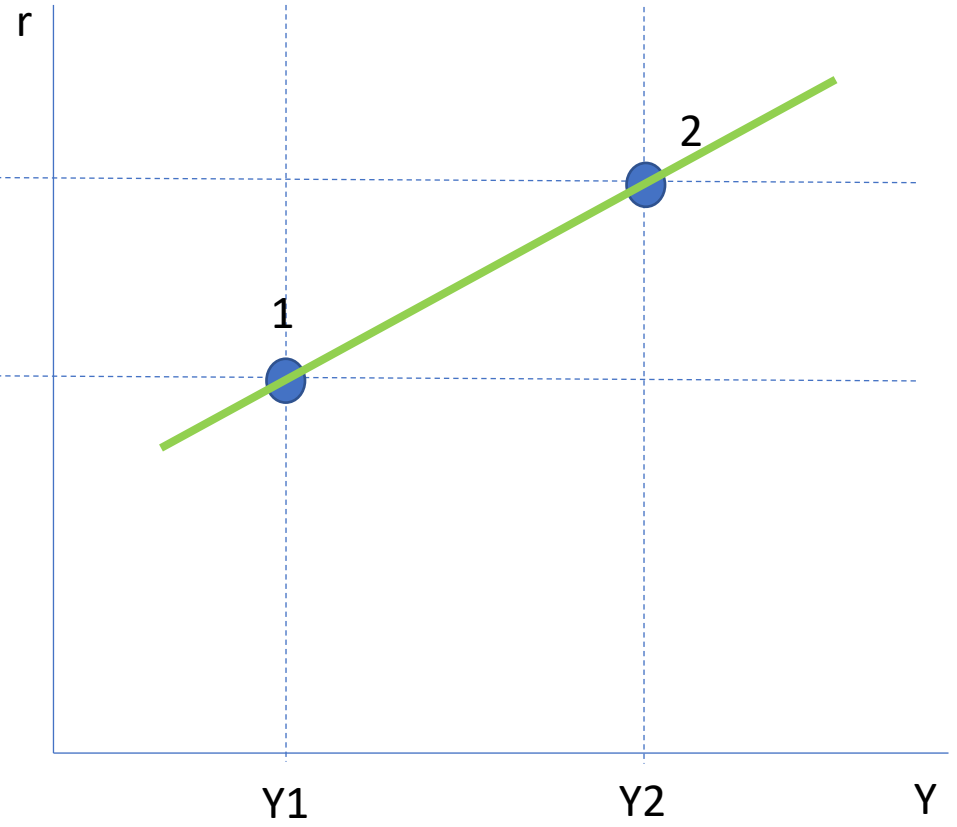




Deriving the LM curve

- What if the national output falls?
- The LM curve shows the combinations of interest rate and national output at which the money market is in equilibrium
- The LM curve is upward sloping in this space because the higher the interest rate the higher the national output





Topic 5 part 4:
IS-LM model and analysis

What is the IS-LM model?

How can we use the IS-LM model to analyse macroeconomic policies?

Summary

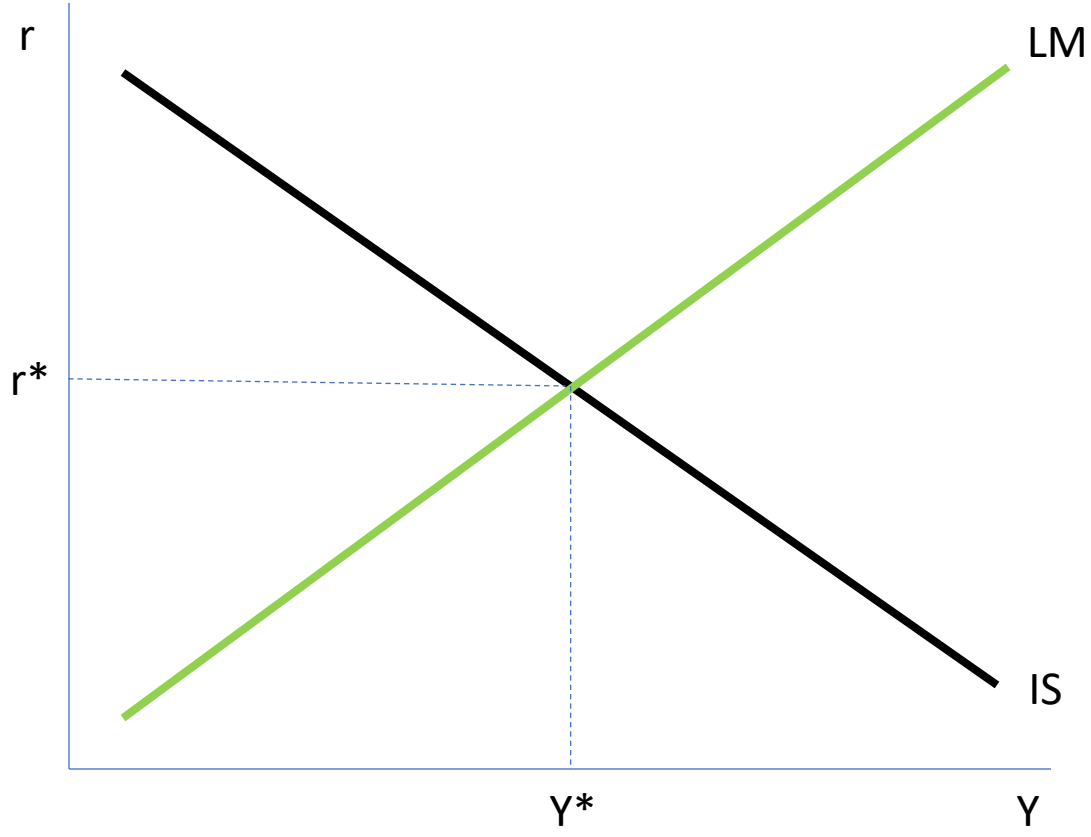
- What is the IS-LM model?
- How is the equilibrium national output determined in the IS-LM model?

The IS-LM model

- Changes in one market may spill over into the other market as in the analysis on transmission mechanisms has shown
- There is a diagram for each stage of the analysis
  - The effect of a change in the money supply on interest rate
  - The effect of a change in the interest rate on investment
  - The effect of a change in the interest rate on the exchange rate
  - The effect of a change in the interest rate on exports and imports
- The ISLM model puts the IS and LM together, so it analyses the process involving both goods and money markets in one diagram

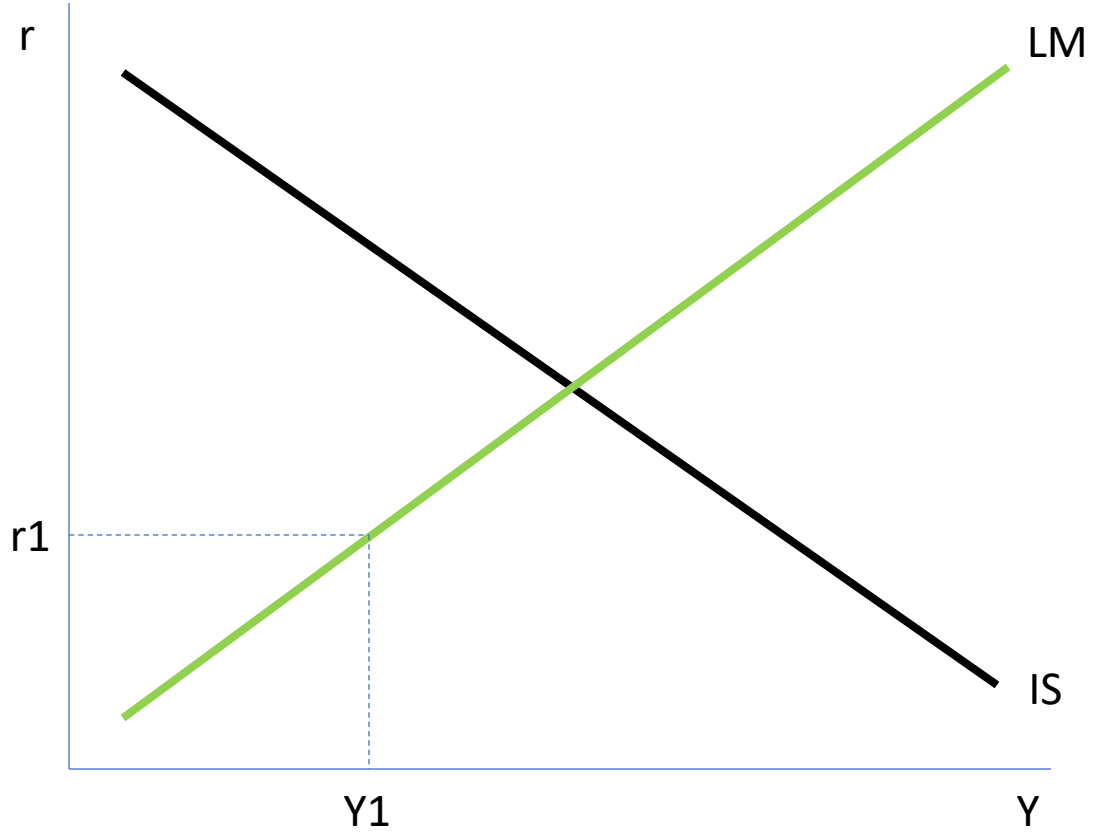
The IS-LM model

- The IS curve shows the combinations of interest rate and national output at which the goods market is at equilibrium
- The LM curve shows the combinations of interest rate and national output at which the money market is at equilibrium
- The intersection between IS and LM curves determine the equilibrium interest rate r* and national output Y*



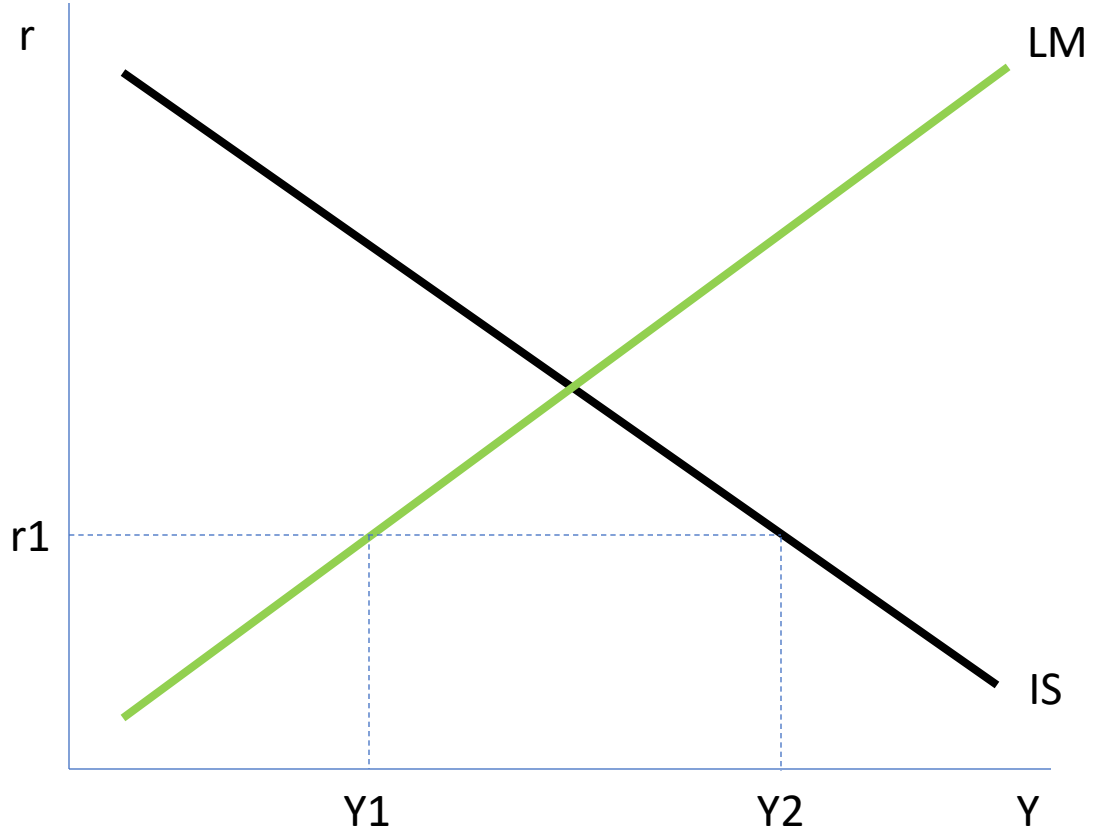
The IS-LM model

- Suppose the level of output is Y1
- The interest rate associated with Y1 in this diagram is r1 on the LM curve where money market is in equilibrium
  - Recall how the LM curve is derived
- However, given r1 the goods market is not in equilibrium
  - Recall how the IS curve is derived



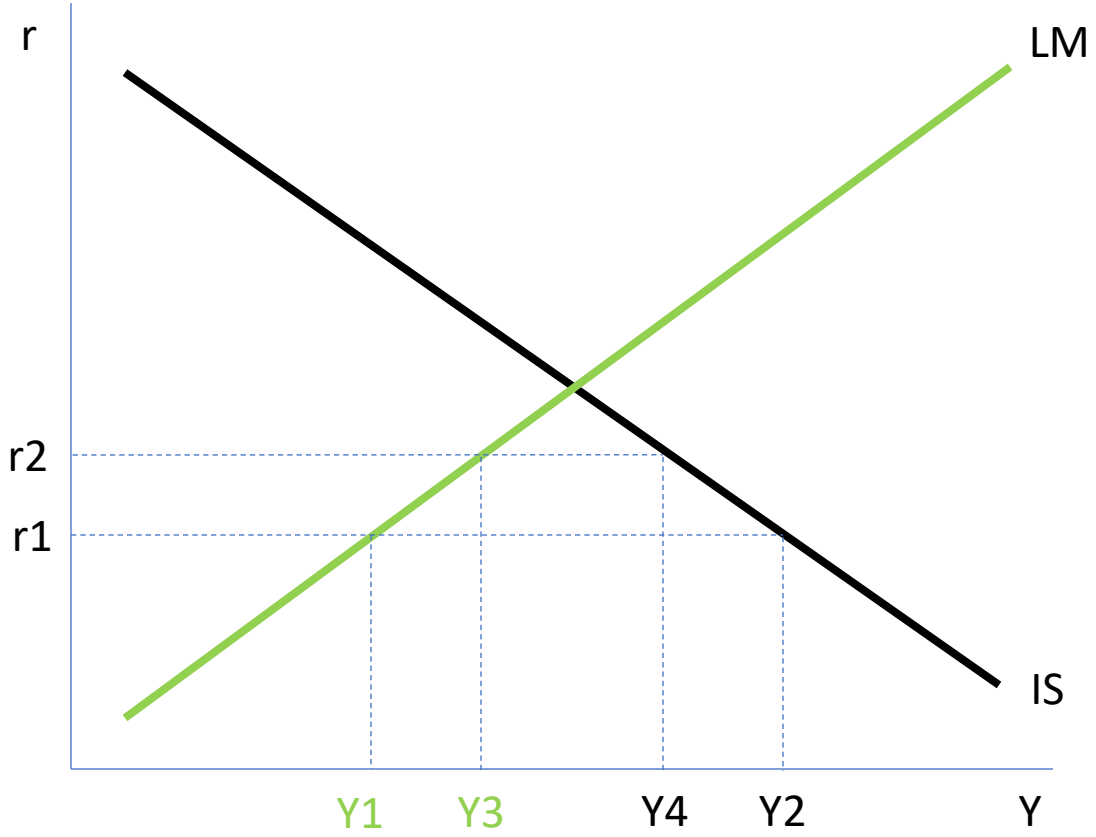
The IS-LM model

- Given r1 the money market requires a national output Y1 for the money market to be in equilibrium
- However, given r1 the goods market requires a national output Y2 for the goods market to be in equilibrium
- At r1 the national output (Y1) is below the goods market equilibrium output (Y2)
- The equilibrium interest rate can not be r1 since Y1 < Y2



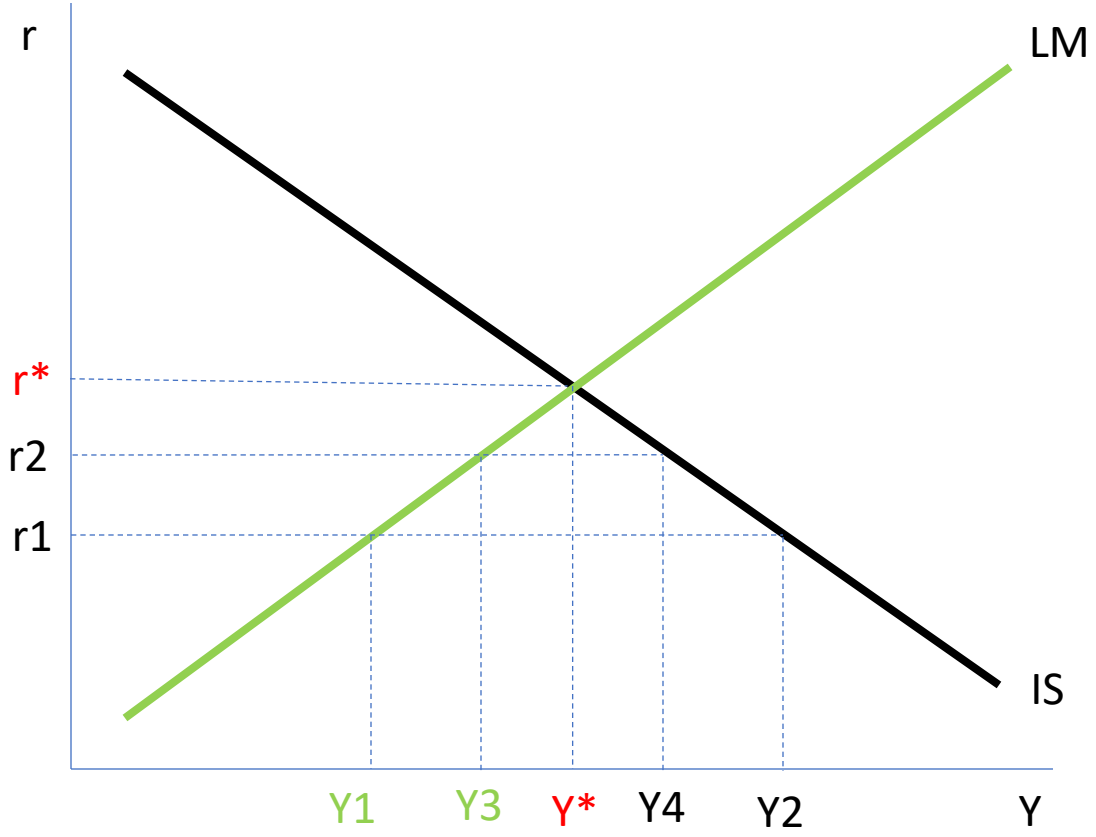
The IS-LM model

- As national output increases from Y1 to Y3 the interest rate increases from r1 to r2 and this is represented by a movement up along the LM curve
- At r2 investment is lower and savings is higher, so the national output associated to r2 (i.e. Y4) is lower than the national output associated to r1 (i.e. Y2) in the goods market and this is a movement up along the IS curve



The IS-LM model

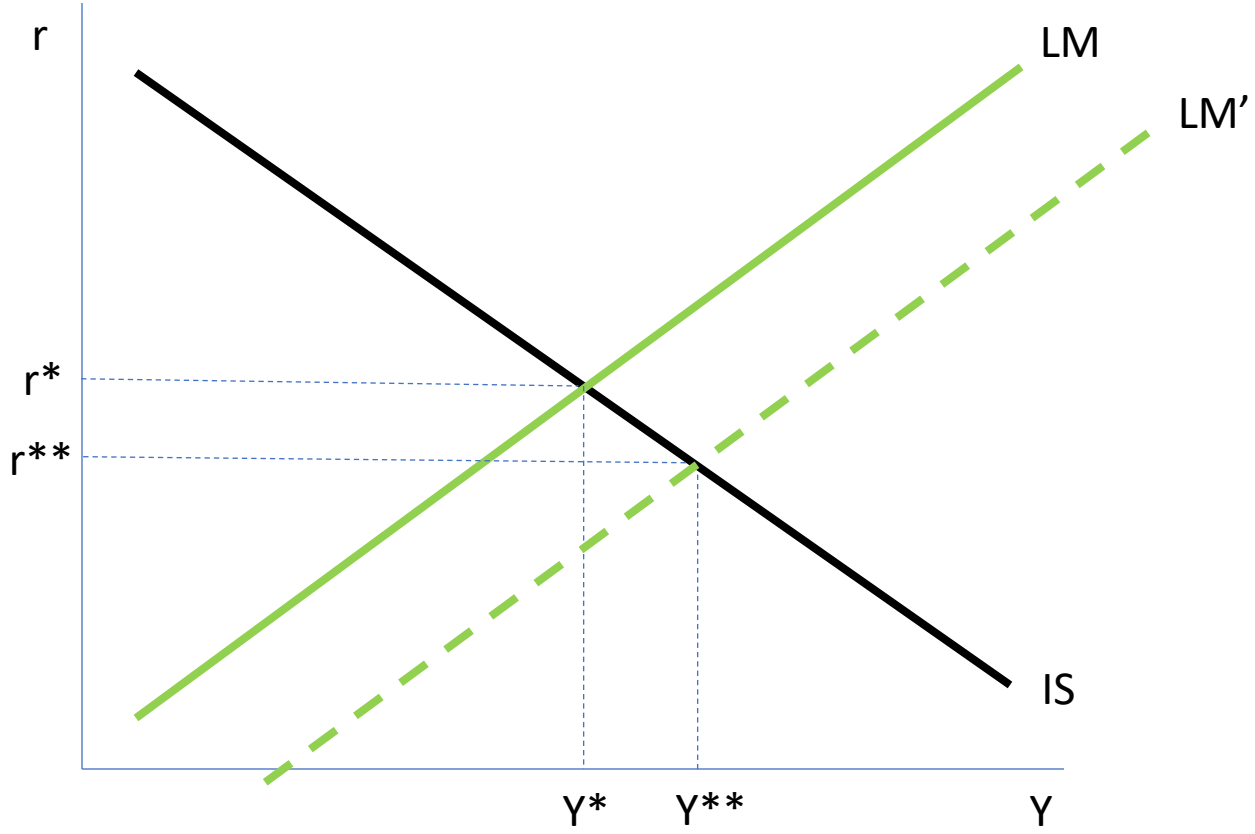
- As national output increases from Y1 to Y3 the interest rate increases from r1 to r2 and this is represent by a movement up along the LM curve
- At r2 investment is lower and savings is higher, so the national output associated to r2 (i.e. Y4) is lower than the national output associated to r1 (i.e. Y2) in the goods market and this is a movement up along the IS curve
- The process continues until the equilibrium is reached in both markets



- How can we use the IS-LM to analyse the effectiveness of macroeconomic policies?
- How does macroeconomics affect firms?
- Summary

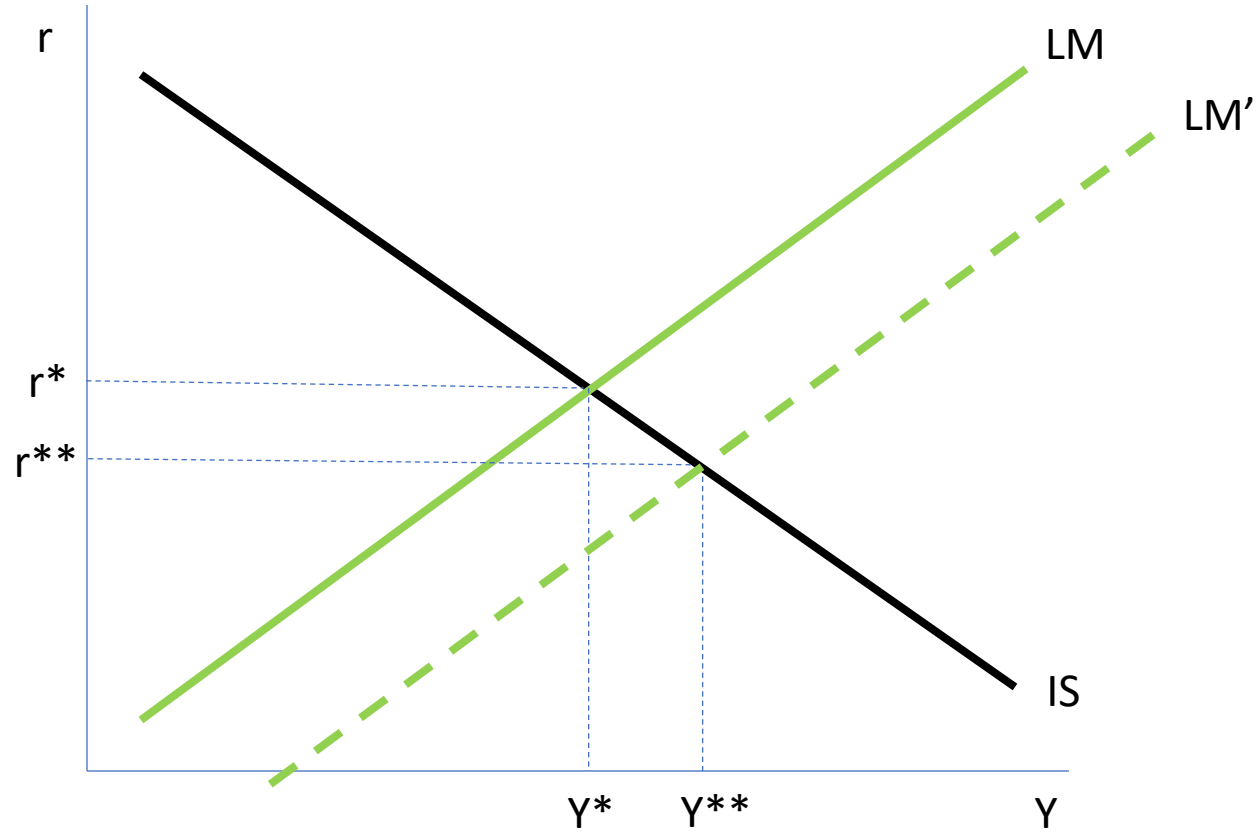
The IS-LM analysis

- Consider a quantitative easing
- The central bank buys assets (government debt) through open market operations and the supply of money in the economy increases
  - We will discuss this further next week
- This raises the price of a long-term government debt and reduces the interest rate
  - Suppose a certain asset worth £100 pays a certain dividend of £10. If interest rate falls from, say 10% to 5%, then the price of the asset has to rise to £200 to keep the dividend constant.

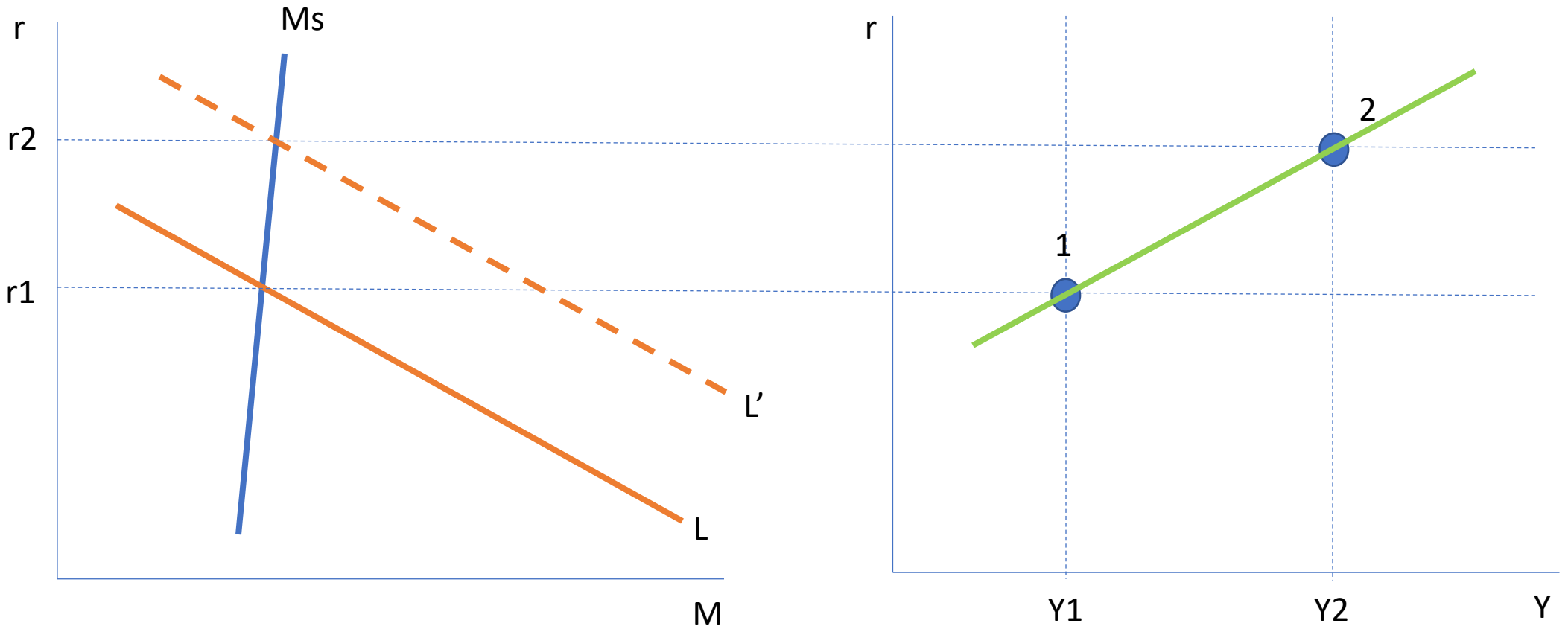


The IS-LM analysis

- Hence, interest rates decreases when money supply increases
- The LM curve shifts to the right from LM to LM’ and the new equilibrium point becomes (Y**, r**)

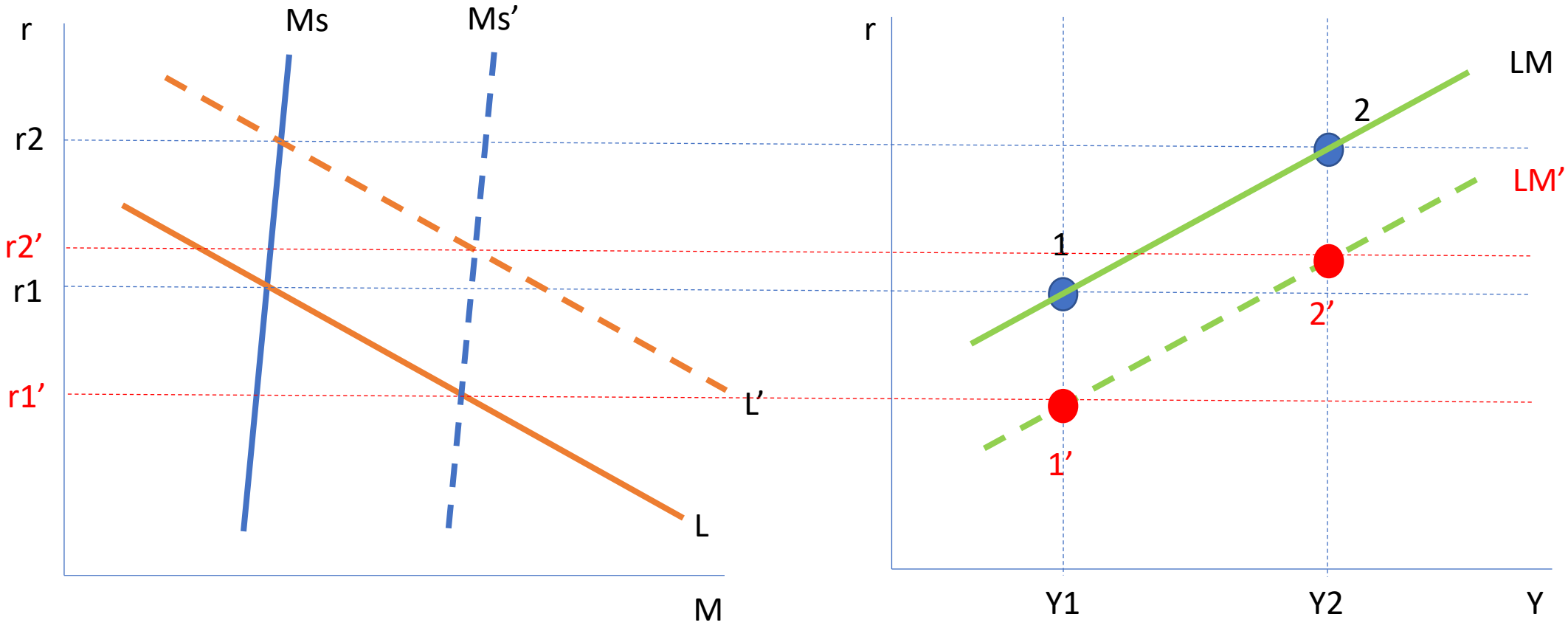


Recall: Deriving the LM curve



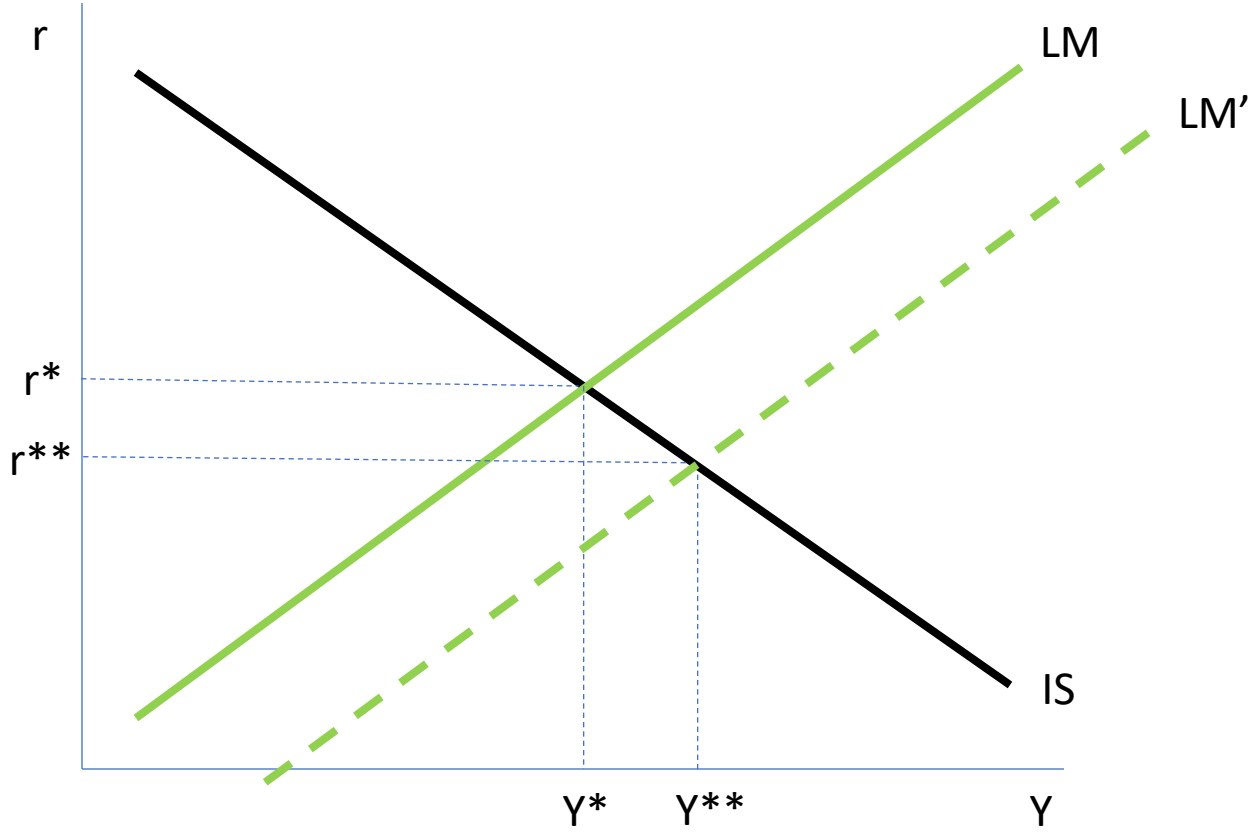
Deriving the LM curve

- What if money supply increases?
- Derive the LM' curve associated with Ms'
- The LM curve shifts from LM to LM'



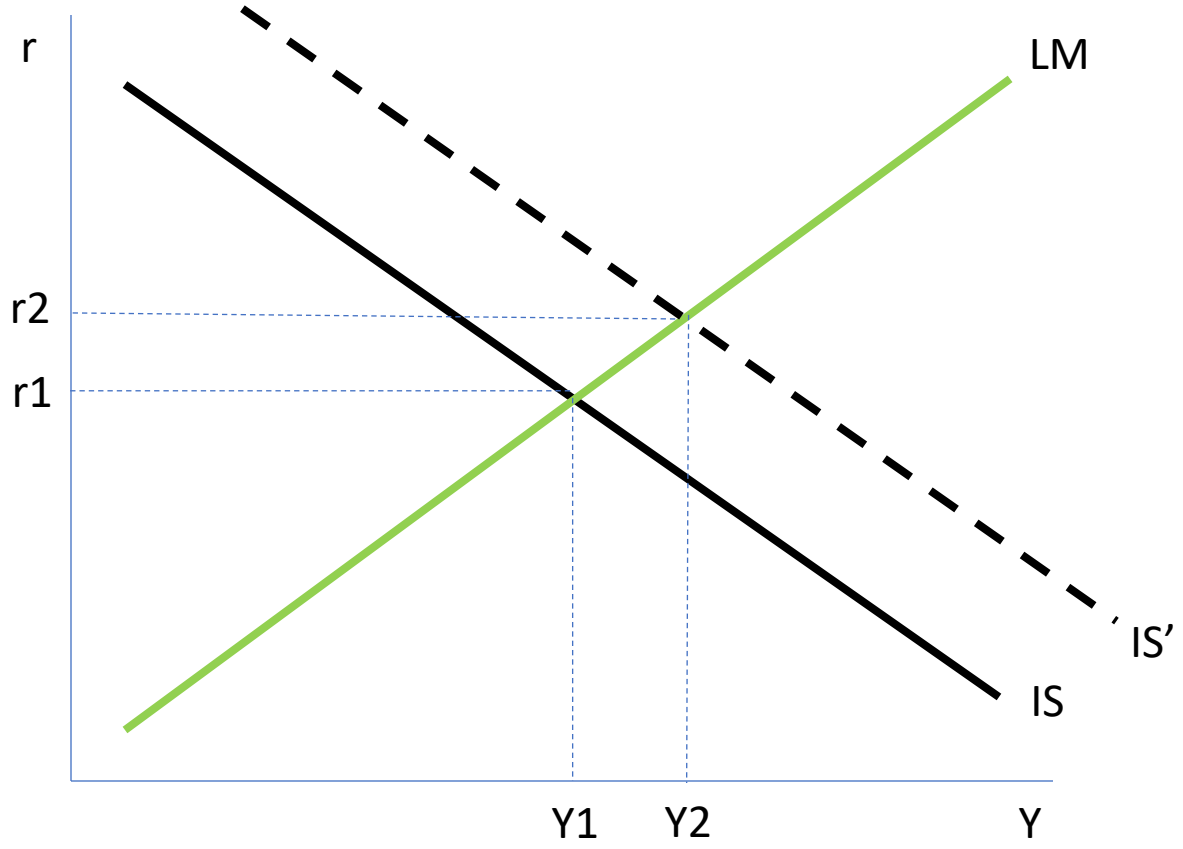
The IS-LM analysis

- The equilibrium interest rate goes down from r* to r**
- This generates a higher level of investment and consumption
- At the same time this leads to lower exchange rate, so exports go up and imports go down
- Overall the national output is higher from Y* to Y**



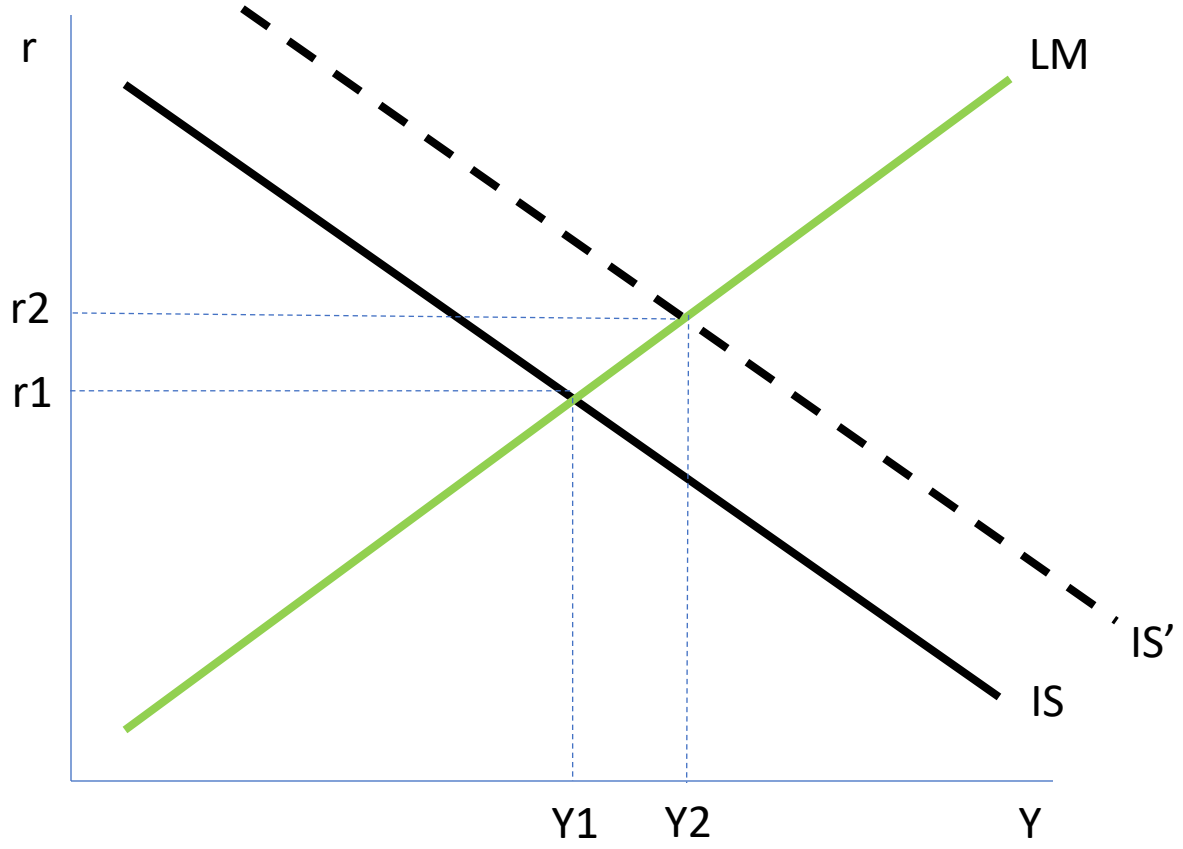
The IS-LM analysis and the effectiveness of policies

- Suppose the initial equilibrium is given by the point (Y1, r1)
- An injection of government spending shifts the IS curve to the right, from IS to IS’



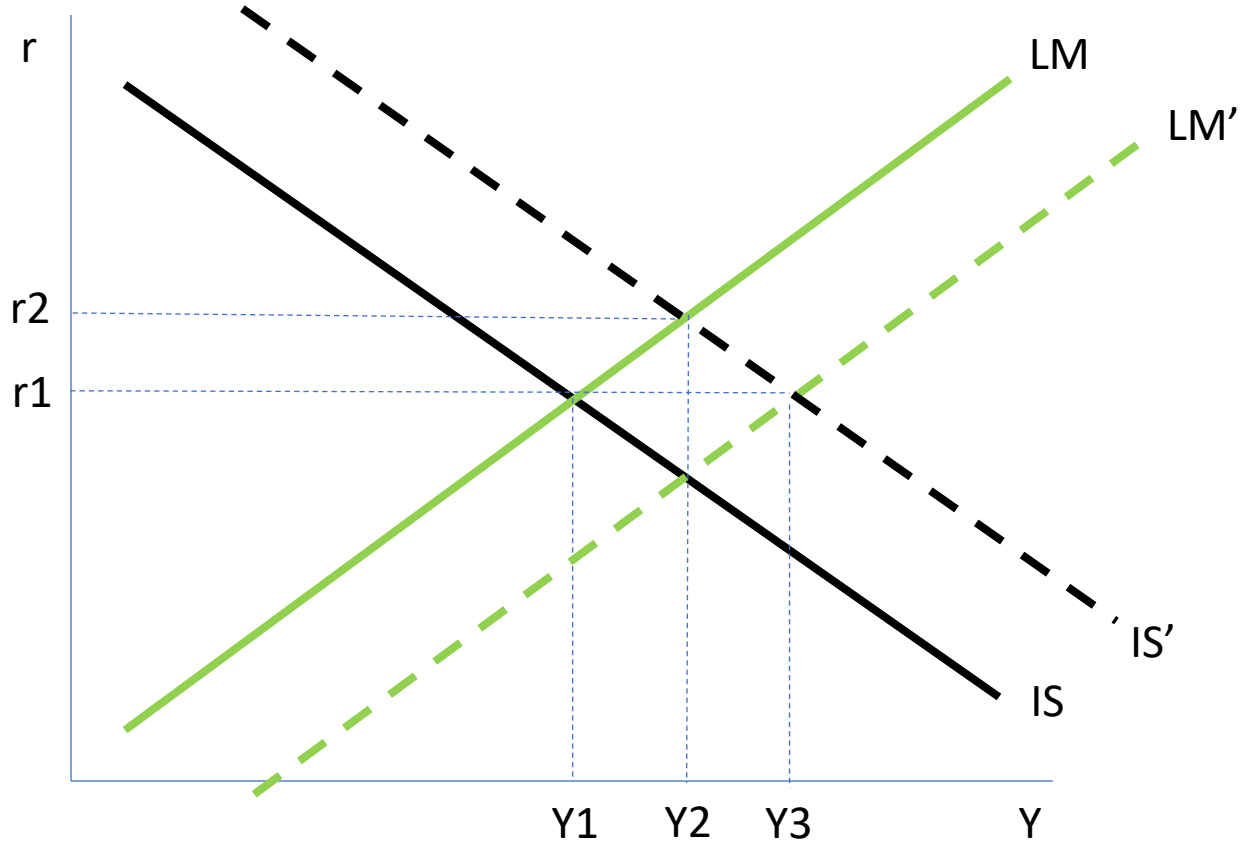
The IS-LM analysis and the effectiveness of policies

- Suppose further that the increase in government spending is financed by borrowing from the banking sector
- The government spending is not financed by increased taxation or by surplus from previous periods
- At the new equilibrium point (Y2, r2) both the national output and interest rate are higher



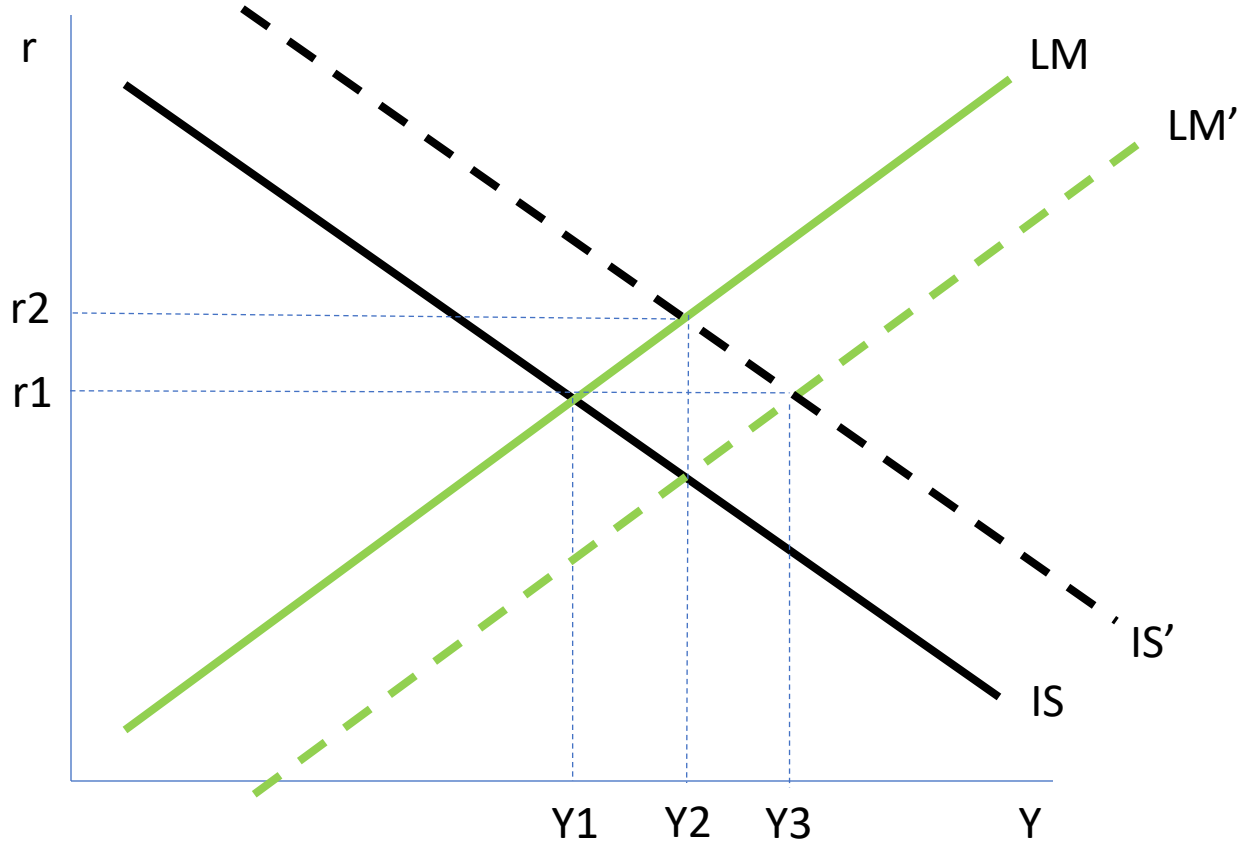
The IS-LM analysis and the effectiveness of policies

- Suppose money supply is increased at the same time as government spending is increased
- Increased money supply shifts the LM curve to the right, from LM to LM’
- At the new equilibrium (Y3, r1) the national output is higher but the interest rate remains at r1



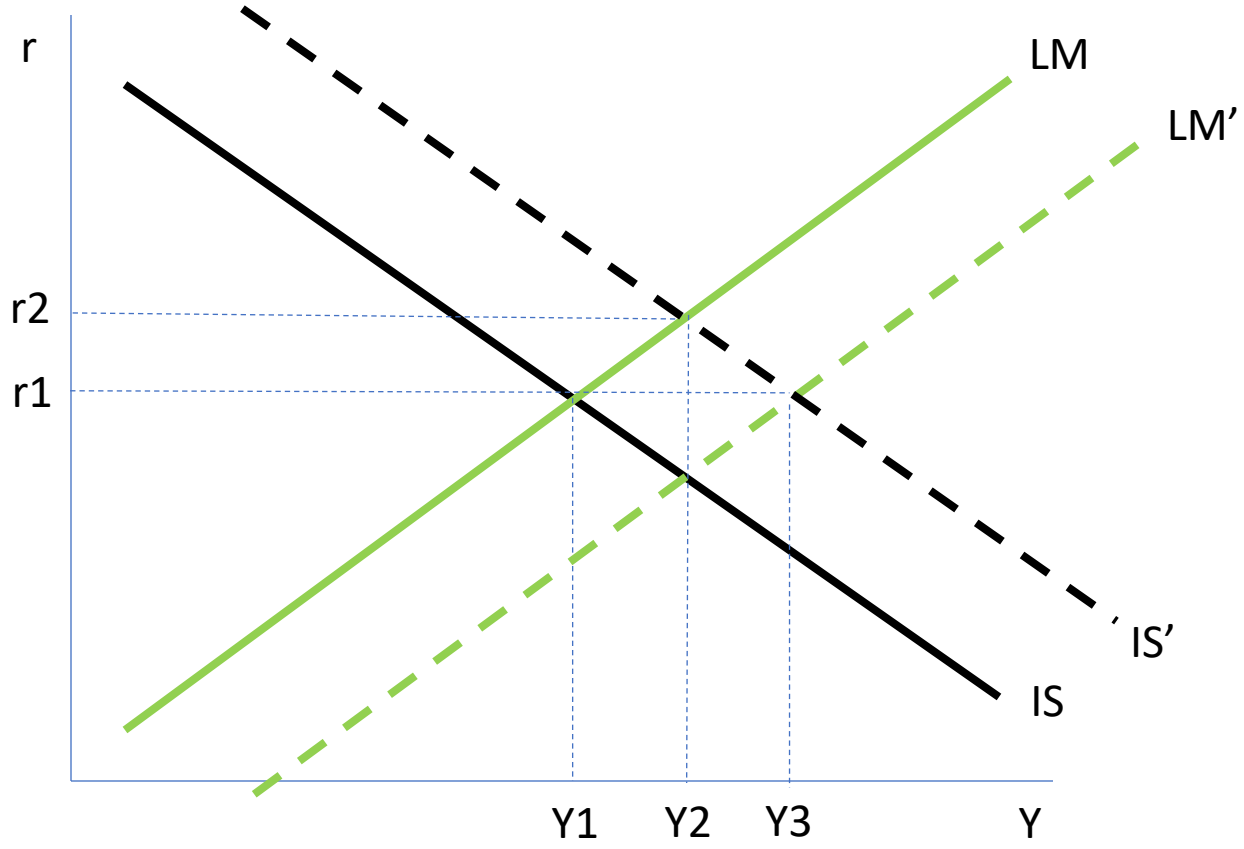
The IS-LM analysis and the effectiveness of policies

- The government spending resulted in a higher output, but not as high as the output generated by the policy mix
- The interest rate associate with Y2 is higher than the interest rate associated with Y3 (i.e. r2 > r1)
- A reason is that the increase in government spending that resulted in a higher interest rate “crowded out” investment, so the national output is not as high as when there is no change in the interest rate



The IS-LM analysis and the effectiveness of policies

- Increasing both government spending and money supply can be more effective in raising the national output
- Using fiscal and monetary policies at the same time can be more effective in raising the national output



References and resources

- Available in EC131 (2024/25) Moodle Textbook Readings and Supplementary Notes