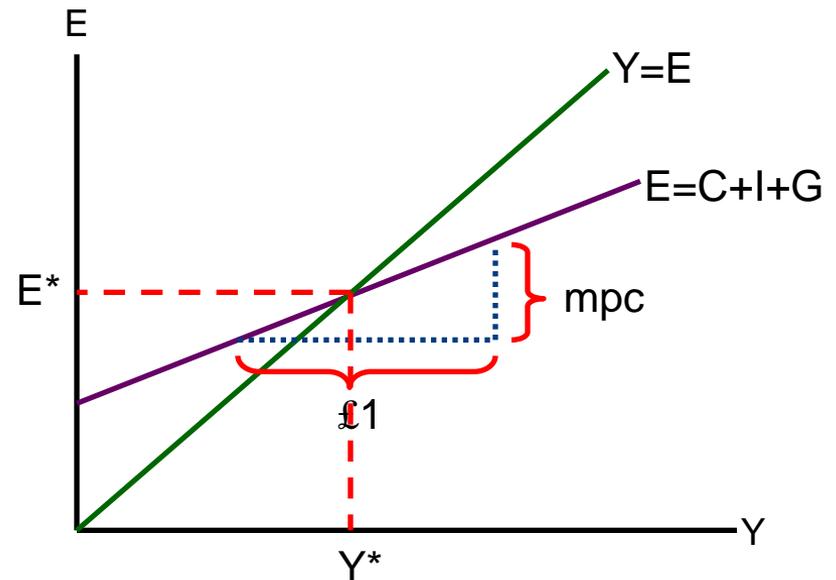


# **The Keynesian Cross Model, The Money Market, and IS/LM**

Planned expenditure and actual  
expenditure.

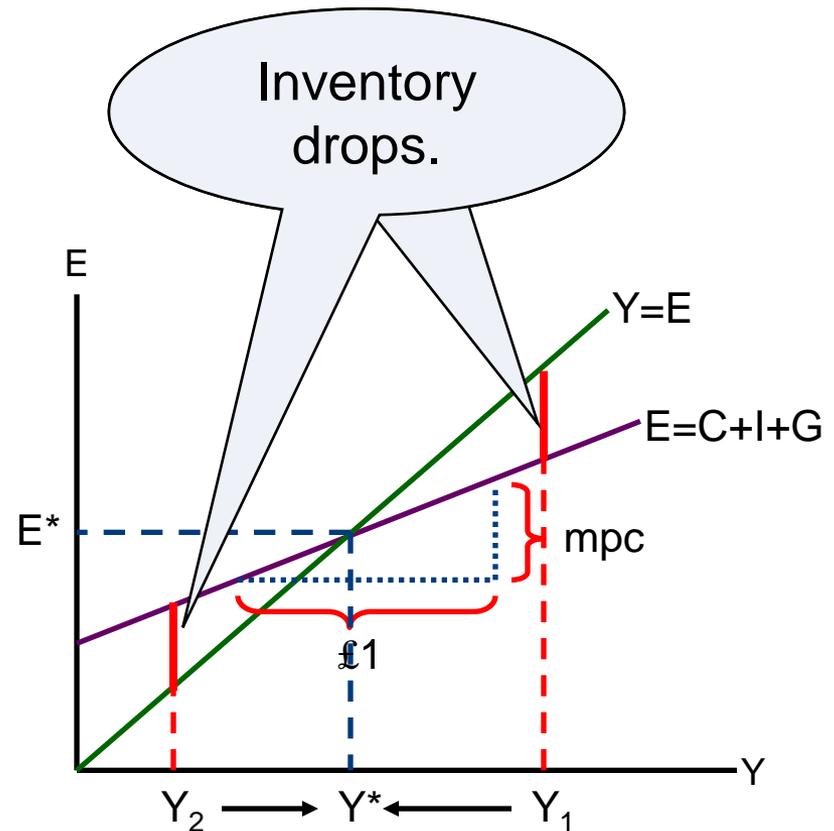
# Constructing the Keynesian Cross

- Actual expenditure is  $Y$  and planned expenditure is  $E = C + I + G$ .
- $I$ ,  $G$ , and  $T$  are assumed exogenous and fixed.
- Our consumption function is  $C = c(Y - T)$ , where  $c$  is the marginal propensity to consume (mpc).
- Mapping out  $E = c(Y - T) + I + G$  gives us...
- The slope of  $E$  is the mpc.
- In equilibrium planned expenditure equals total expenditure or  $Y = E$ .



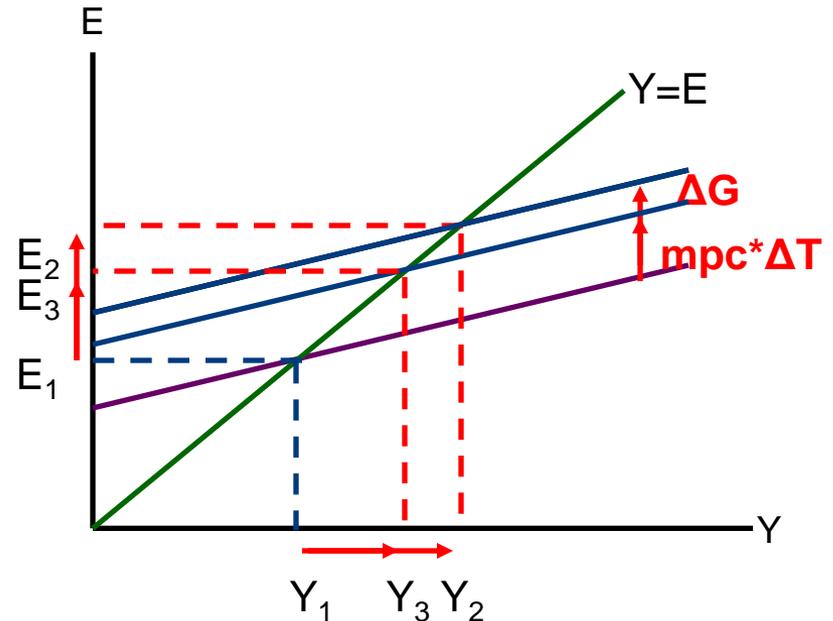
# Constructing the Keynesian Cross

- Equilibrium is at the point where  $Y = C + I + G$ .
- If firms were producing at  $Y_1$  then  $Y > E$
- Because actual expenditure exceeds planned expenditure, inventory accumulates, stimulating a reduction in production.
- Similarly at  $Y_2$ ,  $Y < E$
- Because planned expenditure exceeds actual expenditure, inventory drops, stimulating an increase in production.



# Government expenditure and tax multipliers

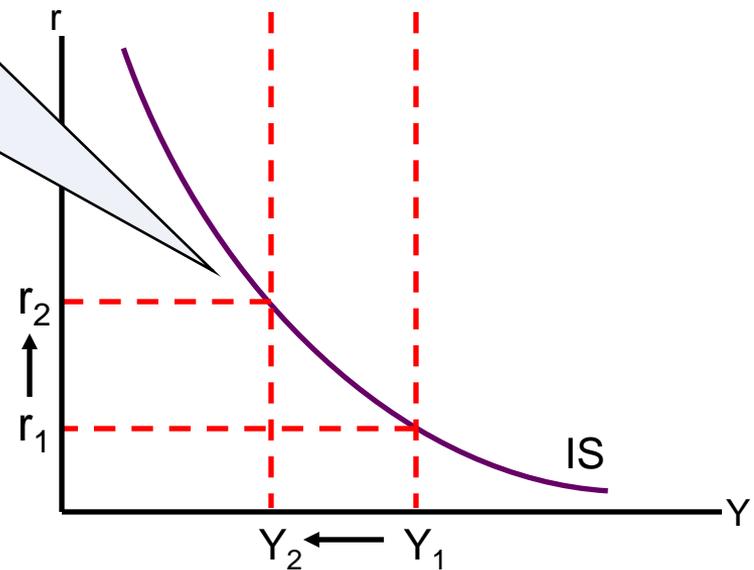
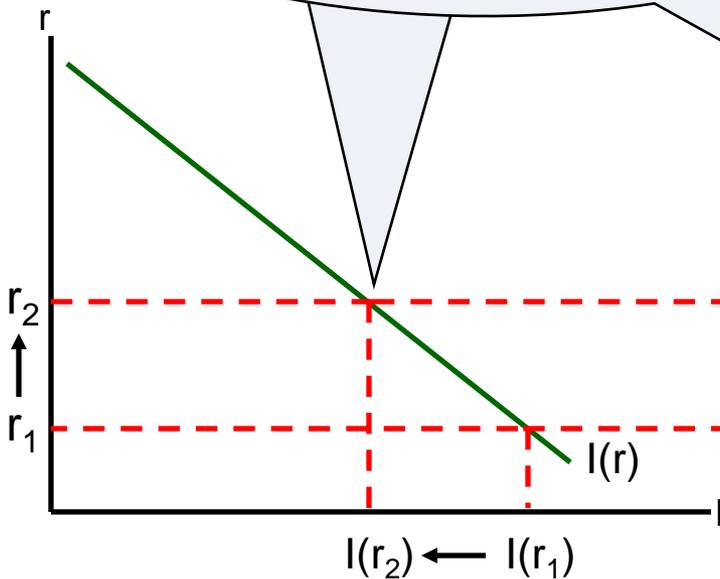
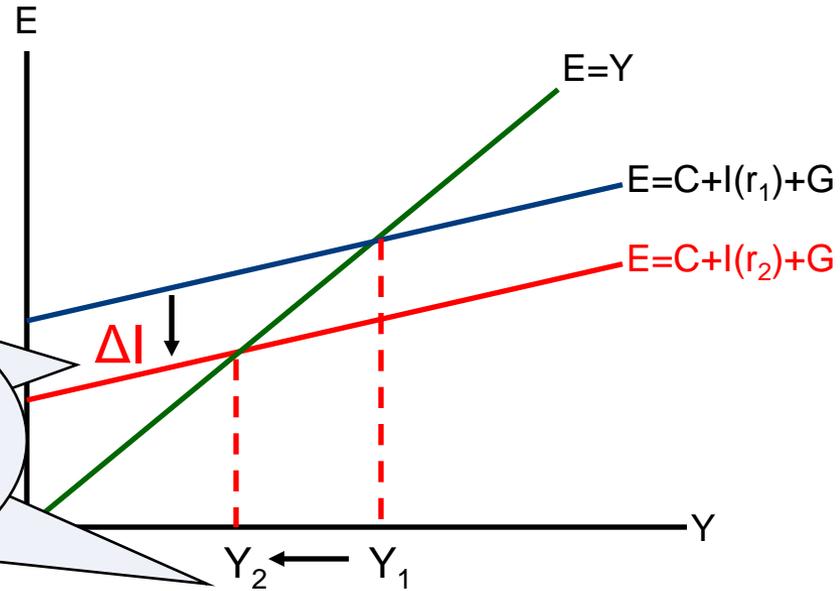
- An increase of  $G$  by  $\Delta G$  causes an upward shift of planned expenditure by  $\Delta G$ .
- Notice that  $\Delta Y > \Delta G$ . This is because although  $\Delta G$  causes an initial change in  $Y$  of  $\Delta G$ , the increased  $Y$  leads to an increase in consumption and triggers a multiplier effect.
- Now suppose a decrease of  $T$  by  $\Delta T$  that causes an upward shift of planned expenditure by  $mpc \cdot \Delta T$ .
- Notice again that  $\Delta Y > \Delta T$  but that  $\Delta Y$  is less than in the case with  $\Delta G$ . This is because  $\Delta T$  causes no initial change in  $Y$  as  $\Delta G$  did, the decrease in  $T$  simply leads to an increase in consumption and triggers the multiplier effect.



# Building the IS curve

- The IS curve maps the relationship between the interest rate,  $r$ , and output (or income)  $Y$  for

The IS curve maps out this relationship between the interest rate,  $r$ , and output (or income)  $Y$ .



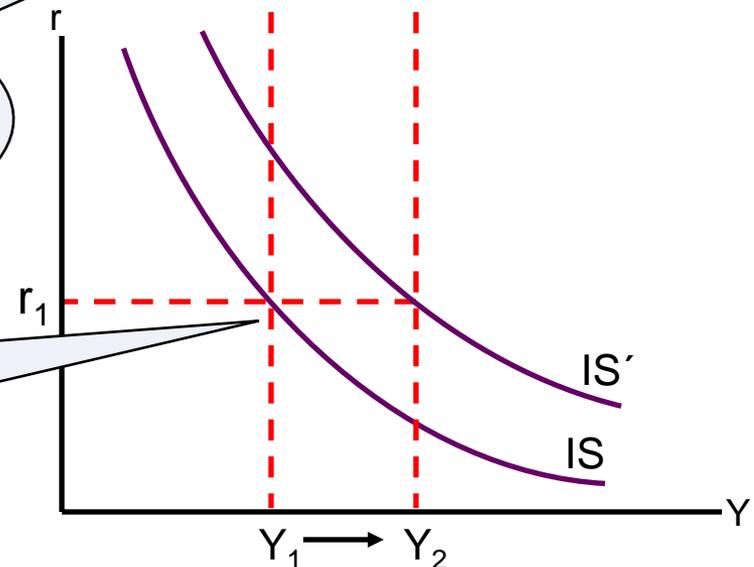
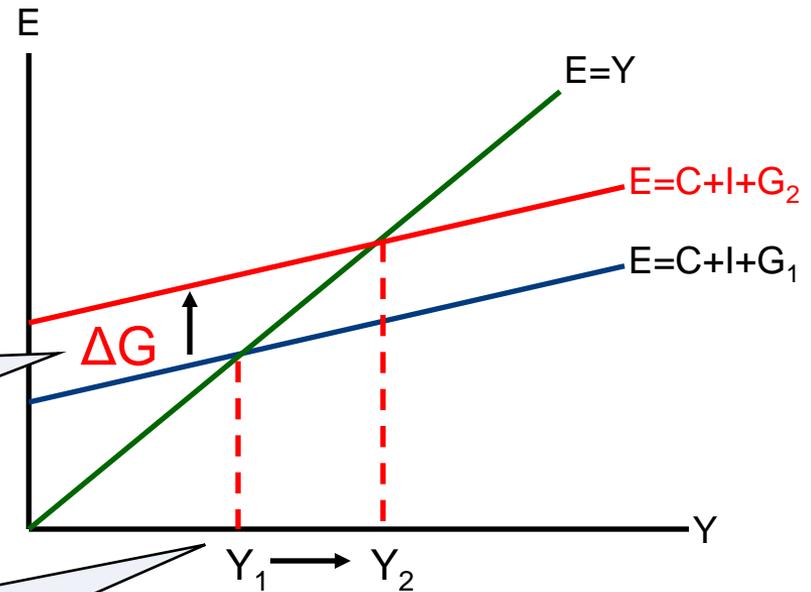
# Shifting the IS curve

- While changing  $r$  allows us to map out the IS curve, changes in  $G$ ,  $T$ , or  $mpc$  cause  $Y$  to change for any level of  $r$ . This causes a shift in the IS curve.

Suppose an increase in  $G$  causes planned expenditure to shift up by

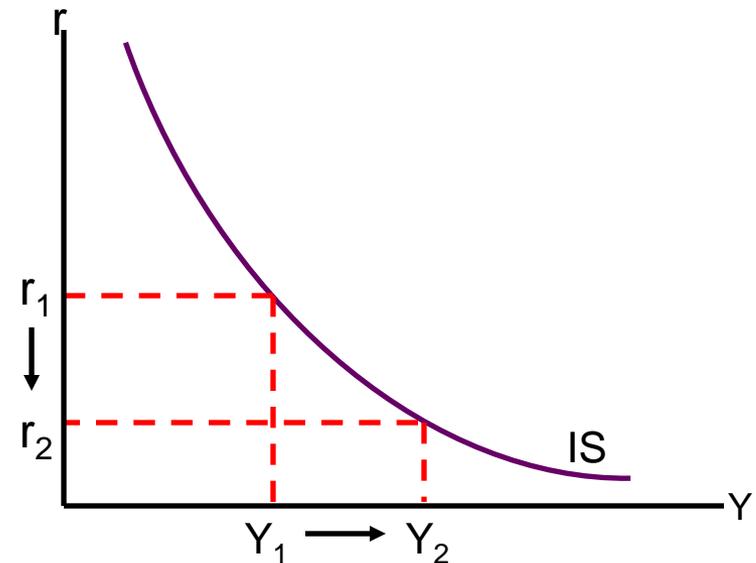
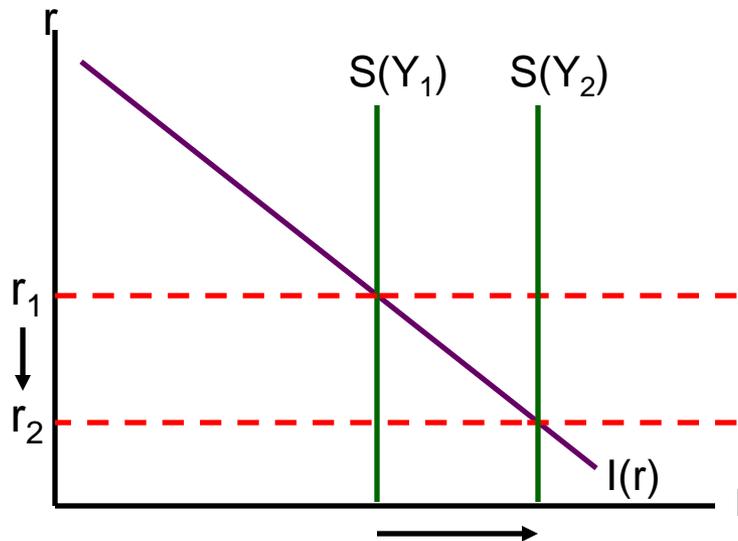
For any  $r$  the increase in  $G$  causes an increase in  $Y$  of  $\Delta G$  times the government expenditure multiplier.

Therefore, the IS curve shifts to the right by this amount.



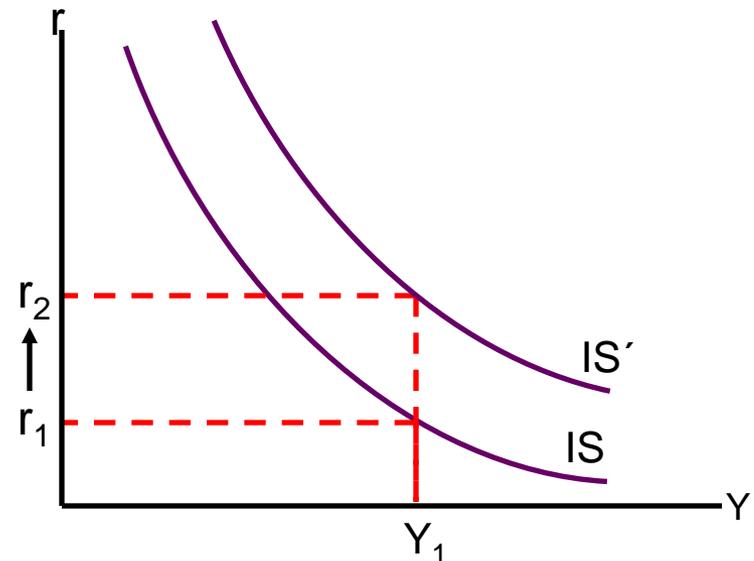
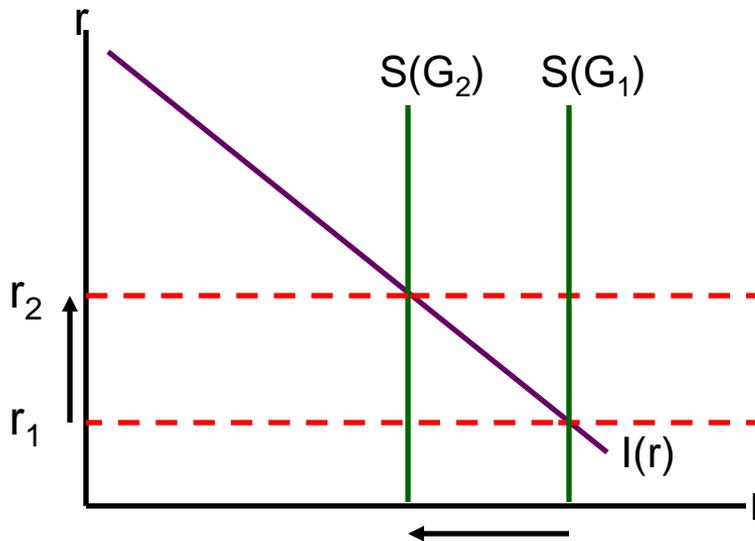
# A loanable funds market interpretation

- The IS curve maps the relationship between  $r$  and  $Y$  for the loanable funds market in equilibrium.
- Suppose  $Y$  increases from  $Y_1$  to  $Y_2$ . This raises savings from  $S(Y_1)$  to  $S(Y_2)$  resulting in a lower equilibrium interest rate.
- The IS curve maps out this relationship between the lower interest rate and increased income.



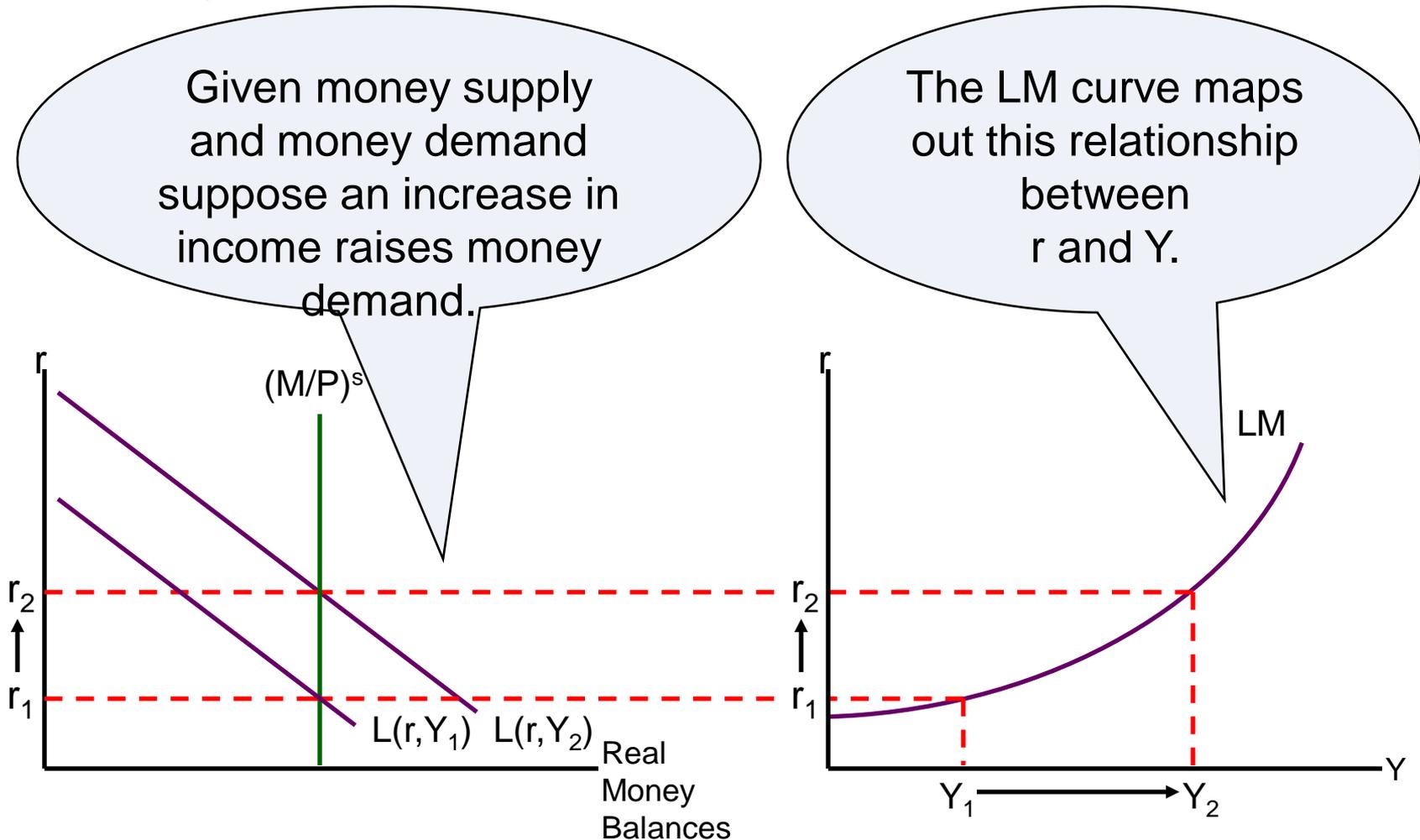
# A loanable funds market interpretation of fiscal policy

- While changing  $r$  allows us to map out the IS curve, changes in  $G$ ,  $T$ , or  $mpc$  cause  $Y$  to change for any level of  $r$ . This causes a shift in the IS curve.
- Suppose again an increase in  $G$ . In the loanable funds market this results in a decrease in  $S$  and an increase in the interest rate.
- Therefore, for a given  $Y$  there is a higher level of  $r$ . So, the IS curve shifts up by this amount.



# Building the LM curve

- The LM curve maps the relationship between  $r$  and  $Y$  for the money market.

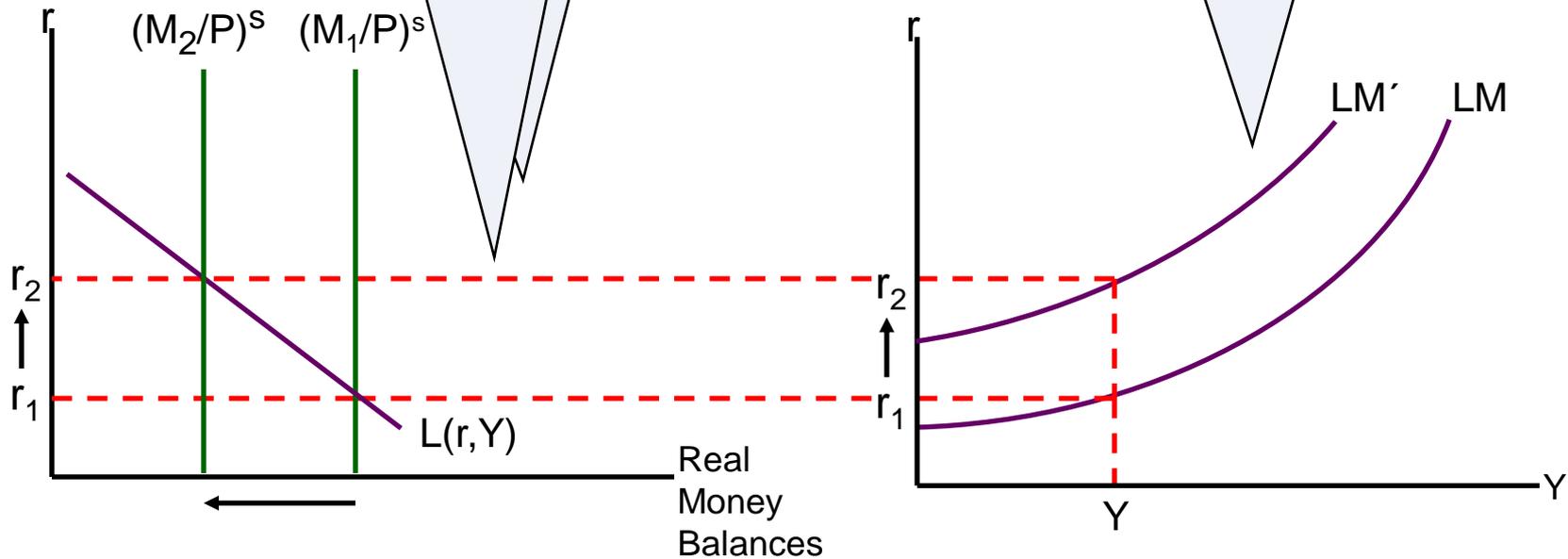


# Shifting the LM curve

- While all

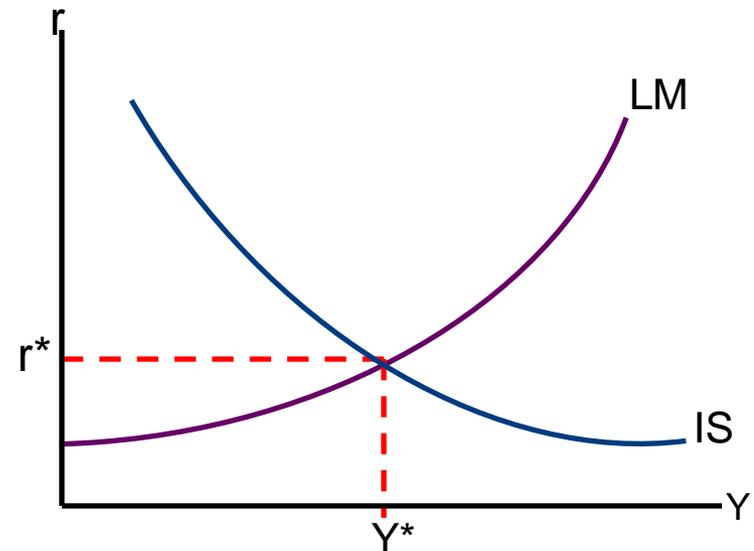
Now there is a higher real interest rate for the current level of output.

The LM curve shifts up so that at the same level of output the interest rate is higher.



# IS=LM: The Short Run Equilibrium

- Given our IS and LM equation we can now determine the short run equilibrium interest rate and output
- By mapping out the relationship between  $Y$  and  $r$  when the goods market (or loanable funds market) is in equilibrium we get the IS curve.
- By mapping out the relationship between  $Y$  and  $r$  when the money market is in equilibrium we get the LM curve.
- When we set  $IS=LM$  we can solve for the equilibrium levels of  $r$  and  $Y$ . This represents simultaneous equilibrium in the goods market (or loanable funds market) and the money market.



# Conclusion

- **We constructed the IS curve from the goods market and from the loanable funds market. We discussed shifting factors for IS.**
- **We constructed the LM curve from the money market and discussed shifting factors for LM.**
- **Finally, we set  $IS=LM$  to achieve equilibrium in all markets giving us short run equilibrium  $r$  and  $Y$ .**