

IS-LM

The IS-LM model:
bringing it all together

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Equilibrium in the IS-LM Model

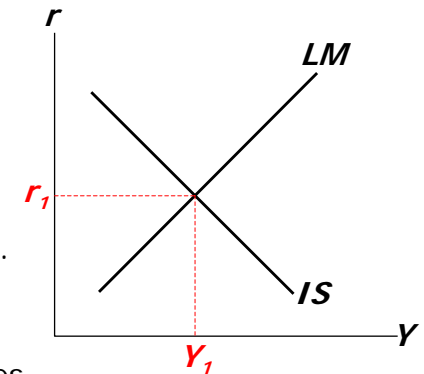
The *IS* curve represents equilibrium in the goods market.

$$Y = C(Y - \bar{T}) + I(r) + \bar{G}$$

The *LM* curve represents money market equilibrium.

$$\bar{M}/\bar{P} = L(r, Y)$$

The intersection determines the unique combination of Y and r that satisfies equilibrium in both markets.



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Policy analysis with the IS-LM Model

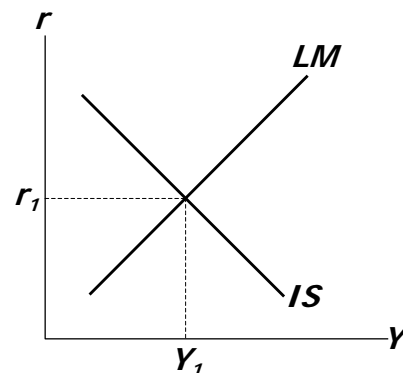
$$Y = C(Y - \bar{T}) + I(r) + \bar{G}$$

$$\bar{M}/\bar{P} = L(r, Y)$$

Policymakers can affect macroeconomic variables with

- fiscal policy: G and/or T
- monetary policy: M

We can use the *IS-LM* model to analyze the effects of these policies.



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Change in G

- $Y = C + I + G$; $C = a + b(Y - T)$; b is MPC
- $I = z - dr$; T is fixed
- Equation of *IS* curve:
- $Y = C + I + G$
- $Y = a + b(Y - T) + z - dr + G$
- $Y = a + bY - bT + z - dr + G$
- $dr = (a - bT + z + G)/(1 - b) + (b/(1 - b))Y$
- $r = [(a - bT + z + G)/d] - [(1 - b)/d]Y$

↙ Q

↘ F

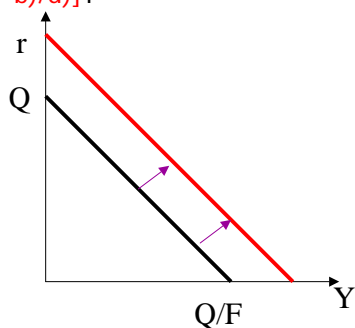
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IS curve

- $r = [(a - bT + z + G)/d] - [(1 - b)/d]Y$
- $r = Q - F Y$

When G increases,
 Q increases

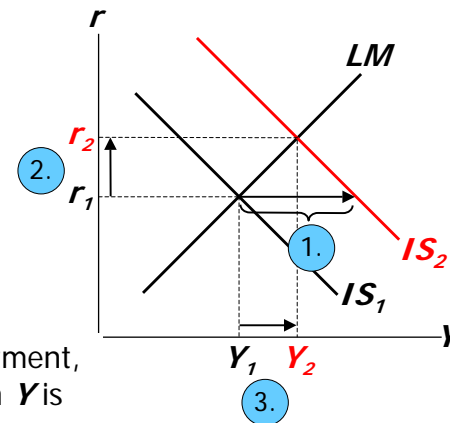
IS curve shifts out



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An increase in government purchases

1. IS curve shifts right causing output & income to rise.
2. This raises money demand, causing the interest rate to rise...
3. ...which reduces investment, so the final increase in Y is smaller than in (1).



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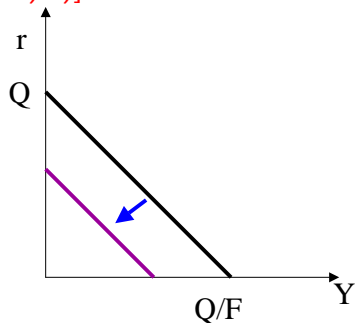
IS curve

- $r = [(a - bT + z + G)/d] + [(1 - b)/d]Y$
- $r = Q - F Y$

When T increases, Q falls

T increase implies IS
curve shifts inwards

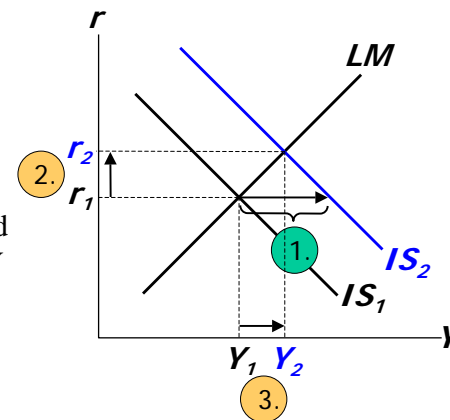
A tax **cut** shifts IS
outwards; similar to G
increase



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A tax cut

Tax cut raises consumption, raises Y . Higher Y raises money demand and raises interest rates, which reduces investment, and brings the increase in Y down [from (1) to (3)]



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Equilibrium

$$M^s/P = (M/P)^d = L(i, Y)$$

The supply of real money balances

Real money demand

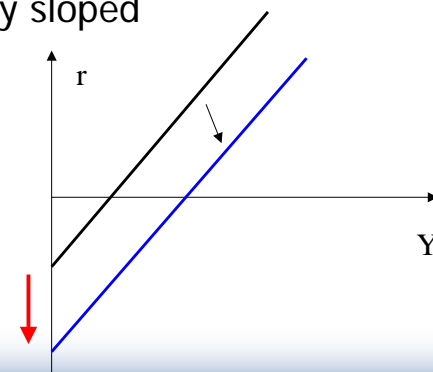
Equilibrium in the money market gives us the other equation connecting r and Y

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LM curve

- $M/P = L(Y, r) = hY - qr$
- $r = (h/q)Y - (M/P)/q$
- LM curve; positively sloped

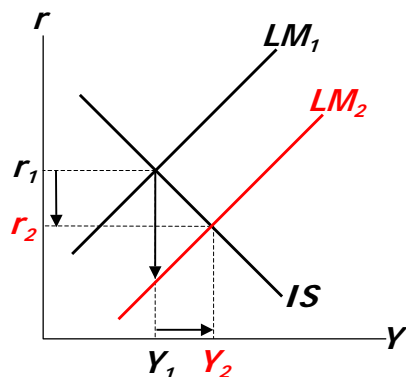
An increase in M
Shifts LM down



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Monetary Policy: an increase in M

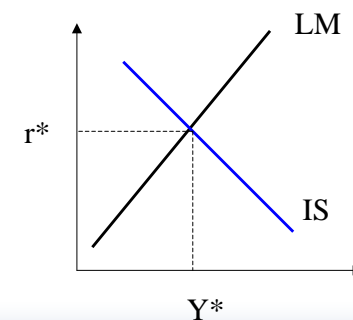
1. $\Delta M > 0$ shifts the LM curve down (or to the right)
2. ...causing the interest rate to fall
3. ...which increases investment, causing output & income to rise.



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Algebra of ISLM

- IS curve:
 $r = [(a - bT + z + G)/d] + [(1 - b)/d]Y$
- LM curve: $r = (h/q)Y - (M/P)/q$



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Algebra -2

$$\begin{aligned} \frac{(a - bT + z + G)}{d} + \frac{(1-b)}{d} Y &= \frac{h}{q} Y - \frac{M}{Pq} \\ \Rightarrow \frac{(a - bT + z + G)}{d} + \frac{M}{Pq} &= Y \left[\frac{h}{q} - \frac{(1-b)}{d} \right] \\ \mapsto Y &= \frac{\frac{(a - bT + z + G)}{d} + \frac{M}{Pq}}{\left[\frac{h}{q} - \frac{(1-b)}{d} \right]} \\ r &= \frac{h}{q} \left\{ \frac{\frac{(a - bT + z + G)}{d} + \frac{M}{Pq}}{\left[\frac{h}{q} - \frac{(1-b)}{d} \right]} \right\} - \frac{M}{Pq} \end{aligned}$$

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Example: problem 3, pg. 305

- $C = 200 + 0.75 (Y - T)$
- $I = 200 - 25 r$
- $G = T = 100$
- $(M/P)^d = Y - 100 r$
- $M = 1000; P = 2$

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Summary

- Increase in G (ceteris paribus) shifts IS curve to the right; no effect on LM
- **Cut** in taxes has same general effect as above (ceteris paribus); no effect on LM
- Increase in M (money supply) shifts LM curve down (ceteris paribus); no effect on IS

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