INTERMEDIATE MACROECONOMICS

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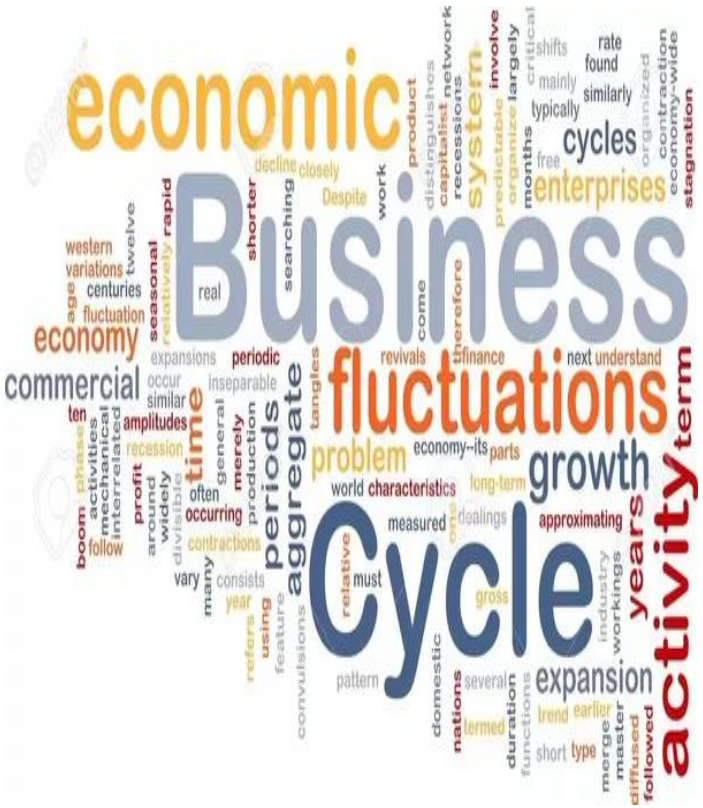
AGENDA



- **Keynesian business cycle studies**
- Core Keynesian model: AD-AS model
  - IS-LM-AD curve
  - AS curve
- Equilibrium analysis and propagation of shocks
- Fiscal and monetary policy analysis
- How does the Keynesian AD-AS model fit the facts?

METHODOLOGICAL FRAMEWORKS FOR BUSINESS CYCLES STUDIES

- Using simplified models that help us to understand how the aggregate economy works.
  - how income, interest rate, and price are determined at the aggregate level.
- In ee212, all these aggregate (endogenous) variables are simultaneously determined, and then are given by determinants, i.e. exogenous variables.
- Changes in the exogenous variables may and can lead to the change in income, interest rate and price, i.e. response of the endogenous variables to exogenous variables.

METHODOLOGICAL FRAMEWORKS FOR BUSINESS CYCLES STUDIES

- In ee312, we reinterpret the variation of exogenous variables and other determinants of aggregate (endogenous) variables as "shocks".
- Shocks *randomly* hit the economy; causing choppy movement in the aggregate variables we are interested in.
- Empirically, we try to identify the source of shocks and understand the way in which identified shocks get propagated – e.g. transmission mechanism of shocks.
- Normatively, we try to think about how to prevent/mitigate the instability or fluctuations.

MODELS OF BUSINESS CYCLES STUDIES

- There are several models that study about the business cycles; for now, we will focus on the traditional Keynesian system.

- After we are done with details on Keynesian system, we will look into the open-economy context, i.e. the extension of closed-economy Keynesian system.

CORE IDEAS/MODELS: KEYNESIAN SYSTEM IN A NUTSHELL.

- **Three variant** versions of Keynesian model

1. **Keynesian cross**
   - AE depends on Y and Y depends on AE. → AE(Y*) = Y*
   - Concept of Multiplier effects
2. **IS-LM model**
   - The linkage between goods market and financial market.
   - Introducing and endogenizing the (real) interest rate.
   - The whole of working economy can be conceptualized by two curves: IS and LM curve.

CORE IDEAS/MODELS: KEYNESIAN SYSTEM IN A NUTSHELL.

•Three variant versions of Keynesian model (cont.)

3. **AD-AS model**
   - Price can be adjusted; endogenizing price, and hence inflation.
   - Provide details foundation on aggregate supply under nominal rigidities.
   - Provide a complete depiction of how macroeconomy works from the point view of Keynesian macroeconomists.

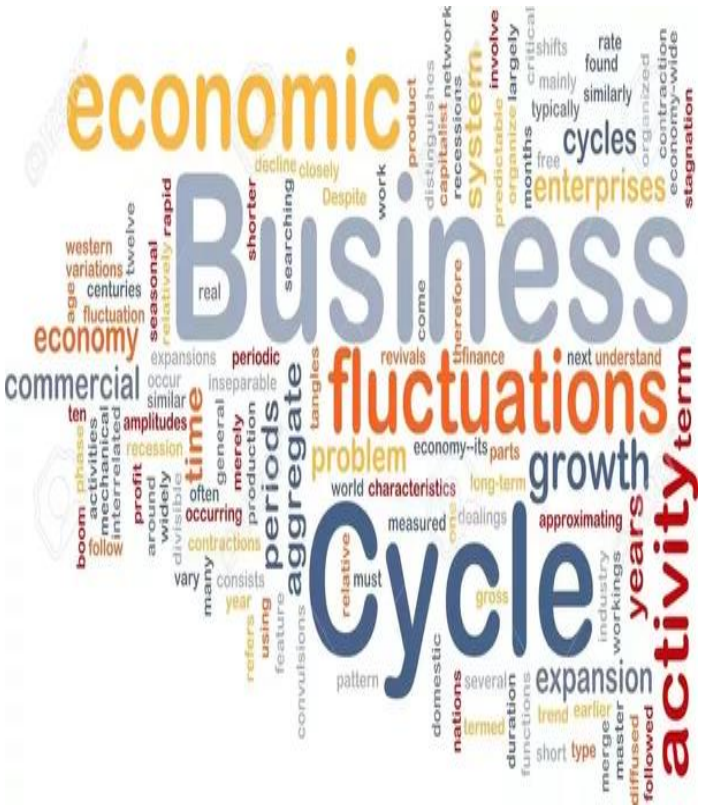
CORE IDEAS/MODELS: KEYNESIAN SYSTEM IN A NUTSHELL.

- Demand shocks matters a lot the output fluctuations.
- Shocks last quite long; deviation exists in a prolonged fashion.
- Short-fall, as well as overly expanded, state in the level of aggregate demand can cause *inefficient* level of output.
- Inefficient fluctuations should be corrected by counter-cyclical policies; policy interventions are considered welfare-improving.

WHAT WE WILL BE DOING

- Review the basic concepts of two important foundations: AD and AS
  - A quick refreshing on IS-LM-AD
  - Then, we proceed to the foundation of AS theory.
- Next, analyze the equilibrium and shock-propagating mechanism under AD-AS framework.
- Look into the policy analysis.
- Lastly, validating the Keynesian framework – e.g. how well does the framework fit the data?

AGENDA



- Keynesian business cycle studies
- **Core Keynesian model: AD-AS model**
  - **IS-LM-AD curve**
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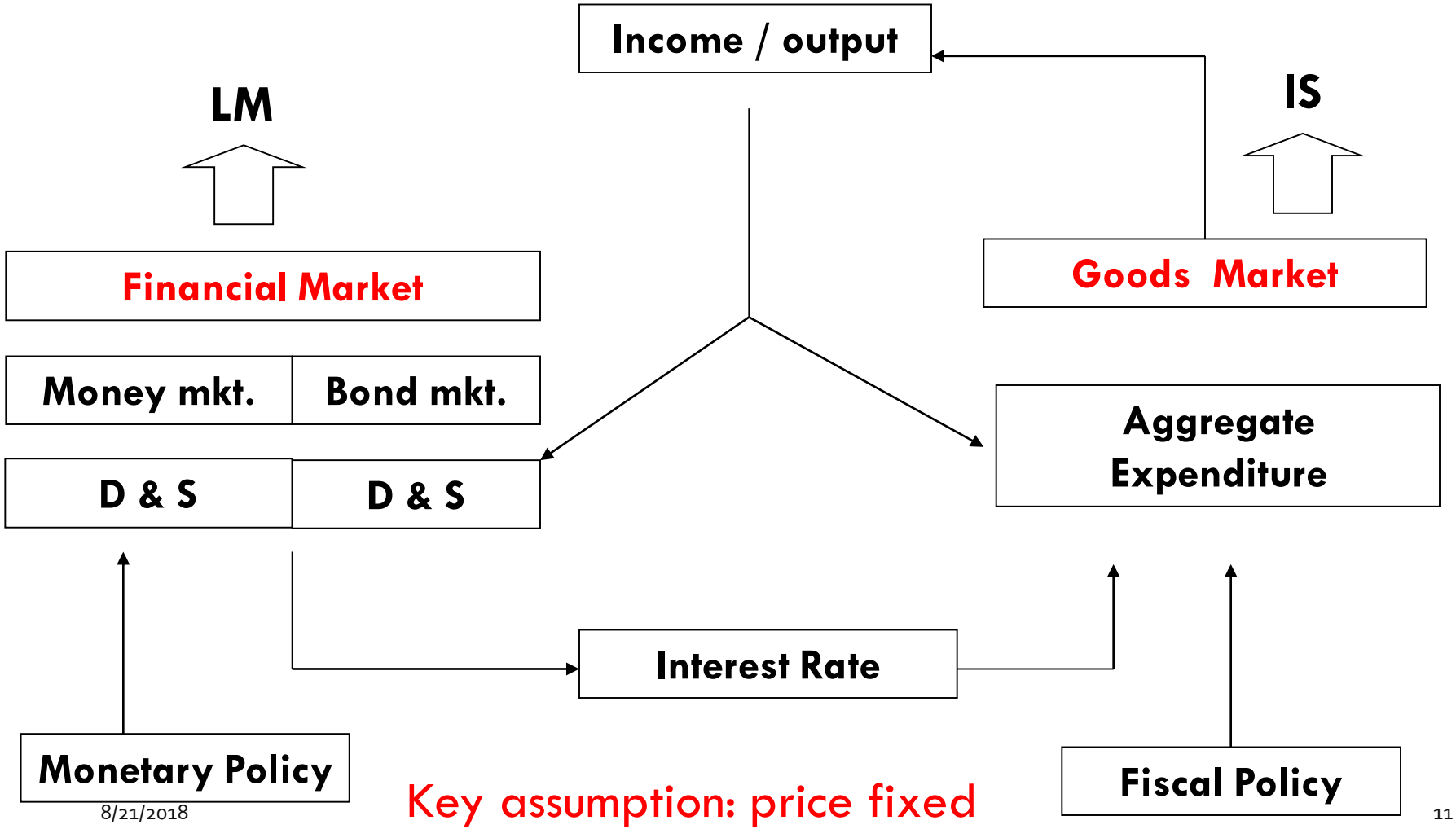
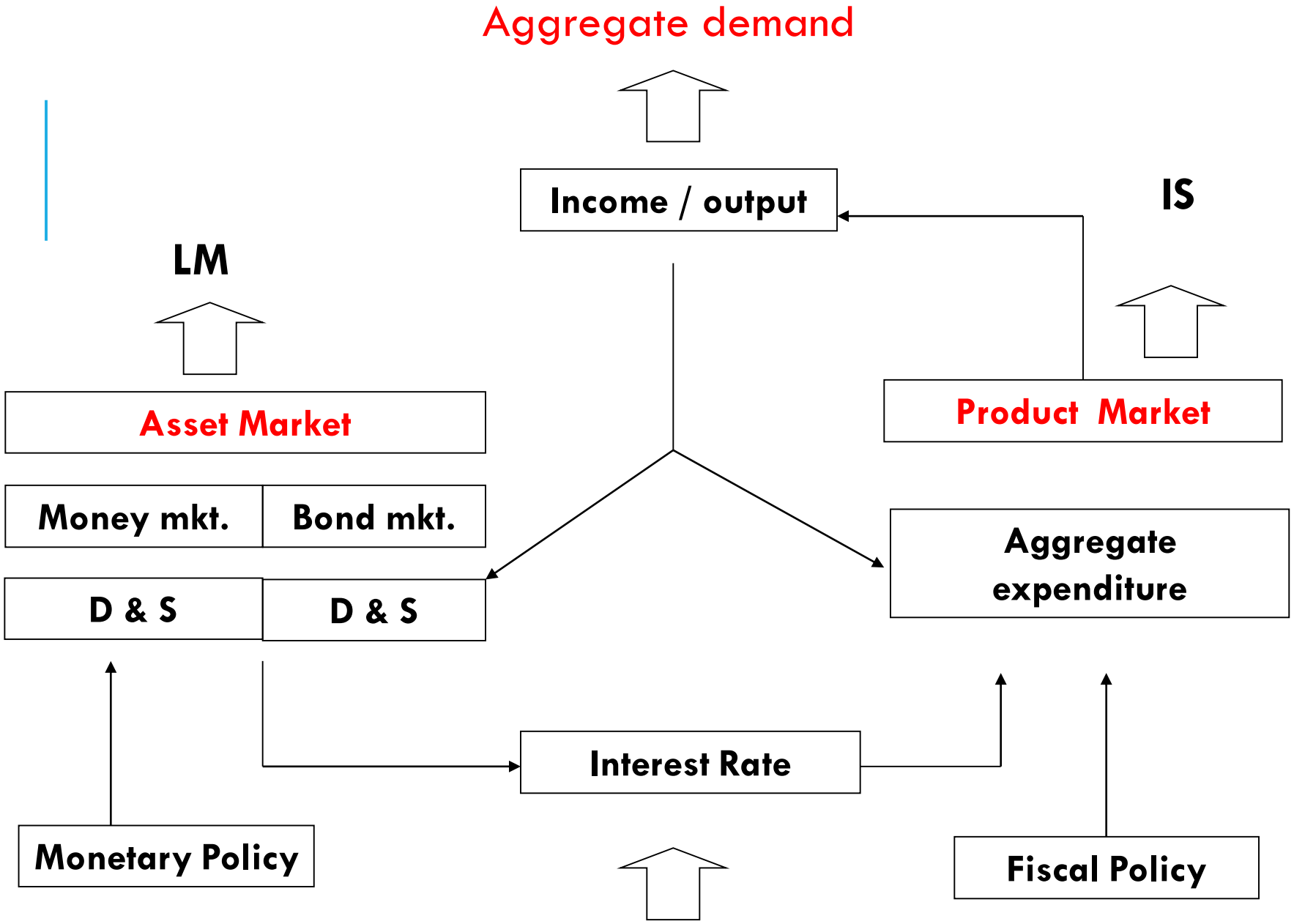
THE IS-LM MODEL AND AGGREGATE DEMAND: A QUICK REFRESHMENT



Key assumption: price fixed


Aggregate demand
Income / output
IS
LM
Asset Market
Product Market
Money mkt.
Bond mkt.
Aggregate expenditure
D & S
D & S
Interest Rate
Monetary Policy
Fiscal Policy
Price can be adjusted

IS CURVE

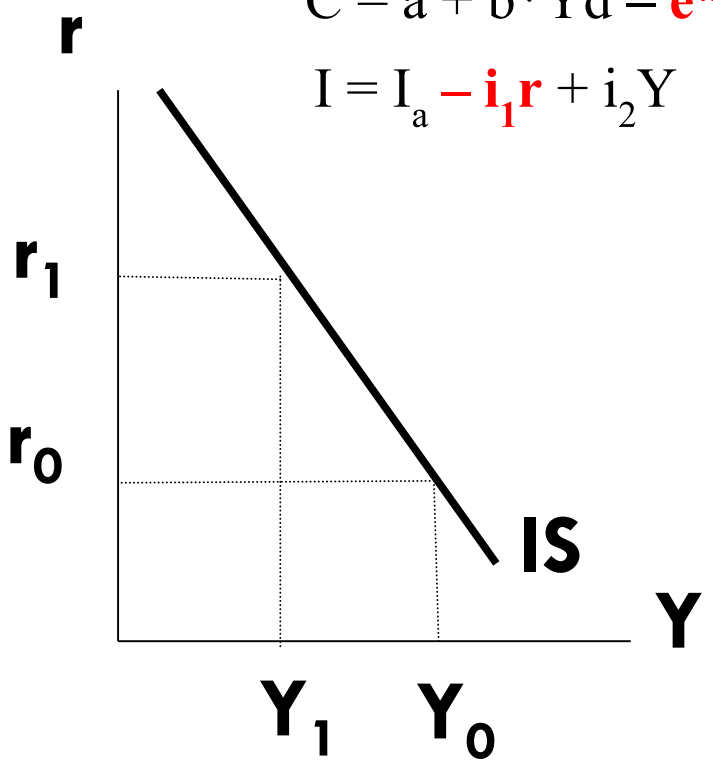
- Equilibrium relationship between "r" and "Y" that put the good market under the equilibrium condition, i.e. Y = AE.
  - Assuming closed-economy.

- IS curve is downward sloping. Why?

IS CURVE: WHY DOWNWARD SLOPING?

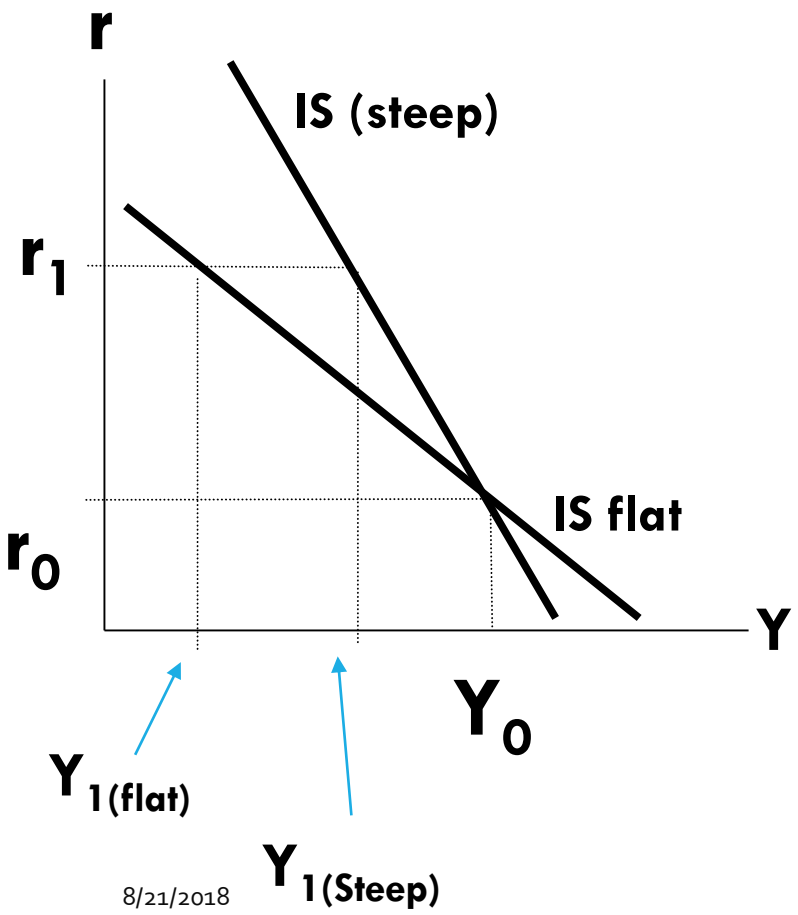
$$C = a + b*Yd - e*r;$$

$$I = I_a - i_1 r + i_2 Y$$



- When (real) interest rate increases (r0 to r1), investment and consumption will decrease.
- Lowering in the investment and consumption causes a drop in aggregate spending (AE).
- Change in AE would change the output, based on the multiplier effect.
- Hence, output would drop (Y0 to Y1).

IS CURVE: SLOPE

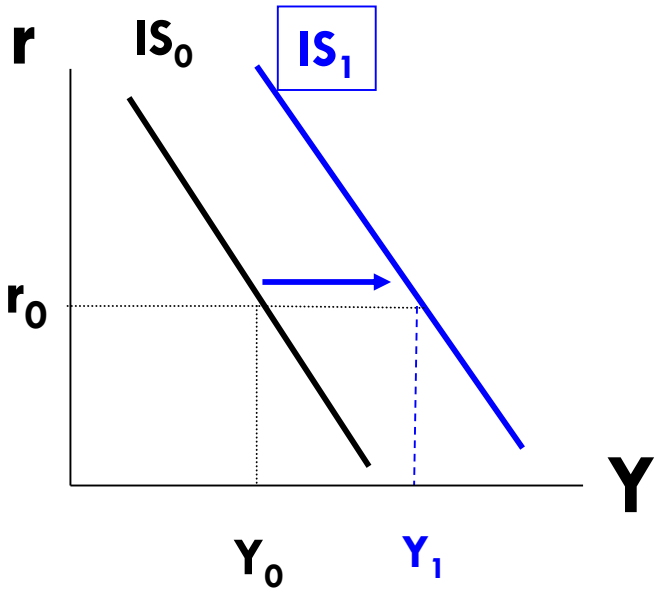


Transmission: r → AE → Y

1. Sensitivity of AE to interest rate: Interest rate effect:

2. Sensitivity of Y to AE: multiplier effect:

IS CURVE: SHIFTING THE CURVE



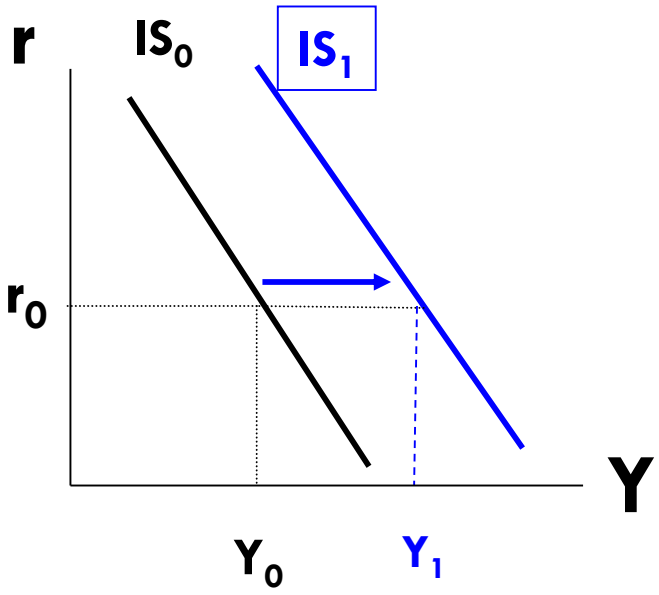
- IS curve is derived under Ceteris Paribus.
- Changes in the exogenous factors can be diagrammatically captured by a horizontal shift of the IS curve.
- The size of horizontal shift depends on the multiplier effect of the changing factors.

$$C = \mathbf{a} + b*Yd - e*r;$$

$$I = \mathbf{I_a} - i_1 r + i_2 Y$$

G; T

IS CURVE: SHIFTING THE CURVE

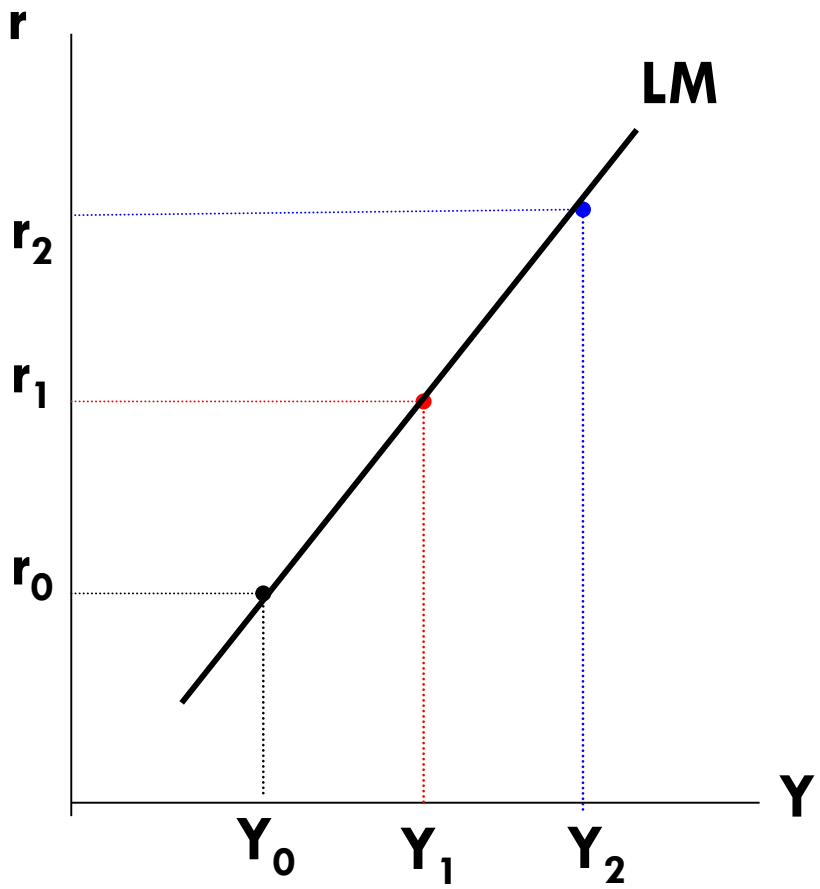


- Question to discuss:

1. For the same amount of the change, which one would produce a bigger shift of IS curve, T or G?

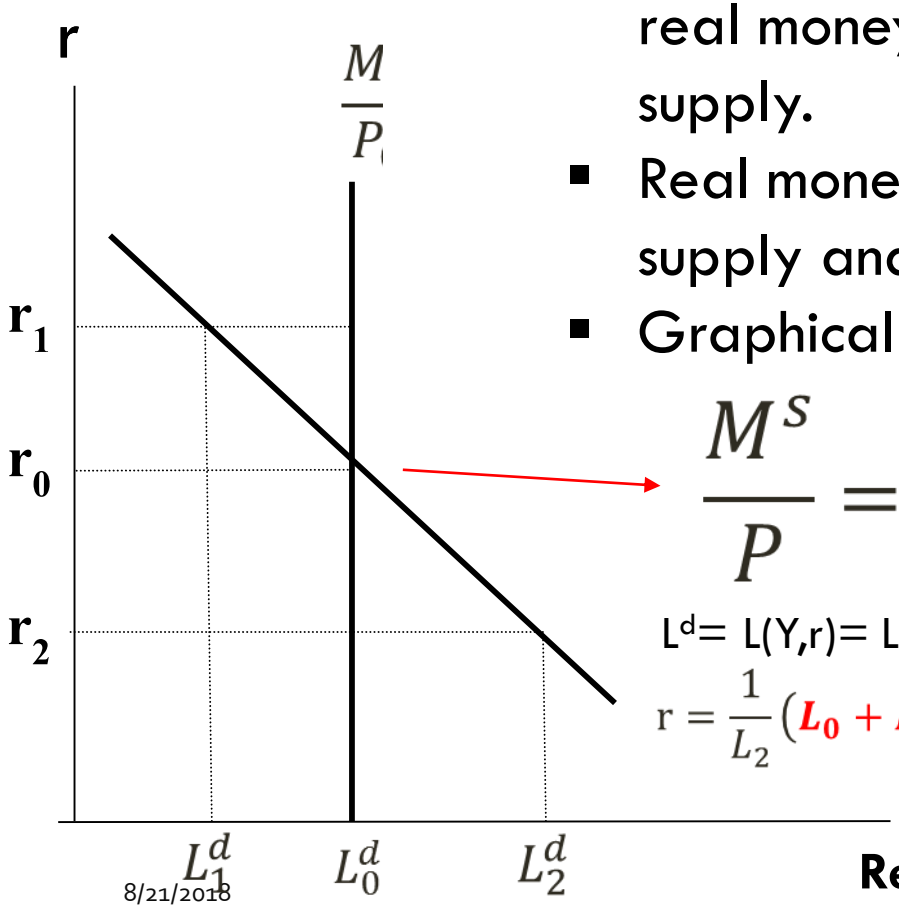
2. Does the size of horizontal shift have any relationship with the slope of IS curve? Why?

LM CURVE



- Paris of "r" and "y" that put the money market into equilibrium condition
- LM curve is upward sloping. Why?

THE MONEY MARKET AND LIQUIDITY PREFERENCE THEOREM



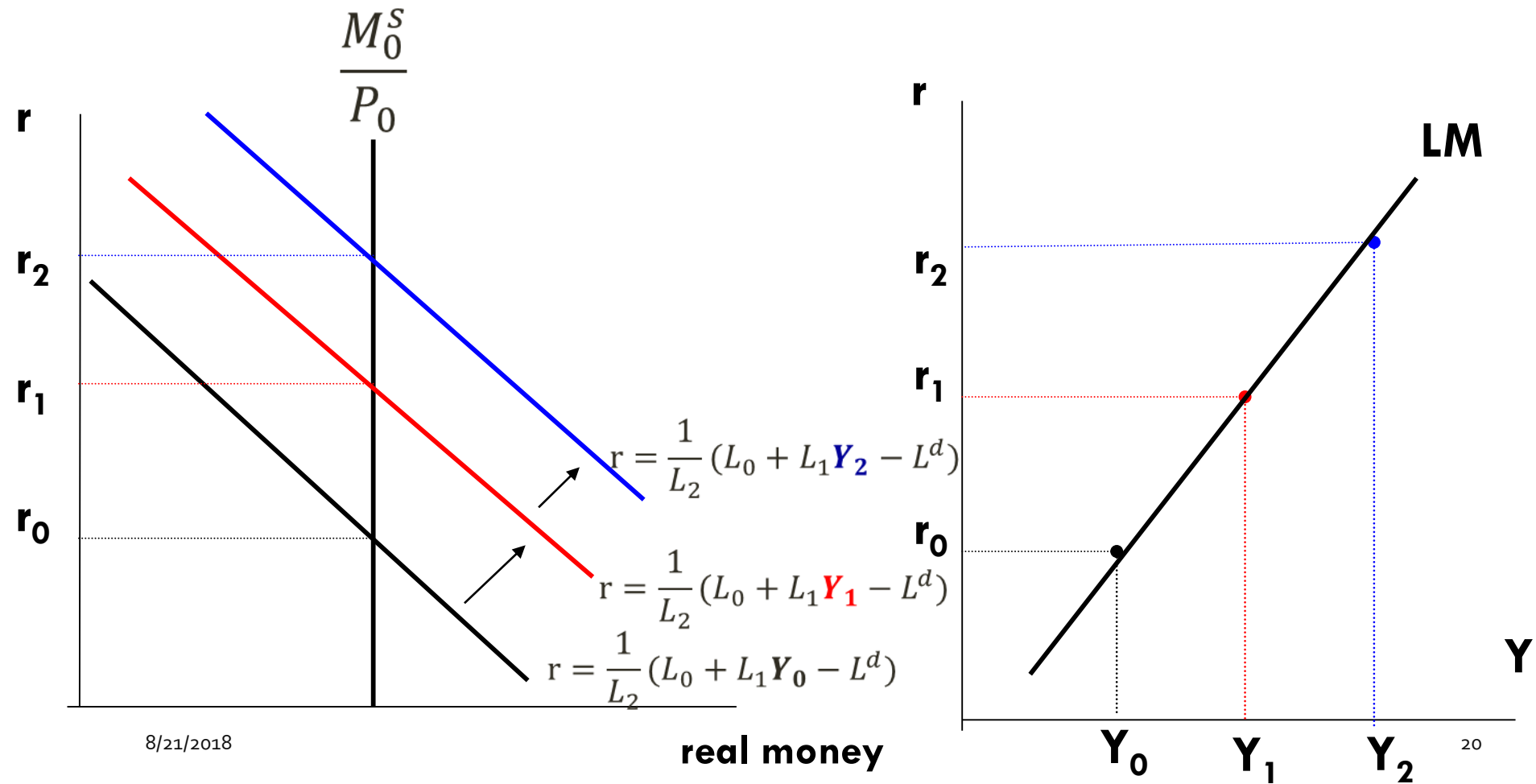
- Equilibrium in the money market occurs when real money demand is equal to real money supply.
- Real money supply: both nominal money supply and price level are treated as given.
- Graphical illustration?

$$\frac{M^s}{P} = L^d$$

$L^d = L(Y,r) = L_0 + L_1 Y - L_2 r$

$$r = \frac{1}{L_2}\left(\boldsymbol{L_0 + L_1 Y_0} - L^d\right)$$

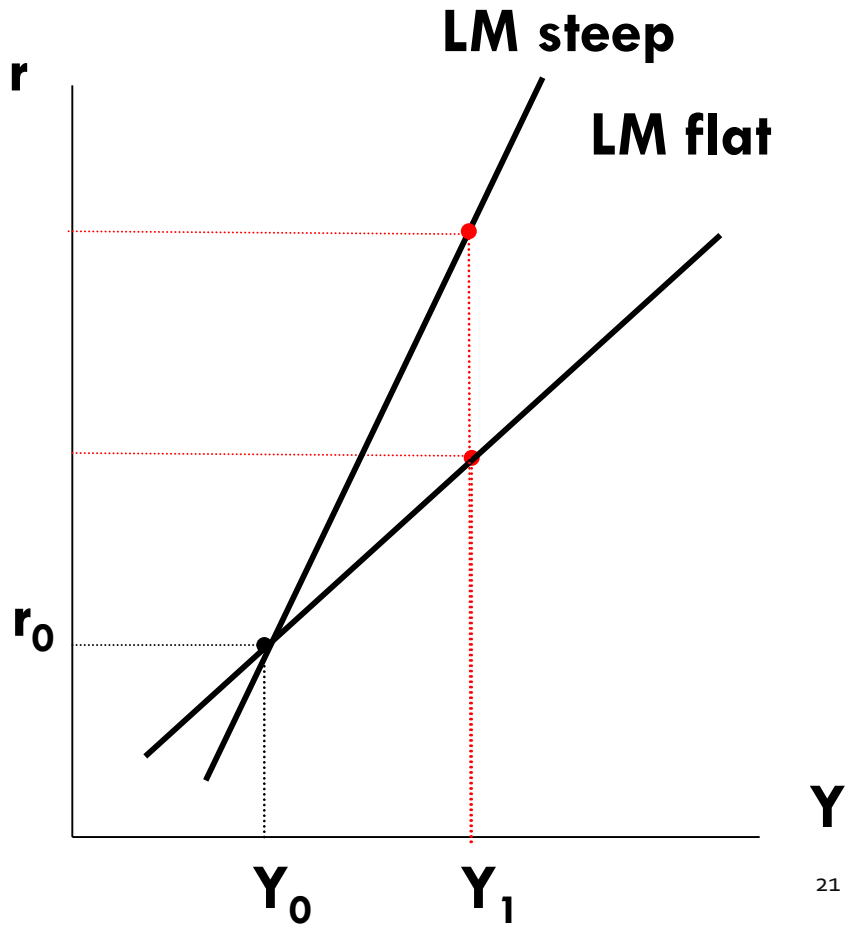
LM CURVE: DERIVATION



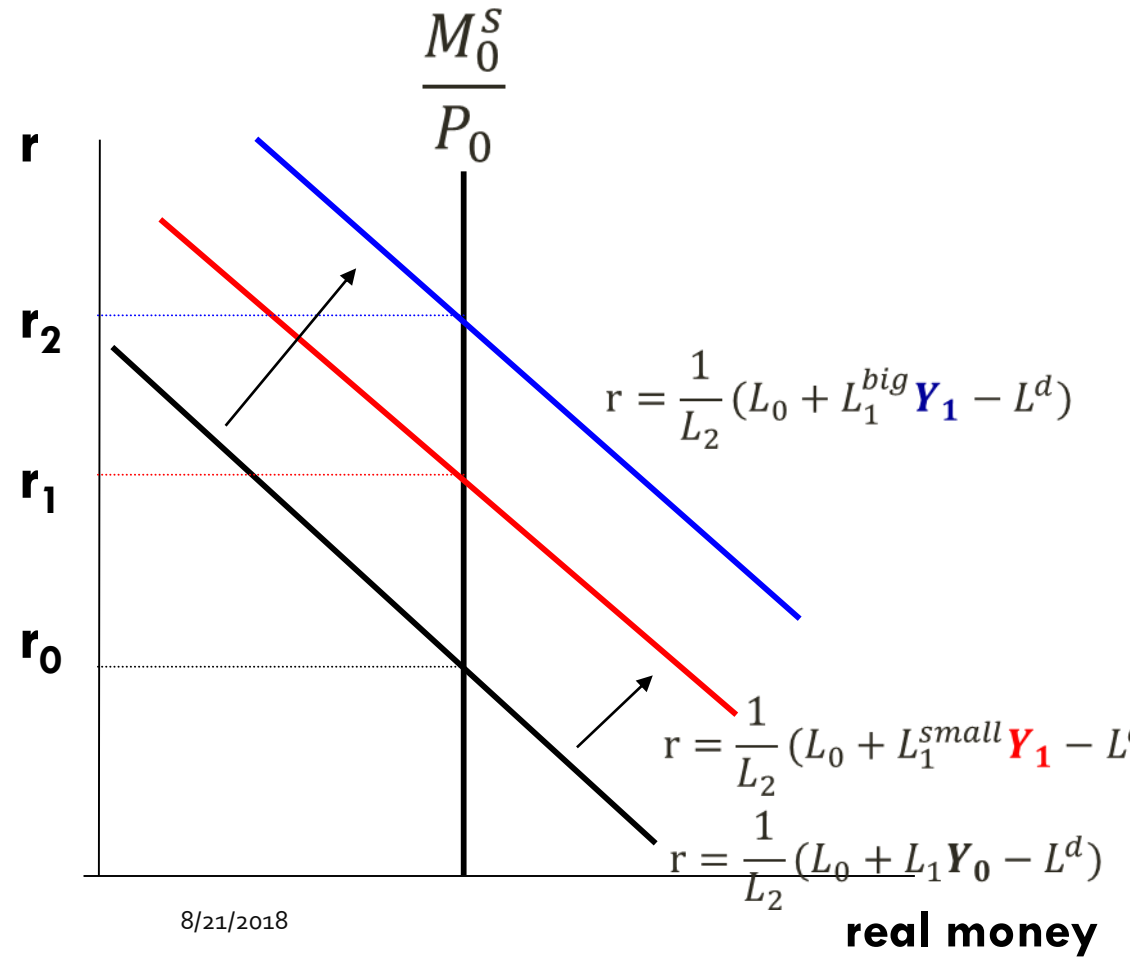
LM CURVE: SLOPE?

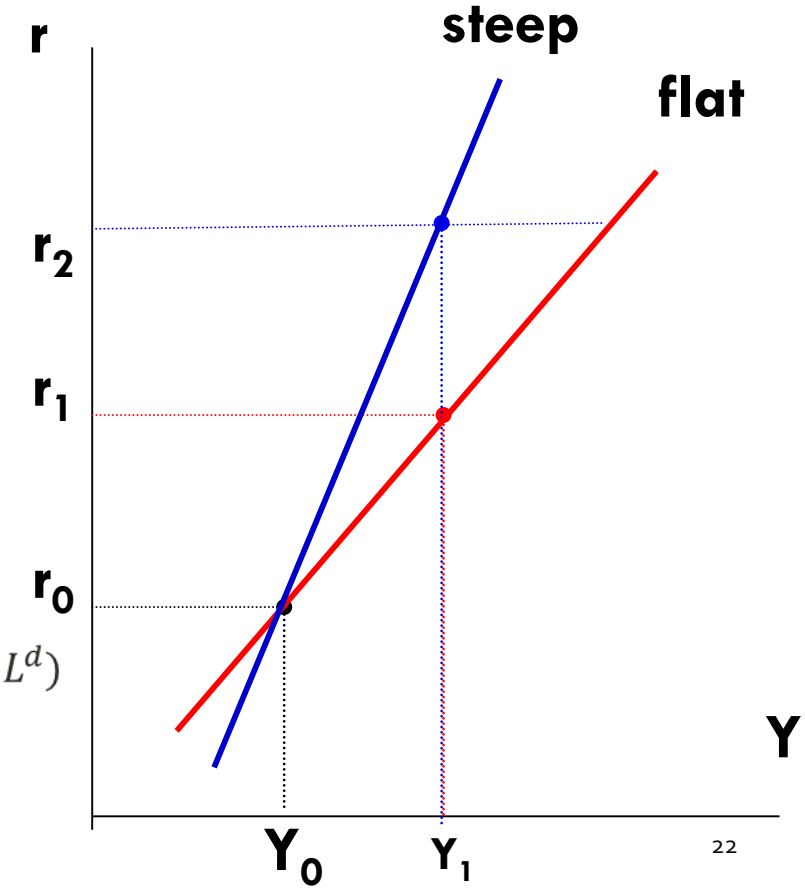
- Flat v.s. Steep LM curve
- Two factors: L1 and L2.

1. How much does the change in income affect the transaction demand for money? (L1)
2. How sensitive does the speculative demand respond to interest rate? (L2)



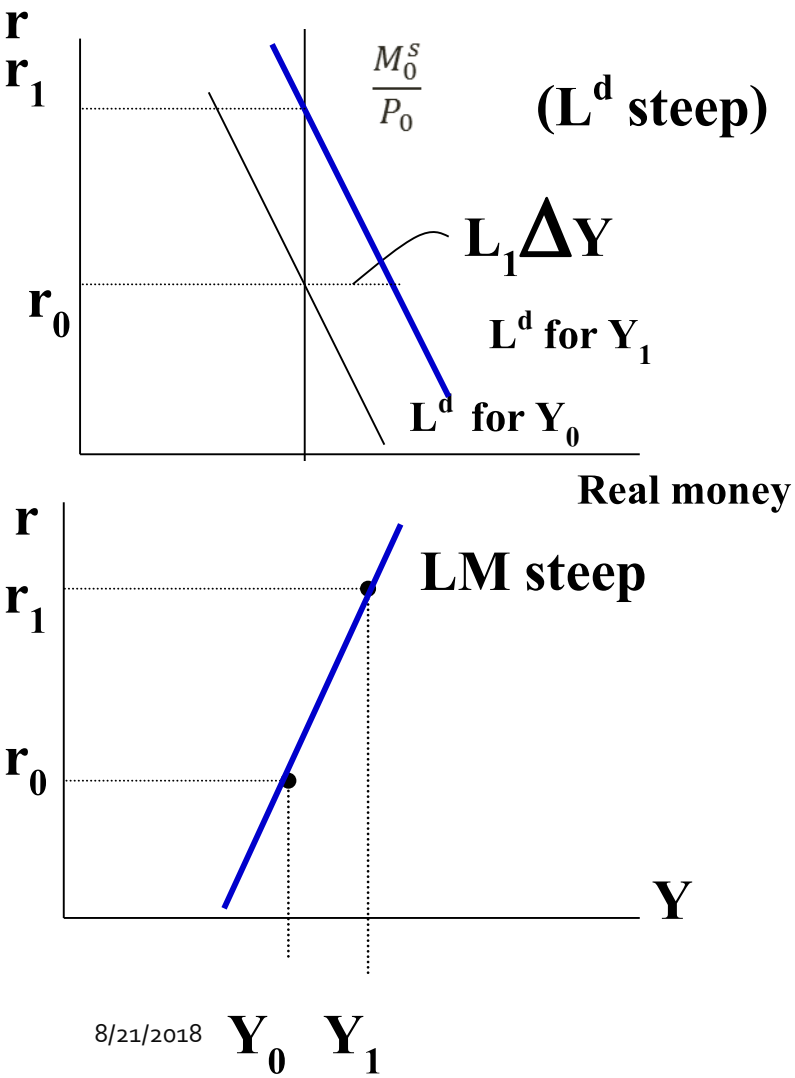
LM CURVE: SLOPE?



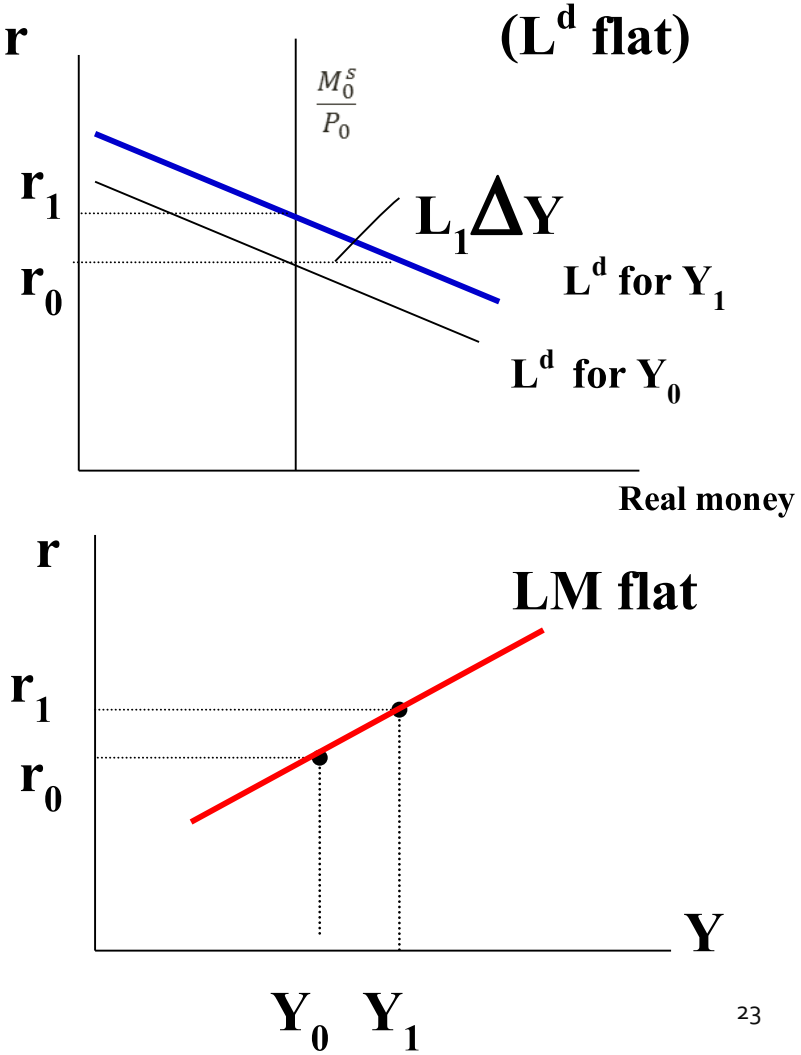


LM curve: Slope?

Highly inelastic L^d to r (L_2 small)



Highly elastic L^d to r (L_2 big)

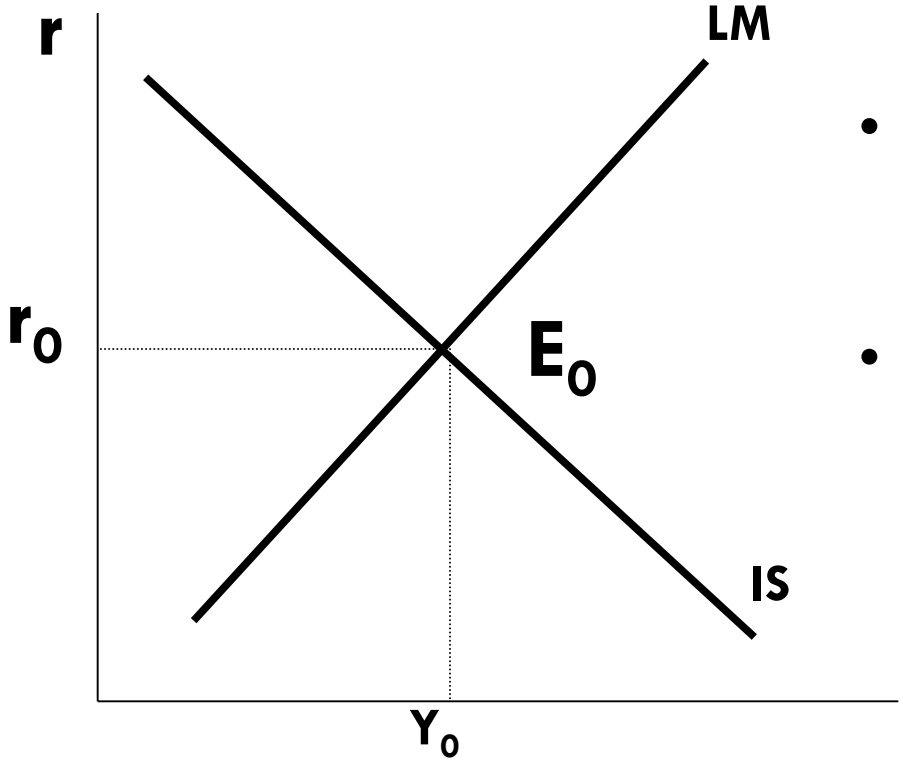


LM CURVE: SHIFT?

- Exogenous variations in demand for money (Lo)
- Change in the level of real money supply
  - Nominal money supply changes
  - Price changes

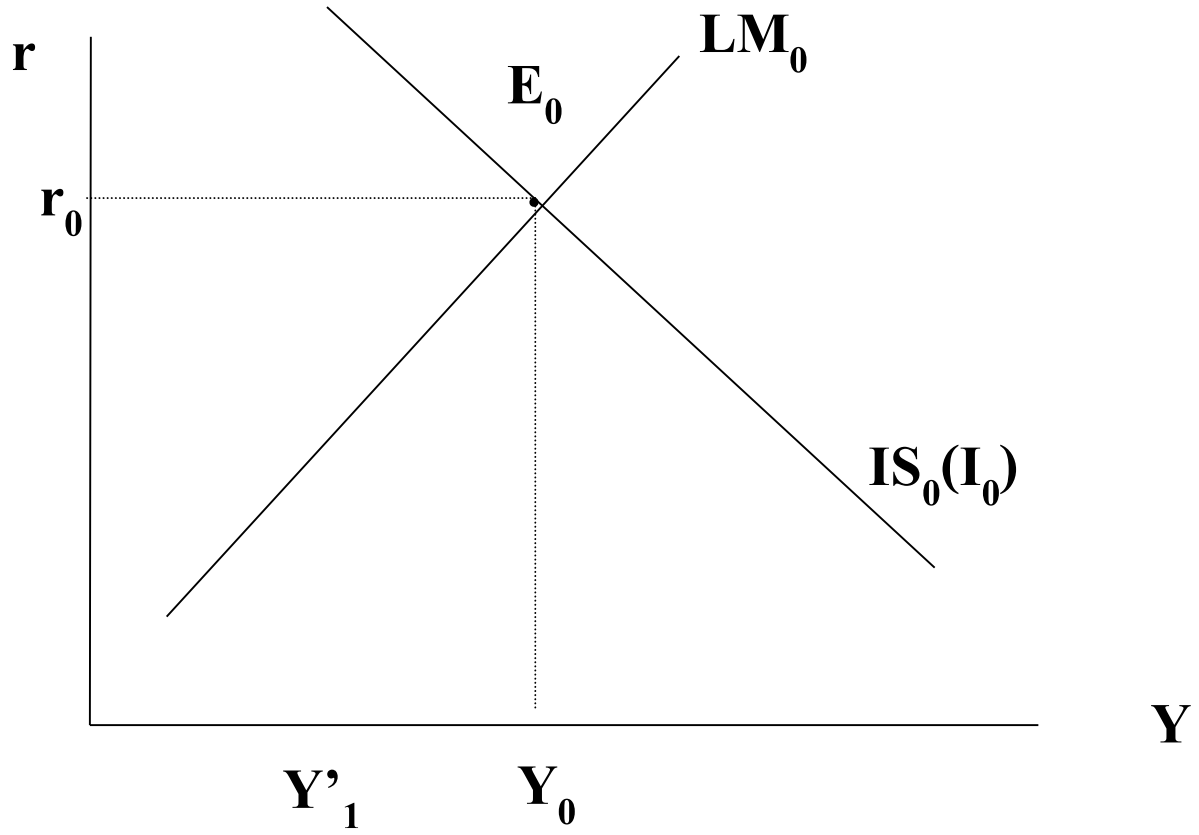
Question: Does the panic in banking sector affect LM curve? How? Why?

EQUILIBRIUM ANALYSIS UNDER THE IS-LM MODEL



- General equilibrium occurs when both goods and money market are in the equilibrium.
- Equilibrium situation can be attained at the intersection point between IS and LM curve.
- E0 will always be the equilibrium if factors that determine IS and LM curve remain the same.

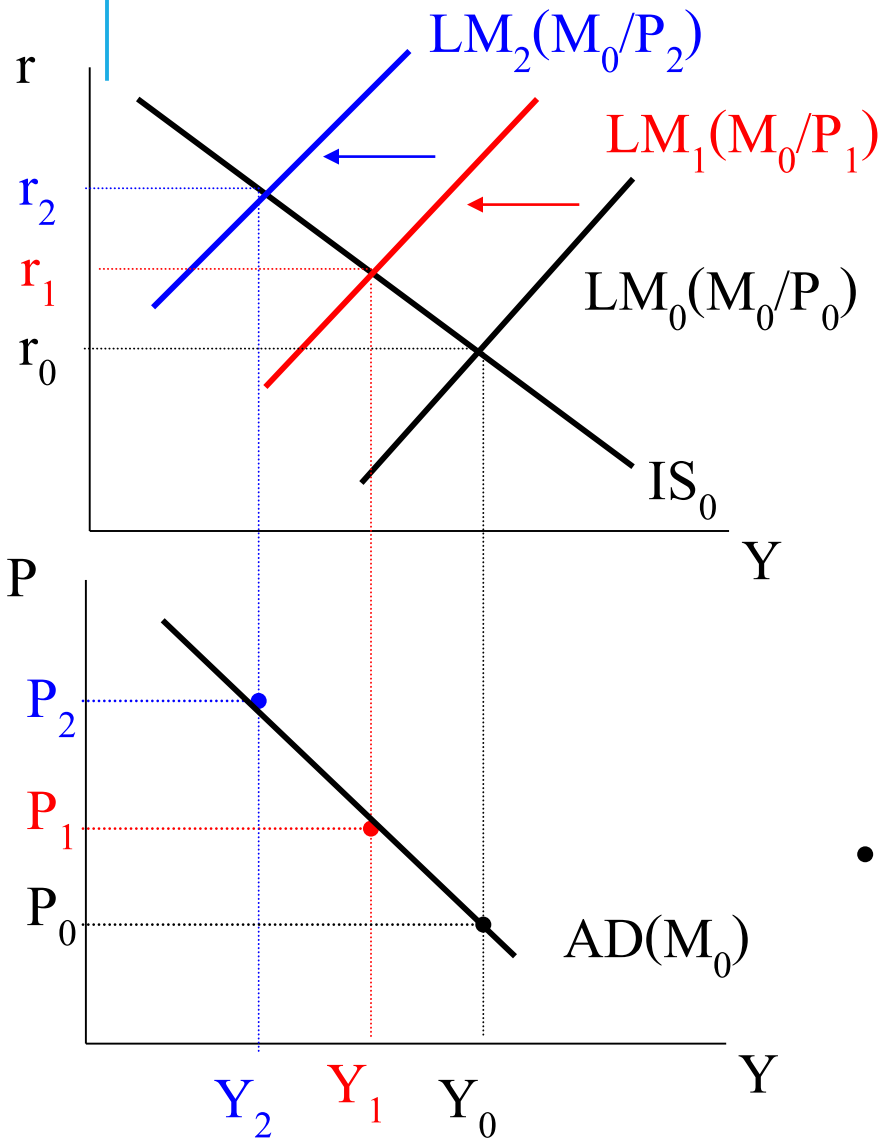
QUESTION: NEGATIVE SHOCKS ON AUTONOMOUS INVESTMENT SPENDING



AGGREGATE DEMAND

- IS-LM model was built on the assumption that price is fixed.
- What if price can be adjusted? How would this affect behavior of aggregate output?
- The relationship that links between "price" and "income" obtained from the IS-LM model is called the aggregate demand relationship.
- Aggregate demand curve is downward sloping in price. (why?)

AGGREGATE DEMAND: DERIVATION



- Suppose that nominal money supply (M_0) is fixed
- $P_2 > P_1 > P_0$
- $(M_0/P_2) < (M_0/P_1) < (M_0/P_0)$
- Rising price causes real money supply to drop; LM curve shifted left

- AD curve can be derived from the equilibrium of the IS-LM model; downward sloping curve.

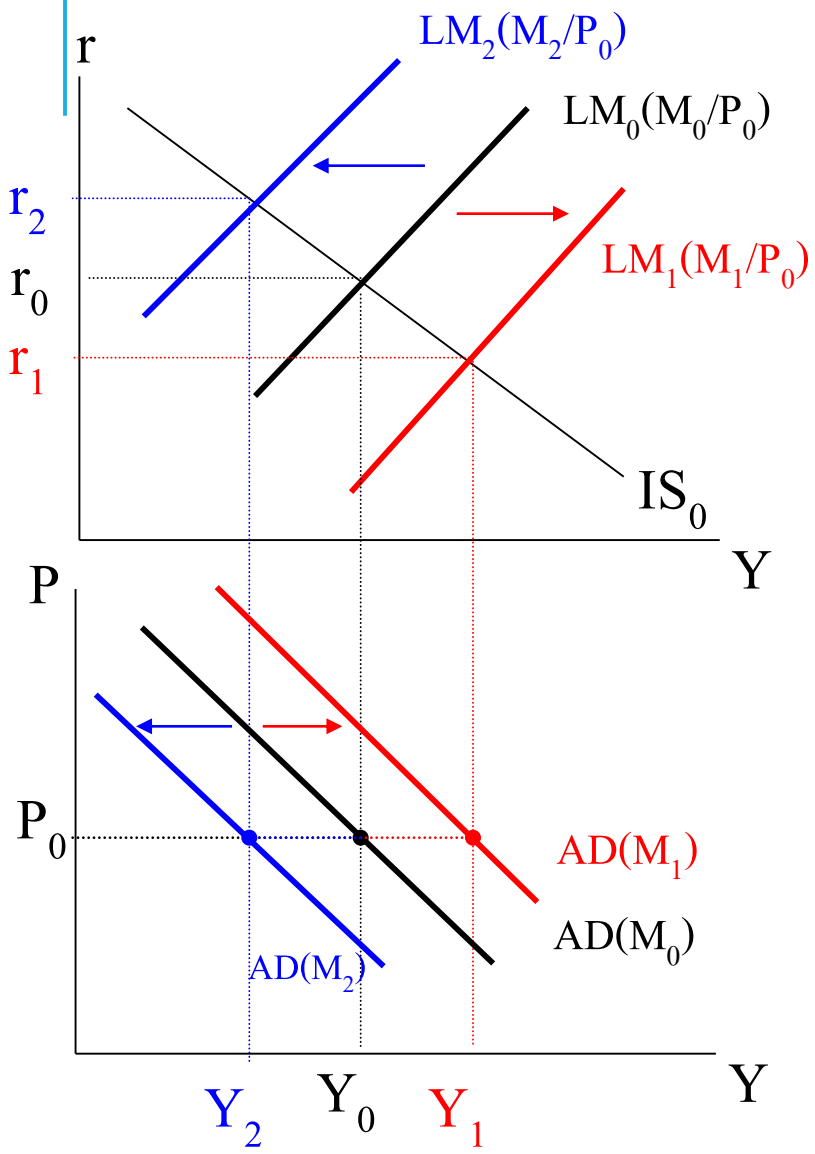
AGGREGATE DEMAND: CHANGES IN THE AD CURVE

- Aggregate demand can be shifted up/right (more demand for any given prices) and down/left (less demand for any given prices.)

- All the underlying factors that determine the IS curve and the LM curve can cause the change in Aggregate demand curve.

- Consider policy variables.

AGGREGATE DEMAND: CHANGES IN THE AD

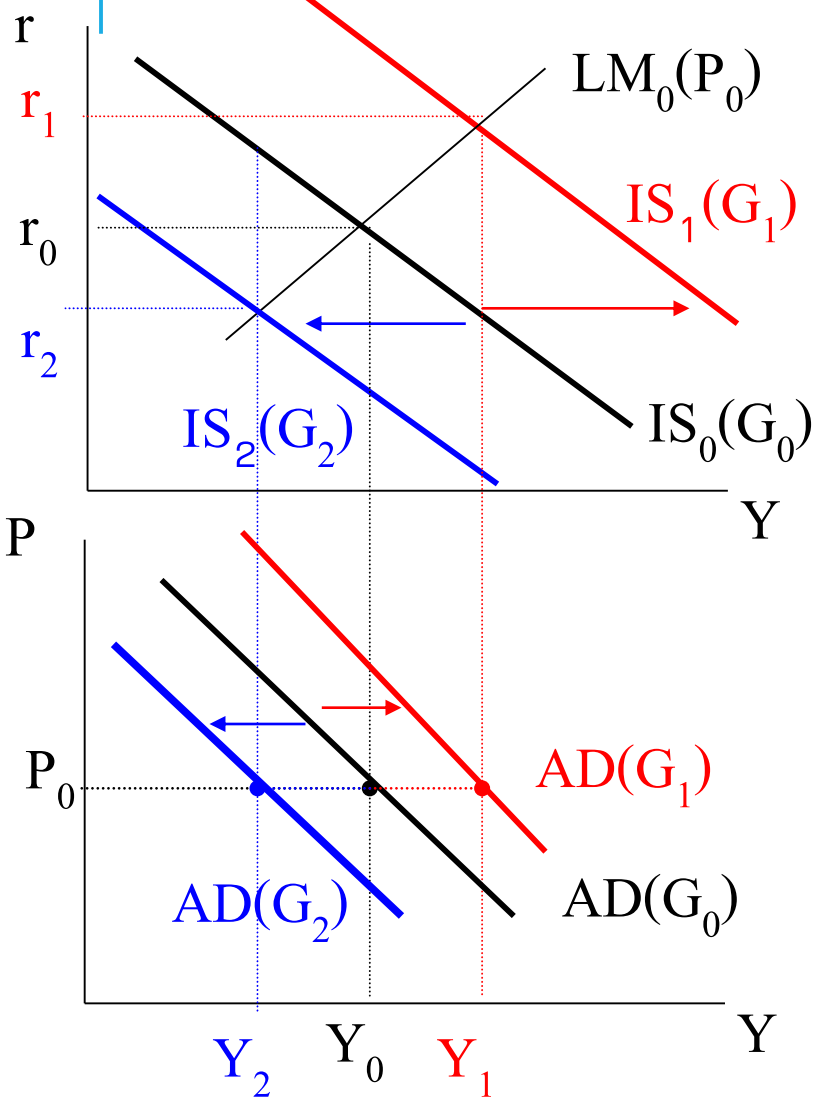


Change in the nominal money supply

- Consider a fixed level of price P_0.
- Suppose central bank increases money supply; M0 → M1
- Positive money creation will cause the LM curve to shift right; income will rise from Y0 to Y1.
- Y0 is no longer aggregate quantity demanded at P0 when money supply is now M1 > M0; aggregate demand curve then shifts right.
- For any level of prices, lowering money supply would cause LM to shift left, and hence the AD curve.

QUESTION: WHAT DETERMINE THE SIZE OF AD SHIFT?

AGGREGATE DEMAND: CHANGES IN THE AD CURVE



Change in the level of Government spending

- Consider a fixed level of price, P0
- Suppose government increases spending from G0 to G1.
- Positive change in government spending will cause the IS curve to shift right; income will rise from Y0 to Y1.
- Y0 is no longer aggregate quantity demanded at P0 when government spending is now G1 > G0; aggregate demand curve then shifts right.
- For any level of prices, lowering G (G0→G2) would cause IS to shift left, and hence the AD curve.

QUESTION: WHAT DETERMINE THE SIZE OF AD SHIFT?

AGGREGATE DEMAND: CHANGES IN THE AD CURVE

- **Question:** how does the deterioration in the level of consumer and business confidence affect aggregate demand curve?

- **Question:** how does the introduction and acceptance of digital currency affect aggregate demand curve?