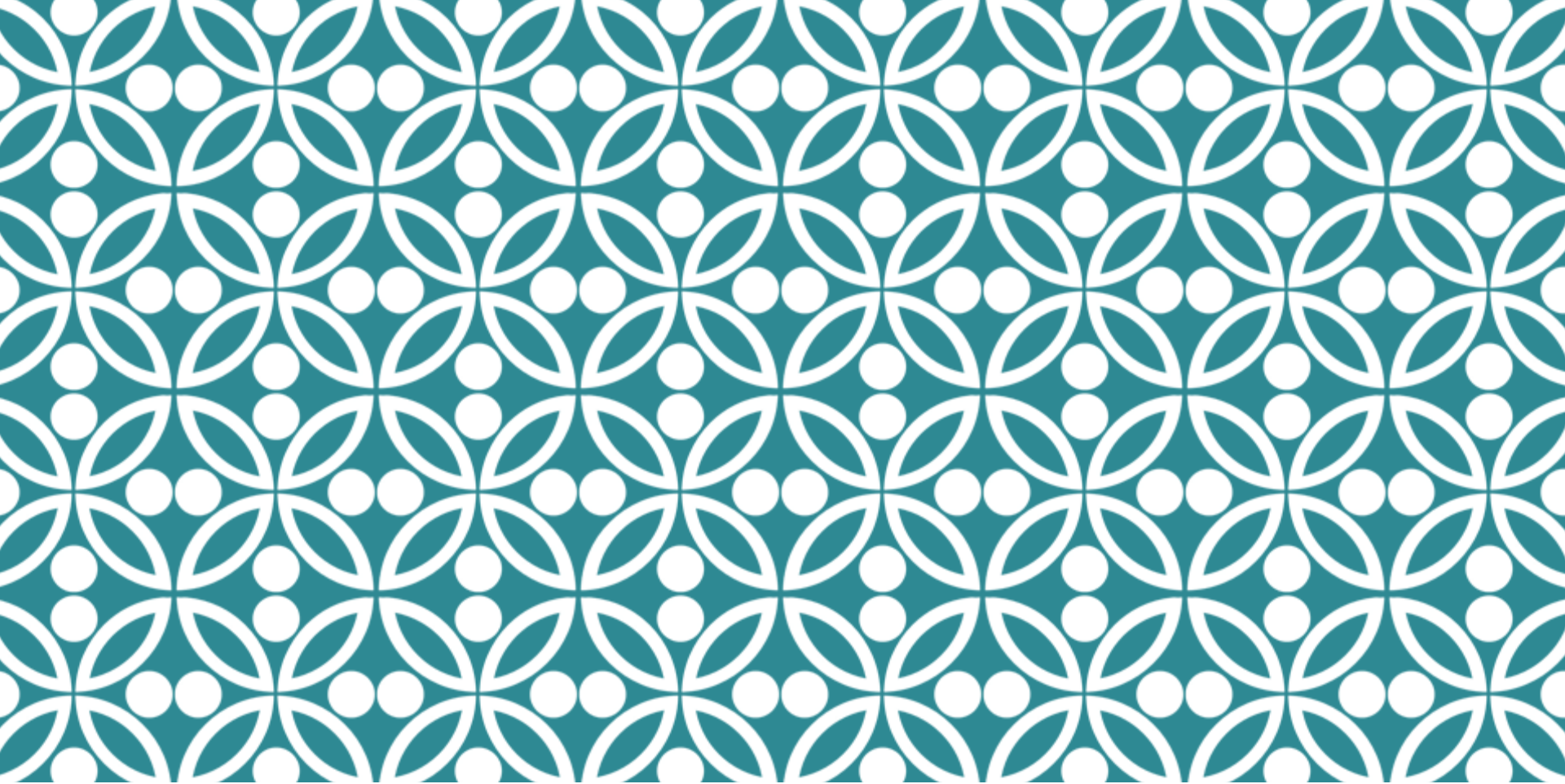




PART 1

SHORT-RUN BUSINESS CYCLES FLUCTUATIONS

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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**.
- The changes that occur among 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 (comparative static)

METHODOLOGICAL FRAMEWORKS FOR BUSINESS CYCLES STUDIES

- In ee312, we reinterpret the variation of the 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**.
- 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**.

**This PowerPoint handout is adapted from the materials produced by Dr. Apichat and Dr.Chalermpon.
I am fully acknowledged and appreciated for their courtesy in allowing me to build upon my handout with several parts of the material drawn from their work.**

TOPIC 1

TRADITIONAL KEYNESIAN FRAMEWORK: AD-AS ANALYSIS

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CORE IDEAS: KEYNESIAN SYSTEM IN A NUTSHELL.

- Output fluctuates around the trend line largely because of the **demand shocks**; supply-side factors contribute to the fluctuations as well, but relatively small. (That's what they thought!)
- Short-fall, as well as overly expanded, state in the level of aggregate demand can cause **inefficient** level of output.
- It takes quite a while before the economy can revert to efficient level; **in the long-run, we are all dead**.
- Support the role of **government interventions**; using fiscal and monetary policy in fighting against fluctuations.

CORE KEYNESIAN MODELS

Three variant versions of Keynesian model

1. Keynesian cross

- AE depends on Y and Y depends on AE. $\rightarrow AE(Y^*) = Y^*$
- 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 KEYNESIAN MODELS

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.

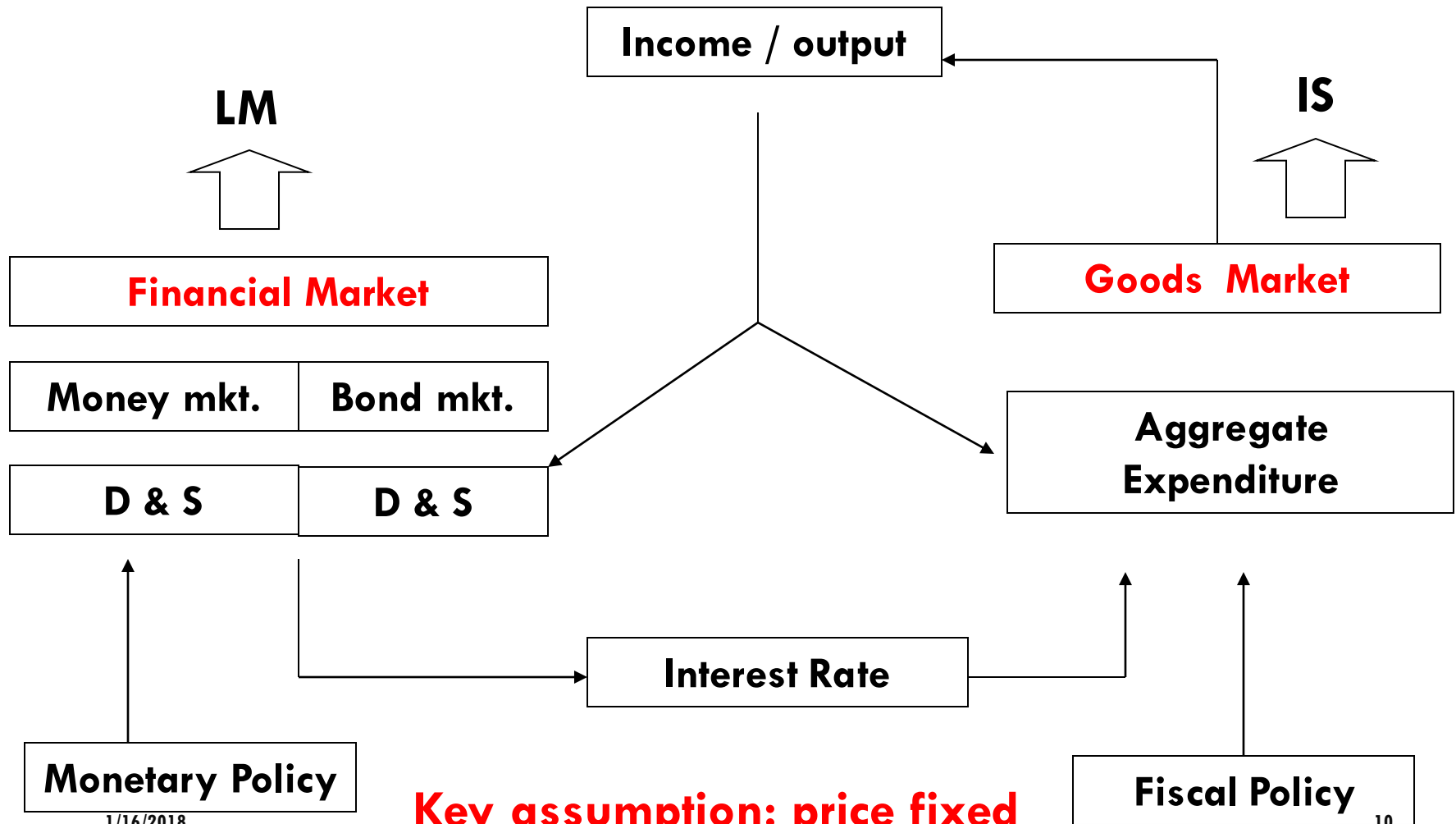
AGENDA FOR THIS TOPIC

1. IS-LM model and Aggregate demand
2. Labor market activities and Aggregate supply
3. Equilibrium analysis, fiscal and monetary policy
4. Demand and Supply shocks: business cycles interpretation

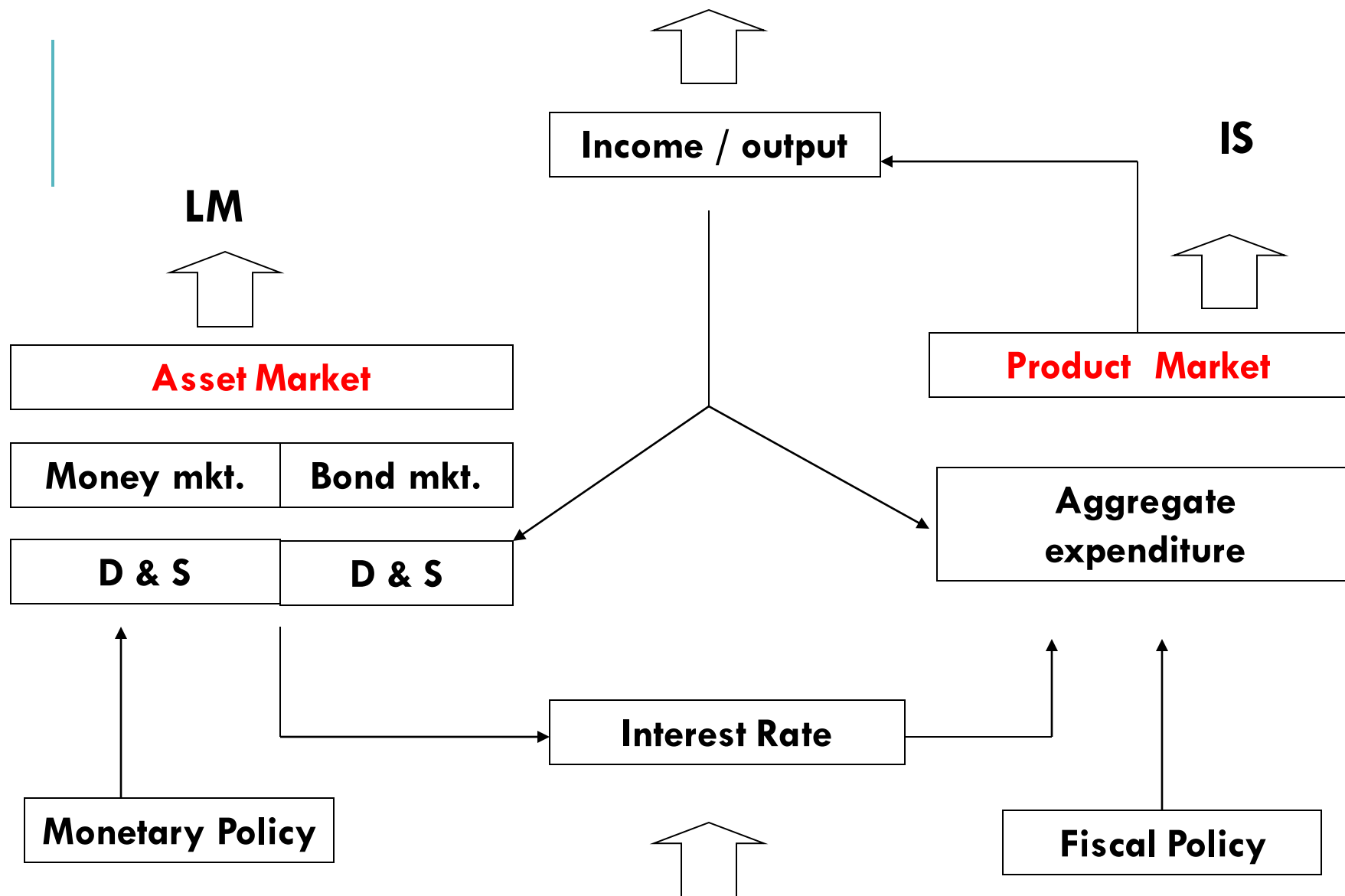
Readings:

Froyen: chapter 5 - 8

1. THE IS-LM MODEL AND AGGREGATE DEMAND: A QUICK REFRESHMENT



Aggregate demand



Price can be adjusted

1.1 PRODUCTION/GOOD MARKET

- **Equilibrium in the good market**
- **Deriving the IS curve**
- **Slope of the IS curve**
- **Shifting the IS curve.**

Assumptions

- 1) Closed economy → no x, m
- 2) **Fixed prices** → real term variables

Equilibrium in product/good market

- 1) Equilibrium occurs when output (Y) is equal to aggregate expenditure (E)

$$Y = E = C + I + G$$

- 2) Alternatively, equilibrium condition can be represented by leakage-injection equality.

$$\begin{aligned} C + S + T &= Y [=C + I + G] \rightarrow \\ S + T &= I + G \text{ (Leakage = Injection)} \end{aligned}$$

UNDERSTANDING COMPONENT OF AGGREGATE EXPENDITURE (AE)

1. Private consumption (C)

- Private consumption is determined by several factors, and commonly denoted by the **consumption function**.
 - Two important factors commonly referred to are disposable income ($Y_d = Y - T$) and real interest rate (r)
- Assume that the consumption function takes the following form
$$C = a + b \cdot Y_d - e \cdot r; \quad a > 0, 0 < b < 1 \text{ and } e > 0$$
 - a = autonomous consumption
 - b = marginal propensity to consume
 - e = sensitivity of consumption to real interest rate

UNDERSTANDING COMPONENT OF AGGREGATE EXPENDITURE (AE)

2. Private Investment (I)

- Private investment is determined by several factors, and commonly denoted by the **investment function**.
 - Two important factors commonly referred to are income (Y) and real interest rate (r)
- Assume that the consumption function takes the following form
$$I = I_a - i_1 r + i_2 Y; \quad \alpha > 0, i_1 > 0 \text{ and } 0 < i_2 < 1$$
 - α = autonomous consumption
 - i_1 = sensitivity of investment to real interest rate
 - i_2 = marginal propensity to invest

UNDERSTANDING COMPONENT OF AGGREGATE EXPENDITURE (AE)

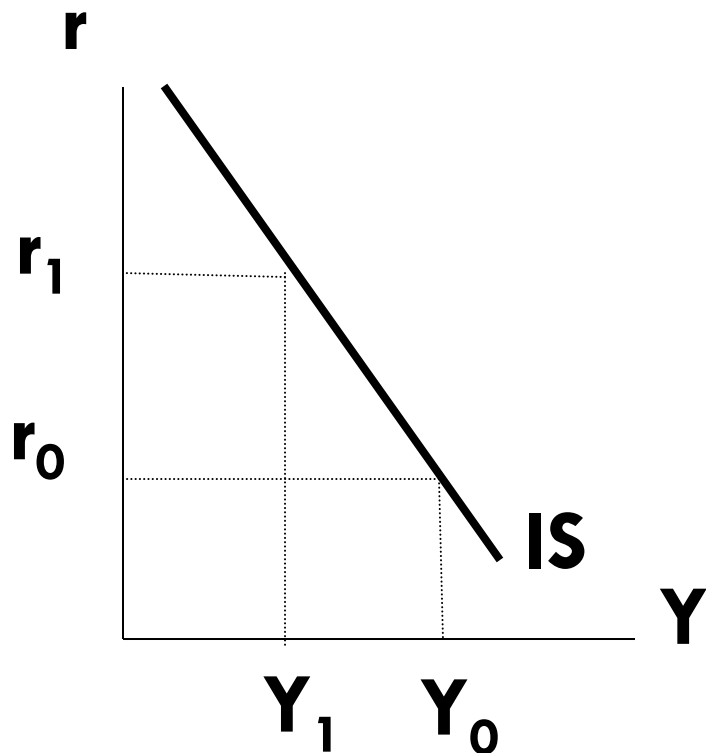
3. Government expenditure (G)

- Government expenditure is typically treated as an exogenous variable, i.e. treated as given.
- A more realistic structure of modeling government behavior is to assume some forms of spending rule.
- An example of the spending rule is to tie the level of government expenditure to the level of GDP, i.e. automatic stabilizing rule.

IS CURVE

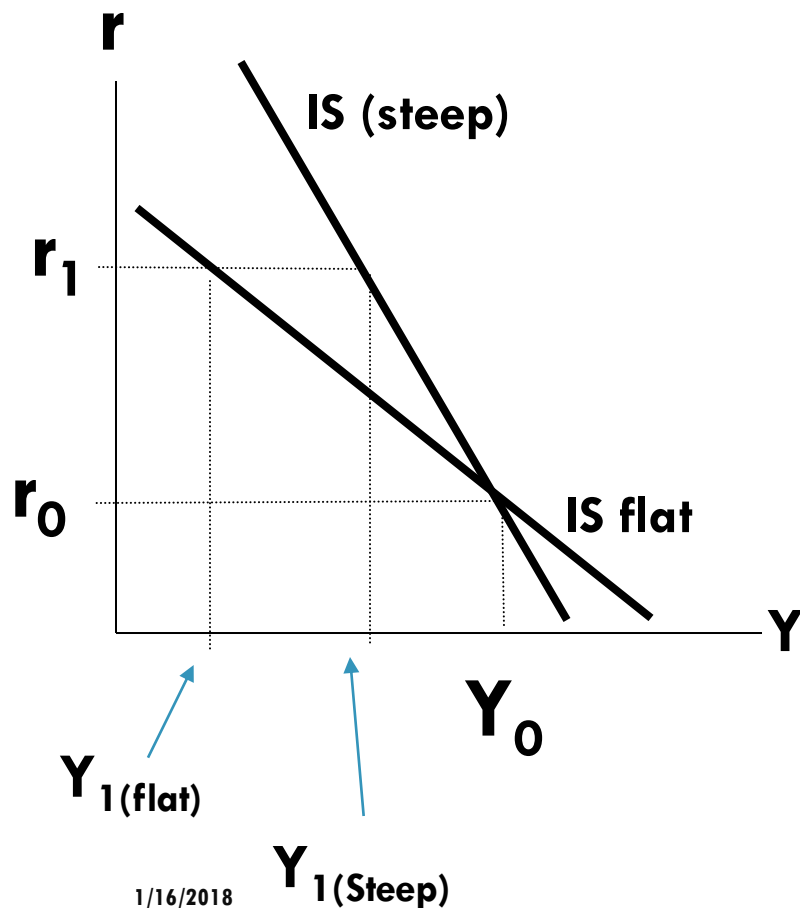
- Equilibrium relationship between “ r ” and “ Y ” that put the good market under the equilibrium condition, i.e. $Y = AE$.
- IS curve is downward sloping. Why?

IS CURVE: WHY DOWNWARD SLOPING?



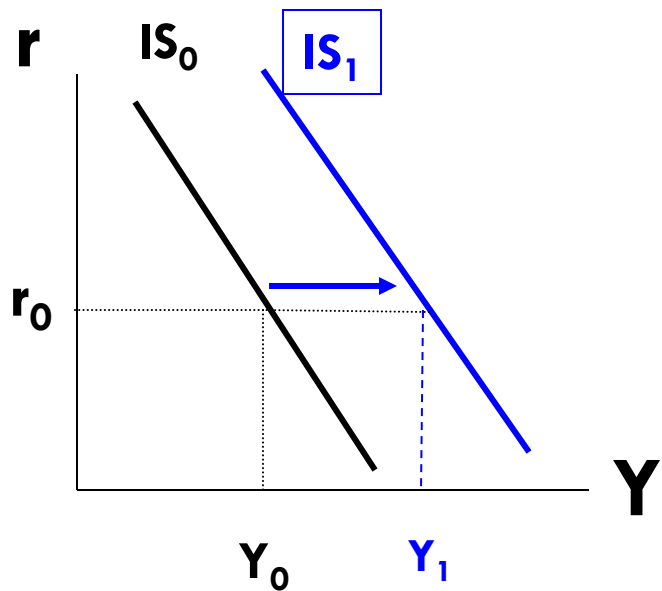
- When (real) interest rate increases (r_0 to r_1), investment and consumption will decrease.
- Lowering in the investment and consumption causes a drop in aggregate spending (AE).
- Change in AE would change the output, based on the multiplier effect.
- Hence, output would drop (Y_0 to Y_1).

IS CURVE: SLOPE



1. Sensitivity of AE to interest rate:
Interest rate effect:
2. Sensitivity of Y to AE: multiplier effect:

IS CURVE: SHIFTING THE CURVE



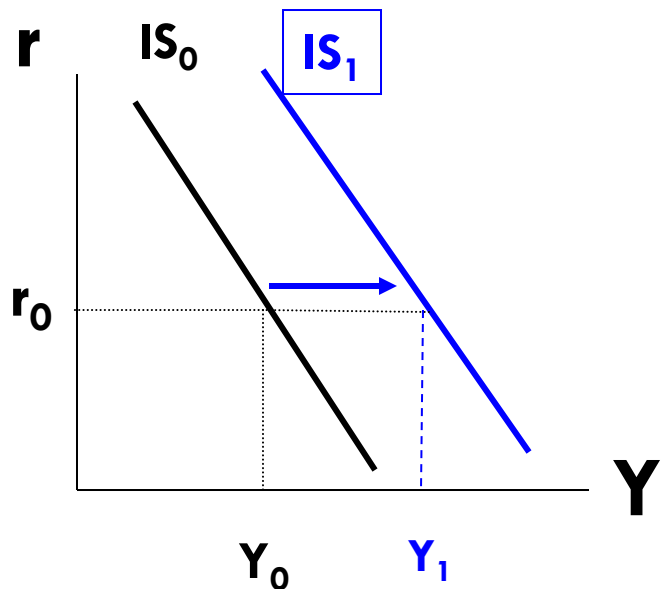
- We keep all the factors constant while deriving the IS curve, i.e. equilibrium in the good market.
- The factors that we thought they are kept constant may be changing over time.
- Changes in those factor can be diagrammatically captured by a horizontal shift of the IS curve.
- The size of horizontal shift depends on the **multiplier effect** of the changing factors.

$$C = \mathbf{a} + b \cdot Y_d - e \cdot r;$$

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

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?

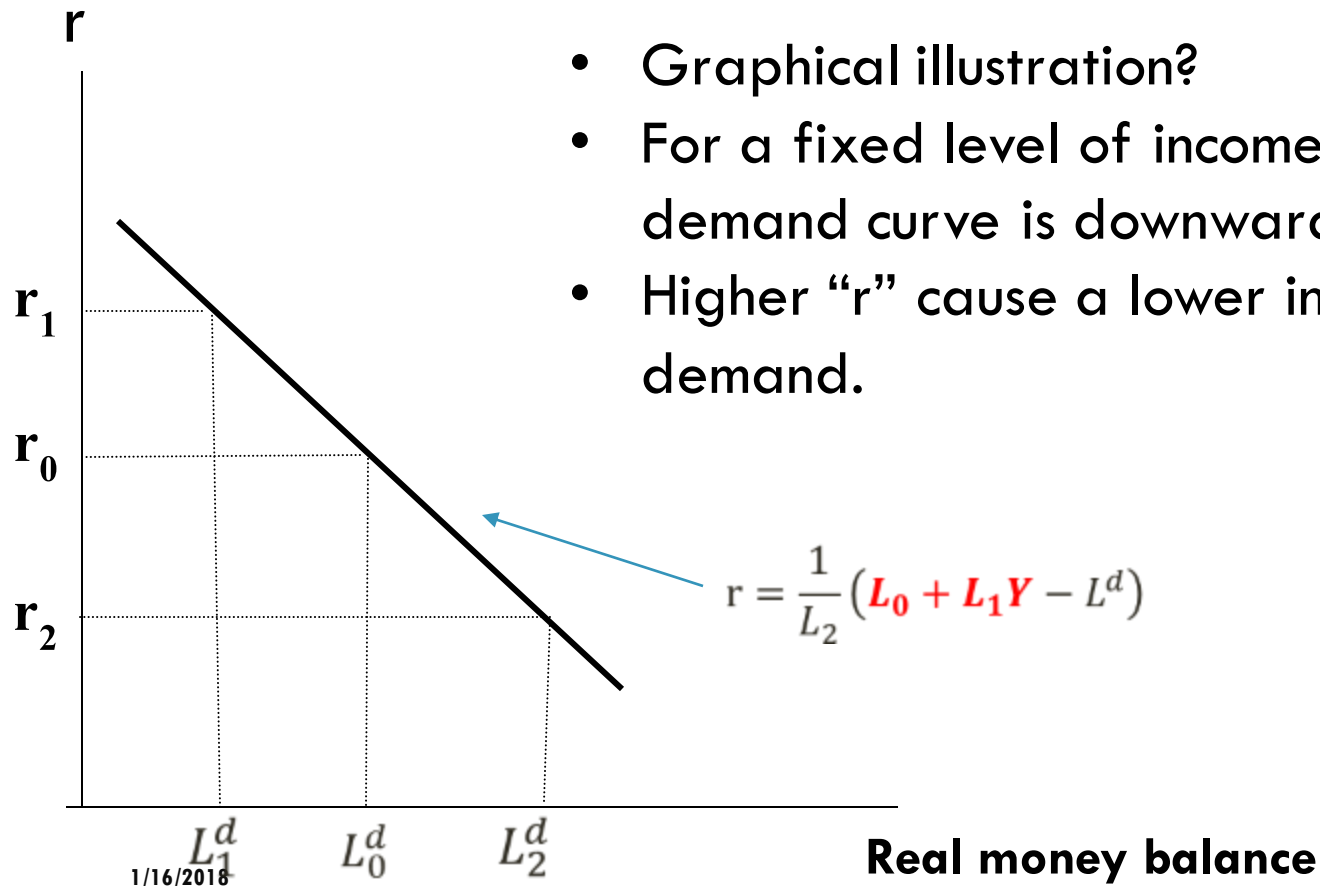
1.2 EQUILIBRIUM IN THE MONEY MARKET (LM)

- What is the LM curve?
- Deriving LM curve
- Slope of the LM curve
- Shifting the LM curve

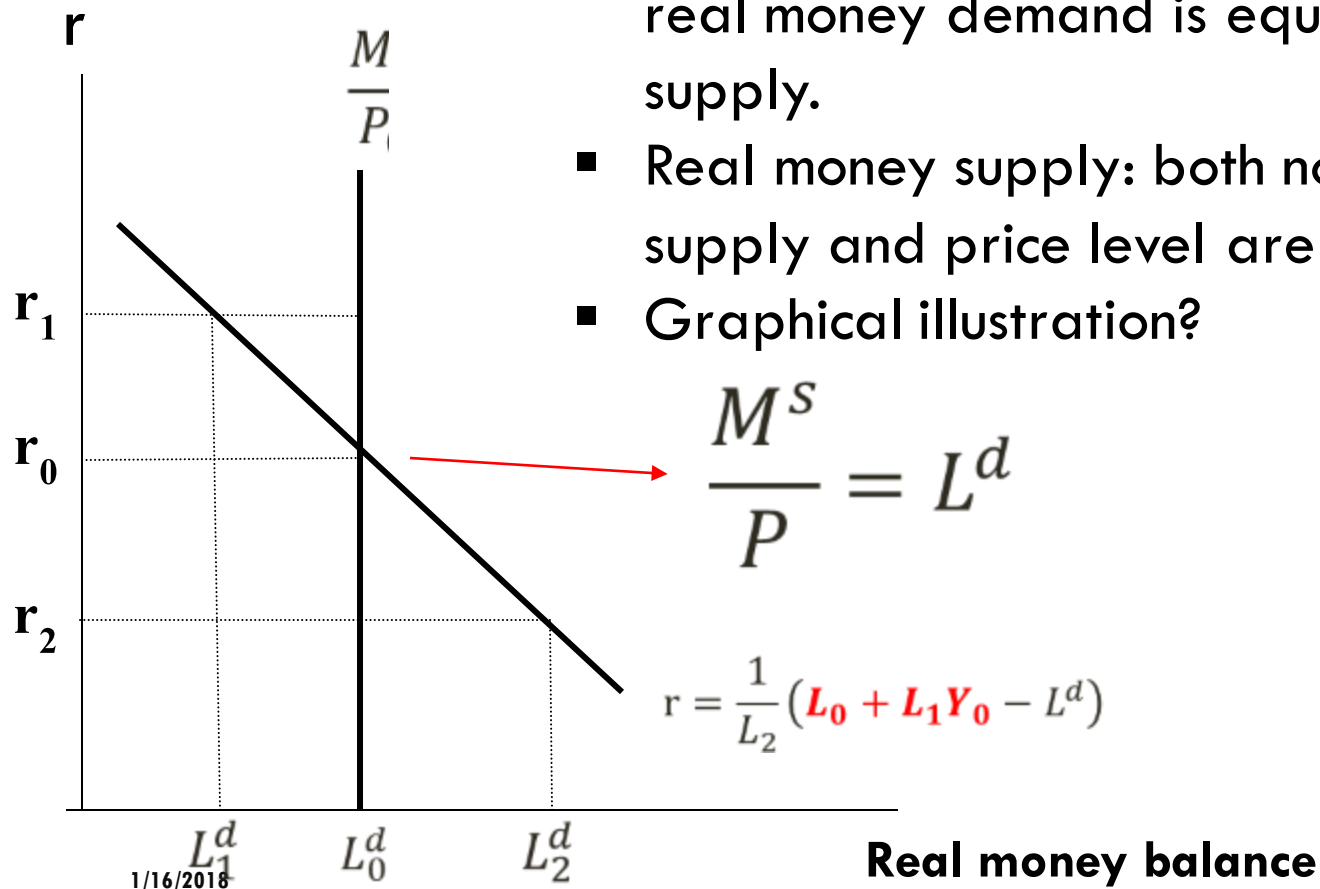
THE MONEY MARKET AND LIQUIDITY PREFERENCE THEOREM

- Financial sector is modeled by the activity in **money market**.
- Two components determine equilibrium in the financial sector: **real money demand** and **real money supply**.
- Real money demand is driven by two motives for money holdings.
 - Transaction/precautionary: positively relate to Y .
 - Speculative: negatively relate to r .
- Mathematically, one may assume the form of real money demand function as **$L^d = L(Y, r) = L_0 + L_1 Y - L_2 r$**
 - L_0 = exogenous component of real money demand

THE MONEY MARKET AND LIQUIDITY PREFERENCE THEOREM



THE MONEY MARKET AND LIQUIDITY PREFERENCE THEOREM

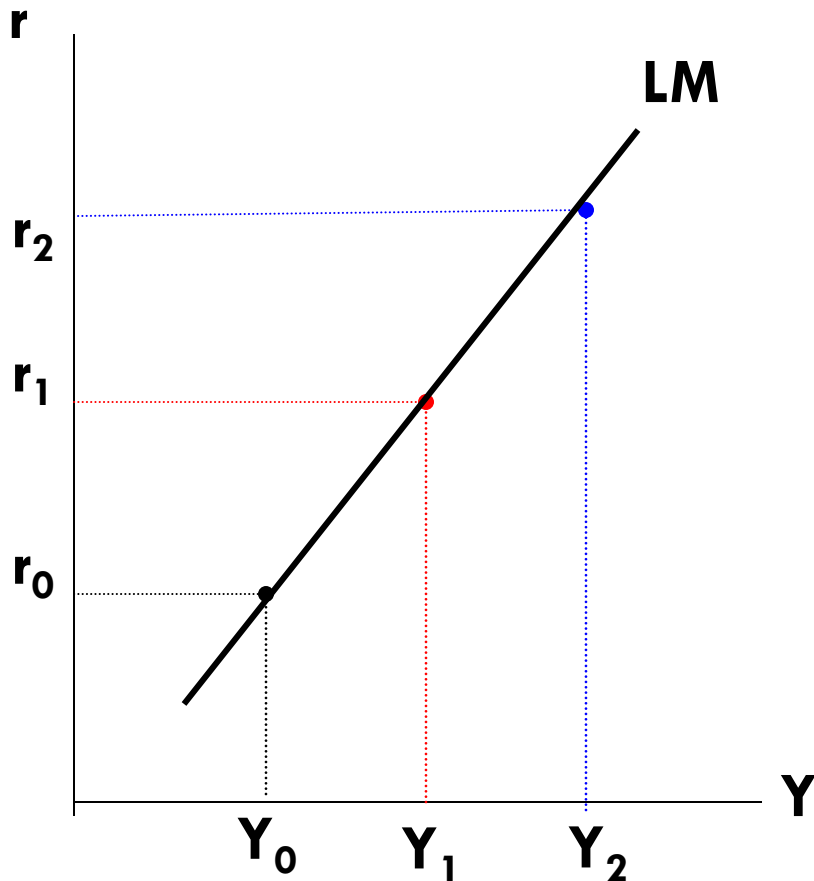


- Equilibrium in the money market occurs when real money demand is equal to real money supply.
- Real money supply: both nominal money supply and price level are treated as given.
- Graphical illustration?

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

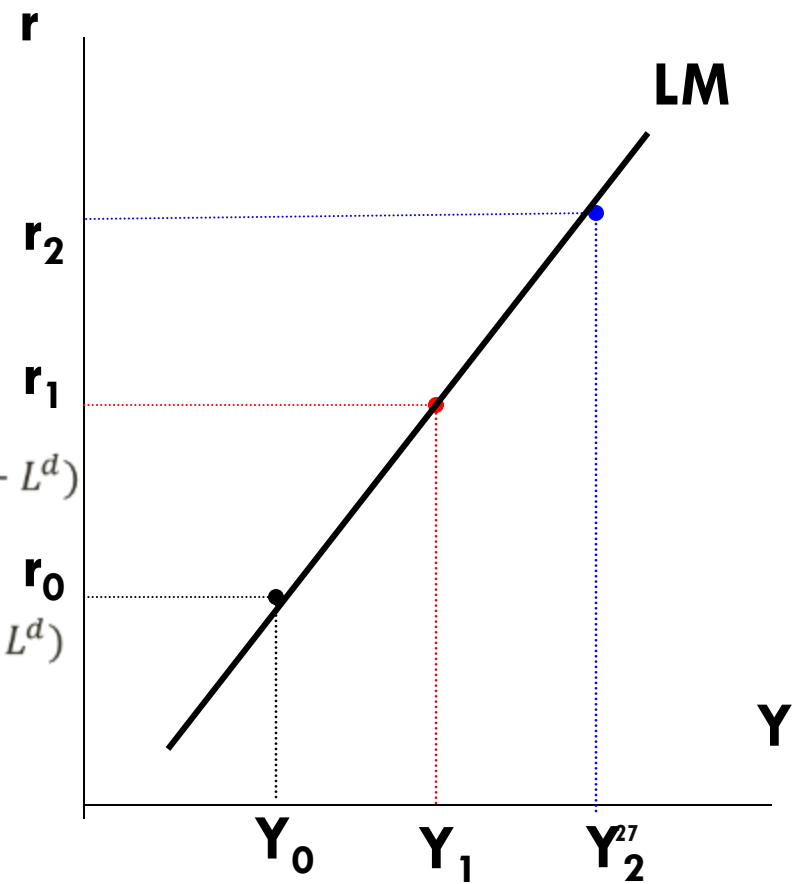
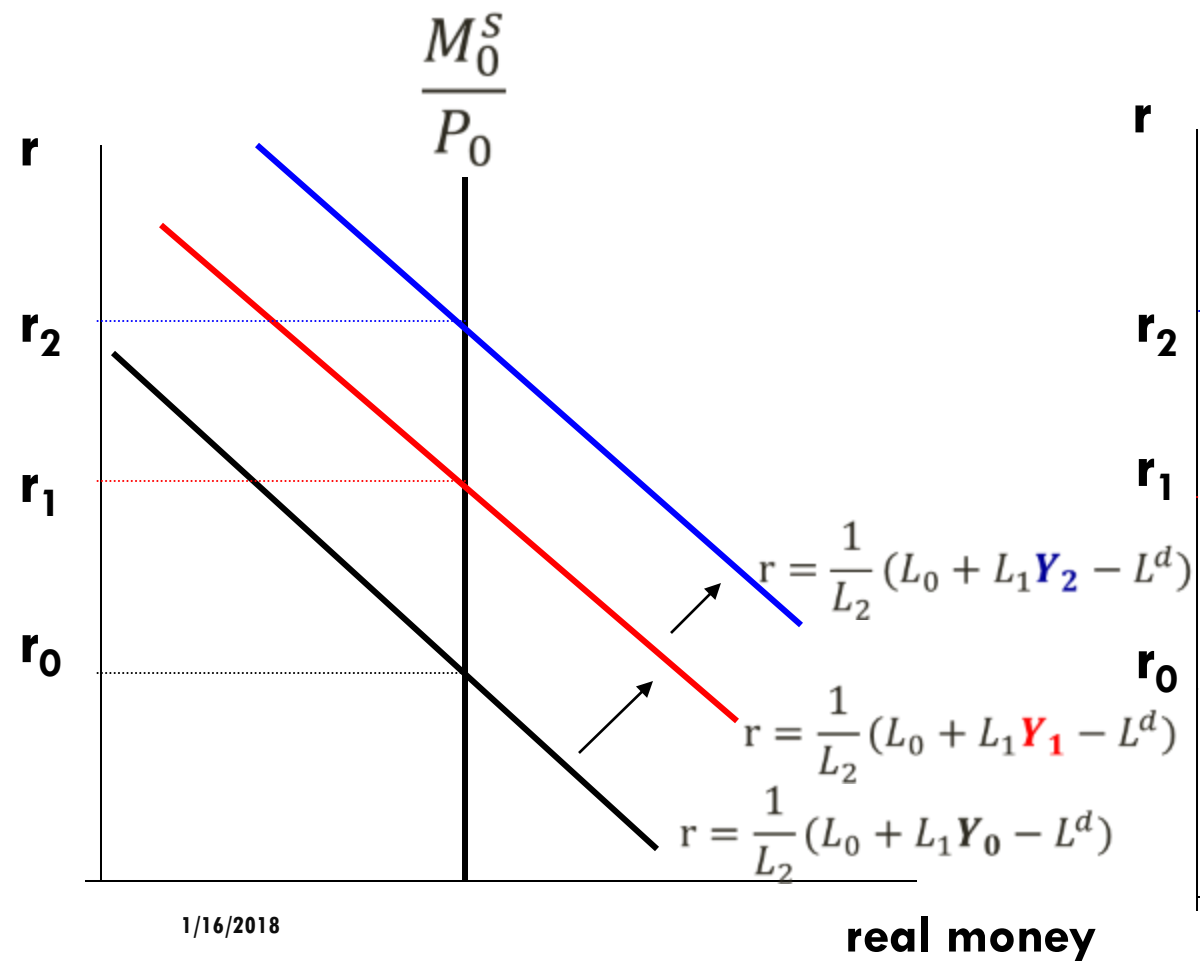
$$r = \frac{1}{L_2} (L_0 + L_1 Y_0 - L^d)$$

LM CURVE



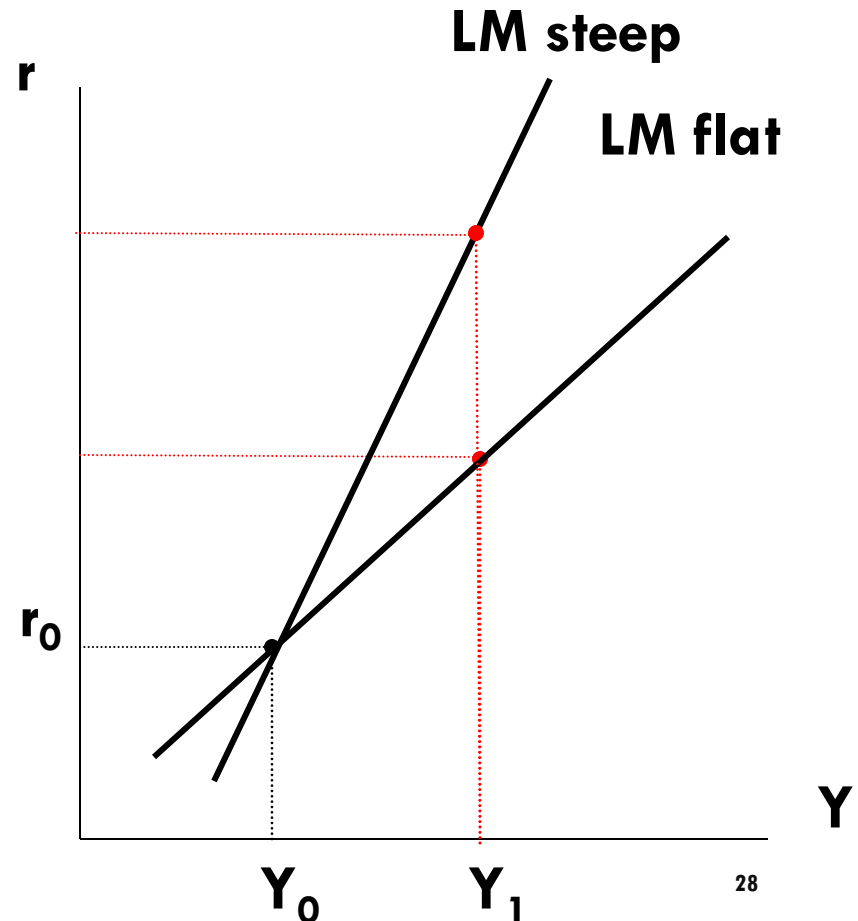
- Pairs of “ r ” and “ y ” that put the money market into equilibrium condition
- LM curve is upward sloping. Why?

LM CURVE: DERIVATION

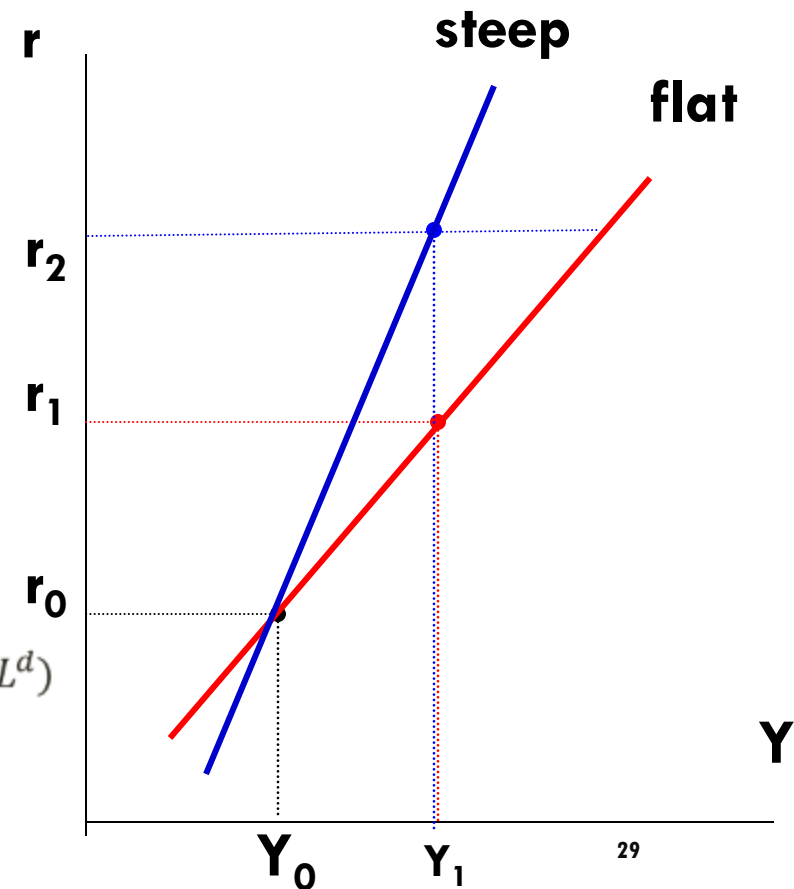
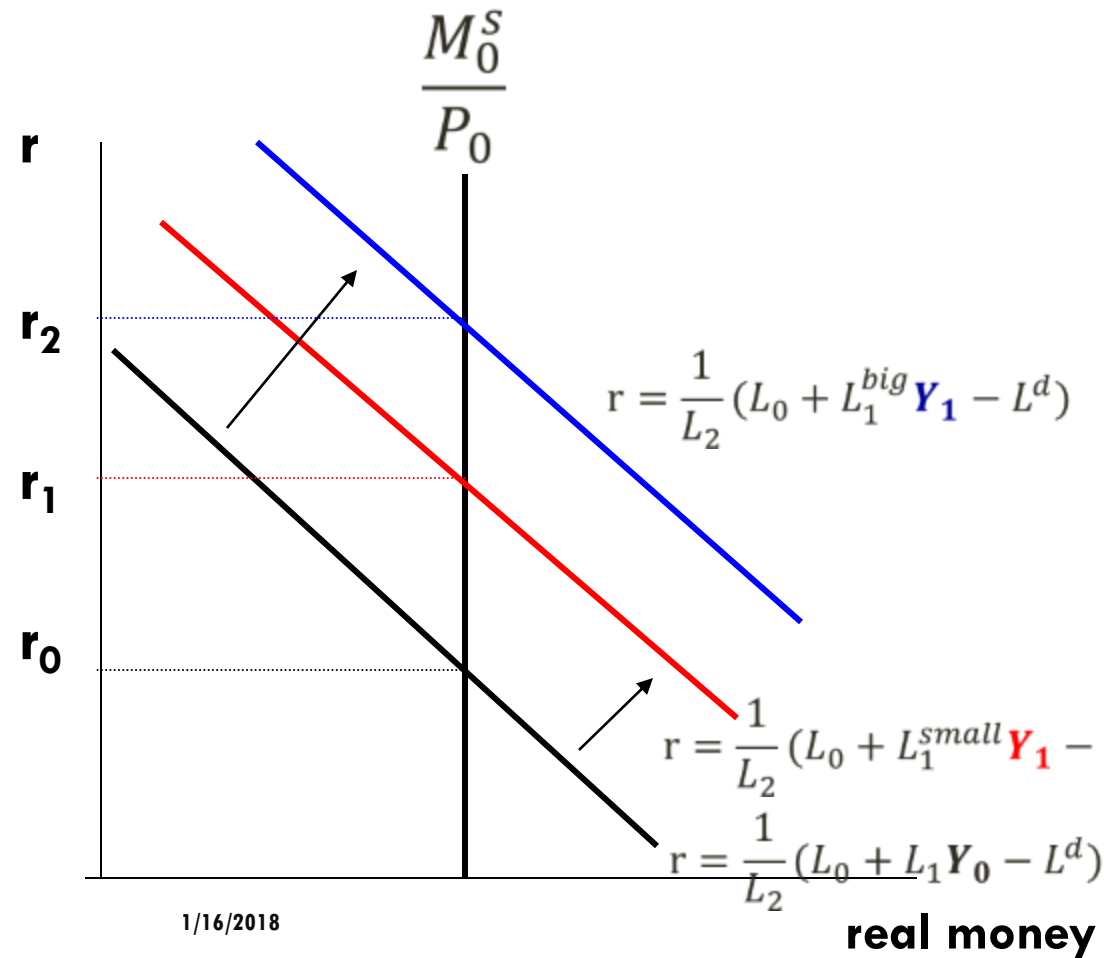


LM CURVE: SLOPE?

- 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)

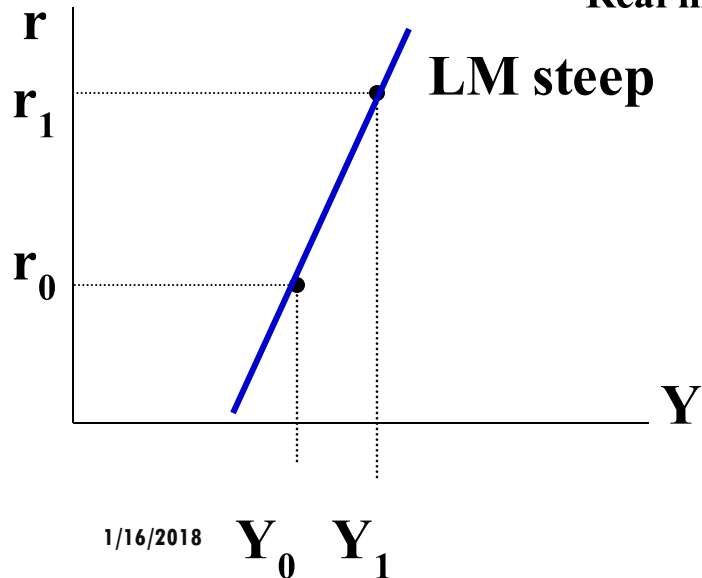
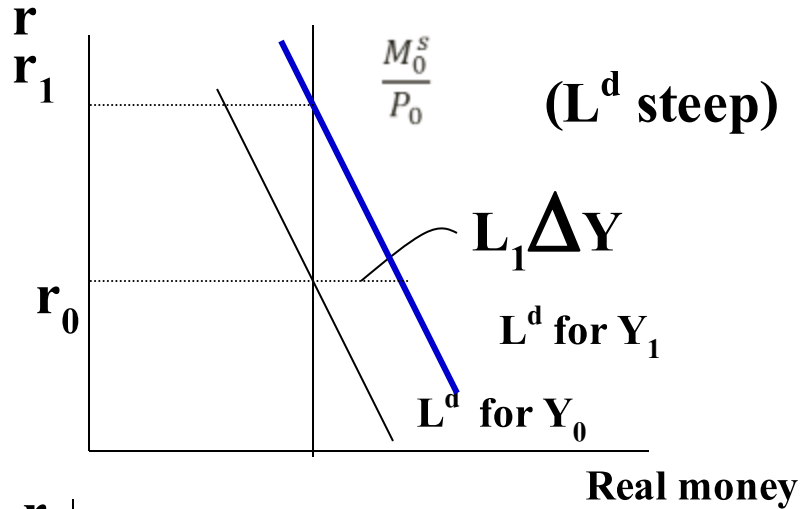


LM CURVE: SLOPE?

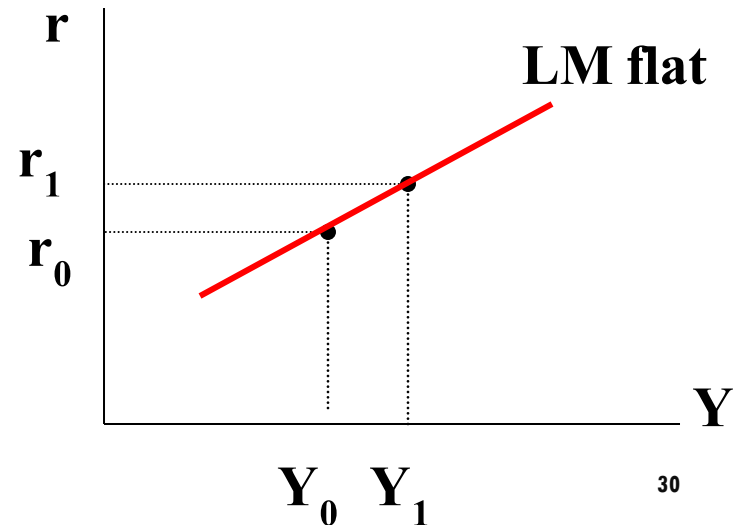
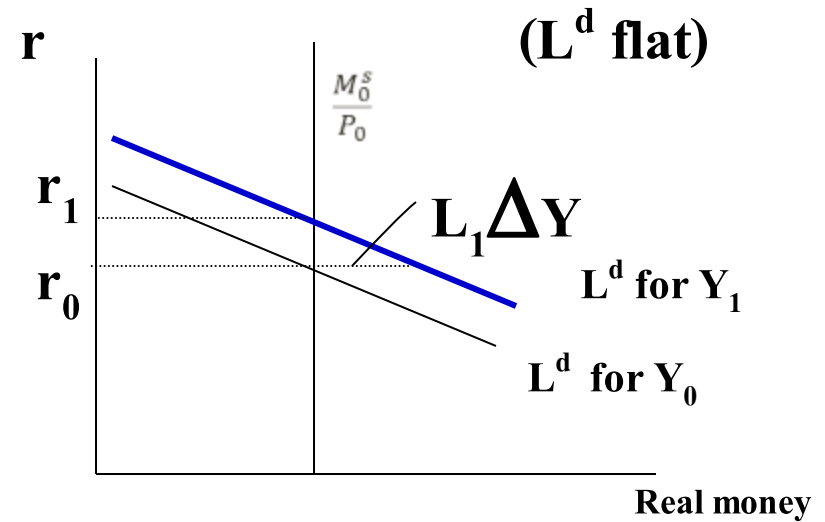


LM curve: Slope?

Highly inelastic L^d to r (L_2 small)



Highly elastic L^d to r (L_2 big)

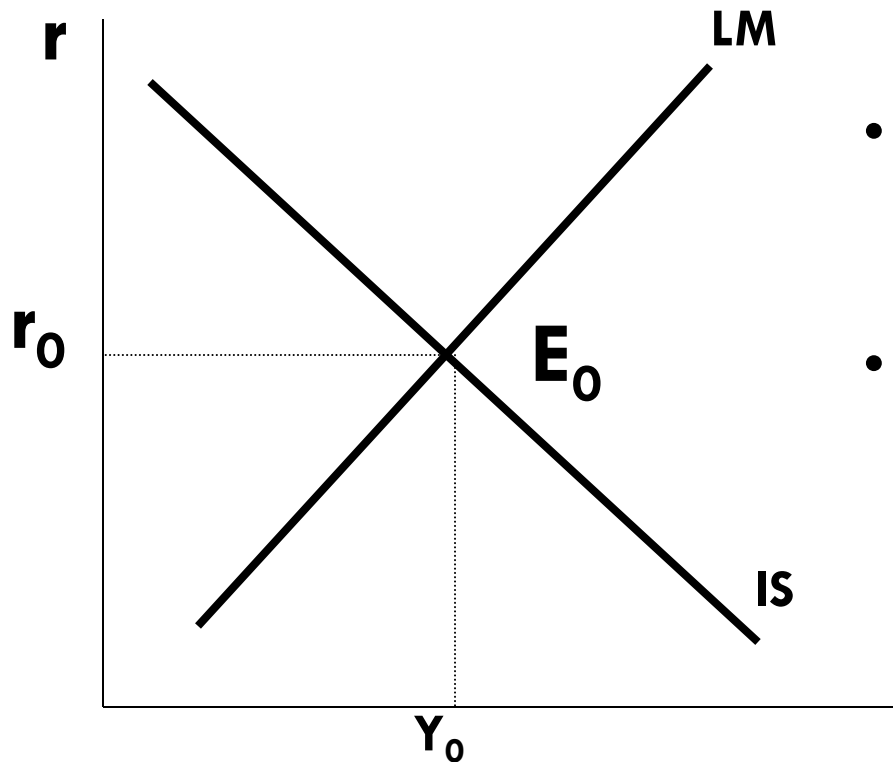


LM CURVE: SHIFT?

- Exogenous variations in demand for money (L_0)
- 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?

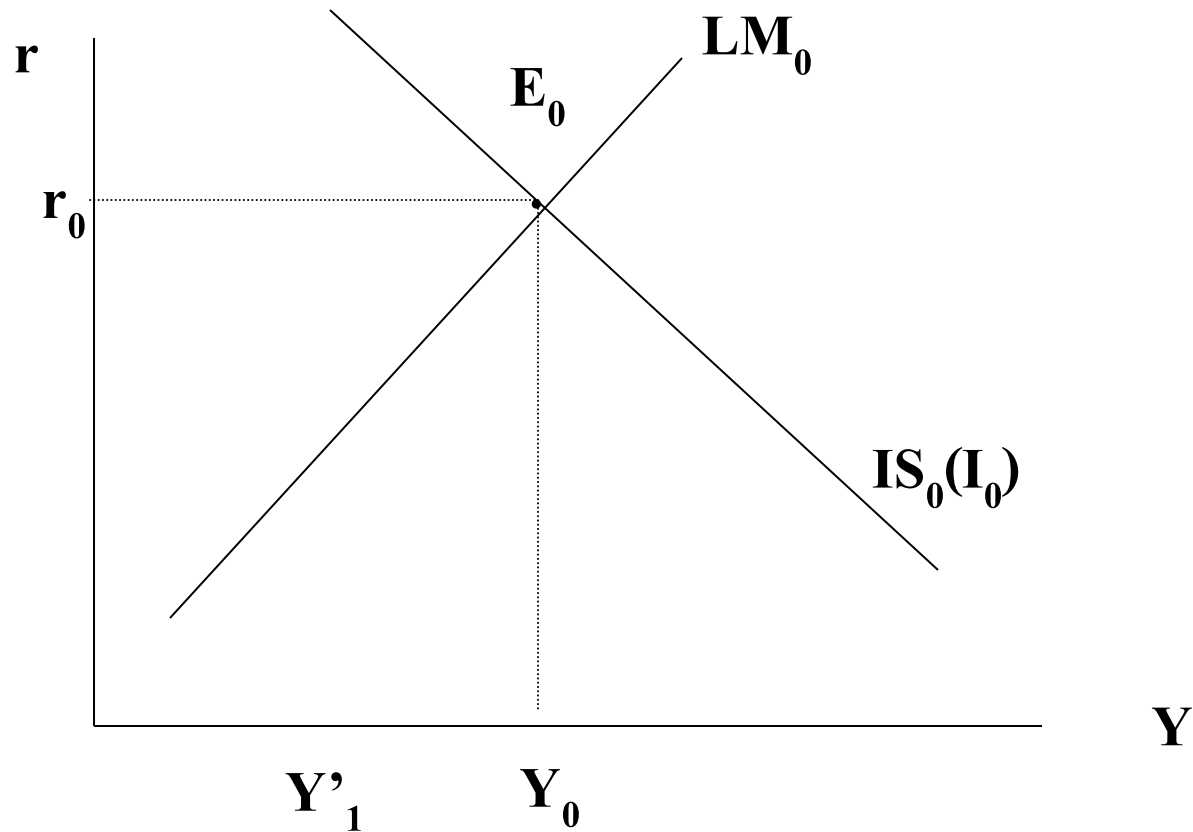
1.3 EQUILIBRIUM ANALYSIS UNDER THE IS-LM MODEL



- 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.
- E_0 will always be the equilibrium if factors that determine IS and LM curve remain the same.

Y

NEGATIVE SHOCKS ON AUTONOMOUS INVESTMENT SPENDING



SHOCKS AND POLICY STABILIZATION

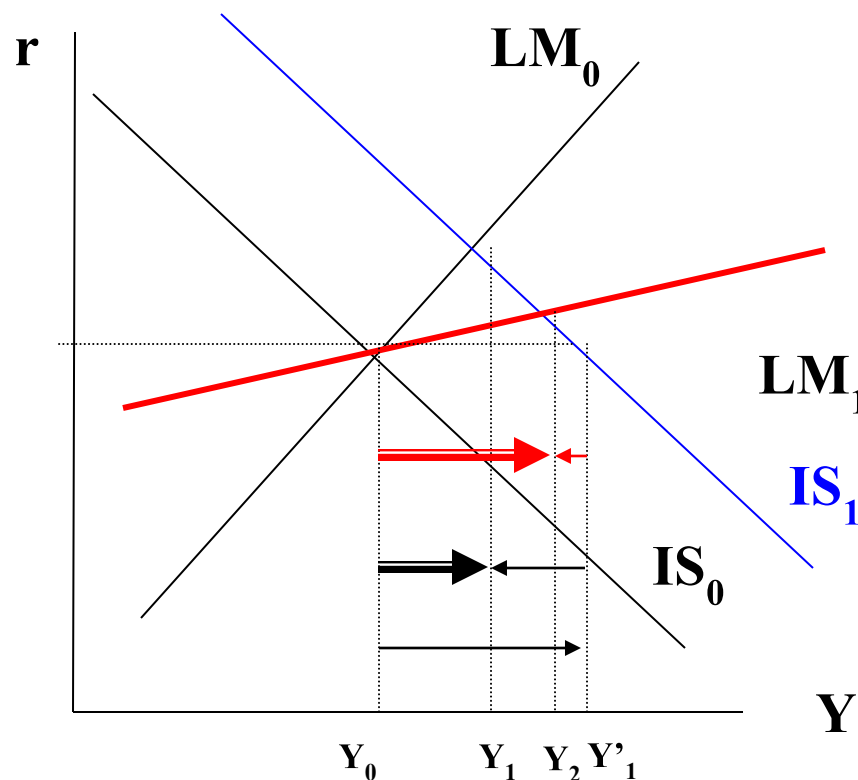
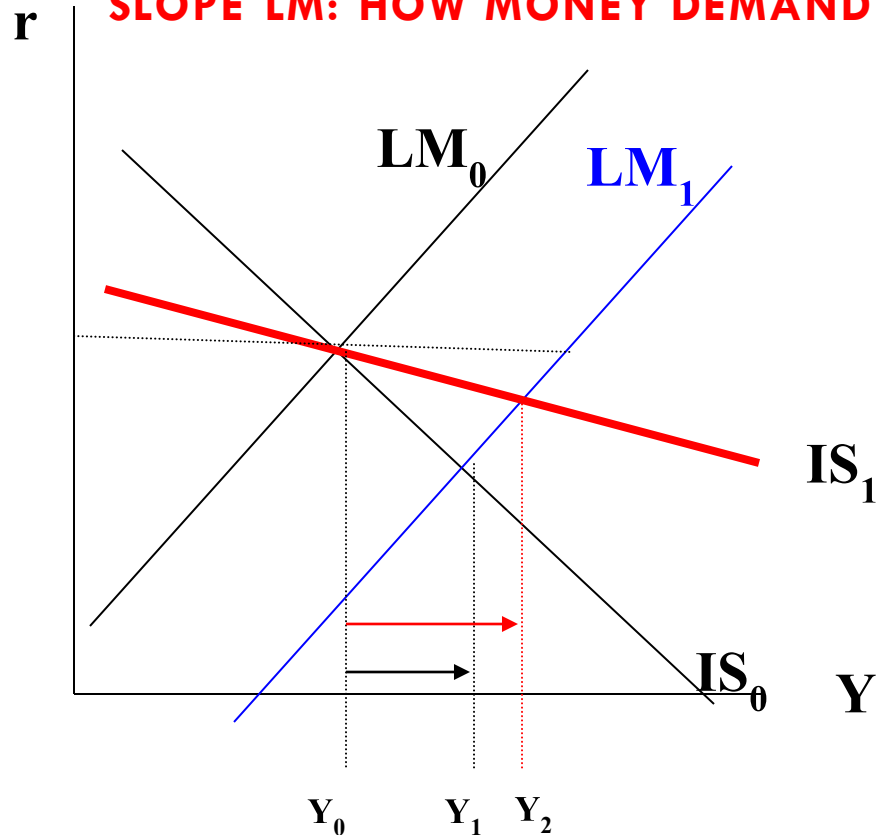
- Shocks randomly hit the economy; causing inefficient fluctuations in output. (too high/too low)
- The problem cannot be waited; they're supposed to be fixed promptly.
- Fiscal and monetary policies are the two important tools that we have.
- Which one is the most appropriate tool to be chosen?
- We pick that one that has the highest effectiveness, measured in terms of the level of output that it can change.

POLICY EFFECTIVENESS IN THE IS-LM MODEL

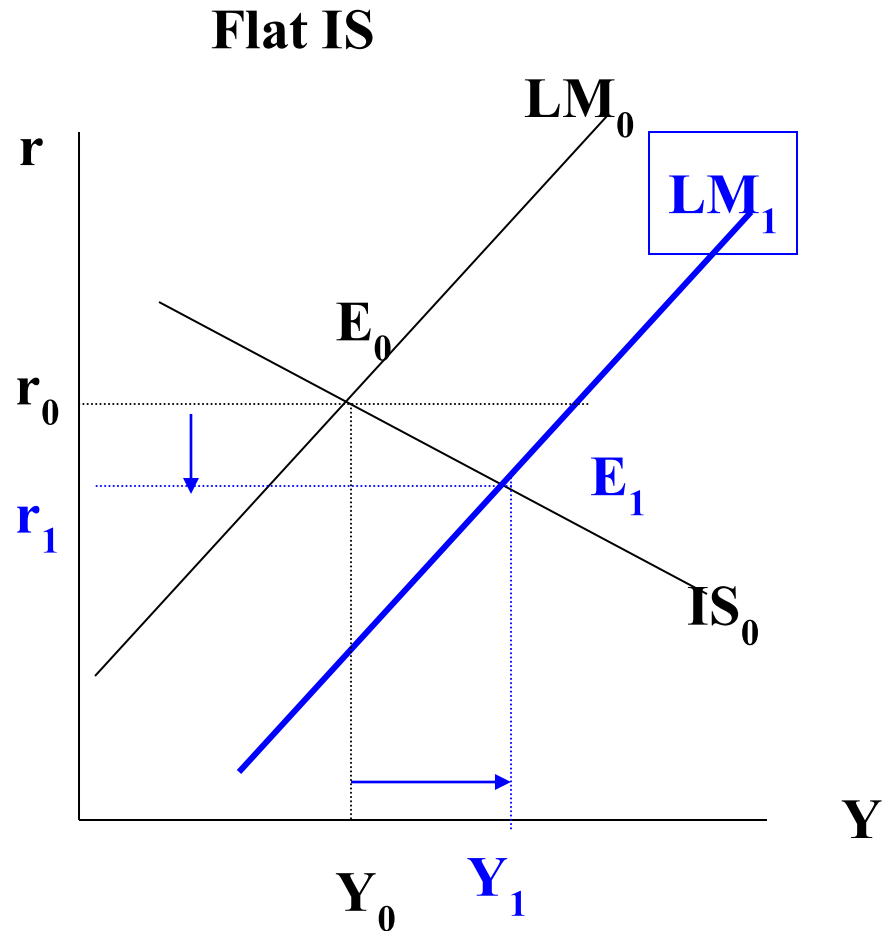
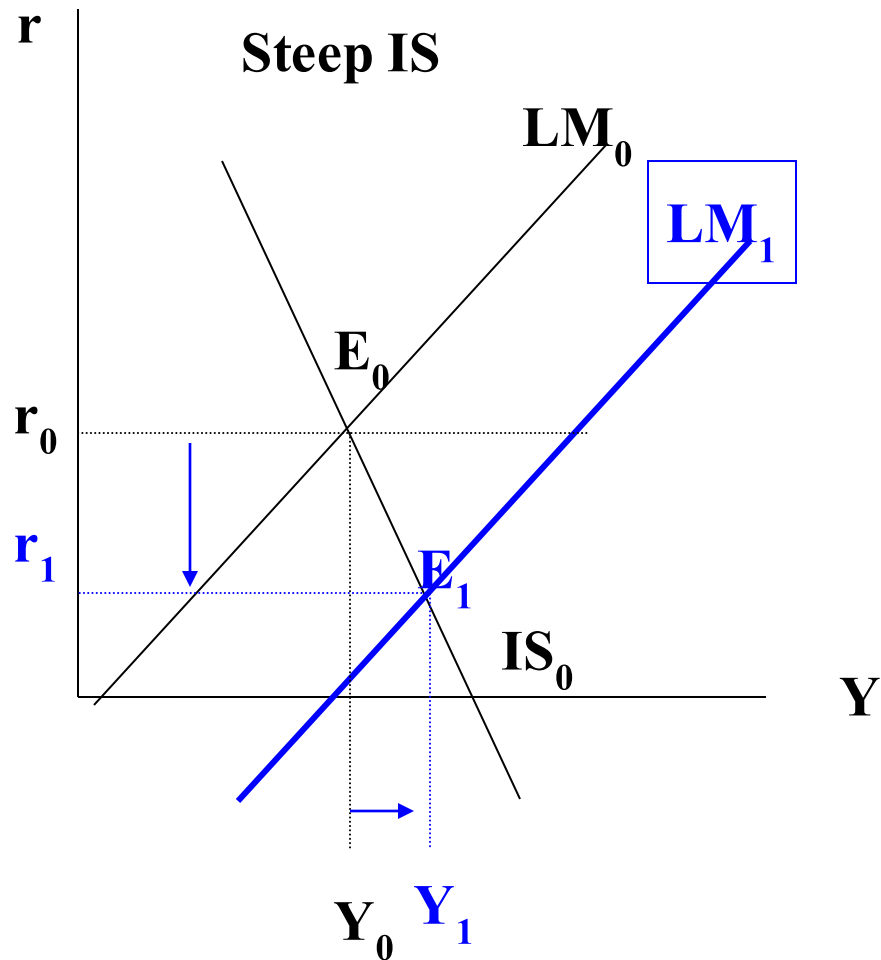
EFFECTIVENESS DEPENDS ON THE SLOPE OF IS/LM CURVE.
SUPPOSE ALL OTHER THINGS THE SAME;

SLOPE IS: HOW SPENDING IS SENSITIVE TO INTEREST RATE

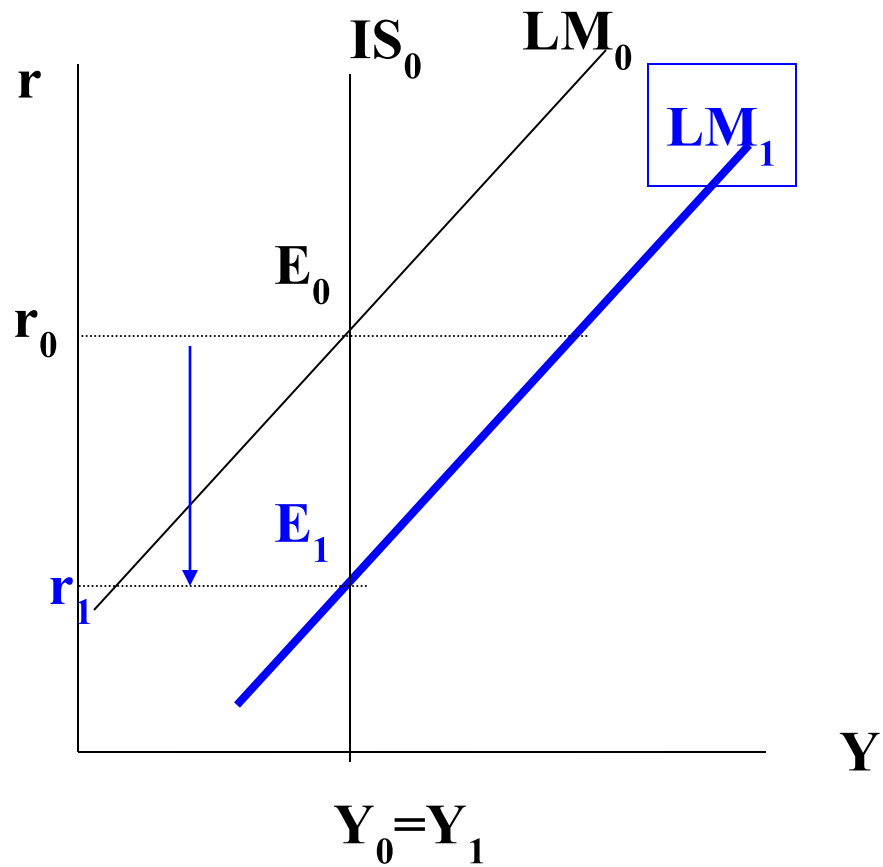
SLOPE LM: HOW MONEY DEMAND IS SENSITIVE TO INTEREST RATE



MONETARY POLICY AND IS CURVE.



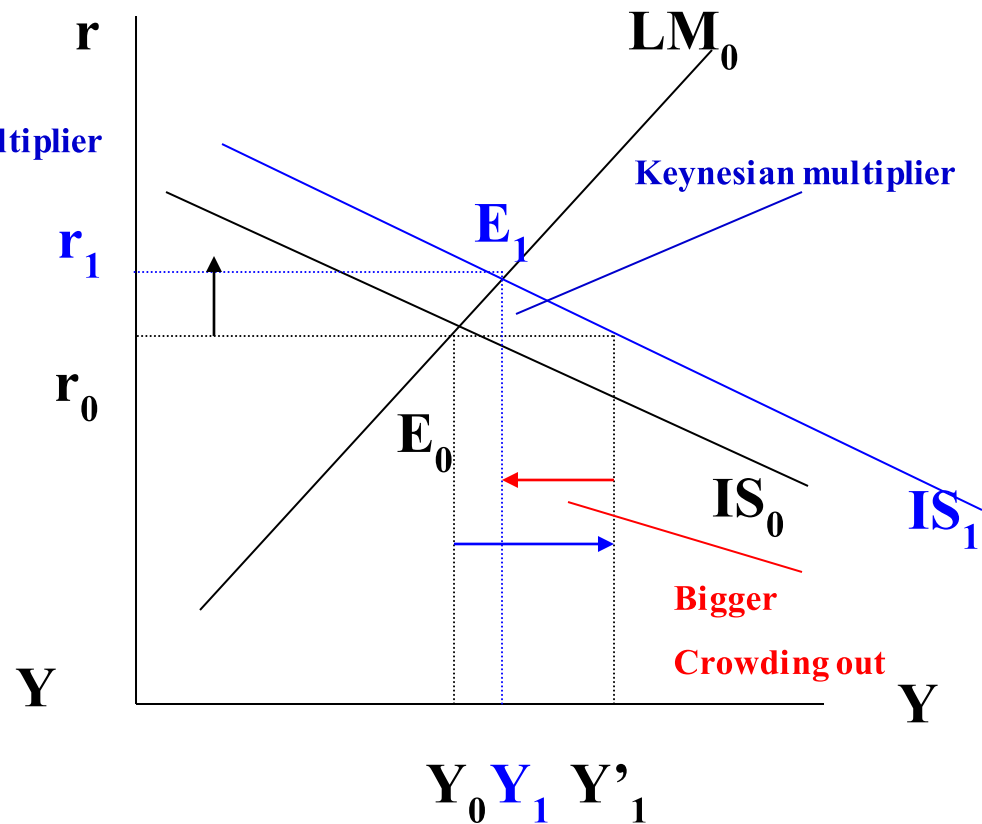
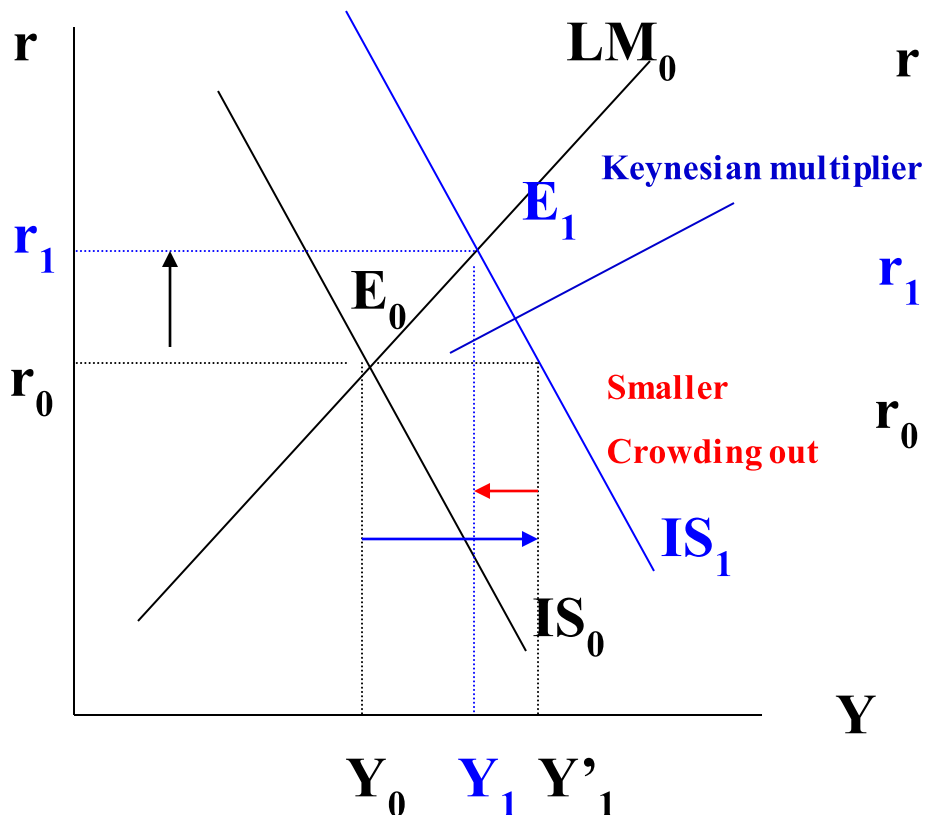
Vertical IS curve: no respond to “r”



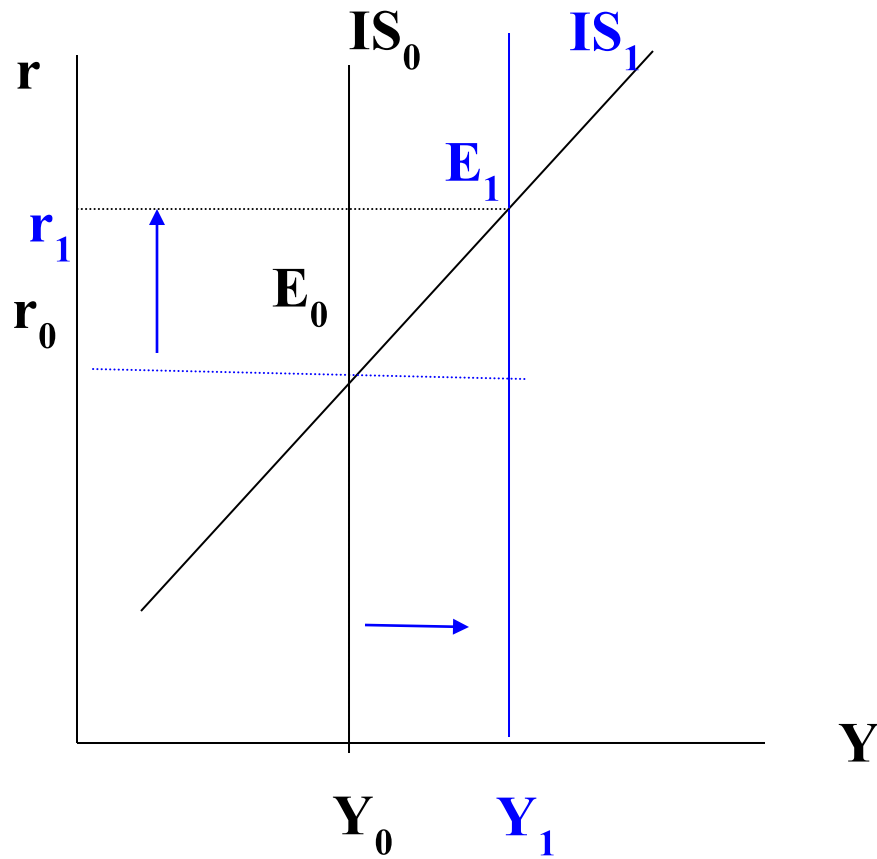
FISCAL POLICY AND THE IS CURVE

Steep IS: less sensitive to “r”

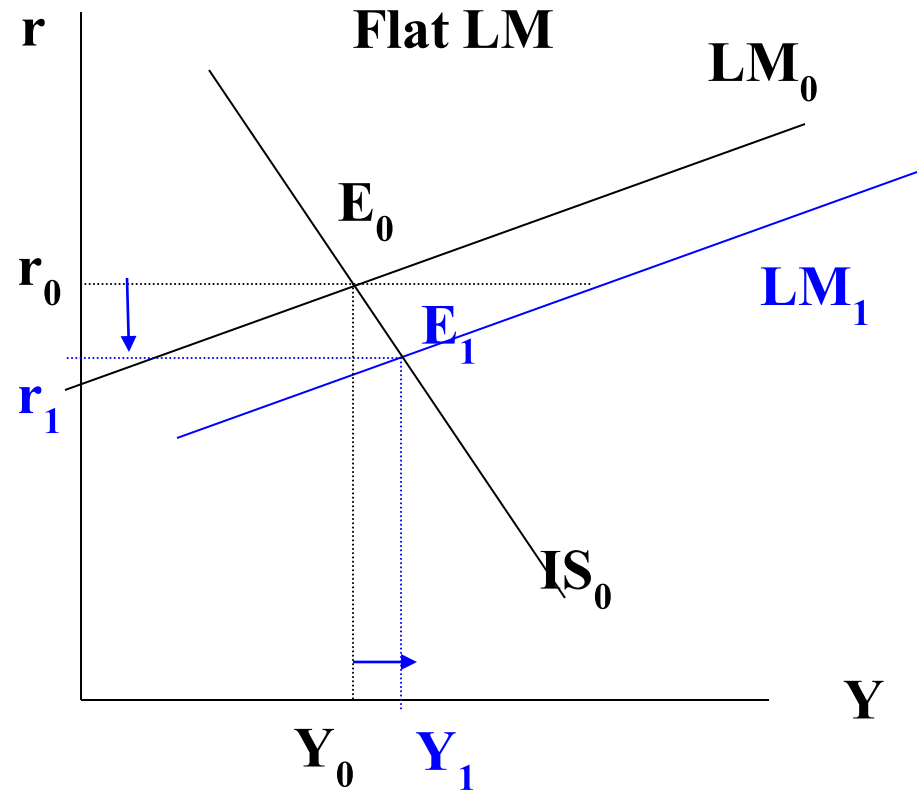
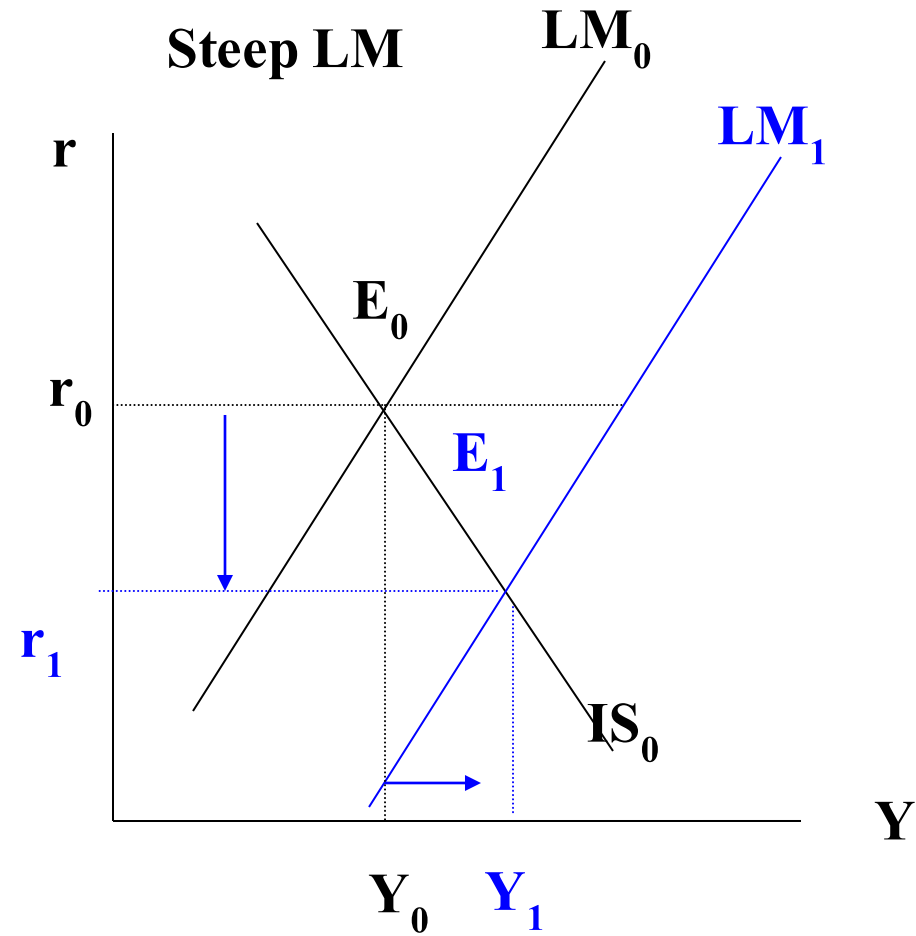
Flat IS: highly sensitive to “r”



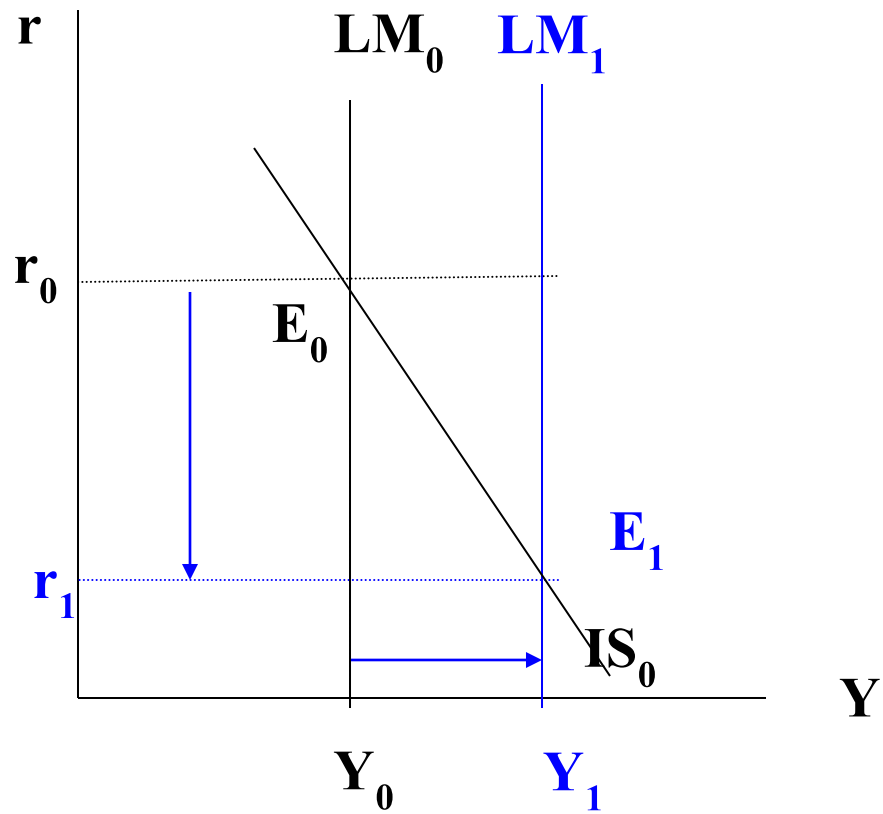
Vertical IS curve



Monetary policy and LM curve

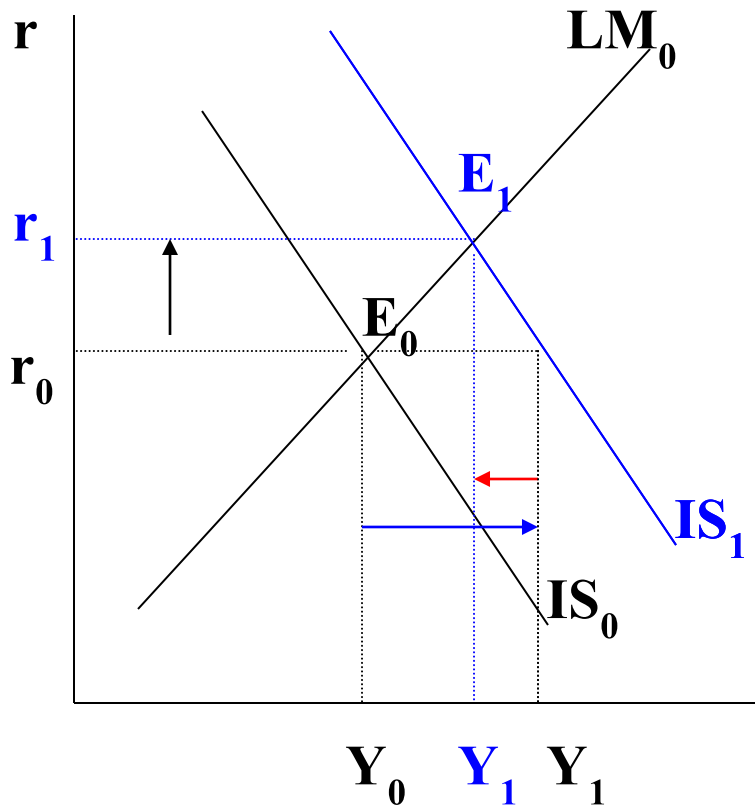


Vertical LM curve

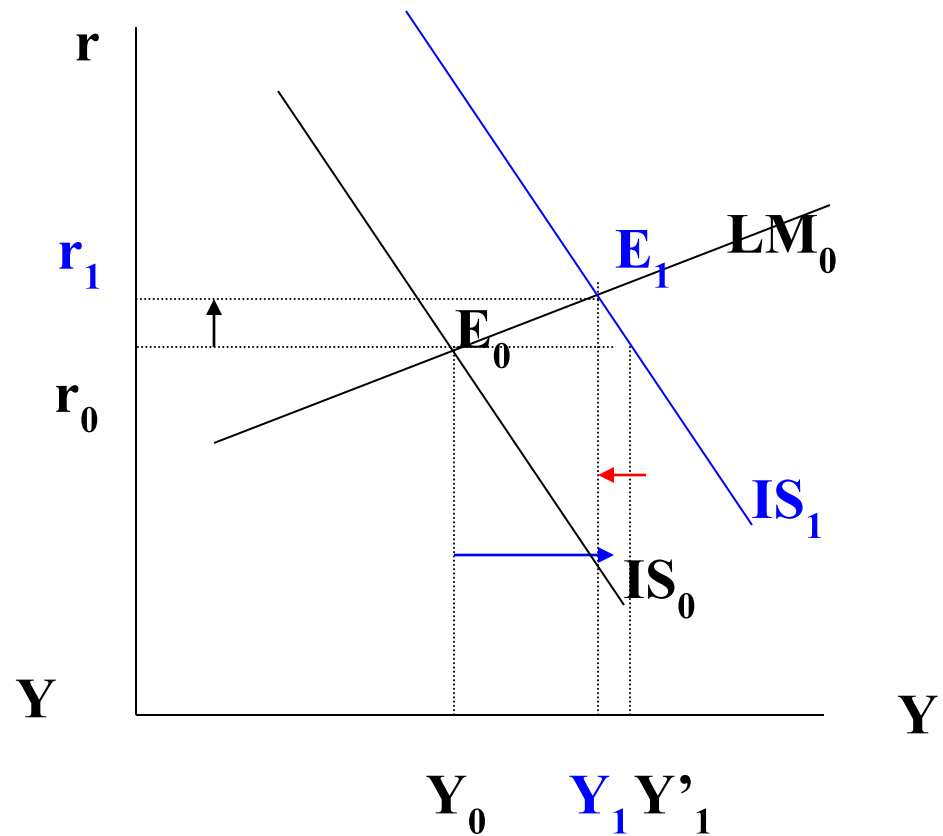


Fiscal policy and the LM curve

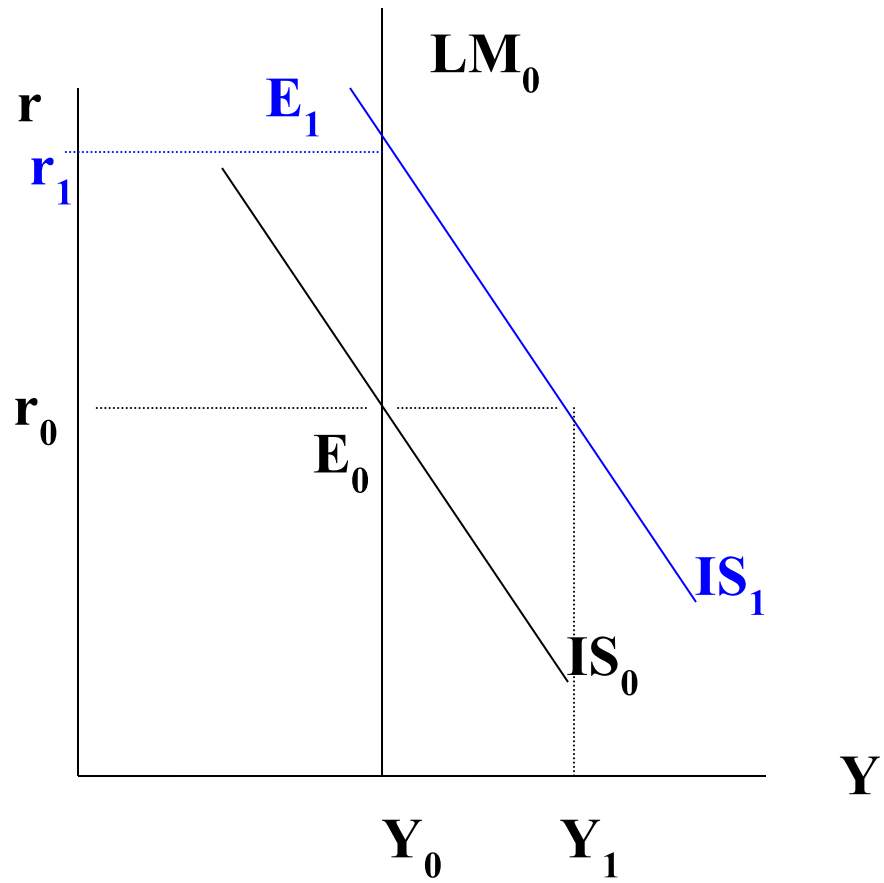
Steep LM



Flat LM



Vertical LM curve



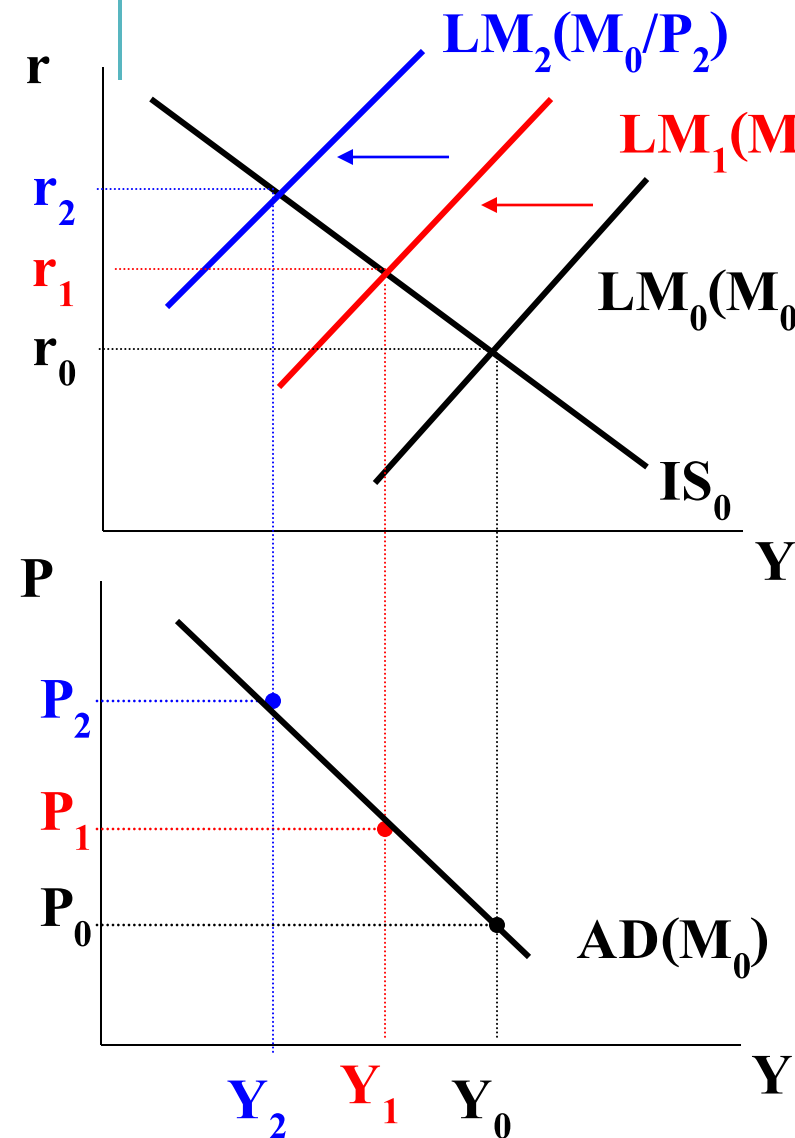
EFFECTIVENESS OF FISCAL AND MONETARY POLICY IN A NUTSHELL...

		Monetary policy	Fiscal policy
Slope IS	Steep	limit	High
	Flat	high	limit
	Vertical	Ineffective	Maximum
Slope LM	Steep	High	Limit
	Flat	Limit	High
	Vertical	Maximum	Ineffective

1.4 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?)

1.4 AGGREGATE DEMAND: DERIVATION



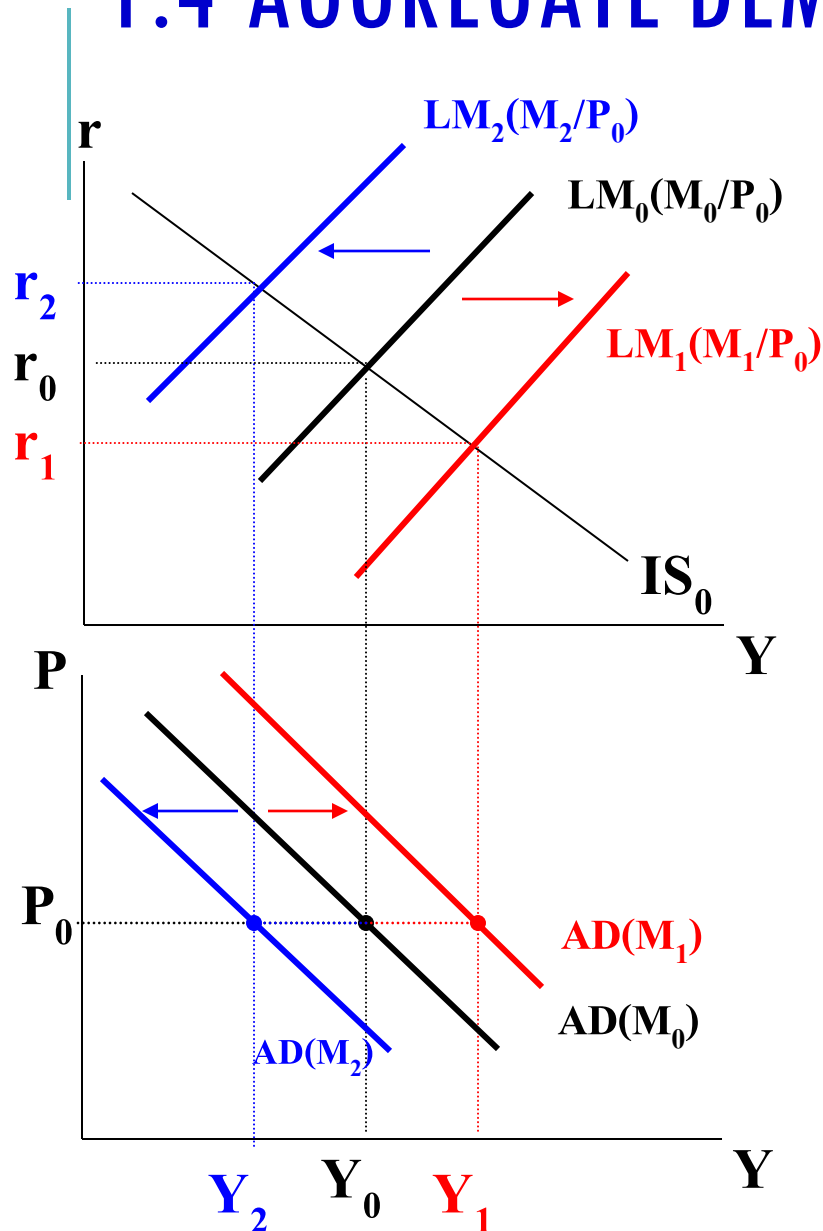
- Suppose that nominal money supply (M_0) is fixed
- $P_2 > P_1 > P_0$
- $(M_0/P_2) < (M_0/P_1) < (M_0/P_0)$
- Rising price causes real money supply to drop; LM curve shifted left

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

1.4 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.

1.4 AGGREGATE DEMAND: CHANGES IN THE AD

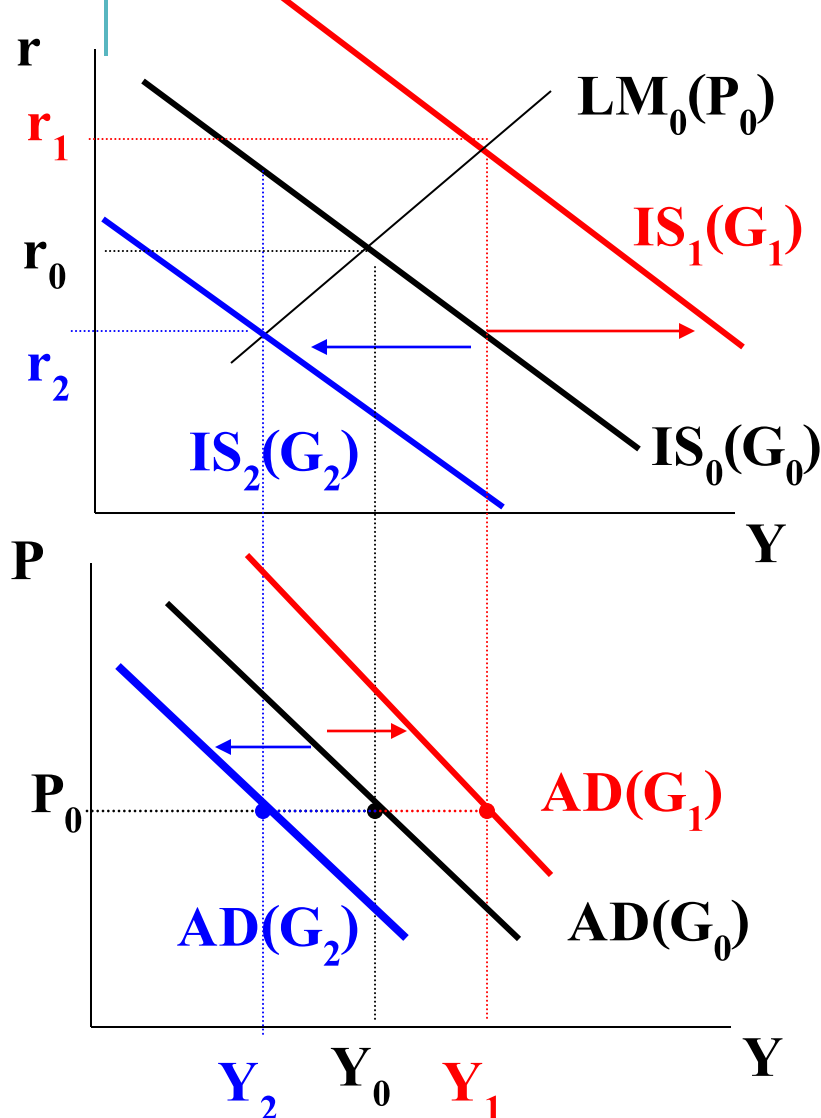


Change in the nominal money supply

- Consider a fixed level of price P_0 .
- Suppose central bank increases money supply; $M_0 \rightarrow M_1$
- Positive money creation will cause the LM curve to shift right; income will rise from Y_0 to Y_1 .
- Y_0 is no longer aggregate quantity demanded at P_0 when money supply is now $M_1 > M_0$; 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.

1.4 AGGREGATE DEMAND: CHANGES IN THE AD CURVE

Change in the level of Government spending



- Consider a fixed level of price, P_0
- Suppose government increases spending from G_0 to G_1 .
- Positive change in government spending will cause the IS curve to shift right; income will rise from Y_0 to Y_1 .
- Y_0 is no longer aggregate quantity demanded at P_0 when government spending is now $G_1 > G_0$; aggregate demand curve then shifts right.
- For any level of prices, lowering G ($G_0 \rightarrow G_2$) would cause IS to shift left, and hence the AD curve.

1.4 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?