

# Lecture 6

## The IS-LM Model





## Lecture 6: The IS-LM Model

**1. The IS Curve**

**2. The LM Curve**

**3. Shifts, Points of The IS-LM Model**

**& Incorporation Into Larger Models**



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*Precautionary Measure* – запобіжний захід

*Transactions Demand for Money* – попит на гроші для здійснення операцій, транзакційний попит



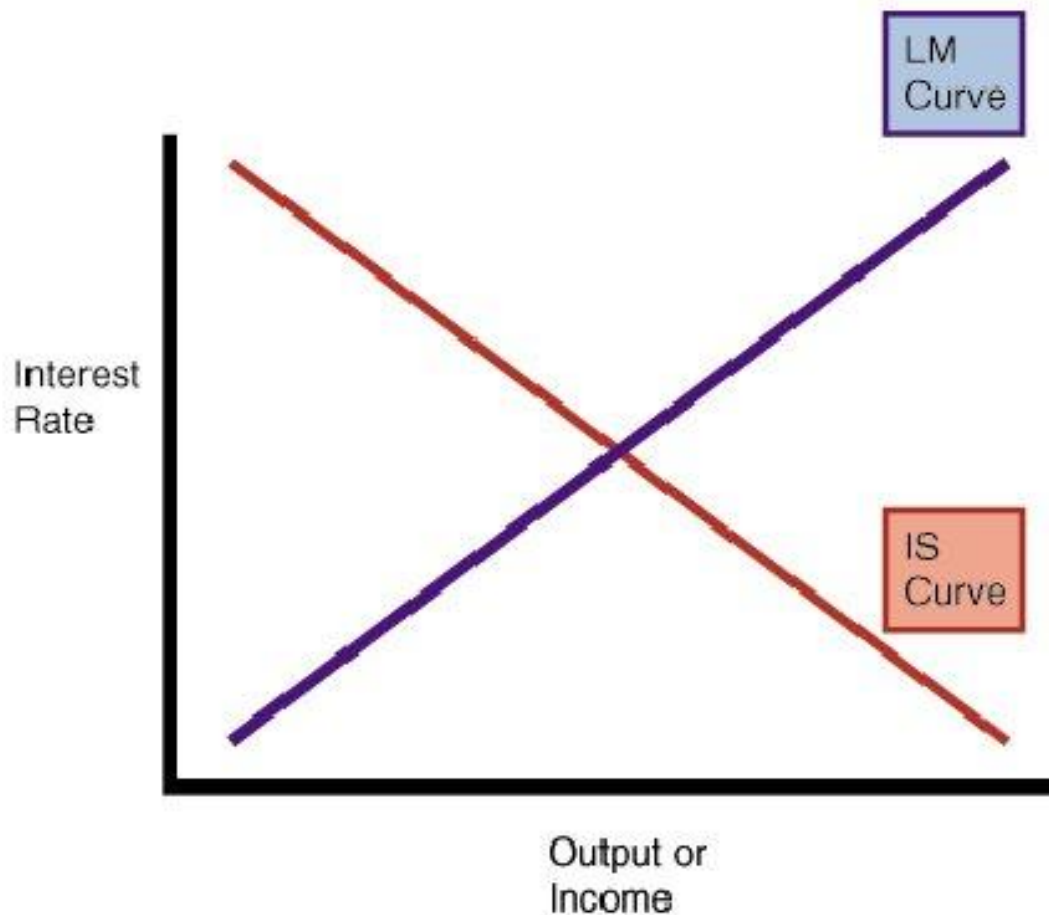
## Lecture 6: The IS-LM Model

**The IS-LM model** is a macroeconomic tool that demonstrates the relationship between **interest rates** and **real output** in the **goods and services market** and **the money market**.

The intersection of the IS and LM curves is the "**General Equilibrium**" where there is simultaneous equilibrium in both markets. IS-LM stands for **Investment Saving — Liquidity preference Money supply**.



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For the **IS curve**, the independent variable is the interest rate and the dependent variable is the level of income (even though the interest rate is plotted vertically).

**In equilibrium**, all spending is desired or planned; there is no unplanned inventory accumulation (or, equivalently, when "leakages" from the circular flow equal "injections").



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The **IS curve** is defined by the equation

$$Y = C(Y - T) + I(r) + G + NX(Y)$$

where **Y** represents income, **C(Y - T)** represents consumer spending as an increasing function of disposable income (income, **Y**, minus taxes, **T**), **I(r)** represents investment as a decreasing function of the real interest rate, **G** represents government spending, and **NX(Y)** represents net exports (exports minus imports) as a decreasing function of income. In this equation, the level of **G** is presumed to be exogenous, meaning that it is taken as a given.

The IS curve describes **equilibrium in the product market** in terms of **r** and **Y**. The IS curve is **downward sloping** because as the interest rate falls, investment increases, thus increasing output.



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For the **LM curve**, the independent variable is income and the dependent variable is the interest rate.

The **LM curve** shows the combinations of interest rates and levels of real income for which the **money market is in equilibrium**. The initials **LM** stand for "Liquidity preference and Money supply equilibrium".



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Two basic elements determine the quantity of cash balances **demanded** (liquidity preference) and therefore the position and slope of the function:

- 1. Transactions demand for money:** this includes both the willingness to hold cash for everyday transactions and a precautionary measure (money demand in case of emergencies). Transactions demand is positively related to real GDP. This is simply explained - as GDP increases, so does spending and therefore transactions.
- 2. Speculative demand for money:** this is the willingness to hold cash instead of securities as an asset for investment purposes. Speculative demand is inversely related to the interest rate.





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The LM curve shows the combinations of interest rates and levels of real income for which **money supply equals money demand** — that is, for which the **money market is in equilibrium**.

The LM curve is **upward sloping** because higher income results in higher demand for money, thus resulting in higher interest rates. The intersection of the IS curve with the LM curve shows **the equilibrium interest rate and price level**.



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The **money supply** is determined by the central bank decisions and willingness of commercial banks to loan money. Mathematically, the LM curve is defined by the equation

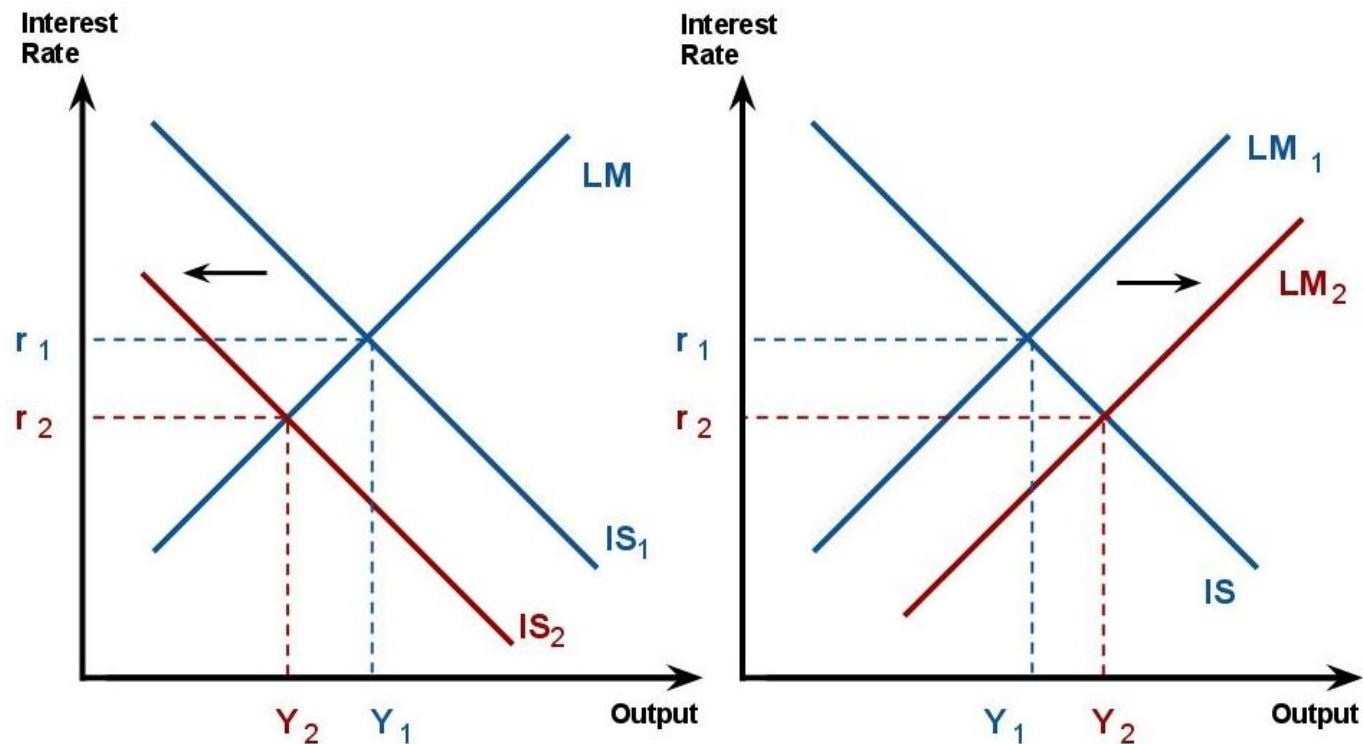
$$\mathbf{M/P = L(i, Y)}$$

where the supply of money is represented as the **real amount M/P** (as opposed to the nominal amount M), with **P** representing the price level, and **L** being the **real demand for money**, which is some function of the interest rate  $i$  and the level  $Y$  of real income.



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The IS curve and the LM curve **shift** in response to economic activities.



**The IS curve shifts outward** as a result of increased government purchases, exogenous increases in investment, decreases in taxes, and exogenous increases in consumption, and vice versa.

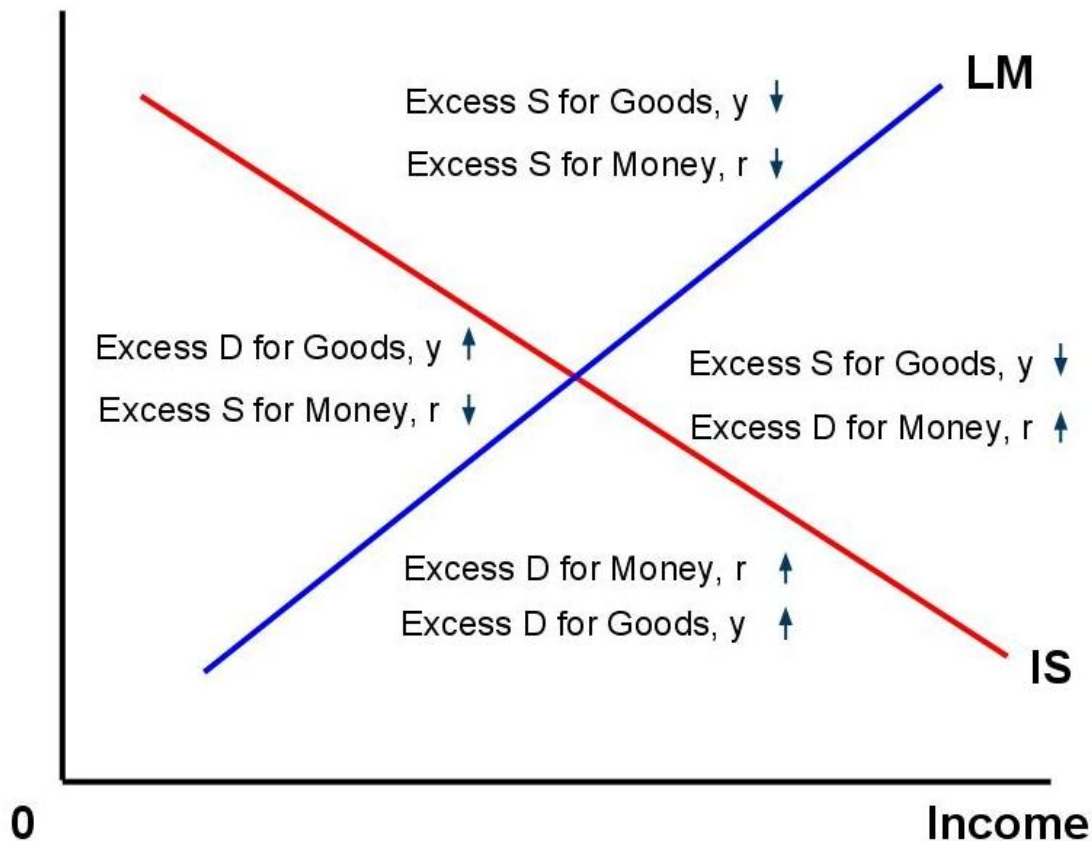
**The LM curve shifts outward** as a result of increases in the money supply and decreases in the price level, and vice versa.



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## Points of IS-LM

Interest Rate



By itself, the **IS-LM model** is used to study the **short run** when **prices are fixed** or sticky and no inflation is taken into consideration.

But in practice the main role of the model is as a **sub-model of larger models** (especially the **Aggregate Demand-Aggregate Supply** model) which allow for a flexible price level.



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In the AD-AS model, each **point on the AD** curve is an **outcome of the IS-LM** model for aggregate demand  $Y$  based on a particular price level.

Starting from one point on the AD curve, at a particular price level and a quantity of aggregate demand implied by the IS-LM model for that price level, if one considers a higher potential price level, in the IS-LM model the real money supply  $M/P$  will be lower and hence the **LM curve** will be **shifted higher**, leading to lower aggregate demand; hence at the higher price level the level of aggregate demand is lower, so the AD curve is negatively sloped.



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Ring-ring!