The IS-LM Model

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Introduction

- John R. Hicks, “Mr. Keynes and the ’Classics’: A Suggested Interpretation” (Econometrica, 1937). Birth of IS-LM model.
- Popularized by Hansen. Aka Hicks-Hansen model.
- Open-economy extension in the 1960s. Aka Mundell-Fleming model, due to the independent developments by these economists.
- IS-LM + Phillips Curve were the main macroeconomic tools after WWII.

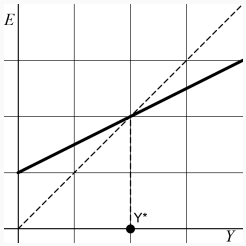
Basic Idea

- Closed economy with spare capacity.
- Goods market: Planned expenditure determines output.
- Money market: Liquidity preference determines the interest rate.
- General equilibrium model of output and interest rate determination.
- Fixed prices.
  - Because of spare capacity, supply can increase with no effect on prices.
  - Real/nominal interest rate?

The Goods Market

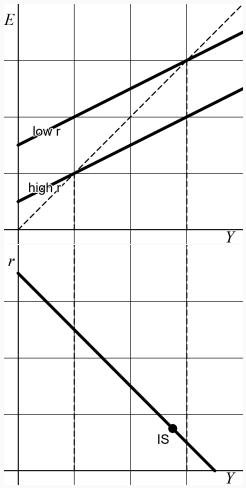
The Goods Market: Output Determination

$$E = C(Y, r) + I(r) + G$$



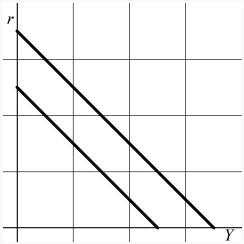
- The equilibrium condition $Y = E$ (or $S = I$) pins down output. Planned expenditure equals output.
- A different interest rate modifies expenditure and output.
- A different government expenditure modifies expenditure and output.

The IS Curve



- **IS Curve**: All combinations of output and the interest rate for which the goods market is in equilibrium.
- Negative slope. The higher the interest rate, the lower the equilibrium level of output. Because the interest rate negatively impacts expenditure.

The IS Curve: Shifts

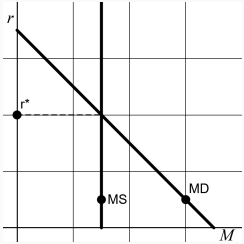


- Changes in r or Y, movement along the same IS curve.
- Changes in government spending G shift the IS curve.
- Changes in autonomous spending also shift the IS curve.

The Money Market

The Money Market: Interest Rate Determination

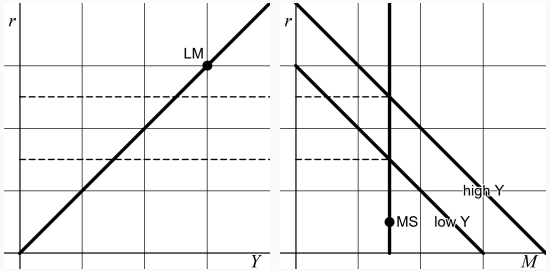
$$\frac{M^{\mathrm{D}}}{P} = L(Y, r)$$



- The equilibrium condition $M^{\mathrm{S}} = M^{\mathrm{D}}$ pins down the interest rate.
- Money supply is controlled by the monetary authority.
- Money demand depends on output (transactionary motive) and the interest rate (speculative motive).

The LM Curve

LM Curve: All combinations of output and the interest rate for which the money market is in equilibrium.



The LM Curve: Shifts

- Positive slope. If output is higher, the interest rate that clears the money market is also higher.
- Changes in Y or r represent a movement along the LM curve.
- Changes in money supply produce a shift of the LM curve.

Interest Rate

Classical View

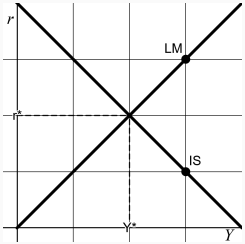
- *r* is the **real** reward for thrift.
- Equilibrates savings and investment across time.
- Explicit time and intertemporal trade-offs.
- Flexible prices.

Keynesian View

- Determined in the money market.
- Equilibrates money supply and liquidity preference.
- No explicit time or intertemporal choice.
- Fixed prices.

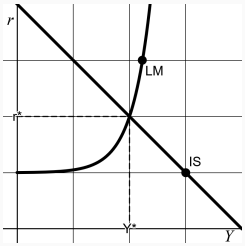
Equilibrium

The ISLM Model



- General equilibrium model of output and interest rate determination.
- Exogenous variables:
  - Behavioral assumptions on $C(Y, r)$ and $I(r)$.
  - Liquidity preference $L(Y, r)$.
  - Government spending and money supply G and M.
- Endogenous variables:
  - Output Y.
  - Interest rate r.

LM Shape

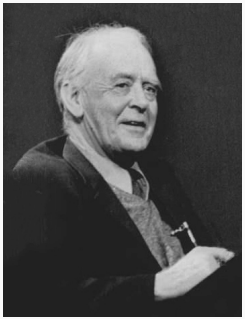


Hicks argues the LM is flat for low levels of output and steep for high levels of output.

It will probably tend to be nearly horizontal on the left, and nearly vertical on the right. This is because there is (1) some minimum below which the rate of interest is unlikely to go, and (though Mr. Keynes does not stress this) there is (2) a maximum to the level of income which can possibly be financed with a given amount of money. If we like we can think of the curve as approaching these limits asymptotically.[a]

[a] From Hicks' Mr. Keynes and the "Classics": A Suggested Interpretation

Keynes vs the “Classics”



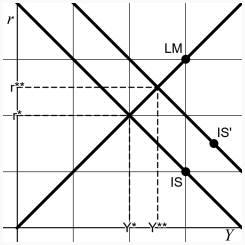
John Hicks

Therefore, if the curve IS lies well to the right (either because of a strong inducement to invest or a strong propensity to consume), P will lie upon that part of the curve which is decidedly upward sloping, and the classical theory will be a good approximation, needing no more than the qualification which it has in fact received at the hands of the later Marshallians. An increase in the inducement to invest will raise the rate of interest, as in the classical theory, but it will also have some subsidiary effect in raising income, and therefore employment as well. But if the point P lies to the left of the LL curve, then the special form of Mr. Keynes' theory becomes valid. A rise in the schedule of the marginal efficiency of capital only increases employment, and does not raise the rate of interest at all. We are completely out of touch with the classical world.[a]

[a] From Hicks' Mr. Keynes and the “Classics”: A Suggested Interpretation

Fiscal and Monetary Policy

Fiscal Policy



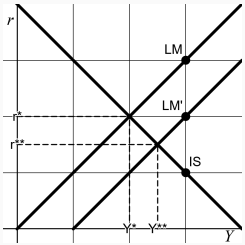
- Increase government spending or reduce taxes.
- Goal: stimulate output in the short run.
- Because money supply is fixed, a higher interest rate is needed to clear the money market.

Crowding Out Effect

Crowding out is the reduction in private investment that occurs when expansionary fiscal policy raises interest rates, partially or fully offsetting the initial increase in aggregate demand.

- With a steeper LM curve, crowding out is more important.
- Keynes vs the “Classics” case.

Monetary Policy



- Increase money supply through an open market operation.
- Goal: stimulate output in the short run.
- The lower interest rate increases expenditure and output.
- By assumption, no impact on prices.

Liquidity Trap

A **liquidity trap** is a situation in which the interest rate is so low that increases in the money supply do not reduce it further, because people are willing to hold any additional money rather than other assets.

- In the horizontal sector of the LM curve.
- Monetary policy becomes ineffective at stimulating output.

Limits of the IS-LM Model

- No intertemporal choice: interest rate is not the reward for saving.
- Static framework.
- No expectations.
- Closed economy.
    - IS-LM-BP model.

Open Economy

Fiscal Policy ↑G with Flexible Exchange Rate

- Direct effect: ↑ domestic expenditure and ↑ output.
- Interest rate effect: ↑r, relative to abroad.
- Exchange rate response: capital inflow and currency appreciates.
- NX channel: ↓ net exports.

Result: Part of the fiscal expansion is crowded out through net exports.

Monetary Policy ↑M with Flexible Exchange Rate

- Direct effect: ↑ money supply and ↓r.
- Exchange rate response: capital outflow and currency depreciates.
- NX channel: ↑ net exports.
- Prices are fixed by assumption.

Result: Monetary policy is effective because depreciation reinforces the expansion.

Fiscal Policy ↑G with Fixed Exchange Rate

- Direct effect: ↑ domestic expenditure and ↑ output.
- Interest rate effect: ↑r, relative to abroad.
- Exchange rate commitment: capital inflow forces the central bank to increase money supply.
- No effect on NX.

Result: fiscal expansion is more effective in this case.

Monetary Policy ↑M with Fixed Exchange Rate

- Direct effect: ↑ money supply and ↓r.
- Exchange rate response: capital outflow and puts pressure on the currency to depreciate.
- Exchange rate commitment: the central bank intervenes to keep the exchange rate fixed.
- The central bank must reverse the monetary expansion.

Result: Monetary policy is ineffective under a fixed exchange rate.