
Agenda
• Equilibrium in the Labor Market: The FE Line.
• Equilibrium in the Goods Market: The IS Curve.
• Equilibrium in the Asset Market: The LM Curve.
• General Equilibrium in the IS-LM Model.

Equilibrium in the Labor Market
• Equilibrium in the labor market leads to employment at its full-employment level ($\bar{N}$) and output at its full-employment level ($\bar{Y}$).
  ➢ The full employment level of output is determined by the full-employment level of employment and the current levels of capital and productivity.

The FE Line
• The FE line is the combinations of output ($Y$) and the real interest rate ($r$) that establish equilibrium in the labor market.
  ➢ Because labor market equilibrium is unaffected by changes in the real interest rate, the FE line is vertical.
The FE Line

• Factors that shift the FE line:
  ➢ The full-employment line shifts right because of:
    • A beneficial supply shock,
    • An increase in labor supply, and/or
    • An increase in the capital stock.

An increase in A

Equilibrium in the Goods Market

• The goods market is in equilibrium when desired investment, \( I_d \), equals desired national saving, \( S_d \).
  ➢ That is, when \( I_d = S_d \).

• If the goods market is not in equilibrium, then the real interest rate adjusts to bring about equilibrium.
The IS Curve

- The IS curve is the combinations of output ($Y$) and the real interest rate ($r$) that establish equilibrium in the goods and services market.
  - Or where $P^l = S^l$.

Deriving the IS Curve

- To derive the IS curve:
  - Start in the $P^l$-$S^l$ diagram and find the level of output ($Y_0$) and the real interest rate ($r_0$) where $P^l = S^l$.
  - Then change the level of output (to $Y_1$) and find the new real interest rate ($r_1$) that re-establishes equilibrium so that $P^l = S^l$ at $Y_1$.
  - Repeat.
The IS Curve

• The slope of the IS curve reflects the real interest rate sensitivity of desired savings ($S^d$), desired consumption ($C^d$) and desired investment ($I^d$).

The IS Curve: The adjustment mechanism

• Suppose we are to the right of the IS curve:
  
  ➢ At any given real interest rate ($r$), desired savings is greater than desired investment and either:
    • $R$ must decrease to reduce $S^d$ and increase $I^d$, and/or
    • $Y$ must decrease to increase $S^d$.
  
  ➢ The adjustment mechanism in the goods market is primarily through changes in output.
The IS Curve

- Factors that shift the IS curve:
  - The IS curve shifts to the right because of:
    - an increase in expected future output,
    - an increase in wealth,
    - an increase in government purchases,

The IS Curve

- Factors that shift the IS curve:
  - The IS curve shifts to the right because of:
    - a decline in taxes,
    - if Ricardian equivalence doesn’t hold,
    - an increase in the expected future marginal product of capital, and/or
    - a decrease in the effective tax rate on capital.

An increase in government purchases

Asset Market Equilibrium

- The asset market is in equilibrium when the real demand for money \((L = M^d/P)\) equals the real supply of money \((M^s = M/P)\).
  - That is, when \(L = M^s\).
- If the asset market is not in equilibrium, then the real interest rate adjusts to bring about equilibrium.
The LM Curve

- The LM curve is the combinations of output ($Y$) and the real interest rate ($r$) that establish equilibrium in the asset market.
  - That is where $L = M^d$.

Deriving the LM Curve

- To derive the LM curve:
  - Start in the $M^d/P – M^s/P$ diagram and find the equilibrium level of output ($Y_0$) and the real interest rate ($r_0$) where $M^d/P = M^s/P$.
  - Then change the level of output (to $Y_1$) and find the new real interest rate ($r_1$) that re-establishes equilibrium so that $M^d/P = M^s/P$ at $Y_1$.
  - Repeat.
The LM Curve

- The slope of the LM curve reflects the both real interest rate sensitivity and the real income sensitivity of the demand for money ($M^d/P$).

The LM Curve: The adjustment mechanism

- Suppose we are to the right of the LM curve.
  - At any given real interest rate ($r$), the real demand for money is greater than the real supply of money.
    - $r$ must increase to reduce $M^d/P$, and/or
    - $Y$ must decrease to reduce $M^d/P$.
  - The adjustment mechanism in the asset market is primarily through changes in the real interest rate.
The **LM Curve**
- Factors that *shift* the **LM** curve:
  - The **LM** curve shifts to the **right** because of:
    - an increase in the nominal money supply,
    - a decrease in the price level,
    - an increase in expected inflation,
    - a decrease in the nominal interest rate on money,

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An increase in the real money supply

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An increase in the real money demand

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The **LM Curve**
- Factors that *shift* the **LM** curve:
  - The **LM** curve shifts to the **right** because of:
    - a decrease in wealth,
    - a decrease in the risk of non-money assets,
    - an increase in the liquidity of non-money assets, and/or
    - an increase in the efficiency of payment technologies.
General Equilibrium in the IS-LM Model

- General equilibrium requires simultaneously:
  - Labor market equilibrium,
  - Goods market equilibrium, and
  - Asset market equilibrium.

- This only occurs where the FE, IS, and LM curves intersect.

An increase in government purchases

- An increase in government purchases shifts the IS curve to the right.
  - This increases $Y$ directly,
  - which also increases $M/P$.
  - At the initial real interest rate ($r_0$), $L > M$, and $r$ begins to rise.
  - A rising $r$ increases $S^d$ and decreases $I^d$,
    - which reduces $Y$ and $M/P$.
  - This process continues until general equilibrium is re-established.
**An increase in government purchases**

- Net result:
  - And increase in both $Y$ and $r$.
  - Composition of spending has changed:
    - Consumption is higher,
    - Investment is lower,
    - Government spending is higher.

**An increase in the real money supply**

- An increase in the real money supply shifts the LM curve to the right.
  - This increases $M/P$ directly.
  - At the initial real interest rate ($r_0$), $M > L$, and $r$ begins to fall.
  - A falling $r$ decreases $S^d$ and increases $I^d$,
  - which increases both $Y$ and $M^d/P$.
  - This process continues until general equilibrium is re-established.

- Net result:
  - And increase in $Y$ and decrease in $r$.

  - Composition of spending has changed:
    - Consumption is higher,
    - Investment is higher,
    - Government spending is the same.
An increase in the real money demand

- An increase in the real money demand shifts the LM curve to the left.
  - This increases \( \frac{Md}{P} \) directly.
  - At the initial real interest rate \( (r_0) \), \( L > M \), and \( r \) begins to rise.
  - A rising \( r \) increases \( Sd \) and decreases \( Id \).
  - which decreases both \( Y \) and \( \frac{Md}{P} \).
  - This process continues until general equilibrium is re-established.

An increase in the real money demand

- Net result:
  - A decrease in \( Y \) and an increase in \( r \).
  - Composition of spending has changed:
    - Consumption is lower,
    - Investment is lower,
    - Government spending is the same.

Key Diagram: The IS-LM model