

Chapter 10 Aggregate Demand I

1 The Goods Market and the *IS* Curve

1.1 The Keynesian Cross

Keynes: The problem during recessions are inadequate spending.

Definition 1.1 Actual expenditure is the amount households, firms, and the government spend on goods and services. It equals the economy's gross domestic product.

Definition 1.2 Planned expenditure is the amount households, firms, and the government would like to spend on goods and services.

Why *actual expenditure* ever differ from *planned expenditure*?

The answer: unplanned inventory investment engaged by firms

Now look at the determinants of the planned expenditure, E :

$$C = C(Y - T)$$

$$I = \bar{I}$$

$$G = \bar{G}$$

$$T = \bar{T}$$

$$E = C(Y - \bar{T}) + \bar{I} + \bar{G}$$

Planned expenditure is a function of income.

In equilibrium, actual expenditure equals planned expenditure.

$$\begin{aligned} \text{Actual Expenditure} &= \text{Planned Expenditure} \\ Y &= E \end{aligned}$$

Keynesian cross

How does the economy get to the equilibrium?

Firms change production levels to counter the unplanned changes in inventories. The changes in the production level influence total income and expenditure, moving the economy toward equilibrium.

The Keynesian cross shows how Y is determined given levels of planned investment I and fiscal policy G and T .

1.2 Fiscal Policy and the Multiplier

Definition 1.3 The ratio $\Delta Y/\Delta G$ is called the government-purchase multiplier. It tells how much income rises in response to a \$1 increase in government expenditure.

An implication of the Keynesian cross: $\Delta Y/\Delta G > 1$

The total effect on income is

$$\begin{aligned}\text{Initial change in government purchases} &= \Delta G \\ \text{First change in consumption} &= MPC \times \Delta G \\ \text{Second change in consumption} &= MPC^2 \times \Delta G \\ \text{Third change in consumption} &= MPC^3 \times \Delta G \\ &\vdots\end{aligned}$$

The government-purchase multiplier is

$$\begin{aligned}\Delta Y/\Delta G &= 1 + MPC + MPC^2 + MPC^3 + \dots \\ &= 1/(1 - MPC)\end{aligned}$$

Definition 1.4 *The ratio $\Delta Y/\Delta T$ is called the tax multiplier. It tells how much income rises in response to a \$1 change in taxes. It is*

$$\begin{aligned}\text{Initial change in income} &= -MPC \times \Delta T \\ \text{First change in consumption} &= -MPC^2 \times \Delta T \\ \text{Second change in consumption} &= -MPC^3 \times \Delta T \\ \text{Third change in consumption} &= -MPC^4 \times \Delta T \\ &\vdots\end{aligned}$$

The government-purchase multiplier is

$$\begin{aligned}\Delta Y/\Delta T &= -(MPC + MPC^2 + MPC^3 + \dots) \\ &= -MPC/(1 - MPC)\end{aligned}$$

Case Study: Kennedy, Keynes and the 1964 tax cut

1.3 The Interest Rate, Investment, and the *IS* Curve

Now relax the assumption that $I = \bar{I}$. Assume

$$I = I(r)$$

The planned investment depends upon the interest rate r .

An increase in the interest rate lowers income.

Summary:

1. The IS curve combines the interaction between r and I expressed by the investment function and the interaction between I and Y demonstrated by the Keynesian cross.
2. The IS curve shows the combination of r and Y that are consistent with equilibrium in the market for goods and services.
3. The IS curve is drawn for a given fiscal policy.
4. The IS curve does not determine either income Y or the interest rate r .

1.4 A Loanable-Funds Interpretation of the *IS* Curve

The national income accounts identity can be written as

$$\begin{aligned} Y - C - G &= I \\ S &= I \end{aligned}$$

Substitute in the consumption function

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

2 The Money Market and the *LM* Curve

2.1 The Theory of Liquidity Preference

The *LM* curve plots the relationship between the interest rate and the level of income that arises in the market for *money balances*.

LM stands for “liquidity” and “money”.

Keynes: The interest rate adjusts to balance the supply and demand for money.

The supply of real money balances:

$$\left(\frac{M}{P}\right)^s = \frac{\bar{M}}{\bar{P}}$$

The demand for real money balances:

$$\left(\frac{M}{P}\right)^d = L(r)$$

Questions:

How does the interest rate get to the equilibrium in the market for money balances?

What are the effects of a fall in M ?

Case Study: Paul Volcker's Monetary tightening

2.2 Income, Money Demand, and the LM Curve

Generalize the money demand equation:

$$\left(\frac{M}{P}\right)^d = L(r, Y)$$

The supply of real money balances:

$$\left(\frac{M}{P}\right)^s = \frac{\bar{M}}{\bar{P}}$$

Higher income leads to a higher interest rate.

Summary

1. The LM curve shows the combinations of the interest rate and the level of income that are consistent with equilibrium in the market for real money balances.
2. The LM curve is drawn for a given supply of real money balances.
3. Decreases in the supply of real money balances shifts the LM curve upward.
4. The LM curve by itself does not determine either income or the interest rate.

2.3 A Quantity-Equation Interpretation of the LM Curve

The quantity equation:

$$MV = PY$$

Holding V fixed, the quantity equation is equivalent to a vertical LM curve.

Relax the assumption of a fixed V :

$$MV(r) = PY$$

3 Conclusion: The Short-Run Equilibrium

The equilibrium is determined by

$$\begin{aligned} Y &= C(Y - T) + I(r) + G \\ \frac{M}{P} &= L(i, Y) \end{aligned}$$

Exogenous variables: G, T, M, P

Endogenous Variables: r, Y

At the intersection, the good market and the money market clear.

The $IS - LM$ model helps explain the position and slope of the aggregate demand curve.