

Learning Objectives

1. Explain why the price of a bond is inversely related to the market interest rate.
2. Describe how the demand for money is related to the interest rate, the price level, and the level of real GDP.
3. Explain how the interest rate is determined in the short run by the interaction of money demand and money supply.
4. Explain the monetary transmission mechanism.
5. Distinguish between the short-run and long-run effects of changes in the money supply.
6. Explain the two methods by which the Bank of Canada can change the level of reserves in the banking system.
7. Explain why the bank rate and the level of reserves cannot be set independently.

1 Understanding Bonds

Present Value and the Interest Rate

Present value is the value now of one or more payments or receipts made in the future; often referred to as the discounted present value.

Consider an asset that pays \$100 in one year's time. If the interest rate is 6% per year, the present value of the asset equals

$$PV = \$100/(1.06) = \$93.34$$

The present value of any asset that yields a given stream of payment over time is negatively related to the interest rate.

A Sequence of Future Payments

Suppose a \$1000 bond pays a coupon of 10% at the end of each of three years. How much is the bond currently worth if the interest rate is 7 percent?

$$PV = \frac{\$100}{1.07} + \frac{\$100}{(1.07)^2} + \frac{\$1100}{(1.07)^3}$$

We can write a more general version of this formula that applies to any interest rate, coupon, initial investment and number of periods.

$$PV = \frac{R_1}{(1+i)} + \frac{R_2}{(1+i)^2} + \dots + \frac{R_T}{(1+i)^T}$$

Where **R** is the coupon paid, **i** is the interest rate, and **T** is the time period.

Present Value and Market Price

The present value of an asset is the highest price someone would be willing to pay now to own the future stream of payments delivered by the asset.

At any price lower than the present value, there would be excess demand for the asset — this would drive up the asset's price.

Therefore, the equilibrium market price of an asset will be the present value of the income stream that the asset produces.

Interest Rates, Market Prices and Bond Yields

The preceding discussion leads us to two important propositions, both of which stress the negative relationship between interest rates and asset prices.

1. The market interest rate is negatively related to the price of a bond.
2. The market interest rate is positively related to the *yield* on any given bond.

Bond Riskiness

An increase in the riskiness of any bond leads to a decline in its expected present value, and thus to a decline in the bond's price.

2 The Demand for Money

Reasons for Holding Money

The amount of money balances that everyone in the economy wishes to hold is called the demand for money.

The opportunity cost of holding any money balance is the interest that could have been earned if the money had been used instead to purchase bonds.

There are three motives for holding money:

- the transactions motive,
- the precautionary motive, and
- the speculative motive.

Transactions balances are money balances held in order to finance payments because payments and receipts are not perfectly synchronized.

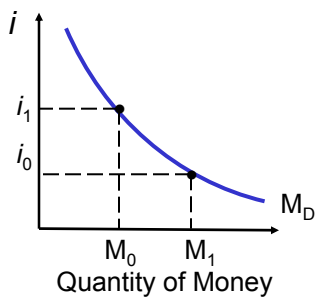
Precautionary balances are money balances held in order to protect against uncertainty of the timing of cash flows.

Speculative balances are money balances held as a hedge against the uncertainty of the prices of financial assets — especially bonds.

The Determinants of Money Demand

We examine three key macroeconomic variables that influence money demand.

1. An increase in the interest rate increases the opportunity cost of holding money and leads to a reduction in the quantity of money demanded.
2. An increase in the level of real GDP increases the volume of transactions and leads to an increase in the quantity of money demanded.
3. An increase in the price level increases the dollar value of a given volume of transactions and leads to an increase in the quantity of money demanded.



The function relating money demanded to the rate of interest is called the money demand curve (M_D).

Changes in the level of real GDP or in the price level will shift the liquidity preference function, while changes in the interest are reflected as movements along the curve.

Money Demand: Summing Up

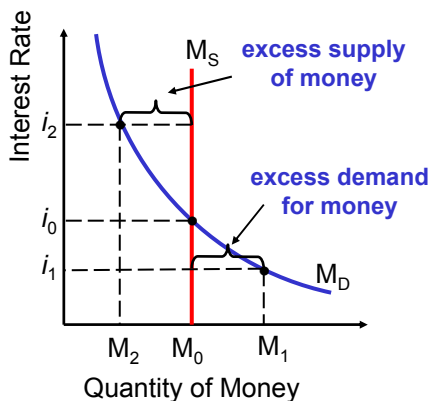
Since the demand for money reflects firms' and households' preference to hold wealth in the form of a more *liquid asset* (money), rather than a less liquid asset (bonds), economists refer to the money demand function as the *liquidity preference function*.

$$M_D = M_D(i, Y, P)$$

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3 Monetary Equilibrium and National Income

Monetary Equilibrium



Monetary equilibrium occurs when the quantity of money demanded equals the quantity of money supplied.

The interest rate falls when there is excess supply of money.

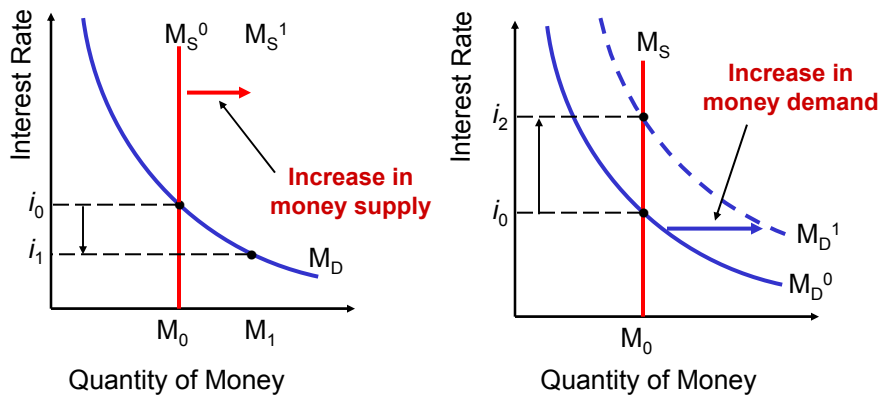
The interest rate rises when there is an excess demand for money.

The Monetary Transmission Mechanism

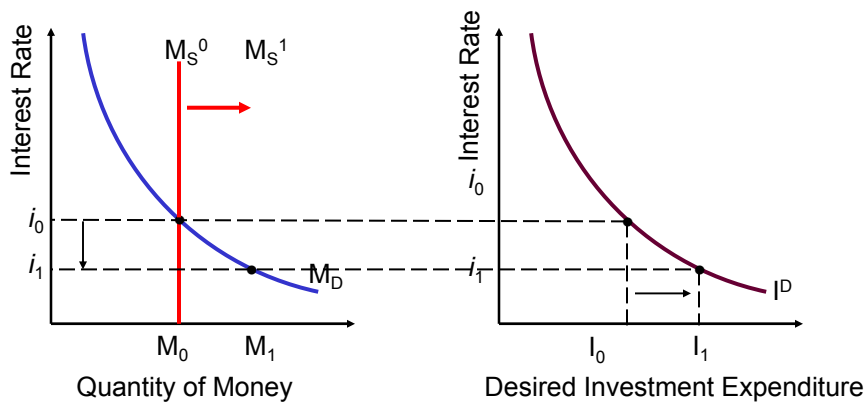
The mechanism by which changes in the supply and demand for money affect aggregate demand is called the transmission mechanism.

The transmission mechanism operates in three stages:

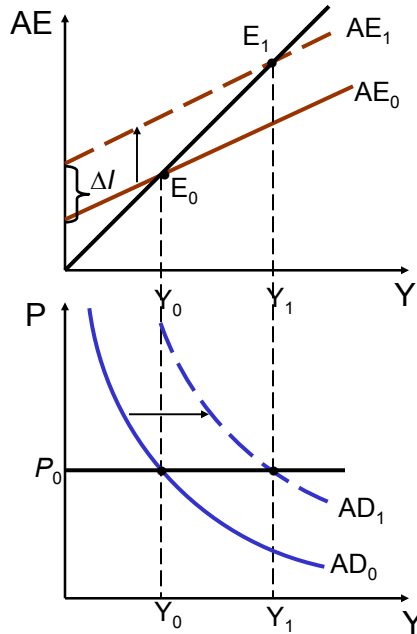
1. A change in money demand or supply changes the equilibrium interest rate.
2. The change in the interest rate leads to a change in desired investment expenditure.
3. The change in desired investment expenditure leads to a change in aggregate demand.



Part 1. Shifts in the supply of money or the demand for money cause the equilibrium interest rate to change.

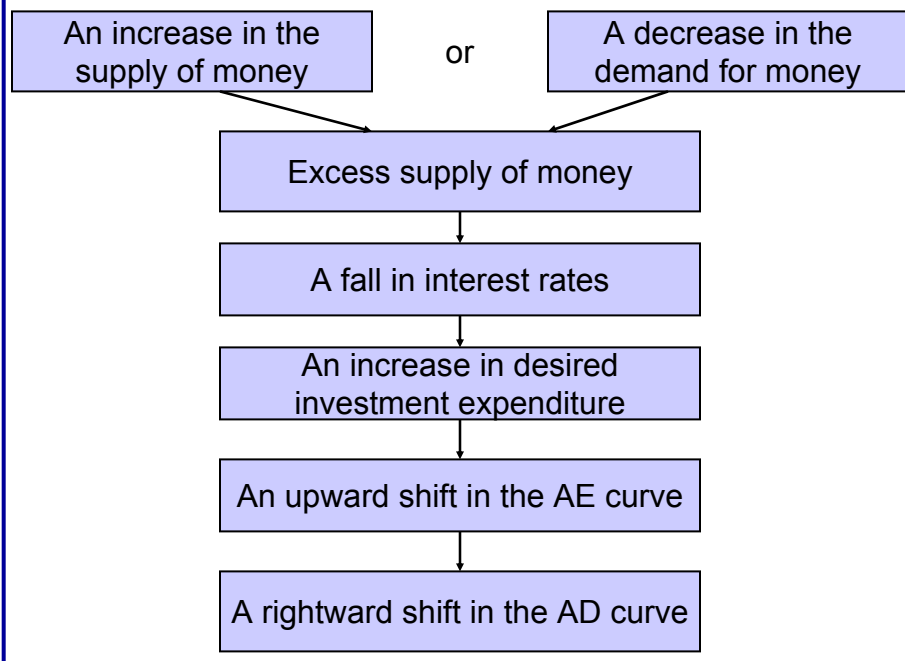


Part 2. Changes in the equilibrium interest rate lead to changes in desired investment expenditure. (In this case, the interest rate changes because of a change in money supply.)



Part 3. Changes in desired investment expenditure lead to a shift in the **AE** function, and therefore a shift in the **AD** curve.

In this case, we illustrate an increase in desired investment and thus a rightward shift in the **AD** curve.

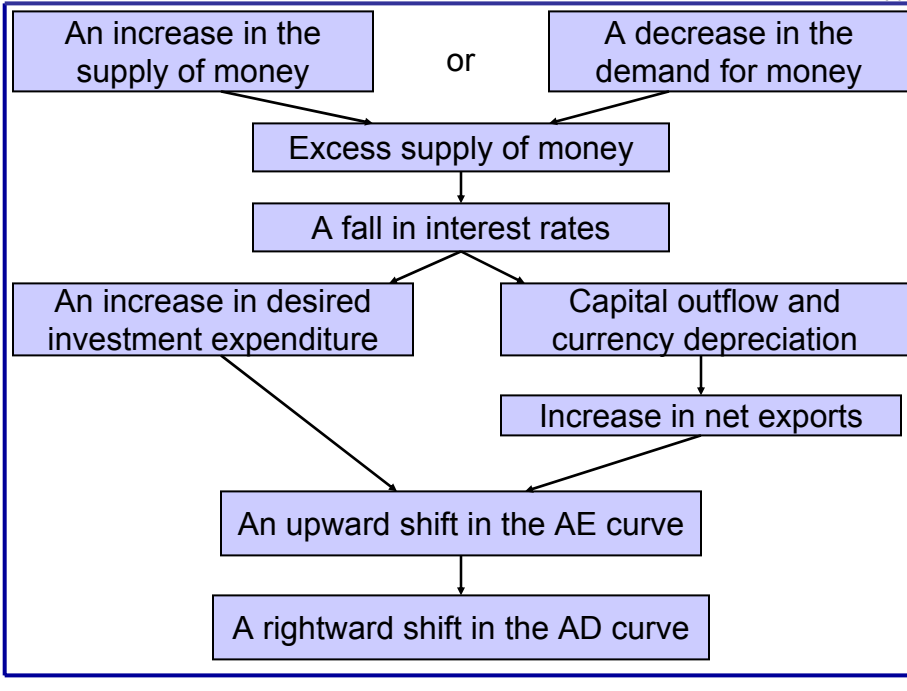


An Open-Economy Modification

In an open economy with mobile financial capital, there is an extra part to the transmission mechanism.

As interest rates change domestically, financial capital flows between countries, putting pressure on the exchange rate.

As the exchange rate changes, exports and imports then change, adding to the effect on aggregate demand.



The Slope of the AD Curve

In Chapter 23 we learned that there were two reasons for the negative slope of the **AD** curve. As **P** changes, there is both a change in wealth and a substitution between domestic and foreign goods.

Now that we understand monetary equilibrium, we can add a third reason — the effect of interest rates.

A rise in **P** raises the nominal demand for money and thus raises the interest rate. This reduces desired investment and thus reduces the equilibrium value of national income. (The stronger this effect is, the flatter is the **AD** curve.)

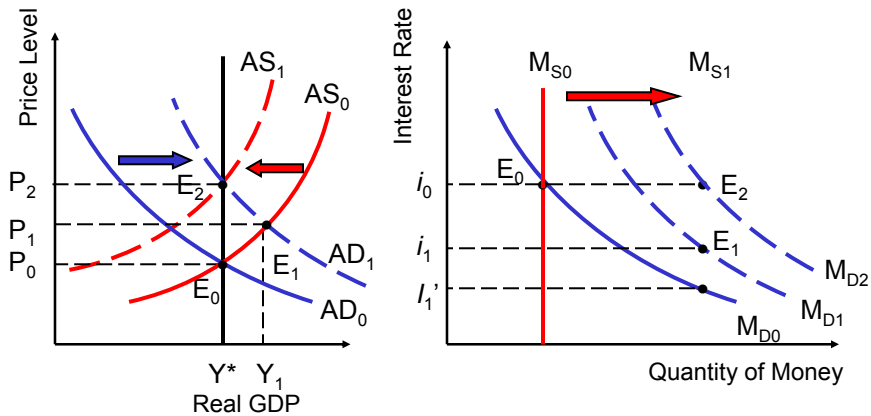
4 The Strength of Monetary Forces

Long-Run Neutrality of Money

A shift in the AD curve will lead to different effects in the short run than in the long run. In the long run, output eventually returns to potential output following a shock.

As a result, although a change in the money supply causes the AD curve to shift, it has no effect on the long-run level of GDP. The belief that changes in the money supply do not have long-run effects is referred to as long-run money neutrality.

The Classical Dichotomy refers to the view that changes in money supply affect only the price level, but do not affect real variables.



Although a change in the money supply causes the **AD** curve to shift, it has no effect on the level of real GDP in the long run. (Nor does it affect any other real variable in the long run.)

Short-Run Non-Neutrality of Money

There is less debate regarding the short-run effects of money. For a given **AS** curve, the short-run effect of a change in the money supply on real GDP and the price level is determined by the extent of the shift of the **AD** curve.

There is debate, however, regarding how effective policies that stimulate aggregate demand are. Monetarists hold the view that monetary policy is a very effective tool for stimulating aggregate demand.

In the 1950s and 1960s, there was an important debate about the strength of monetary forces. The debate centered around the slopes of the M_D and I^P curves.

Keynesians argued that M_D was relatively flat and I^P was relatively steep. As a result, they argued that monetary policy was not very effective.

Monetarists argued that M_D was relatively steep and that I^P was relatively steep. As a result, monetary policy was quite effective.

Most empirical evidence points to a steep M_D curve, but is inconclusive about the slope of the I^P curve.

5 The Bank of Canada and the Money Supply

Open-Market Operations

When the Bank of Canada purchases securities on the open market, the cash reserves of the commercial banks are increased. These banks can then expand deposits, thereby increasing the money supply.

When the Bank of Canada sells securities on the open market, the cash reserves of the commercial banks are decreased. These banks must then contract deposits, thereby decreasing the money supply.

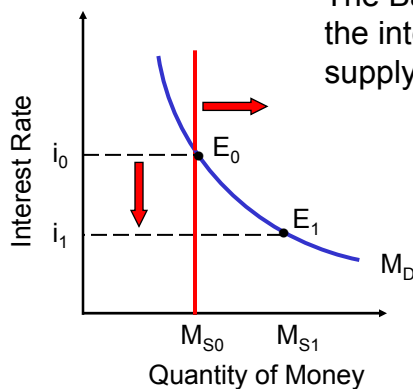
Shifting Government Deposits

The Bank of Canada can also shift government deposits between itself and the chartered banks.

Commercial Bank			
Assets		Liabilities	
Reserves	100,000	Government deposits	100,000
	0		
Bank of Canada			
Assets		Liabilities	
No change		Government deposits	-100,000
		Commercial bank deposits	100,000

A transfer of government deposits from the Bank of Canada to a commercial bank increases bank reserves. Through an expansion of bank lending, this increases the money supply.

Money Supply or the Interest Rate?



The Bank of Canada cannot set the interest rate and the money supply independently.

If the Bank wishes to increase the money supply, it must accept the lower interest rate (and vice versa).

The Bank actually sets the interest rate, and then provides the necessary change in the money supply.

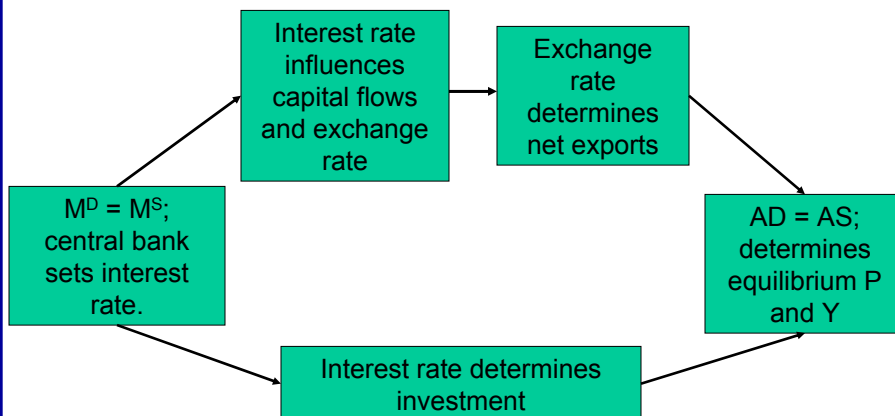
6 Monetary Policy Targets

Policy instruments are the variables that the policy maker controls directly. These can be viewed as the tools available to the policy maker.

Policy targets are the variables that the policy maker seeks to influence.

The Bank of Canada has only one monetary policy instrument: the overnight interest rate.

The Monetary Transmission Mechanism



Monetary policy works through the transmission mechanism; macroeconomic equilibrium then determines the price level and the level of real GDP.