

Equilibrium in the bond market occurs when the amount of bonds that people are willing to buy (demand) equals the amount that people are willing to sell (supply) at a given price.

$B^d = B^s$  defines the equilibrium (or market-clearing) price and interest rate.

When  $B^d > B^s$ , there exists excess demand, so price will rise and interest rate will fall to eliminate the excess.

When  $B^d < B^s$ , there is excess supply, so price will fall and interest rate will rise to eliminate the excess.

These price adjustments occur rapidly in markets like those for bonds, which are traded continuously.

#### Shifts in the demand for bonds:

- **Wealth:** with growing wealth in the economy, the supply of saving rises and the demand curve for bonds accordingly shifts to the right.
- **Expected returns:** higher expected future interest rates (than previously anticipated) lower the expected return on long-term bonds, shifting the demand curve to the left.
- **Expected inflation:** an increase in the expected rate of inflation lowers the expected real return of bonds, leading the demand curve to shift to the left.
- **Risk:** an increase in the riskiness of bonds causes the demand curve to shift to the left
- **Liquidity:** increased liquidity of bonds results in the demand curve shifting to the right

#### Shifts in the supply for bonds:

- **Expected profitability of investment opportunities:** in an expansion, the supply curve shifts to the right
- **Expected inflation:** an increase in expected inflation shifts the supply curve for bonds to the right. (The real interest rate is lower for any given nominal interest rate, boosting desire to borrow and therefore to issue bonds.)
- **Fiscal policy:** increased budget deficits shift the supply curve to the right

Supply and Demand in the Market for Money: The Liquidity Preference Framework

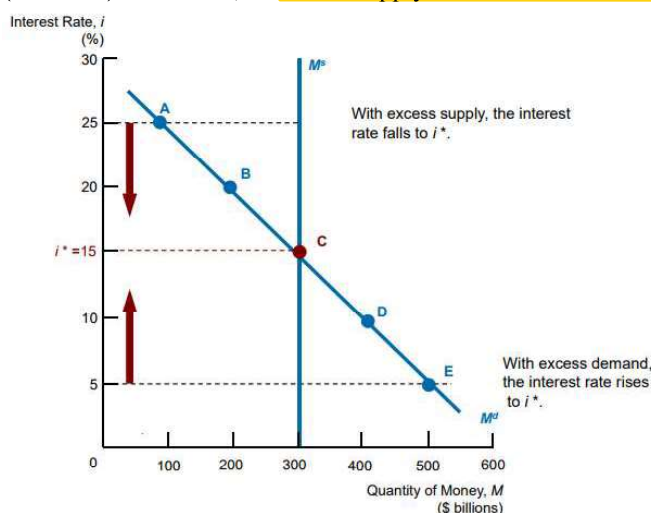
**Keynesian model** that determines the equilibrium interest rate in terms of the supply of and demand of money.

There are two main categories of assets that people use to store their wealth: money and bonds

$$\text{Total wealth in the economy} = B^s + M^s = B^d + M^d$$

$$\therefore B^s - B^d = M^d - M^s$$

Therefore, when market for money is in equilibrium ( $M^d = M^s$ ), the market for bonds is also in equilibrium ( $B^s = B^d$ ). Therefore, an **excess supply of bonds = an excess demand for money**.



#### Shifts in the demand for money:

- **Income effect:** a higher level of income leads the demand for money at each interest rate to increase and the demand curve to shift to the right.
- **Price-Level Effect:** a rise in the price level leads the demand for money at each interest rate to increase

#### Shifts in the supply of money:

- **Assume that the supply of money is controlled by the central bank.**
- An increase in the money supply engineered by the central bank will shift the supply curve for money to the right.

### Money and Interest Rates:

A one-time increase in the money supply initially shifts the supply curve to the right, and therefore the equilibrium interest rate would decrease.

However, the one-time increase in the money supply will eventually lead prices to rise to a permanently higher level. This is because an increase in money supply will lead to an increase in prices, and therefore an increase in the interest rate (the price-level effect). i.e. A rise in M lowers  $i$  only if the rise in M is associated with higher real money balances  $M/P$ .

Consider the reasons people hold money:

- One reason is a demand for money in transactions. An  $x$  percent increase in the price level implies a need for  $x$  percent higher money holdings in transactions. Therefore, an equal rise in  $M$  and  $P$  does not leave households feeling they have any excess money that they can try to dispose of by converting money into bonds. Hence, if  $\Delta M\% = \Delta P\%$ , there is no change for the bond market, and therefore no change on interest rates.
- People will also expect inflation to be higher over the period of the price rise. When the price level stops rising, expectations of inflation will return to zero.
- Expected-inflation effect on interest rates therefore persists only as long as the price level continues to rise. Therefore, an increase in the level of  $M$  lowers  $r$  only temporarily.

Does a Higher Rate of Growth of the Money Supply Lower Interest Rates?

- Multiple effects in operation
- Liquidity preference framework leads to the conclusion that an increase in  $M$  will initially lower interest rates: the liquidity effect. This assumes  $P$  is slow to adjust
- But, inflation expectations will be permanently higher
- Under the classical view, the real interest will return to its starting point over time.
- The Fisher equation implies an eventual rise in the nominal interest rate consistent with this
- All the above analysis was for a change in monetary policy that made  $M$  higher and created an excess supply of money to which the economy had to adjust (in order to get the money market to clear). Interest rates play a role in this adjustment.
- However, for cases in which the demand for money underwent an exogenous shift upward (a positive liquidity-preference shock – also called a positive money demand shock) and monetary policy makers simply expanded  $M$  to meet this shift, we would not see interest rates (or any variables other than  $M$ ) change.

## Chapter 6 – Interest Rates: The Modern Central Banking View

### Why do CBs set $r$ instead of $M$ ?

- Unstable demand for money – this would otherwise result in unacceptable volatility of interest rate
- The ‘ $M$ ’ that the central bank can control (about \$1bn) is tiny compared to the ‘ $M$ ’ that the public uses as money (around \$2tn)
- The monetary aggregates bear little relation to the objectives of monetary policy, which are output and inflation.
- However, the quantity-based view is still relevant for understanding simpler monetary systems, for monetary history, and for the analysis of hyperinflations. The supply-demand analysis can be useful in studying micro-phenomena in financial markets, though not at a macro level.

Macfarlane (2001)

### Why isn't it feasible to set the interest rate at a fixed level?

It is dynamically unstable, if the fixed interest rate is above the equilibrium, deflationary spiral, and vice versa.

Even if  $r$  is initially exactly right, any random disturbance would be destabilising

### Why not leave it to the market?

That would decrease the power of the CB in the markets. Demand for money is unstable.

### Why not adopt another country's interest rate?

Effectively, this would mean a fixed exchange rate. Attempting to do so without a fixed exchange rate would be unstable. With a fixed exchange rate, the system would be (essentially) stable, but sub-optimal: monetary conditions would be driven by conditions in another country

How interest rates affect the economy:



- Cash flow channel: net borrowers face higher costs
- Cost of borrowing: housing
- Cost of borrowing: business investment
- Exchange rate channel: effect on both output and prices
- Indirect effect of spending on output, employment, wages, and prices.
- Summary: *ceteris paribus*, a higher nominal interest rate reduces expected GDP growth and inflation.