Real versus Nominal Interest Rates

If you bought a one-year bond for $1,000 and the bond paid an interest rate of 10 percent, at the end of the year would you be 10 percent wealthier? You will certainly have 10 percent more money than you did a year earlier, but can you buy 10 percent more? If the price level has risen, the answer is that you cannot buy 10 percent more. If the inflation rate were 8 percent, then you could buy only 2 percent more; if the inflation rate were 12 percent, you would be able to buy 2 percent less! The *nominal interest rate* is the rate the bank pays you on your savings or the rate that appears on your bond or car loan. The *real interest rate* represents the change in your purchasing power. The *expected real interest rate* represents the amount you need to receive in real terms to forgo consumption now for consumption in the future.

The *Fisher Equation* shows the relationship between the nominal interest rate, the real interest rate, and the inflation rate as shown below:

$$r = i - \pi$$

where

r = the real interest rate
i = the nominal interest rate
π = the inflation rate.

In the previous example with the 10 percent bond, if the inflation rate were 6 percent, then your real interest rate (the increase in your purchasing power) would be 4 percent (6 = 10 – 4).

Obviously banks and customers do not know what inflation is going to be, so the interest rates on loans, bonds, and so forth are set based on expected inflation. The expected real interest rate is

$$re = i - \pi e$$

where

πe = the expected inflation rate.

The equation can be rewritten as $i = re + \pi e$.

A bank sets the nominal interest rate equal to its expected real interest rate plus the expected inflation rate. However, the real interest rate it actually receives may be different if inflation is not equal to the bank's expected inflation rate.

According to the Fisher Equation, if the Federal Reserve increases the money supply, the price level will increase. The resulting inflation will increase the nominal interest rate, decrease the real interest rate, or some combination of the two. This is known as the *Fisher Effect*. In the short run, increases in the money supply decrease the nominal interest rate and real interest rate. In the long run, an increase in the money supply will result in an increase in the price level and the nominal interest rate.

Table 4-9.1
Real and Nominal Interest Rates

Year	Nominal interest rate (%)	Inflation rate (%)	Real interest rate (%)
1	5.02	1.87	
2	5.07	1.85	
3	4.78	1.14	
4	4.64	1.56	
5	5.82	2.29	
6	3.39	1.95	

1. Table 4-9.1 provides the nominal interest rates and inflation rates for the Years 1–6. Compute the real interest rates and then graph the nominal and real interest rates on Figure 4-9.1.

Figure 4-9.1
Real and Nominal Interest Rates