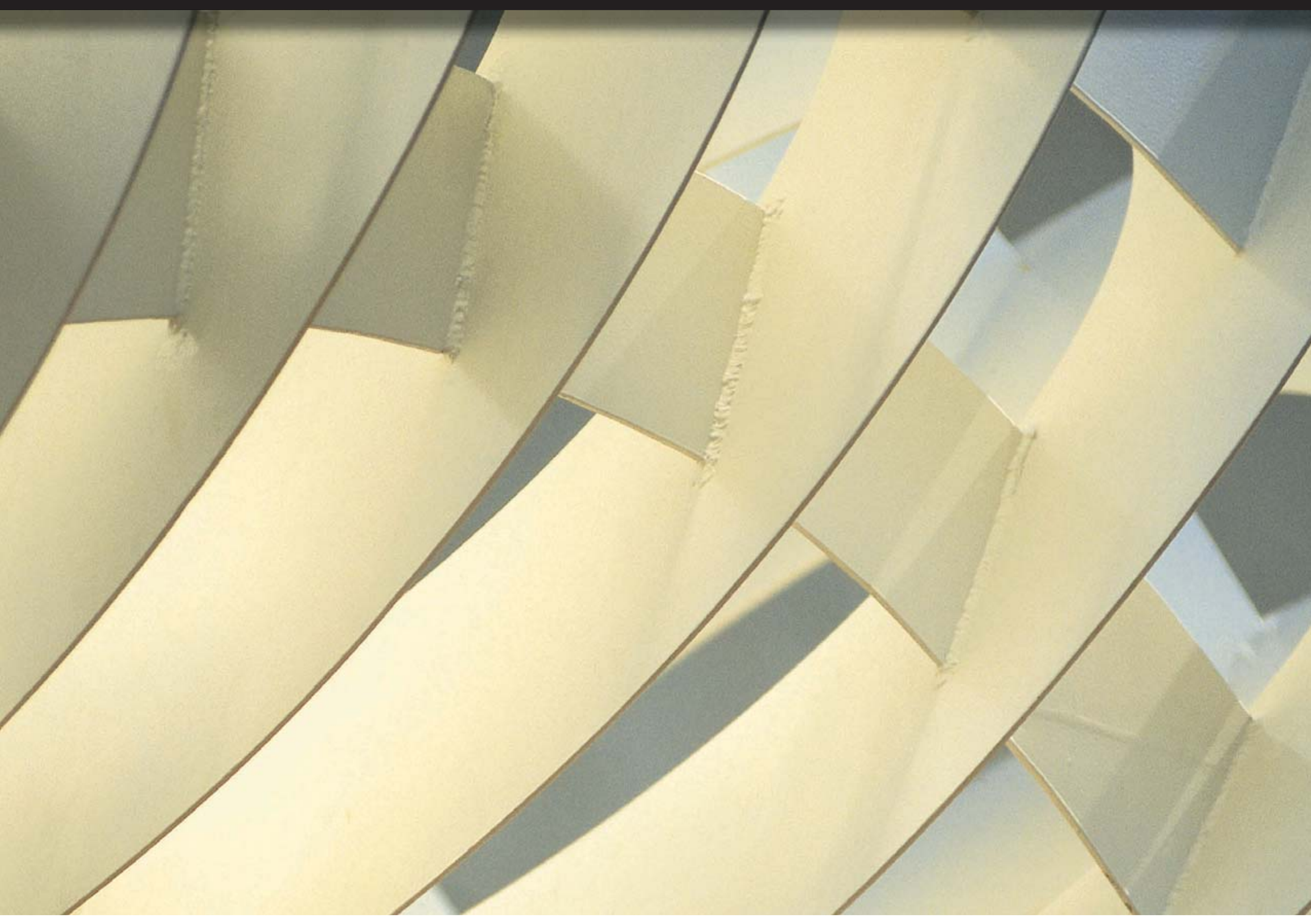
BREALEY MYERS ALLEN

Principles *of* Corporate Finance

TENTH EDITION



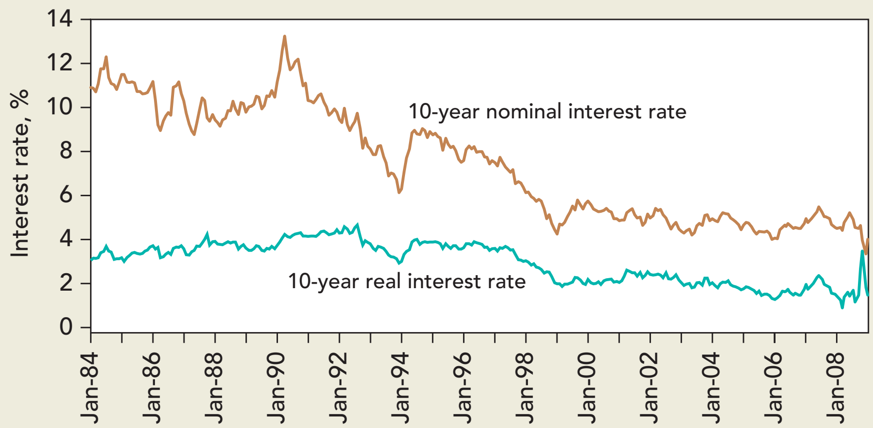


FIGURE 3.8

The green line shows the real yield on long-term indexed bonds issued by the U.K. government. The brown line shows the yield on long-term nominal bonds. Notice that the real yield has been much more stable than the nominal yield.

Figure 3.8 shows that the real yield to maturity on these bonds has fluctuated within a relatively narrow range, while the yield on nominal government bonds (the brown line) has declined dramatically.

Inflation and Nominal Interest Rates

How does the inflation outlook affect the nominal rate of interest? Here is how economist Irving Fisher answered the question. Suppose that consumers are equally happy with 100 apples today or 103 apples in a year's time. In this case the real or "apple" interest rate is 3%. If the price of apples is constant at (say) \$1 each, then we will be equally happy to receive \$100 today or \$103 at the end of the year. That extra \$3 will allow us to buy 3% more apples at the end of the year than we could buy today.

But suppose now that the apple price is expected to increase by 5% to \$1.05 each. In that case we would *not* be happy to give up \$100 today for the promise of \$103 next year. To buy 103 apples in a year's time, we will need to receive 1.05 × \$103 = \$108.15. In other words, the nominal rate of interest must increase by the expected rate of inflation to 8.15%.

This is Fisher's theory: A change in the expected inflation rate causes the same proportionate change in the *nominal* interest rate; it has no effect on the required real interest rate. The formula relating the nominal interest rate and expected inflation is

$$1 + r_{\text{nominal}} = (1 + r_{\text{real}})(1 + i)$$

where r_{real} is the real interest rate that consumers require and i is the expected inflation rate. In our example, the prospect of inflation causes $1 + r_{\text{nominal}}$ to rise to $1.03 \times 1.05 = 1.0815$.

Not all economists would agree with Fisher that the real rate of interest is unaffected by the inflation rate. For example, if changes in prices are associated with changes in the level of industrial activity, then in inflationary conditions I might want more or less than 103 apples in a year's time to compensate me for the loss of 100 today.

We wish we could show you the past behavior of interest rates and *expected* inflation. Instead we have done the next best thing and plotted in Figure 3.9 the return on Treasury bills (short-term government debt) against *actual* inflation for the U.S., U.K., and Germany. Notice that since 1953 the return on Treasury bills has generally been a little above the rate of inflation. Investors in each country earned an average real return of between 1% and 2% during this period.

Look now at the relationship between the rate of inflation and the Treasury bill rate. Figure 3.9 shows that investors have for the most part demanded a higher rate of interest