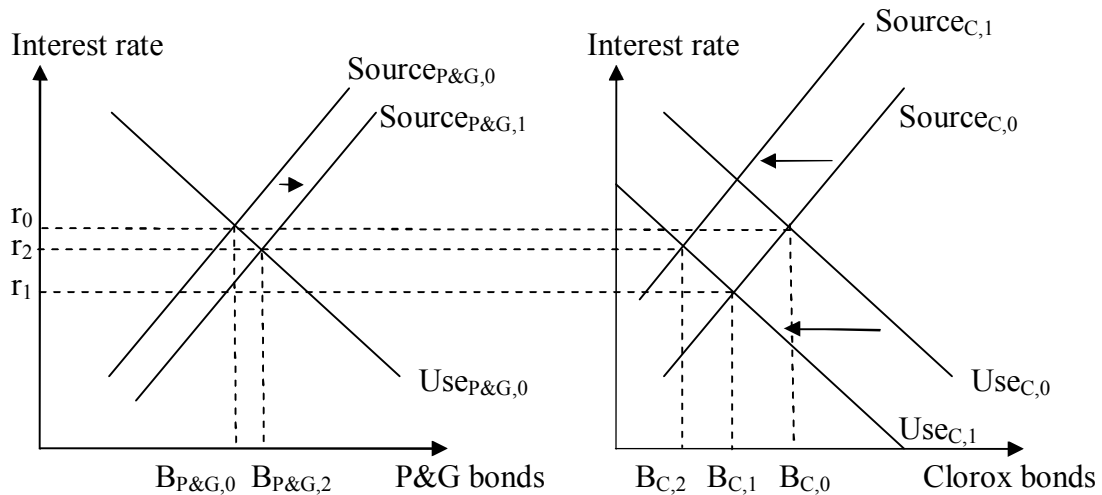


Chapter 7 Selected Answers

Problem 7.1:

- a) When Clorox buy back some of its bonds, fewer bonds are available at each interest rate, so that the borrowing curve in Figure 7.1.1 shifts leftward from $Use_{C,0}$ to $Use_{C,1}$. This will reduce the interest rate for Clorox bonds from r_0 to r_1 . However, at the interest rate r_1 for the Clorox bond and the interest rate r_0 for the P&G bond cannot be the equilibrium since the interest rates in the two markets are not the same. The arbitrageurs see this opportunity and will buy more of P&G bond and sell more of Clorox bond. This results in the rightward shift in the lending curve for P&G bonds (from $Source_{P\&G,0}$ to $Source_{P\&G,1}$) and leftward shift in the lending curve for Clorox bonds (from $Source_{C,0}$ to $Source_{C,1}$). The equilibrium interest rate will be at r_2 somewhere between r_0 and r_1 .

Figure 7.1.1: The Effects of Clorox Repurchasing its Bonds



Problem 7.3:

Table 7.3.1.
Yields and Risk Premia on Treasury and Corporate Bonds

Bond	Mean Yield (percent)	Mean Risk Premium (percent)
10-year Treasury	6.33	
Aaa Corporate	7.14	0.82
Baa Corporate	8.12	1.79

Problem 7.5:

Table 2: *Ex Post* Real Total Returns on Stocks and Bonds, 1970-2010

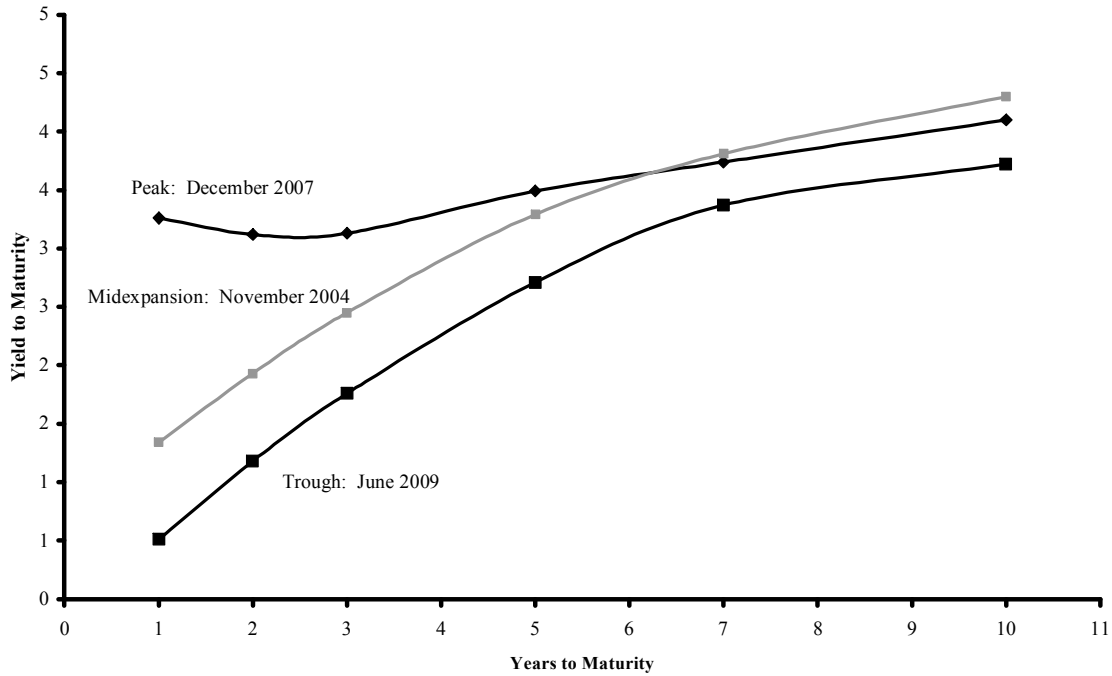
	3-month Treasury Bill	10-year Treasury Bill	S&P 500
Mean (percent)	1.3	4.0	7.2
Standard Deviation (percent)	2.7	10.9	18.5
Coefficient of variation (percent)	209.0	273.0	257.2

Measured by mean real total return, short (3-month) bonds have the smallest return, long bonds (10-year) a much higher return, and stocks (S&P 500) the highest return. The pattern of their variability as measured by standard deviations is exactly inverse with long bonds showing more than three times the variability of short bonds and stocks showing more than six times the variability. The tradeoff reflects the old adage: “no pain, no gain.” However, the coefficient of variation, which puts variability into perspective by measuring it as a percentage of the mean, shows that, once the higher return on stocks is accounted for they are actually a little less variable than long bonds – presumably because they protect better against inflation.

Problem 7.7:

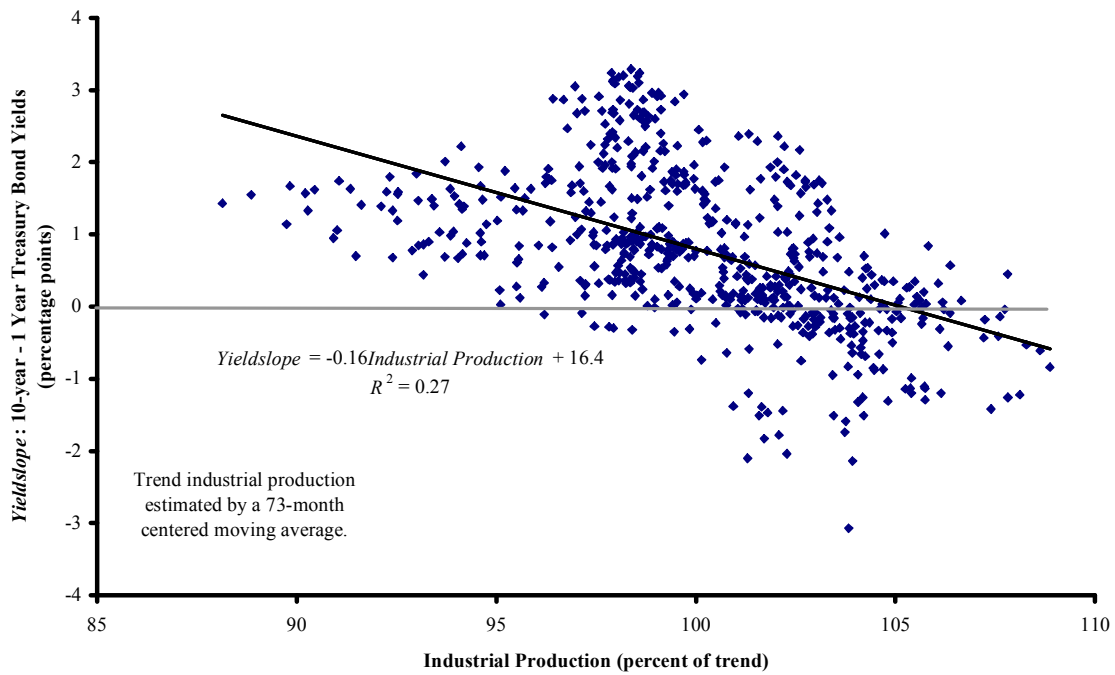
Students may chose different recessions and different mid-expansion points. Here is one reasonable choice: Figure 7.7.1 shows the yield curve for the peak and trough of the recession 2007:12-2009:06 and for a month in the middle of the previous expansion (2004:11).

Figure 7.7.1. The Yield Curve and the Business Cycle



Problem 7.9:

Figure 7.9.1. The Yield Curve and the Business Cycle



Problem 7.11:

Table 7.11.1. Estimated Term Premia on Treasury Bonds, 1977:01-2010:07

	1 year (percent)	2 year (percent)	3 year (percent)	5 year (percent)	7 year (percent)	10 year (percent)
Term premium (percent)	0.60	0.92	1.09	1.38	1.60	1.73

Term premia rise monotonically with maturity.

Problem 7.12:

Figure 7.12.1.
Inflation and 1-year Treasury Bond Rates: 1954-2010

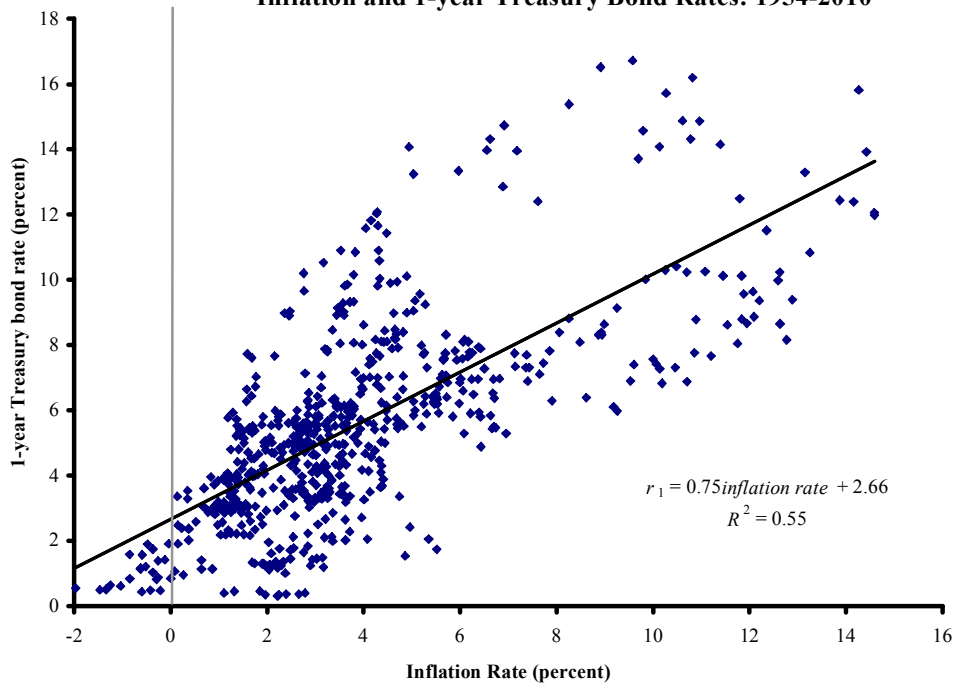
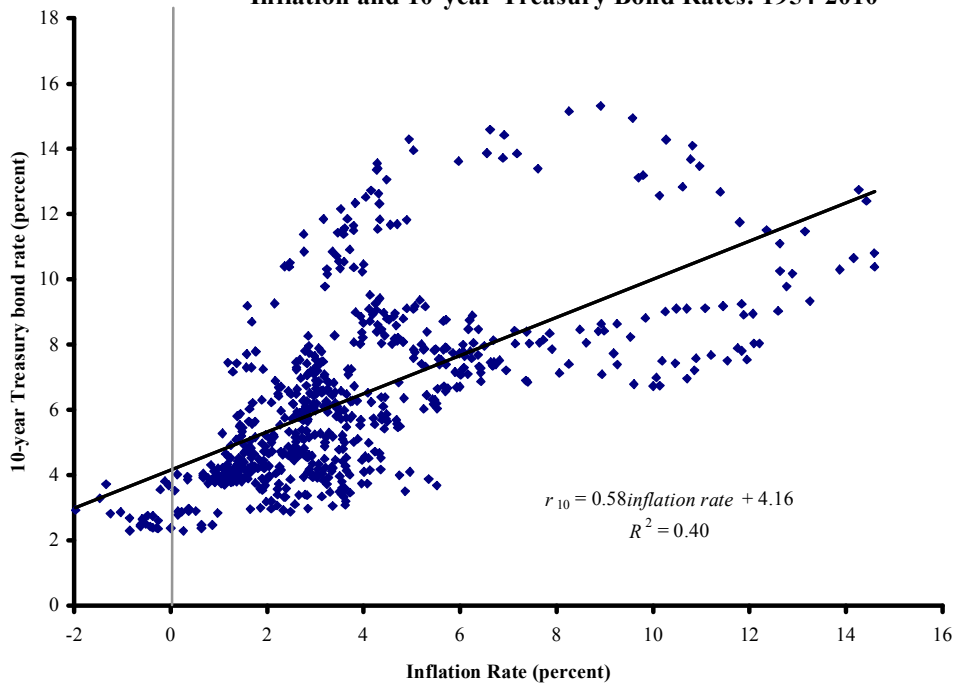


Figure 7.12.2.
Inflation and 10-year Treasury Bond Rates: 1954-2010

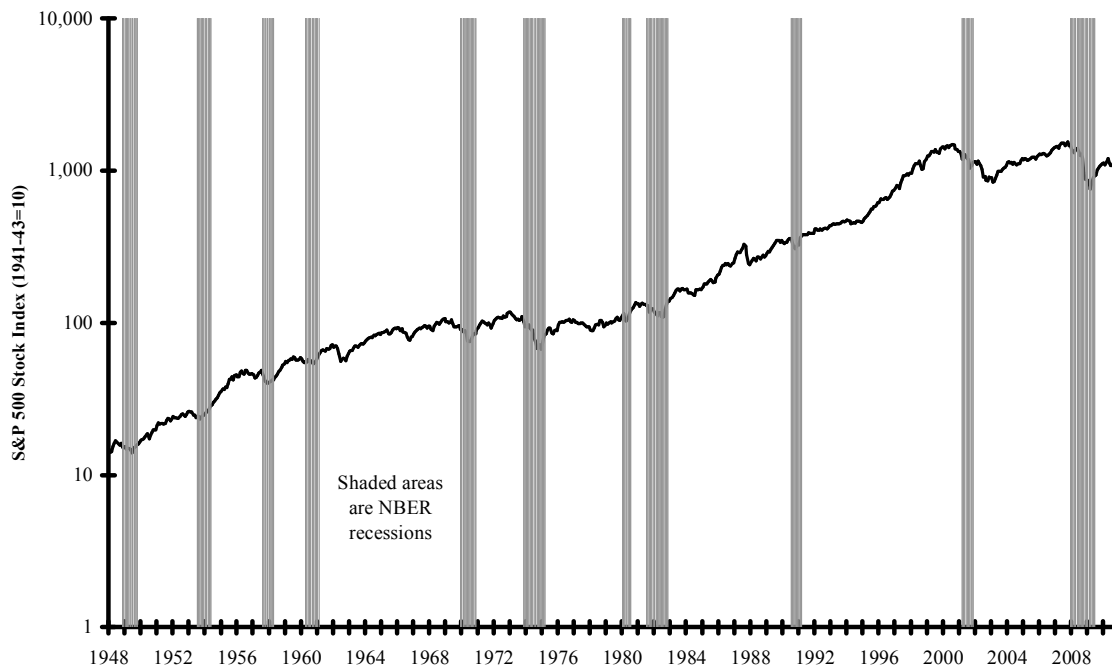


According to the Fisher hypothesis, nominal interest rates should rise point for point with expected inflation. Therefore, a regression of a nominal interest rate (r) on expected inflation (\hat{p}^e) should have a coefficient of unity on the inflation term, and the constant should measure the real rate of interest (rr). Both Figures 7.12.1 and 7.12.2 confirm that inflation is positively associated with the nominal rate of interest, though the slope coefficients are both well below unity (0.75 for the 1-year bond and 0.58 for the 10-year bond). Both fit the data according to R^2 moderately well – with equivalent of correlations of 0.74 for 1-year bonds and 0.63 for 10-year bonds). The data suggest that the Fisher hypothesis points in the right direction: it is, at best, approximately true; it is certainly not strictly true. Part of the difference may lie in the fact that our estimate of the expected rate of inflation may not be a good one. We can interpret the equations as implying that the average 1-year real rate of interest is 1.74 percent and the average 10-year real rate of interest is 3.79 percent.

Problem 7.15:

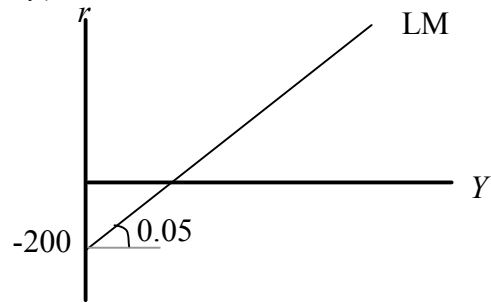
Figure 7.15.1 shows the S&P 500 stock market index on a logarithmic scale. The logarithmic scale is valuable, first, because the index grows so much that, without it, data on the left-side of the figure would cluster very near the axis and be hard to distinguish; and, related and more importantly, equal percentage changes show up as equal vertical distances on the logarithmic scale, no matter what the level of the index is. Generally, according to the figure, recessions are preceded by significant falls in the stock market, though the lag is sometimes short and the falls continue right through the recession. There is a one possible exception (a false negative (type I error)): the recession in 1980 started while the stock market was still rising. There are, however, many false positives, periods in which there is a significant fall in the stock market, yet a recession does not follow in short order and, indeed, the stock market begins to rise again without a recession having occurred: the figure shows two such cases in the 1960s; one in the 1970s; and two in the 1980s.

Figure 7.15.1. The Stock Market and the Business Cycle



Problem 7.18.

(b) *(Diagram only)*



(c) $Y = 2,050$

(e) $r = 4$