Chapter 16 Selected Answers

Problem 16.4.

(a)

Table 16.4.1
An open-market sale by the Fed of $100 million of government bonds

Federal Reserve		Commercial Banks	
Assets	**Liabilities**	**Assets**	**Liabilities**
Government Bonds (–$100 billion)	Banknotes held by non-bank public	**Reserves (–$100 billion)**	Transactions Accounts
Discount Loans	**Reserves (reserve balances and eligible vault cash) (–$100 billion)**	Loans	Savings and large and small time deposits
Coins held by Federal Reserve		**Government and commercial bonds and other assets (+100 billion)**	Discount Loans
Foreign Exchange		(Federal funds lent)	(Federal funds borrowed)
Gold	Net worth		Net worth

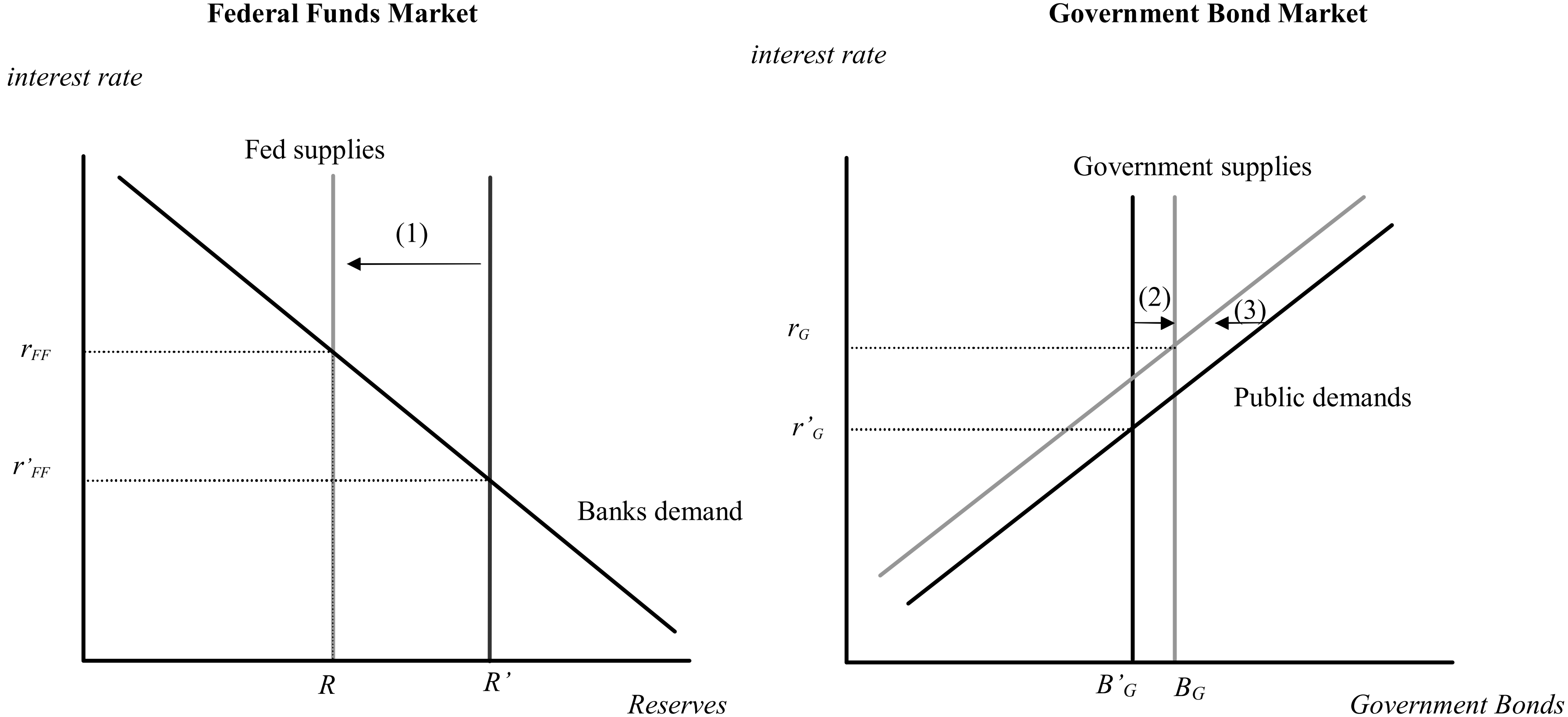
(c) On the commercial bank T-account, loans must rise by $1 billion and transactions accounts also by the same amount (as the money lent out is an least initially deposited in the checking account of the borrower). This could be the end of the story, provided that banks are holding enough reserves already to meet reserve requirements. If not, there are various ways of adding additional reserves – the Fed may supply them through open-market operations or the banks may borrow them through the discount window. The reserves needed would, in any case, be some fraction (say 10 percent) of the amount of new checking deposits. On those assumptions, the T-account shows an increase in reserves and discount loans of $100 million on both the commercial bank and Fed portfolios. Other correct answers are possible.

Table 16.4.3
$1 billion of new loans by the commercial banks

Federal Reserve		**Commercial Banks**	
Assets	**Liabilities**	**Assets**	**Liabilities**
Government Bonds	Banknotes held by non-bank public	**Reserves (+$100 million)**	**Transactions Accounts (+$1 billion)**
Discount Loans (+$100 million)	**Reserves (reserve balances and eligible vault cash) (+$100 million)**	**Loans (+$1 billion)**	Savings and large and small time deposits
Coins held by Federal Reserve		Government and commercial bonds and other assets	**Discount Loans (+$100 million)**
Foreign Exchange		(Federal funds lent)	(Federal funds borrowed)
Gold	Net worth		Net worth

Problem 16.5: Figure 16.5.1 refers. An open-market sale consists of the Fed accepting reserves from the banks in order to pay for the public's purchases of government bonds from the Fed. This decreases the supply of reserves (shift 1), increases the supply of government bonds (shift 2). In addition, because reserves and government bonds are substitutes, the demand curve for government bonds also shifts to the left in response to the rise in the Federal funds rate. The net effect is that the stock of reserves falls, the stock of government bonds rises, and the interest rates on both instruments rise.

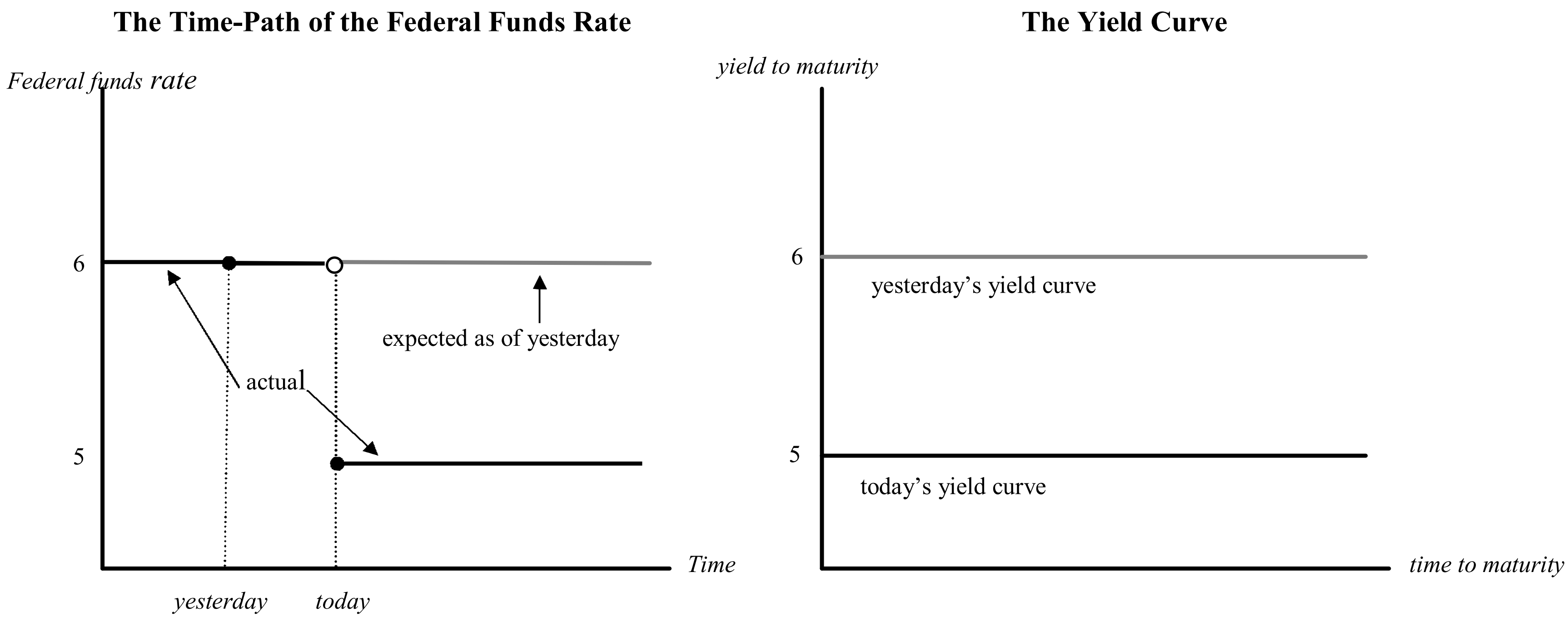
Figure 16.5.1. Open-market Sale of Government Bonds (see explanation on next page)



Problem 16.7:

(a) An unexpected, permanent decrease in the Federal funds rate shifts the yield curve downward

Figure 16.7.1.
The Term Structure and a Credible Permanent Cut in the Federal Funds Rate



Problem 16.9: The equation of the regression line in Figure 16.9.1 is $\Delta r_3 = 0.62\Delta r_{FF}$. Thus, a one-point increase in the Federal funds rate would imply a 0.62 point increase in the 3-month T-bill rate. Similarly, the equation of the regression line in Figure 16.9.2 is $\Delta r_{10} = 0.18\Delta r_{FF}$. Thus, a one-point increase in the Federal funds rate would imply a 0.18 point increase in the 10-year T-bond rate. The yield curve for Treasury securities would, therefore, rise more than three times as much at the short end than the long end and would, therefore, tend to rise but also become less steep (flatten). The equation of the regression line in Figure 16.9.3 is $\Delta r_{Aaa} = 0.70\Delta r_{10}$. Thus, a one-point increase in the 10-year T-bond rate would imply a 0.70 point increase in the Aaa commercial bond rate. Since the T-bond rate rises by 1 point and the Aaa bond rate rises by 0.70, the risk premium narrows by 0.30. The fit as measured by R^2 is reasonably high for both Figures 16.9.1 and 16.9.3, suggesting that the linkage represented by the equation is reasonably reliable. But the fit of Figure 16.9.3 is quite low ($R^2 = 0.12$), suggesting that much of the fluctuations in 10-year T-bond yields results from other factors than changes in the Federal funds rate. Both the relatively small coefficient on Δr_{FF} and the poor fit suggest that Fed can better control short rates than long rates, and that monetary policy actions will tend to change the slope of the yield curve much more than shift the long end of the yield curve. The tendency of all long rates to move closely together is also confirmed.

Figure 16.9.1
The Relationship Between the Federal Funds Rate and the 3-month Treasury Bill Rate

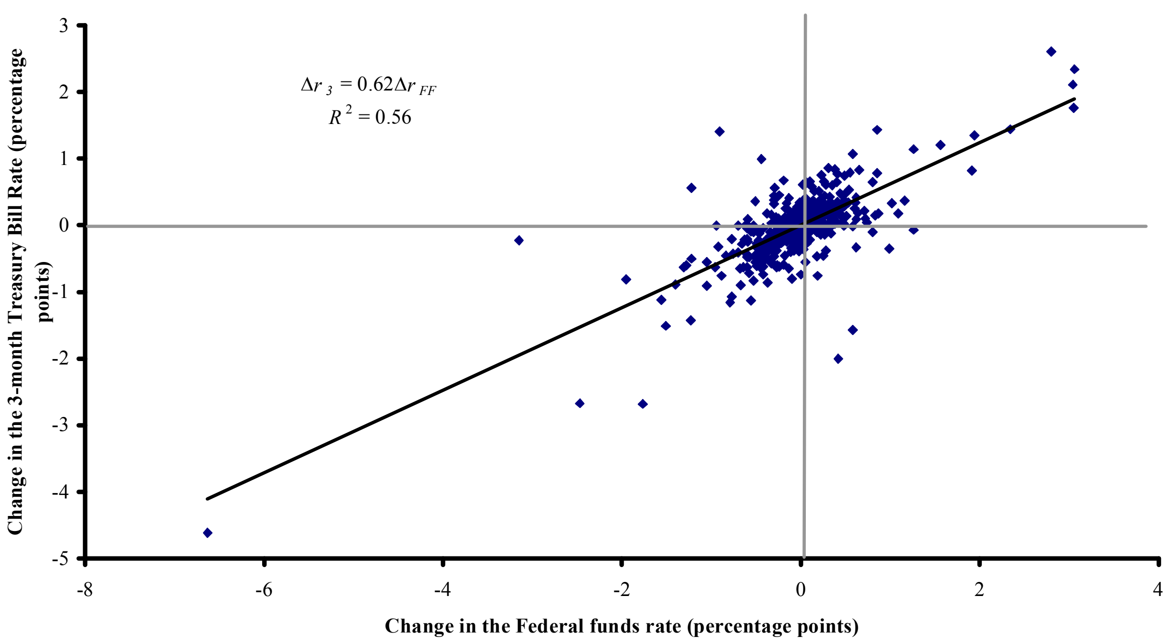


Figure 16.9.2
The Relationship Between the Federal Funds Rate and 10-year Treasury Bond Rate

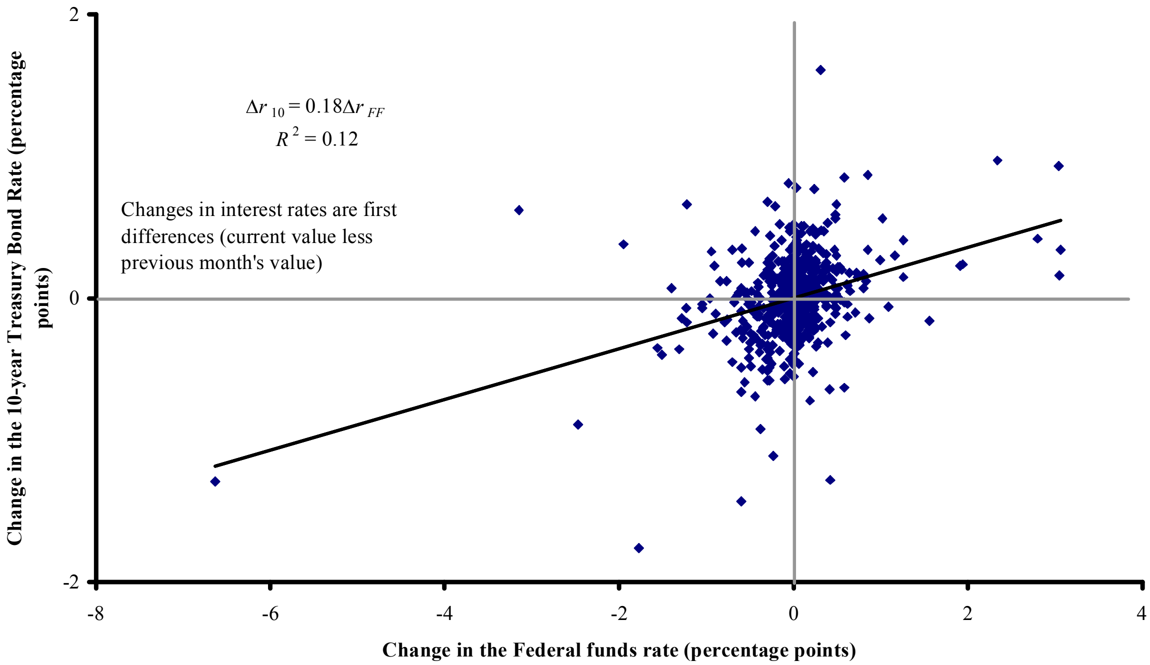
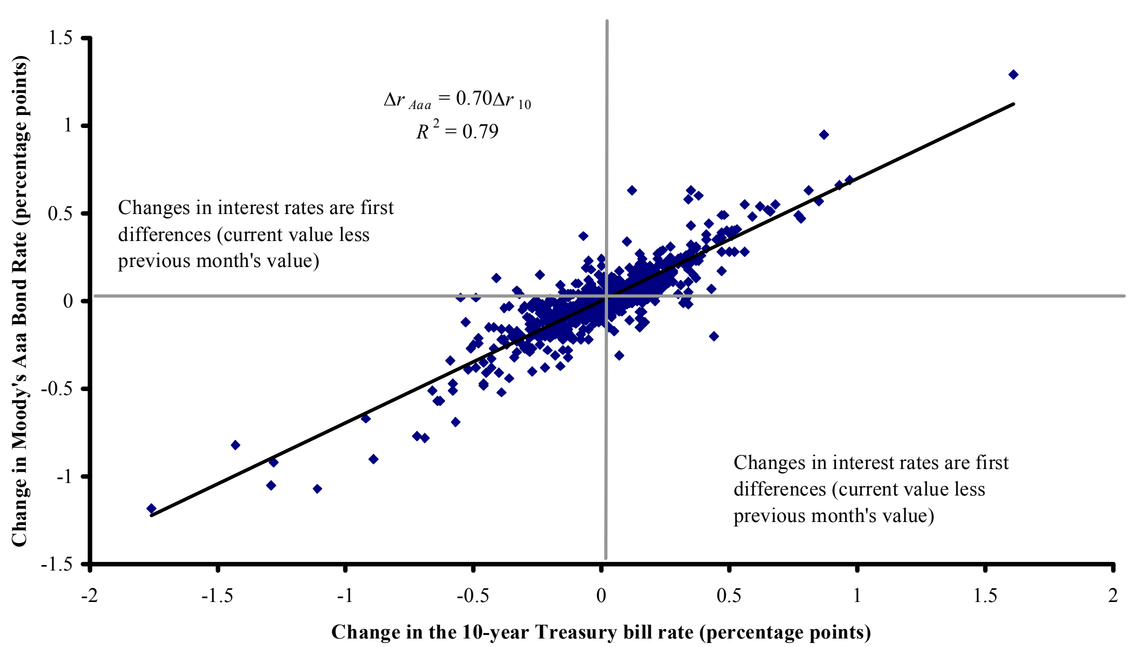
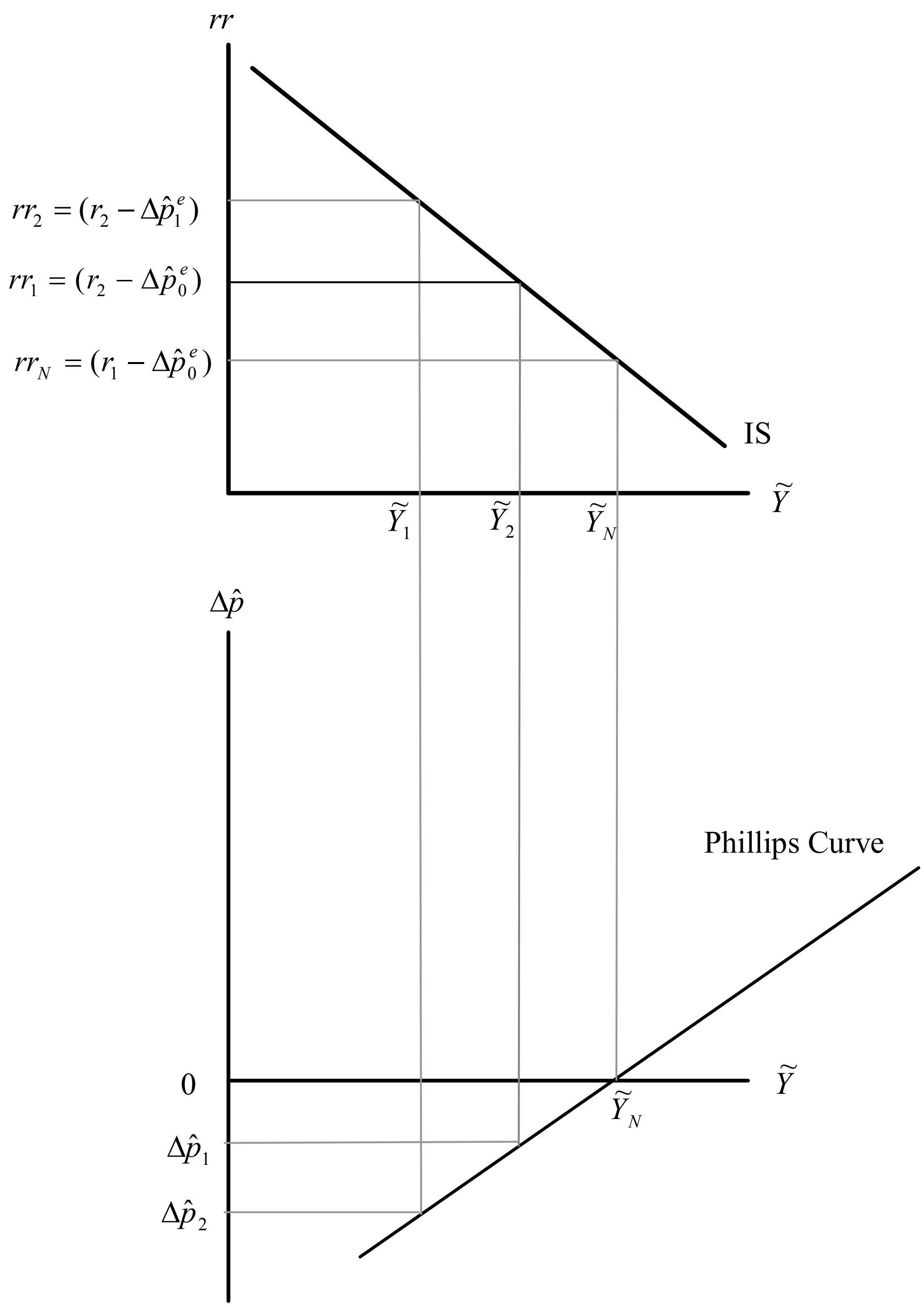


Figure 16.9.3
The Relationship Between Changes in the 10-year Treasury Bond Rate and Moody's Aaa Bond Rate



Problem 16.12: Figure 16.12.1 refers. An increase in the long-run nominal interest rate as a result of Federal Reserve action results, at a given level of inflation, in an increase in the real rate of interest. The top panel shows this as the rise of rr_N to rr_1 as a result of the rise in the nominal rate from r_1 to r_2. The IS curve (top panel) shows that this results in a fall in aggregate demand from $\tilde{Y}_N$ to $\tilde{Y}_2$. Lower aggregate demand, according to the Phillips curve (lower panel) results in a deceleration of prices, lowering the rate of inflation by $\Delta\hat{p}_1$. The lower rate of inflation at the new nominal rate of interest raises the real rate of interest to rr_2. But this in turn lowers aggregate demand further and the process continues in a cumulative cycle of lower inflation leading to higher real rates of interest leading to lower aggregate demand leading to lower inflation . . .

Figure 16.12.1
The Effect of Monetary Policy Increasing Interest Rates



Problem 16.16:

(a) Figure 16.16.1 refers. The real rate of interest is given by $rr_{10} = r_{10} - \hat{p}^e$, where expected inflation ($\hat{p}^e$) was based on the annual growth of the CPI (current value over previous year's value). Figure 16.8 puts the real rate of the vertical axis and scaled output on horizontal axis in order to align the figures so that the scaled output axes of the IS curve and the Phillips curve are parallel. This is merely a visual convenience. However, since we think that the direction of causation runs from the real rate of interest to scaled output, we place the real rate in Figure 16.16.1 on the horizontal axis, making sure that it is the independent (causal variable) for the regression, which (see the *Guide*, section G.15.3) is asymmetric.

(b) The equation for the IS curve based on Figure 16.16.1 is $\tilde{Y} = 90.1 - 0.43 rr_{10}$. Setting the NAIRU value of $\tilde{Y} = 88.5$ percent (based on equation 15.12), we can solve for rr_{10} = 3.7 percent as the real rate consistent with NAIRU.

(c) According to the IS curve in (b), a one-point fall in the real rate to rr_{10} = 2.7 percent should result in a fall in scaled output to $\tilde{Y} = 90.1 - 0.43 \times 2.7 = 88.9$ percent. Feeding this value into the Phillips curve, yields $\Delta \hat{p}_t = 0.61(\tilde{Y}_t - 88.5) = 0.61(88.9 - 88.5) = 0.25$ percentage point increase in the rate of inflation.

Figure 16.16.1
Estimated IS Curve