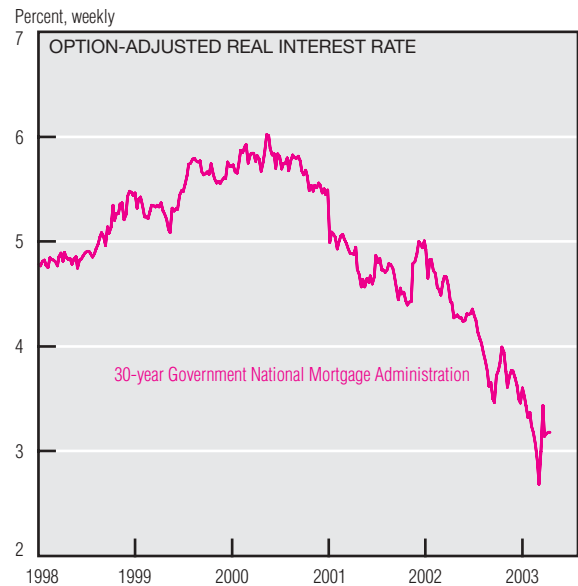
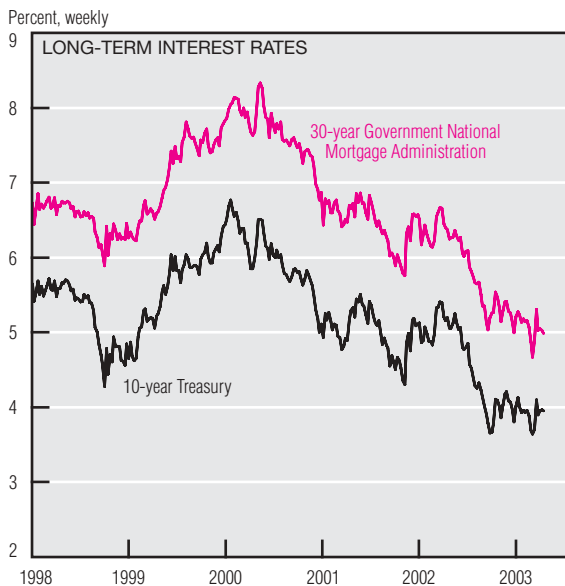
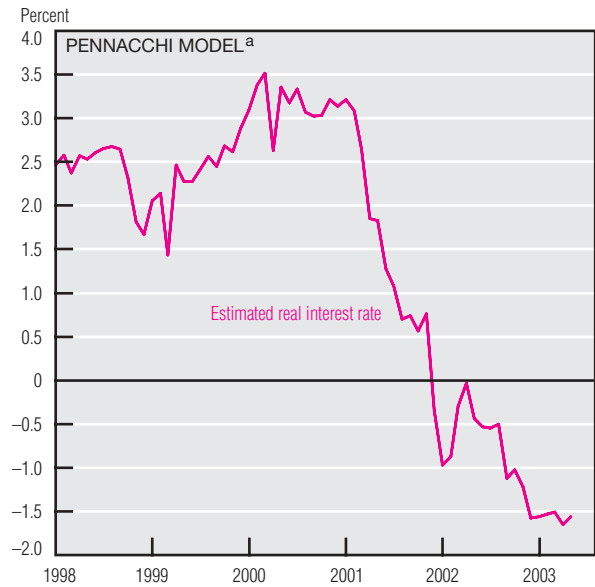
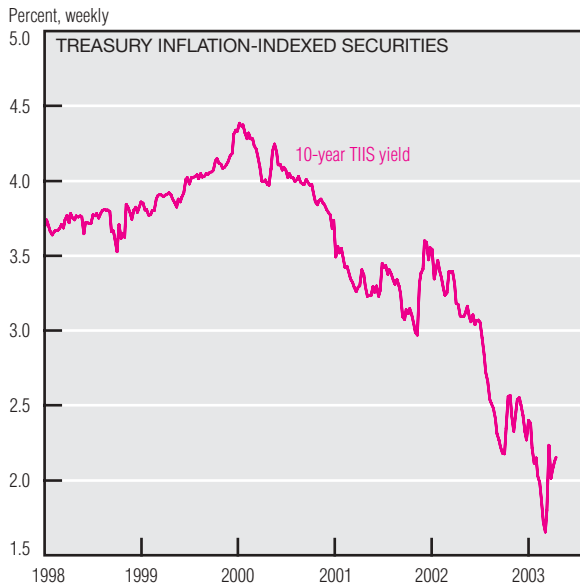


Money and Financial Markets



a. The estimated real interest rate is calculated using the Pennacchi model of inflation estimation and the median forecast for the GDP implicit price deflator from the Survey of Professional Forecasters. Monthly data.
 SOURCES: Bloomberg Financial Information Services; Jonathan B. Berk, "A Simple Approach for Deciding When to Invest," *American Economic Review*, vol. 89 (1999), pp. 1319–26; and *Wall Street Journal*.

While the Federal Reserve controls several *nominal* interest rates, the real economy is affected by *real* rates, that is, rates adjusted for inflation. Treasury inflation-indexed securities (TIIS) adjust their principal and interest for inflation, giving a direct measure of real rates. It is also possible to estimate real rates using inflation expectations; for example, the Pennacchi approach estimates 30-day real interest rates to have been negative since late 2001. Both short and long rates have fallen substantially since early 2002, although they remain at or near their levels at the beginning of 2003.

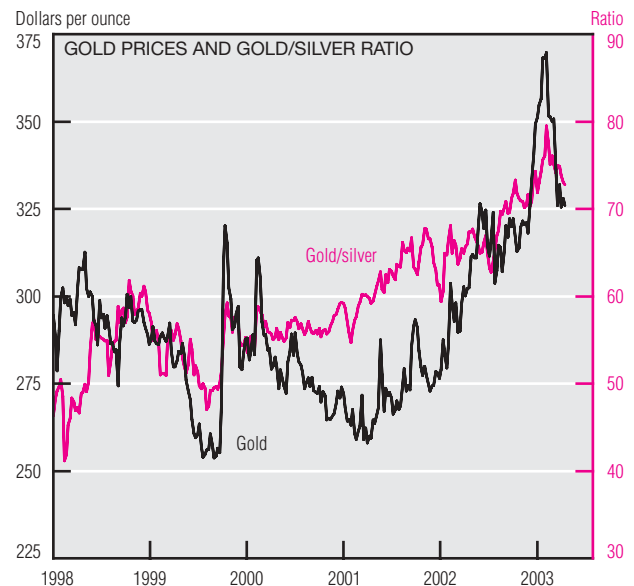
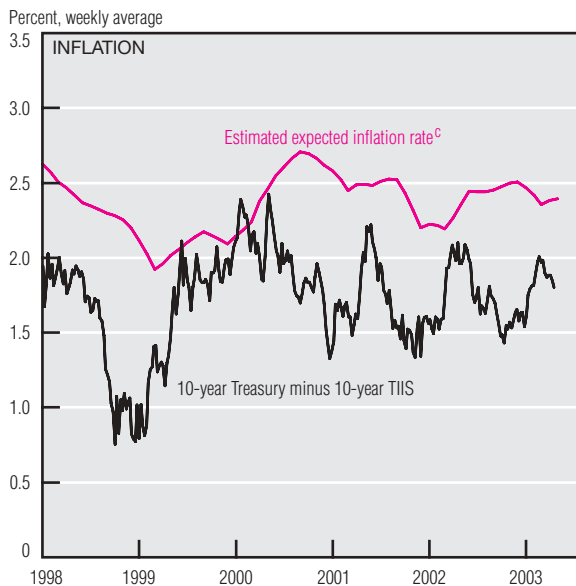
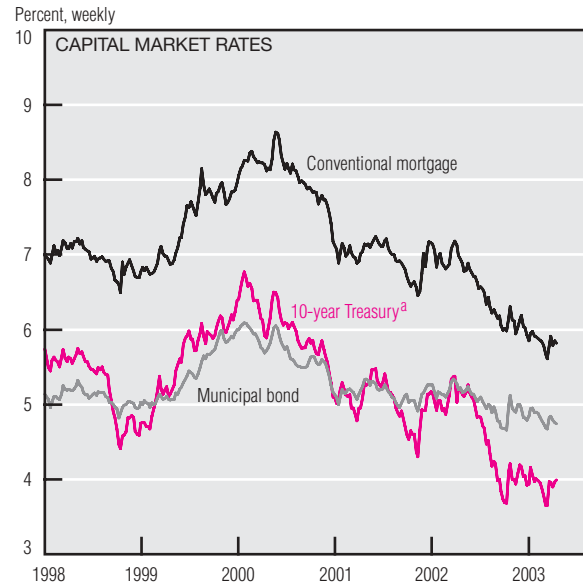
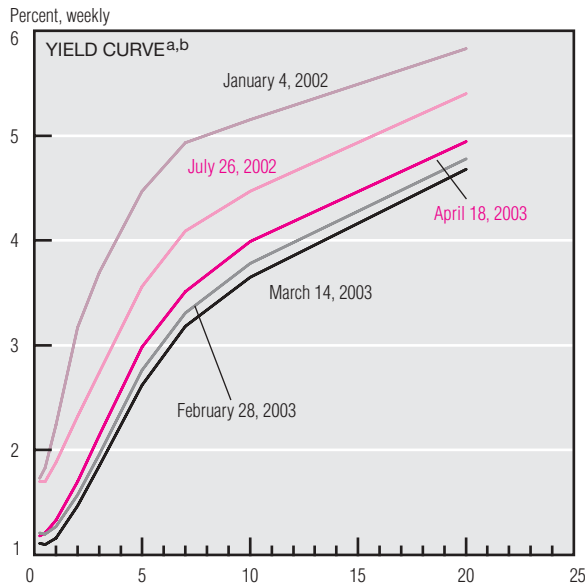
Real rates matter because they influence investment. Businesses must decide which gives them the better return, buying a bond or buying new equipment. A high real rate makes investment projects less profitable. One must be careful to consider the appropriate real rate, however, since most projects implicitly embed a subtle option—the option to wait. That is, if you don't buy that new stamping machine today, you can buy it next month. If real interest rates rise, this has two contrary effects: The future profits from the machine look worse than the high interest rate of the

bond, but delaying those profits for another month also looks worse. The increase in real rates has an ambiguous effect on investment.

One way to adjust for this problem is to use bonds that themselves embed an option. Fortunately, rates on these "callable" bonds are readily available. "Callable" means that the issuer can buy them back at a previously specified price. Such bonds generally aren't protected against inflation, however, so finding their real rate requires an inflation adjustment. The bottom right chart takes a common callable

(continued on next page)

Money and Financial Markets (cont.)



a. All yields are from constant-maturity series.

b. Average for the week ending on the date shown.

c. The estimated expected inflation rate is calculated using the Pennacchi model of inflation estimation and the median forecast for the GDP implicit price deflator from the *Survey of Professional Forecasters*. Monthly data.

SOURCES: Board of Governors of the Federal Reserve System, "Selected Interest Rates," *Federal Reserve Statistical Releases*, H.15; Bloomberg Financial Information Services; and *Wall Street Journal*.

instrument, the 30-year Government National Mortgage Administration bond, and subtracts, as an inflation estimate, the yield difference between a 10-year Treasury bond and 10-year TIIS. Although its pattern resembles that of the 10-year TIIS rate, the option-adjusted rate is higher and, in addition, has fallen more since the end of 2001: 182 basis points (bp) versus 147 bp.

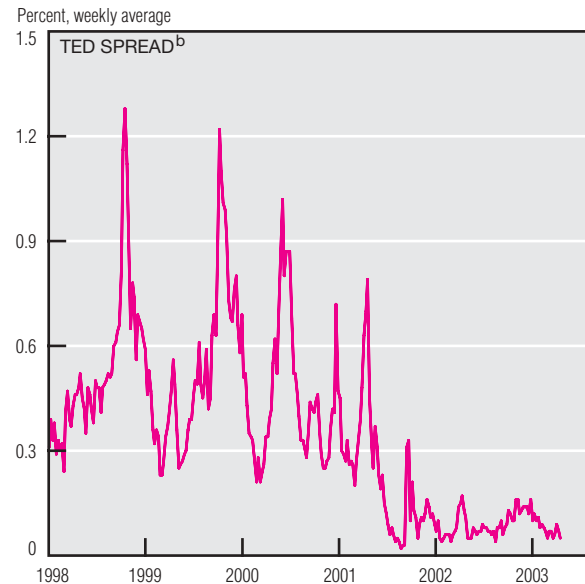
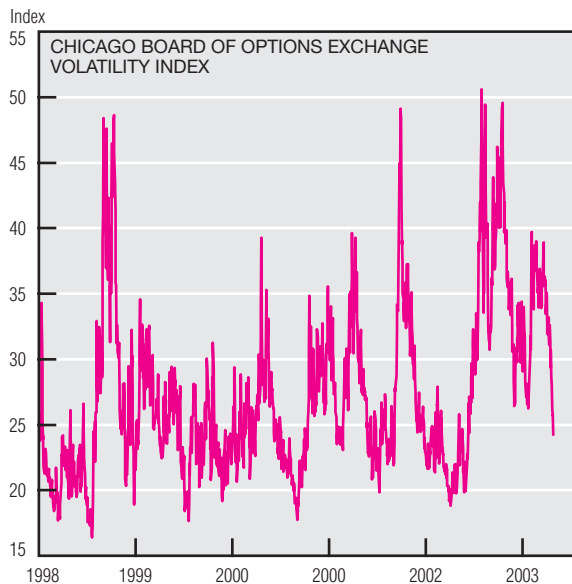
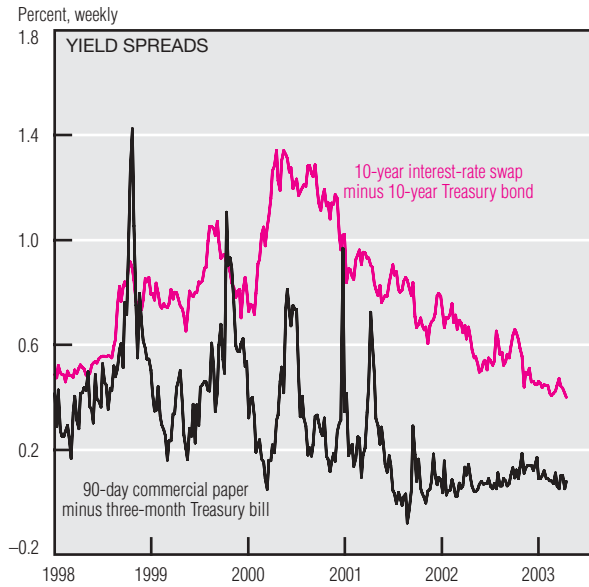
Since last month, the yield curve has moved up and gotten steeper. The 10-year, three-month spread has risen

from 254 bp to 281 bp, remaining well above its historical average of 120 bp. If past performance is any indication, this predicts strong economic growth in the year ahead. The two-year, three-month spread is watched because inversions are thought to indicate that monetary policy rates are out of line with the market; however, the spread has increased from 36 bp to a robust 62 bp. Other long-term rates have followed the general pattern of long-term Treasuries, although so far this year, municipal bond rates have not recovered from their precipitous fall.

Central banks may operate by affecting interest rates, but keeping inflation within appropriate bounds remains a major goal. The difference between nominal yields (Treasury bonds) and real yields (TIIS) gives a market-based measure of inflationary expectations. Although these long-run expectations have notched downward recently, they are still close to $\frac{1}{2}$ percentage point higher than in mid-2002. Shorter-term expectations produced by the Pennacchi approach have been somewhat steadier.

(continued on next page)

Money and Financial Markets (cont.)



a. Merrill Lynch AA, BBB, and High Yield Master II indexes, each minus the yield on the 10-year Treasury note.

b. Yield spread: three-month euro minus three-month constant-maturity Treasury bill.

SOURCES: Board of Governors of the Federal Reserve System, "Selected Interest Rates," *Federal Reserve Statistical Releases*, H.15; Chicago Board of Options Exchange; and Bloomberg Financial Information Services.

Gold, often considered an inflation hedge, rose from less than \$260 per ounce in early 2001 to nearly \$370 in early 2003 but has since retreated to around \$325 per ounce. Because gold's price relative to silver followed a similar pattern, the rise can probably be attributed more to specific market factors than to fears of inflation.

Financial markets, being forward-looking, can be sensitive to risk. One measure of risk is the yield spread between risky and safe instruments. It may be surprising that in recent months, risk spreads have moved lower across a broad class of bonds

despite worries about war and peace in the Middle East, fears of a double-dip recession, and uncertainty over fiscal policy. Higher-grade spreads, such as those between interest rate swaps or commercial paper and Treasuries, remain at historically low levels. Spreads of corporate bonds, although they may not be at historical lows, have declined appreciably since 2002.

A different measure, considering risk as volatility in prices, is based not on bonds but on option prices, which are particularly sensitive to such volatility. The Volatility Index, which measures the implied volatility

of the Chicago Board of Options Exchanges' option contract on the S&P 100, has fallen substantially in recent months.

The Treasury-to-eurodollar (TED) spread looks at the difference between the rates on eurodollar deposits and Treasury notes. It is thought to pick up traders' worries about international problems because it is a way to arbitrage rates between the U.S. and the rest of the world without bearing any currency risk. By historical standards, the TED spread remains quite low.