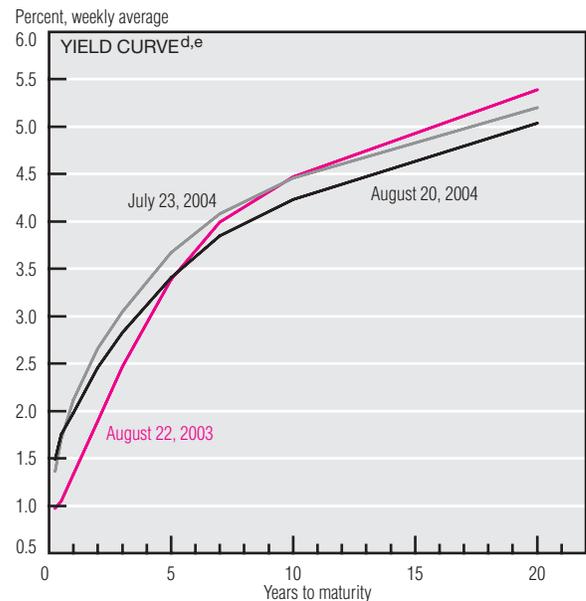
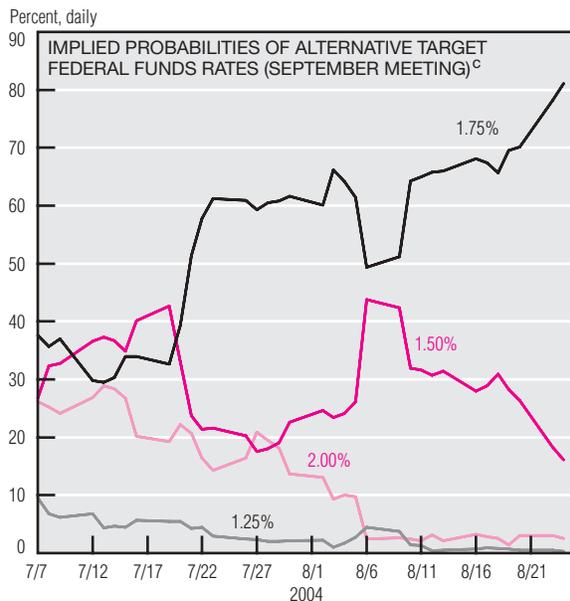
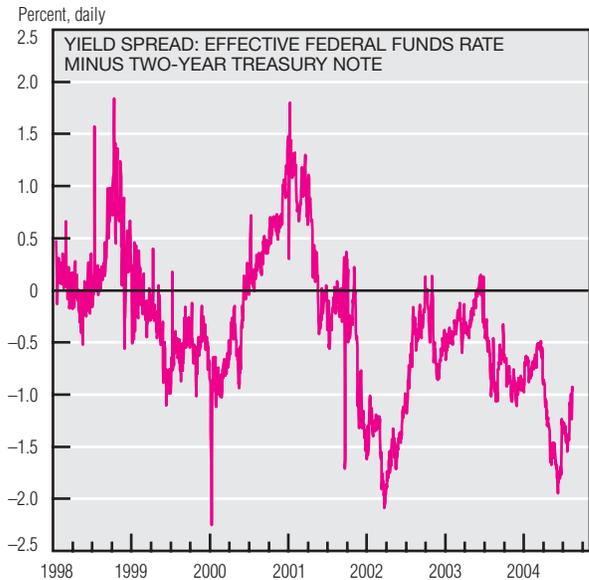
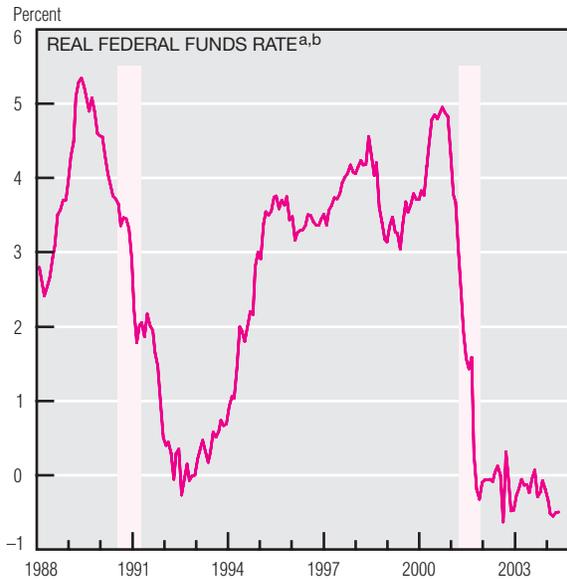


# Money and Financial Markets



a. Defined as the effective federal funds rate, deflated by the core PCE Chain Price Index.

b. Shaded bars indicate periods of recession.

c. Probabilities are calculated using trading-day closing prices from options on October 2004 federal funds futures that trade on the Chicago Board of Trade.

d. All yields are from constant-maturity series.

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

SOURCES: U.S. Department of Commerce, Bureau of Economic Analysis; Board of Governors of the Federal Reserve System, "Selected Interest Rates," *Federal Reserve Statistical Releases*, H.15; Chicago Board of Trade; and Bloomberg Financial Information Services.

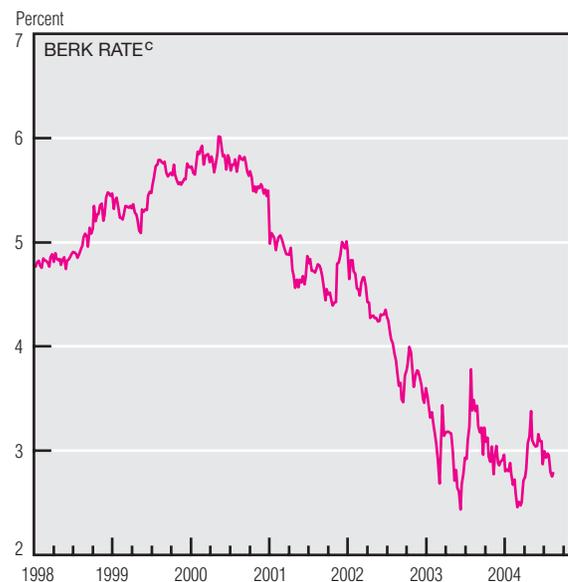
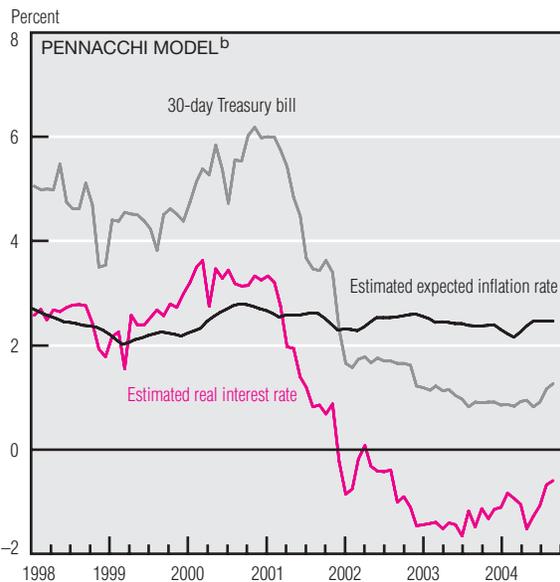
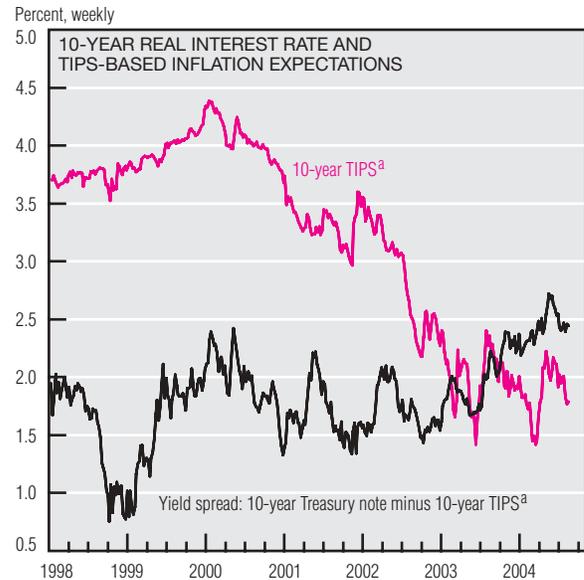
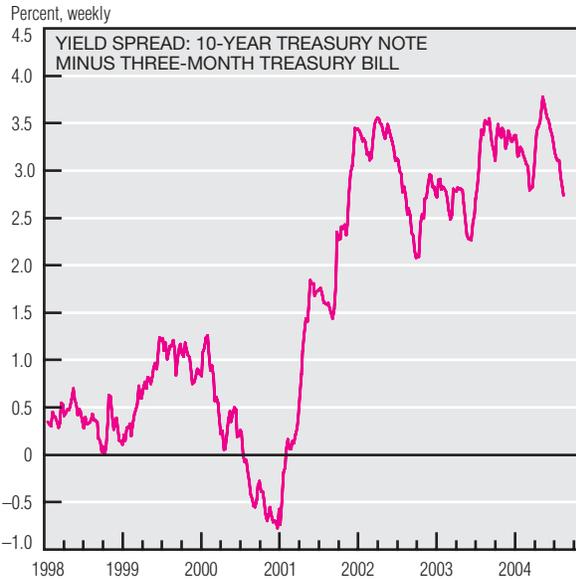
Financial markets offer one way to gauge the degree of accommodation in monetary policy (and perhaps to judge whether it is removed at "a pace that is likely to be measured" in the future). The real federal funds rate, that is, the nominal federal funds rate less the current inflation level, has been negative for several years, a substantially longer period than that which followed the 1990–91 recession. Just as the fed funds rate appears low relative to inflation, it seems low compared to other market

rates, having generally been lower than the two-year Treasury note rate since late 2001. By historical measures, then, the current degree of accommodation seems large.

Market participants expect increases in the target federal funds rate, but they do not anticipate large moves immediately. Backing out the market's expectations from the Chicago Board of Trade's options on federal funds futures, the betting is heavily in favor of another move of 25 basis points (bp) in September, with some sentiment for no change.

Short-term rates are only part of the financial markets, however, and the yield curve gives a broader picture. Since last month (and since last year) the yield curve has flattened as short rates have risen and long rates fallen. This represents a classic—though not universal—pattern in which short rates rise along with the federal funds rate and long rates fall when inflation fears subside. Despite this flattening, one popular predictor of future economic growth, the 10-year, three-month spread, remains at  
*(continued on next page)*

## Money and Financial Markets (cont.)



a. Treasury inflation-protected securities.

b. The estimated expected inflation rate and the estimated real interest rate are 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.

c. The Berk rate is calculated as the 30-year Government National Mortgage Association yield plus the 10-year Treasury inflation-protected securities yield minus the 10-year Treasury yield.

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*.

274 bp, well above its historical average of 120 bp.

Apportioning shifts in the nominal yield curve to inflation expectations is tricky, however, because real rates may also change. Fortunately, more direct measures of real rates and inflation expectations exist. Treasury inflation-protected securities (TIPS) provide a measure of a real interest rate, and the difference between that real rate and a corresponding nominal rate measures expected inflation. (Of course, differences in taxes, liquidity, and indexing may make

even this estimate imperfect.) Real rates have fallen since May, but so has expected inflation. Of potentially greater concern, however, is the increase of 100 bp since October 2002. The same pattern in real rates appears in the Berk rate, an alternative measure that adjusts for the firm's ability to delay investment.

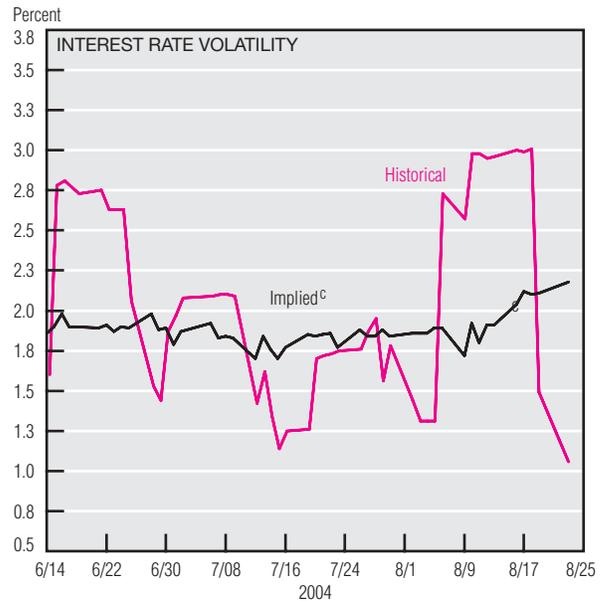
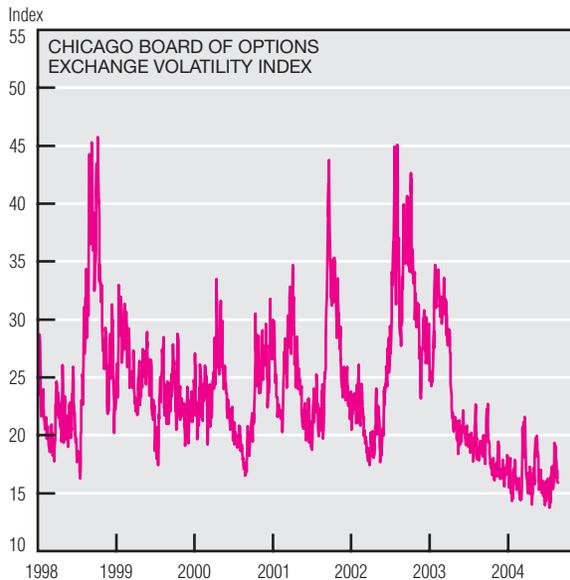
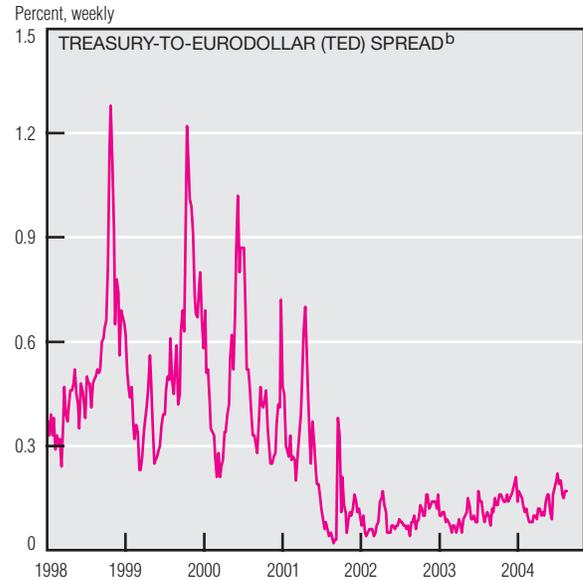
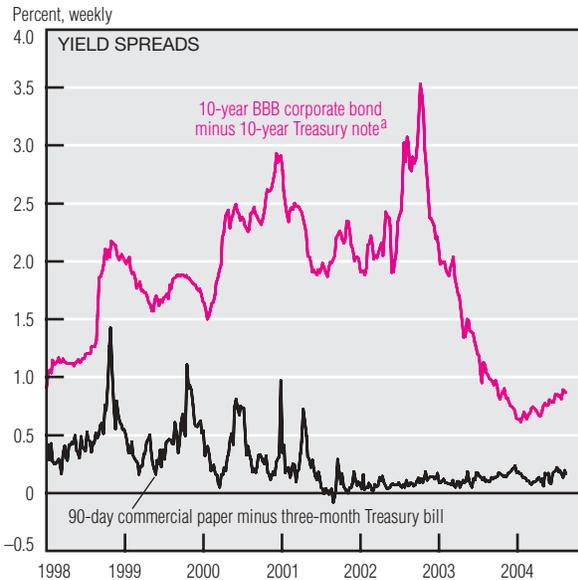
Models that take survey measures as the starting point provide a complementary view of expected inflation and real rates. One of these, the Pennacchi model, combines survey forecasts with Treasury bill rates. It shows a negative

but increasing real rate with essentially stable inflation. Because it focuses on short rates, it helps confirm the conventional wisdom of the yield curve: Short rates rise with the federal funds rate and long rates fall (in part) as inflation expectations fall.

Rates on U.S. Treasury bills and bonds give an incomplete notion of the market because those instruments carry virtually no credit risk; a comparison with risky securities can yield more information. At the longer end of the maturity spectrum, the

(continued on next page)

## Money and Financial Markets (cont.)



a. Merrill Lynch BBB index minus the yield on the 10-year Treasury note.

b. Yield spread: three-month eurodollar deposit minus the three-month, constant-maturity Treasury bill.

c. Implied volatility is calculated from options on September 2004 two-year Treasury bill futures that trade on the Chicago Board of Trade.

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

spread between BBB corporate bonds and 10-year Treasury notes has risen in 2004 from 64 bp to 87 bp, indicating more uncertainty, a bigger chance of defaults, and some increased possibility of an economic downturn. The spread and the accompanying risks remain well below their pre-2003 levels, however. A short-term risk spread, between 90-day commercial paper and the three-month Treasury bill, remains low. Moreover, the TED spread, the difference between eurodollar deposits

and Treasury bonds, which is often thought to reflect concern about international tensions, remains quite low by recent historical standards.

Spreads reflect uncertainty, but an alternative approach is to look at volatility—how prices have changed and are expected to change. A different measure, which considers risk as price volatility, is based not on bonds but on option prices, which are particularly sensitive to such volatility. The implied volatility (that is, the volatility backed out of the formula for the option price, given the

observed option price) on the Chicago Board of Trade's two-year Treasury option has risen slightly in recent weeks. The historical volatility, calculated from actual prices, has moved around considerably more. A similar approach may be taken for stocks: The Exchange Volatility Index measures the implied volatility of the Chicago Board of Options Exchange's option contract on the S&P 100 Index. It had been trending downward since late 2002, but has moved upward over the past several months.