Monetary Trends

Page 1: Implied One-Year Forward Rates are calculated by this Bank from Treasury constant maturity yields. Yields to maturity, Ron, for maturities with a â€œâ€ 10 years to maturity are obtained by linear interpolation between reported yields. These yields are smoothed by fitting the regression suggested by Nelson and Siegel (1987).

\[ R(n) = \alpha_s + \beta_s \ln(1 +]\text{constant maturity yield/100}) + \gamma \text{maturity} \]

and forward rates are calculated from these smoothed yields using equation (a) in table 13.1 of Shiller (1990),

\[ 
\text{firm} = \frac{\text{Down}/\text{On}}{\text{Down} + 1} = \frac{\text{Down}}{\text{On}} - 1. \]

where duration is approximated as \(D_{on} = (1 - e^{-\lambda D_{on}})/(\lambda D_{on})\). These rates are linear approximations to the true instantaneous forward rates, see Shiller (1990). For a discussion of the use of forward rates as indicators of inflation expectations, see Shiller (1997). Rates on 3-month Eurodollar Futures and Rates on Selected Federal Funds Futures Contracts track through time the yield on three specific contracts. Rates on Federal Funds Futures on Selected Dates display a single day's snapshot of yields for contracts expiring in the months shown on the horizontal axis. Inflation-Indexed Treasury Securities and Yield Spreads are those plotted on page 5. Inflation-Indexed 10-Year Government Notes shows the yield of an inflation-indexed note that is scheduled to mature in approximately (but not greater than) 10 years. The current U.K. note has a maturity date of 7/30/15, the current U.K. note has a maturity date of 6/16/2013, and the current U.S. note has a maturity date of 11/15/2016. Inflation-Indexed Treasury Yield Spreads and Inflation-Indexed 10-Year Government Yield Spreads equal the difference between the yields on the most recently issued inflation-indexed securities and the unindexed yield of the security with the same maturity.

Page 12: Velocity (for M2 and M3) equals the ratio of GDP, measured in current dollars, to the level of the monetary aggregate. M3 and M2 Own Rates are weighted averages of the rates received by households and firms on the assets included in the aggregates. Prior to 1982, the 3-month Tbill rates are secondary market yields. From 1982 forward, rates are 3-month constant maturity yields.

Page 13: Real Gross Domestic Product is GDP as measured in chained 2000 dollars. The Gross Domestic Product Price Index is the implicit price deflator for GDP which is defined by the Bureau of Economic Analysis, U.S. Department of Commerce, as the ratio of GDP measured in current dollars to GDP measured in chained 2000 dollars.

Page 14: Investment Securities are all securities held by commercial banks in both non-qualifying and qualifying accounts.

Page 15: Inflation Rate Differentials are the differences between the foreign consumer price inflation rate and year-over-year changes in the U.S. all-items Consumer Price Index.

Page 17: Treasury Yields are Treasury constant maturity rates as reported in the Board of Governors of the Federal Reserve System's H.15 release.

Sources

Agence France-Télévision: French note yields.
Bank of Canada: Canadian note yields.
Chicago Board of Trade: Federal funds futures contract.

Chicago Mercantile Exchange: Eurodollar futures.
Congressional Budget Office: Potential real GDP.
Federal Reserve Bank of St. Louis: Adjusted monetary base and adjusted reserves, monetary services index, MZM own rate, one-year forward rates.
Organization for Economic Cooperation and Development: International interest and inflation rates.
Standard & Poor's: Stock price-earnings ratio, stock price composite index.
University of Michigan Survey Research Center: Median expected price change.

References


Note: *Available on the Internet at research.stlouisfed.org/publications/review/.

Are Investors More Risk-Averse During Recessions?

Observations of financial markets have long noted that broad stock market price indices tend to fall steeply immediately before and during recessions. In theory, a stock's price is equal to the sum of its discounted expected future dividends, and the discount rate is expected gross stock return. This, it is tempting to suggest that, when the economy becomes weaker, the Sharpe ratio in stock prices reflects the reduction in expected future dividends. However, many studies have found that the magnitude of the cyclical fluctuation in dividends is too small to account for such large stock market price movements.

One possible explanation is that large changes in stock prices might be accompanied by swings in investors' attitudes toward risk. For example, many commentators have routinely suggested that investors exhibited irrational exuberance during the dramatic stock price run-up in the late 1990s, while they were overly pessimistic during the Great Depression in the early 1930s. Campbell and Cochrane (1999) have formalized the idea in a model: when the economy goes into recession, investors have fewer incentives to engage in risk-taking behavior. They form expected risk-neutral valuation formulas and thus are less willing to bear financial risk. To induce them to hold stocks instead of risk-free short-term Treasury bills, for a given level of stock market risk, the expected equity premium must increase. Therefore, stock prices fall during recessions because dividends are discounted by a higher rate as a result of the increase in the equity premium.

Lettau and Ludvigson (2003) provide some empirical evidence for this explanation. They use expected stock market volatility, which measures the size and frequency of fluctuations in a broad stock market price index as a gauge of stock market risk. When stock prices are expected to be more volatile, risk-averse investors will reduce their stock holdings because the chance of having a large capital loss becomes higher. Investors will hold the same amount of stocks as they did before only if they are compensated by a higher equity premium. Thus, one can use the ratio of the expected equity premium to the expected volatility—which is commonly known as the Sharpe ratio—as a measure of shareholders' risk tolerance. For example, for a given level of expected stock market volatility, investors require a higher equity premium and thus a higher Sharpe ratio if they become more risk-averse.

In the accompanying chart, we replicate Figure 3 of Lettau and Ludvigson (2003) using updated data from 1952:Q2-2004:Q4. The shaded area indicates business recessions dated by the National Bureau of Economic Research. We find that the Sharpe ratio exhibits substantial variation across time. More importantly, it increases dramatically just before and during every recession in the 52-year sample. This pattern appears to be consistent with the conjecture that investors are more risk-averse and thus demand a higher return for holding stocks during economic downturns.


The equity premium is the difference between the stock market return and the risk-free rate.
Contents

Monetary Trends

Definitions

M1: The sum of currency held outside the vaults of depository institutions, Federal Reserve Banks, and the U.S. Treasury; travelers' checks; and demand and other checkable deposits issued by financial institutions (except demand deposits due to the Treasury and depository institutions), minus cash in transit in process of collection and Federal Reserve float.

M2: M1 plus savings deposits (including money market deposit accounts) and large (over $100,000) time deposits issued by financial institutions; and shares in retail money market mutual funds (funds with initial investments under $50,000), net of retirement account balances.

M3: M2 plus large (over $100,000) time deposits; repurchase agreements issued by depository institutions; Eurodollars deposits, specifically, dollar-denominated deposits due to non-U.S. banks held at foreign offices of U.S. banks worldwide and all banking offices in Canada and the United Kingdom; and institutional money market mutual funds (funds with initial investments of $50,000 or more).

Bank Credit: All loans, leases, and securities held by commercial banks.

Domestic Nonfinancial Debt: Total credit market liabilities of the U.S. Treasury, federally sponsored agencies, state and local governments, households, and nonfinancial firms. End-of-period basis.

Adjusted Monetary Base: The sum of vault cash and Federal Reserve bank deposits held by depository institutions and an adjustment for the effects of changes in statutory reserve requirements on the quantity of base money held by depositories. This series is a simple chain index; see Anderson and Rasche (1996a, 2001, 2003).

Adjusted Reserve: The sum of vault cash and Federal Reserve Bank deposits held by depository institutions and an adjustment for the effects of changes in statutory reserve requirements and Federal Reserve Bank deposits used to satisfy required clearing balance contracts; see Anderson and Rasche (1996a, 2001, 2005).

Monetary Service Index: An index that measures the flow of monetary services received by households and firms from their holdings of liquid assets; see Anderson, Jones, and Neumadt (1997). Indexes are shown for the assets included in M2, with additional data at research.stlouisfed.org/monindex.html. Note: M1, M2, M3, Bank Credit, and Domestic Nonfinancial Debt are constructed and published by the Board of Governors of the Federal Reserve System. For details, see Statistical Supplement to the Federal Reserve Bulletin, tables 1.22 and 1.26. M2M, Adjusted Monetary Base, Adjusted Reserves, and Monetary Service Index are constructed and published by the Research Division of the Federal Reserve Bank of St. Louis.

Notes

Page 9: Please see the Research Division's website at research.stlouisfed.org/monindex.html for the latest data on the monetary service index. The index measures the flow of monetary services received by households and firms from their holdings of liquid assets. The index is calculated for each quarter and published with the Federal Reserve's Statistical Supplement to the Federal Reserve Bulletin. The index is based on a survey of bank holding companies and thrift institutions. The survey is conducted quarterly and includes banks and thrifts with assets of $500 million or more.

Page 10: Federal Reserve Board of Governors, Research Division. "Monetary Service Index." Federal Reserve Bulletin, tables 1.22 and 1.26. Available online at research.stlouisfed.org/monindex.html. The index is calculated for each quarter and published with the Federal Reserve's Statistical Supplement to the Federal Reserve Bulletin. The index is based on a survey of bank holding companies and thrift institutions. The survey is conducted quarterly and includes banks and thrifts with assets of $500 million or more.
### Monetary Trends

**Percent change at an annual rate**

<table>
<thead>
<tr>
<th>Year</th>
<th>M1</th>
<th>M2</th>
<th>M3*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>3.33</td>
<td>15.80</td>
<td>8.73</td>
</tr>
<tr>
<td>2002</td>
<td>4.91</td>
<td>12.76</td>
<td>7.41</td>
</tr>
<tr>
<td>2003</td>
<td>6.49</td>
<td>7.41</td>
<td>6.96</td>
</tr>
<tr>
<td>2004</td>
<td>5.58</td>
<td>4.01</td>
<td>4.62</td>
</tr>
<tr>
<td>2005</td>
<td>2.01</td>
<td>2.24</td>
<td>4.34</td>
</tr>
</tbody>
</table>

**M2 and MZM**

<table>
<thead>
<tr>
<th>Year</th>
<th>M2</th>
<th>MZM</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>5.89</td>
<td>2.64</td>
</tr>
<tr>
<td>2004</td>
<td>6.24</td>
<td>9.36</td>
</tr>
<tr>
<td>2005</td>
<td>4.12</td>
<td>1.97</td>
</tr>
<tr>
<td>2005</td>
<td>4.85</td>
<td>2.05</td>
</tr>
<tr>
<td>2006</td>
<td>0.24</td>
<td>0.85</td>
</tr>
<tr>
<td>2006</td>
<td>0.33</td>
<td>0.36</td>
</tr>
<tr>
<td>2006</td>
<td>0.78</td>
<td>3.54</td>
</tr>
<tr>
<td>2006</td>
<td>-0.29</td>
<td>4.74</td>
</tr>
<tr>
<td>2006</td>
<td>2.39</td>
<td>5.40</td>
</tr>
<tr>
<td>2006</td>
<td>1.06</td>
<td>2.61</td>
</tr>
</tbody>
</table>

**Treasury Yield Curve**

- **Percent**
- **Year Ending Friday**
- **09/18/06**
- **09/25/06**

**Adjusted Monetary Base**

<table>
<thead>
<tr>
<th>Year</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>0.64</td>
<td>5.66</td>
<td>0.28</td>
<td>11.76</td>
<td>-1.73</td>
<td>2.16</td>
</tr>
<tr>
<td>2005</td>
<td>0.22</td>
<td>0.37</td>
<td>-5.71</td>
<td>4.12</td>
<td>3.71</td>
<td>6.66</td>
</tr>
<tr>
<td>2006</td>
<td>2.92</td>
<td>5.07</td>
<td>-2.08</td>
<td>0.37</td>
<td>2.75</td>
<td>-5.50</td>
</tr>
</tbody>
</table>

**Real Treasury Yield Curve**

- **Percent**
- **Year Ending Friday**
- **09/18/06**
- **09/25/06**

**Reserve Market Rates**

- **Percent**
- **Effective Federal Funds Rate**
- **Revised Federal Funds Rate**

**Inflation-Indexed Treasury Yield Spreads**

- **Percent**
- **Year Ending Friday**
- **09/18/06**
- **09/25/06**

*See table of contents for changes to the series.*
Monetary Trends

<table>
<thead>
<tr>
<th>Money Stock</th>
<th>Bank</th>
<th>Adjusted</th>
<th>Domestic Nonfinancial Debt</th>
<th>Currency Held by the Nonbank Public</th>
<th>Checkable and Savings Deposits</th>
<th>Repurchase Agreements and Eurodollars*</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>M2M</td>
<td>M2**</td>
<td>Percent change from year ago</td>
<td>Percent change from year ago</td>
<td>Percent change from year ago</td>
<td>Percent change from year ago</td>
</tr>
<tr>
<td>2001</td>
<td>2002</td>
<td>2003</td>
<td>2004</td>
<td>2005</td>
<td>2006</td>
<td>2007</td>
</tr>
<tr>
<td>1140.196</td>
<td>1196.188</td>
<td>1273.742</td>
<td>1344.831</td>
<td>1371.928</td>
<td>1318.426</td>
<td>1388.677</td>
</tr>
<tr>
<td>5215.744</td>
<td>5081.069</td>
<td>6317.022</td>
<td>6570.629</td>
<td>6718.064</td>
<td>4309.049</td>
<td>4905.971</td>
</tr>
<tr>
<td>5213.352</td>
<td>5909.509</td>
<td>8981.196</td>
<td>8255.925</td>
<td>6537.799</td>
<td>6171.729</td>
<td>6644.113</td>
</tr>
<tr>
<td>7648.507</td>
<td>8595.055</td>
<td>8797.321</td>
<td>9234.718</td>
<td>7696.477</td>
<td>9003.705</td>
<td>6430.049</td>
</tr>
<tr>
<td>2001</td>
<td>2002</td>
<td>2003</td>
<td>2004</td>
<td>2005</td>
<td>2006</td>
<td>2007</td>
</tr>
<tr>
<td>1140.196</td>
<td>1196.188</td>
<td>1273.742</td>
<td>1344.831</td>
<td>1371.928</td>
<td>1318.426</td>
<td>1388.677</td>
</tr>
<tr>
<td>5215.744</td>
<td>5081.069</td>
<td>6317.022</td>
<td>6570.629</td>
<td>6718.064</td>
<td>4309.049</td>
<td>4905.971</td>
</tr>
<tr>
<td>5213.352</td>
<td>5909.509</td>
<td>8981.196</td>
<td>8255.925</td>
<td>6537.799</td>
<td>6171.729</td>
<td>6644.113</td>
</tr>
<tr>
<td>7648.507</td>
<td>8595.055</td>
<td>8797.321</td>
<td>9234.718</td>
<td>7696.477</td>
<td>9003.705</td>
<td>6430.049</td>
</tr>
<tr>
<td>2001</td>
<td>2002</td>
<td>2003</td>
<td>2004</td>
<td>2005</td>
<td>2006</td>
<td>2007</td>
</tr>
<tr>
<td>1140.196</td>
<td>1196.188</td>
<td>1273.742</td>
<td>1344.831</td>
<td>1371.928</td>
<td>1318.426</td>
<td>1388.677</td>
</tr>
<tr>
<td>5215.744</td>
<td>5081.069</td>
<td>6317.022</td>
<td>6570.629</td>
<td>6718.064</td>
<td>4309.049</td>
<td>4905.971</td>
</tr>
<tr>
<td>5213.352</td>
<td>5909.509</td>
<td>8981.196</td>
<td>8255.925</td>
<td>6537.799</td>
<td>6171.729</td>
<td>6644.113</td>
</tr>
<tr>
<td>7648.507</td>
<td>8595.055</td>
<td>8797.321</td>
<td>9234.718</td>
<td>7696.477</td>
<td>9003.705</td>
<td>6430.049</td>
</tr>
</tbody>
</table>

Note: All values are given in billions of dollars. *See table of contents for changes to the series.

**We will not update the MSI series until we revise the code to accommodate the discontinuation of M3.

Research Division
Federal Reserve Bank of St. Louis
Monetary Trends

Bank Credit
Percent change from year ago

Investment Securities in Bank Credit at Commercial Banks
Percent change from year ago

Total Loans and Leases in Bank Credit at Commercial Banks
Percent change from year ago

Commercial and Industrial Loans at Commercial Banks
Percent change from year ago

Adjusted and Required Reserves
Billions of dollars

Total Borrowings, nsa
Billions of dollars

Excess Reserves plus RCB Contracts
Billions of dollars

*Actual value for September 2001 is $3.4 billion.

Nonfinancial Commercial Paper
Percent change from year ago

As of April 10, 2006, the Federal Reserve Board made major changes to its commercial paper calculations. For more information, please refer to http://www.federalreserve.gov/releases/gnp/about.htm.

Consumer Credit
Percent change from year ago

Research Division
Federal Reserve Bank of St. Louis
Inflation and 1-Year-Ahead Inflation Expectations

Percent

The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2003, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See notes on page 19.

Treasury Security Yield Spreads

Yield to maturity

Real Interest Rates

Percent, Real rate = Nominal rate less CPI inflation

Gross Domestic Product

Percent change from year ago

Dashed lines indicate 10-year moving averages.

Real Gross Domestic Product

Percent change from year ago

Dashed lines indicate 10-year moving averages.

Gross Domestic Product Price Index

Percent change from year ago

Dashed lines indicate 10-year moving averages.

M2

Percent change from year ago

Dashed lines indicate 10-year moving averages.