The Federal Funds Rates and Long-Term Rates

T
he Federal Open Market Committee (FOMC) increased its target for the federal funds rate from 1.0 percent in late June 2004 to 5.25 percent (as of February 2007) in a series of 17 consecutive 25-basis-point adjustments. But this rise in the funds rate is not reflected in long-term yields: The 10-year Treasury yield averaged 4.75 percent in June 2004 and 4.72 percent in February 2007. It is widely accepted that the absence of a change in long-term yields alongside a large change in the funds rate marks a break in the historical relationship between these rates and has been referred to as a “comoduranum.” I argue that the break in this relationship between long-term and short-term rates may have occurred in the early 1990s.

It is well known that over sufficiently long periods of time, long-term and short-term rates move together. The attached chart shows this by plotting the effective federal funds rate, the 10-year Treasury yield, and the relationship of the 10-year Treasury yield to the federal funds rate from May 1982 to February 2007. The ratio is close to 1.0 at the beginning and end of the period, after both rates had declined by about 900 basis points. From May 1982 to late 1990 the funds rate and the 10-year yield moved relatively closely together, and the ratio deviated relatively little from 1.0 despite relatively large swings in rates. As rates continued to fall in the early 1990s (the funds rate declined more than the 10-year yield), the ratio increased to a peak of nearly 2.9 in December 1992. Moreover, the deviation of the ratio from 1.0 was very persistent, with the ratio remaining above the previous peak from the May 1991-January 1995 sample period. The ratios began increasing dramatically in early 2001, reaching a peak of 4.5 by June 2004 before falling back to 1.0; during this time, the FOMC was increasing its target federal funds rate relative to an essentially unchanged 10-year yield.

Larger and more persistent departures of the ratio from 1.0 since the early 1990s, despite the less-volatile long-term yield, suggest that the recent comoduranum may be a dramatic example of a fundamental change in the relationship between the federal funds rate and the 10-year yield that occurred in the early 1990s.

This interpretation is supported by regressing monthly changes in the 10-year yield on monthly changes in the funds rate. When the equation is estimated using monthly data over the May 1982–December 1990 period, the estimated slope coefficient is 0.41 (indicating that, on average, a 104-basis-point change in the funds rate would be associated with a 41-basis-point change in the 10-year yield) and is highly statistically significant, with a t-statistic of 5.46. Moreover, the adjusted R-squared (R^2) is 22 percent, indicating that 22 percent of the monthly variation in the 10-year yield is accounted for by the funds rate. However, when estimated over the January 1991–June 2004 period, the estimated slope coefficient declines to 0.14 and is not statistically significant. Indeed, the estimated R^2 indicates that the funds rate accounts for less than 1 percent of the monthly variation in the 10-year yield over this period. The results are not appreciably different when the equation is estimated over the July 2004–February 2007 period. Furthermore, the results are qualitatively the same if quarterly data are used. The reason for this marked change in the behavior of these rates is a topic for further research.

—Daniel L. Thornton

Sources

Agence France Presse: French news wire.
Bank of Canada: Canadian news wire.
Board of Trade Economic Analysis: GDP.
Bureau of Labor Statistics: CPI.
Chicago Board of Trade: Federal funds futures contract.
Chicago Mercantile Exchange: Eurodollar futures.
Congressional Budget Office: Federal 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/
Conventions used in this publication:

1. Unless otherwise indicated, data are monthly.
2. Shaded areas indicate recessions, as determined by the National Bureau of Economic Research.
3. Percent change at an annual rate is the simple, not compounded, monthly percent change multiplied by 12. For example, using consecutive months, the percent change at an annual rate in x between month t-1 and the current month t is: \( \left[ \frac{x_{t} - x_{t-1}}{x_{t-1}} \right] \times 1200 \). Note that this differs from National Economic Trends. In that publication, monthly percent changes are compounded and expressed as annual growth rates.
4. The percent change from year ago refers to the percent change from the same period in the previous year. For example, the percent change from year ago in x between month t-12 and the current month is: \( \left[ \frac{x_{t} - x_{t-12}}{x_{t-12}} \right] \times 100 \).

We welcome your comments addressed to:

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On March 23, 2006, the Board of Governors of the Federal Reserve System ceased the publication of the M3 monetary aggregate. It also ceased publishing the following components: large-denomination time deposits, RPs, and eurodollars.

Definitions

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

M2: M1 minus large-denomination time deposits, physical monetary gold and silver bullion held by depository institutions, and currency held by the U.S. Treasury. M3: M2 minus net worth of Federal Reserve Banks.

M2: M1 plus savings deposits (including money market deposit accounts) and large-denomination (over $100,000) time deposits associated with depository institutions; Eurodollars (deposits held by banks outside the United States and not held in the United States), and currency held by nonbanks.

M3: M2 plus large-denomination (over $100,000) time deposits; repurchase agreements owned by depository institutions; Eurodollars, deposits held by banks outside the United States and not held in the United States, and currency held by nonbanks.

Adjusted Monetary Base: The sum of currency in circulation outside Federal Reserve Banks and the net change in reserves required to service the demand for currency.

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 on the quantity of base money held by depository institutions. This series is a simple chain index; see Anderson and Rudebusch (1996a, 2003).

Monetary Stock Indices: An index that measures the flow of monetary services received by households and firms from their holdings of liquid assets; see Anderson and Rudebusch (1997). Indices are based on the assets included in M2, with additional data at research.stlouisfed.org/indicators/index.html.

Note: M1, M2, M3, Bank Credit, and Domestic Monetary Indices 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 1.2 (and 1.2d, 1.2f, 1.2g, 1.2h, 1.21, 1.22, 1.23, 1.24, 1.25, 1.26, 1.27, 1.28, 1.29, 1.30, 1.31, 1.32, 1.33, 1.34, 1.35, 1.36, 1.37, 1.38, 1.39, 1.40, 1.41, 1.42, 1.43, 1.44, 1.45, 1.46, 1.47, 1.48, 1.49, 1.50, 1.51, 1.52, 1.53, 1.54, 1.55, 1.56, 1.57, 1.58, 1.59, 1.60, 1.61, 1.62, 1.63, 1.64, 1.65, 1.66, 1.67, 1.68, 1.69, 1.70, 1.71, 1.72, 1.73, 1.74, 1.75, 1.76, 1.77, 1.78, 1.79, 1.80, 1.81, 1.82, 1.83, 1.84, 1.85, 1.86, 1.87, 1.88, 1.89, 1.90, 1.91, 1.92, 1.93, 1.94, 1.95, 1.96, 1.97, 1.98, 1.99, 1.100).
Monetary Trends

M1 M2 M3

Percent change at an annual rate

2002 4.9% 12.76% 7.36% 7.98%
2003 6.46% 7.42% 6.99% 6.40%
2004 5.58% 4.02% 4.68% 5.09%
2005 2.04% 2.25% 4.36% 5.97%
2006 0.18% 4.03% 4.71% 4.95%

2005 1 -0.58% 0.06% 3.08% 5.63%
2 0.05% 0.70% 3.05% 5.98%
3 1.96% 4.15% 4.98% 7.81%
4 -0.26% 4.66% 4.88% 9.29%
2006 1 1.35% 4.18% 5.36%
2 0.50% 2.72% 3.27%
3 -3.52% 4.02% 4.20%
4 -0.13% 7.56% 6.78%
2007 1 -0.62% 8.62% 8.17%

2005 Mar 2.39% 0.52% 3.84% 4.25%
Apr -11.86% 0.30% 1.63% 6.97%
May 8.36% -0.24% 2.81% 5.80%
Jun 11.76% 4.21% 5.15% 7.48%
Jul -10.65% 3.85% 4.29% 4.58%
Aug 8.66% 5.44% 6.30% 12.56%
Sep 0.83% 6.56% 6.07% 10.48%
Oct -4.01% 5.04% 4.57% 9.79%
Nov 0.93% 1.97% 3.55% 5.67%
Dec -2.40% 4.21% 4.47% 8.99%
2006 Jan 7.51% 7.37% 7.95% 10.49%
Feb -3.25% 1.52% 4.18% 6.55%
Mar 7.48% 1.98% 3.36%
Apr -3.17% 3.47% 3.38%
May 6.29% 2.05% 1.91%
Jun -10.20% 4.43% 4.51%
Jul -3.89% 3.44% 4.34%
Aug 0.39% 5.06% 4.85%
Sep -6.69% 4.71% 4.04%
Oct 4.60% 9.45% 8.67%
Nov 1.16% 7.04% 7.06%
Dec -4.37% 10.96% 7.06%
2007 Jan 5.13% 8.28% 10.27%
Feb -10.55% 5.20% 5.23%
Mar 7.65% 13.26% 9.57%

*See table of contents for changes to the series.

Updated through 04/17/07

M2 and M3

Billions of dollars

Adjusted Monetary Base

Percent change at an annual rate

Reserve Market Rates

Percent

Inflation-Indexed Treasury Yield Spreads

Percent

Treasury Yield Curve

Percent

Real Treasury Yield Curve

Percent
## Monetary Trends

### Money Stock

<table>
<thead>
<tr>
<th>Year</th>
<th>M1</th>
<th>M2M</th>
<th>M2</th>
<th>M2**</th>
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<tbody>
<tr>
<td>2002</td>
<td>1195.221</td>
<td>5880.427</td>
<td>5500.430</td>
<td>8299.555</td>
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<tr>
<td>2003</td>
<td>1273.495</td>
<td>6316.470</td>
<td>5861.308</td>
<td>8767.321</td>
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<tr>
<td>2004</td>
<td>1344.923</td>
<td>6570.332</td>
<td>6251.698</td>
<td>9234.718</td>
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<tr>
<td>2005</td>
<td>1371.916</td>
<td>6718.681</td>
<td>6533.679</td>
<td>9736.477</td>
</tr>
<tr>
<td>2006</td>
<td>1374.374</td>
<td>6988.712</td>
<td>6841.510</td>
<td>10270.74</td>
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### Bank Credit

<table>
<thead>
<tr>
<th>Year</th>
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<th>M2M</th>
<th>M2</th>
<th>M2**</th>
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</thead>
<tbody>
<tr>
<td>2005</td>
<td>1 368.653</td>
<td>6655.182</td>
<td>6436.480</td>
<td>9528.052</td>
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<tr>
<td>2006</td>
<td>1 378.392</td>
<td>6965.659</td>
<td>6725.407</td>
<td>9641.125</td>
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### Adjusted Monetary Base

<table>
<thead>
<tr>
<th>Year</th>
<th>M1</th>
<th>M2M</th>
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<th>M2**</th>
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<tbody>
<tr>
<td>2002</td>
<td>5596.806</td>
<td>697.892</td>
<td>85.158</td>
<td>234.008</td>
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<td>2003</td>
<td>6122.841</td>
<td>740.830</td>
<td>93.313</td>
<td>315.152</td>
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<td>2004</td>
<td>6689.942</td>
<td>776.711</td>
<td>96.069</td>
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<td>2005</td>
<td>7240.591</td>
<td>806.316</td>
<td>96.246</td>
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<td>2006</td>
<td>7949.443</td>
<td>835.025</td>
<td>94.859</td>
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### Domestic Nonfinancial Debt

#### Percent change from year ago

<table>
<thead>
<tr>
<th>Year</th>
<th>M1</th>
<th>M2M</th>
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<td>2005</td>
<td>1 396.424</td>
<td>796.249</td>
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<td>339.358</td>
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<td>2006</td>
<td>1 391.150</td>
<td>830.484</td>
<td>96.450</td>
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</tbody>
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### Currency Held by the Nonbank Public

#### Percent change from year ago

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<tr>
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### Time Deposits

#### Percent change from year ago

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### Checkable and Savings Deposits

#### Percent change from year ago

<table>
<thead>
<tr>
<th>Year</th>
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</tbody>
</table>

### Money Market Mutual Fund Shares

#### Percent change from year ago

<table>
<thead>
<tr>
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**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.

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Inflation and 1-Year-Ahead Inflation Expectations

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 = Nominal rate less year-over-year 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.