

**FRBNY Blackbook**

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**RESEARCH AND STATISTICS GROUP**

**FOMC Background Material**

**January 2006**

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# FRBNY BLACKBOOK

## January 2006

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## 1. Overview

Our central forecast and risk assessment are consistent with another 25 basis point increase in the federal funds target rate at the January 31st meeting. Conditional on the committee implementing that change, however, we recommend that the statement language be configured in such a way as to lead financial markets to expect the near-term path for policy to be extremely sensitive to incoming data.

Our uncertainty over the appropriate near-term policy path increased over the inter-meeting period because of unexpectedly weak real GDP growth in 2005Q4 as well as the decline in the term spread to levels approaching those that historically have signaled a significant likelihood of recession. As noted above, this increased uncertainty has not led us to alter our general support for a 25 basis point increase in January. Our justification for this recommendation is threefold. First, our outlook for near-term inflation is little changed from the last FOMC meeting. Second, fourth quarter growth in non-auto consumption and business fixed investment were fairly robust, with the weakness in the overall number being driven largely by a weakness in inventory investment relative to expectations and a likely transitory drop in federal spending. Third, financial markets have not altered their expectations for a January increase, a fact that would effectively transform a pause at the January meeting into an easing.

Real GDP growth is anticipated to moderate slightly to just under 3½% over the course of 2006 and 2007. The deceleration of demand is expected to offset any lagged pass-through of higher energy costs, and keep core inflation rates near current levels (2% or less for core PCE). The current gap between headline inflation and core inflation is expected to dissipate as energy prices stabilize.

Longer-term inflation expectations still appear to be well-contained, as gauged by breakeven rates on indexed securities and consumer surveys. The latest sharp run-up in oil prices so far appears to have had little impact on either short- or long-term views of inflation.

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A continuing challenge for monetary policy in the current environment is communicating our views. The policy cycle has now evolved to the point where there is less certainty regarding the near-term path of the funds rate; upside risks to core inflation do not appear to have diminished, while downside risks to output are a bit more evident. It will be important to communicate that a pause in tightening is now more likely in the near-term, but that such a pause would not by itself signal that the funds rate has peaked.

This Blackbook includes three special topics. The first examines the yield curve and real activity around peaks of monetary tightening cycles. The second argues against claims that the term spread has lost its power to predict recessions. The third argues that the benefits of increasing the target funds rate to 4.5% in January are outweighed by the risks of doing so.

## 2. Recent Developments

### U.S.

*Summary.* The U.S. economy grew at a much slower-than-expected 1.1% (annual rate) in Q4. While the data on Q4 GDP has not changed our forecast numbers for GDP in 2006 in a significant way, it has added to the uncertainty concerning the forecast. Recent core inflation measures remain elevated compared to the 1½% implicit target, indicating continued upside risk to that target. Lower energy prices pushed down overall inflation measures in November and December, but recent rises in energy prices suggest a reversal in coming months. As expected, consumption growth in Q4 was weak. The housing market has shown further signs that it has begun to slow from the frenzied pace of the summer and autumn. While monthly business spending and production indicators had shown more vigor, inventory investment and capital spending in Q4 were weaker than expected. This weakness and an unexpected drop in defense spending were the main sources for the slowdown in Q4 activity. Payroll employment growth is close to trend, although hours growth has been rather flat. Wage growth continued to pick up moderately. Consumer confidence measures maintained their recent rebound, while business survey indicators generally remained at levels consistent with solid growth.

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*Inflation.* Core inflation measures remain somewhat elevated compared to desired levels [see Exhibit A-6]. The core PCE deflator increased 0.1% in November, and its 12-month change was 1.8%. On a quarterly basis, the core PCE deflator increased 2.2% (annual rate); year-over-year, the increase was 1.9%. While the 12-month and year-over-year changes are about ½ percentage point below the corresponding change at the end of 2004, they still remain above the assumed implicit point target and near the upper end of the acceptable range of inflation consistent with price stability. Although the monthly change in the core CPI declined from 0.25% in November to 0.2% in December, there has been a rebound in core CPI inflation after some very soft numbers during the summer. The 12-month change slightly increased from 2.1% in November to 2.2% in December. Core goods inflation has been hovering around zero, while core services inflation has moderated slightly from earlier in Q4. The core PPI increased 0.1% in both November and December. The index is unchanged over the last three months, with its 12-month change standing at 1.8%.

With the moderation in energy prices in November and December, inflation rates declined but remained elevated. The 12-month change in the overall PCE deflator declined from 3.4% in October to 2.7% in November. On a quarterly basis, the overall PCE deflator rose 2.6% (annual rate). For the CPI, the 12-month change declined from 4.3% in October to 3.4% for the months of November and December. Measures of underlying inflation derived from time series models indicate inflation pressures remain high relative to the implicit inflation target of the FOMC and the signal from the core PCE deflator. In contrast, our underlying inflation gauge (UIG) was little changed at longer (2-3 and 3-5 year) horizons [see Exhibit A-7]. Alternative measures of “core” inflation have remained flat recently [see Exhibit A-8] but remain close to the upper end of the acceptable range. Moreover, longer-term inflation expectations from TIPS changed little and remained contained, while household survey expectations edged down further in January. Given the recent uptick in energy prices, the lower inflation expectations should be taken as encouraging news.

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*Real activity.* Real GDP only grew by 1.1% (annual rate) in Q4, significantly below our expectation of 3% growth for the quarter. The main sources for the error were in inventories and defense spending; the latter is expected to reverse in coming quarters. Consumption growth was weak in the quarter; in addition, the housing market shows further signs of slowing. Business investment in Q4 was weak relative to our prior projections, suggesting more uncertainty about its future outlook.

Consumption growth in Q4 was 1.1% (annual rate), close to our expectations, primarily because auto sales were weak resulting from a payback from the summer's incentive-induced surge. Auto sales rebounded some in December to 17.2 million units (annual rate): a sales pace over 16 million in coming months would indicate that the Q4 slowdown was a temporary pullback. Retail sales excluding autos increased modestly in December. More encouragingly, services expenditures were fairly robust in November. Future data will be important in determining whether the consumption slowdown is temporary as we expect, particularly the discretionary services component of PCE.

There were further signs that the housing market has slowed from the more frenzied pace of the summer and autumn. Total and single-family housing starts fell in December to their lowest level since March. Existing home sales fell for the third consecutive month in December; their level is the lowest since March 2004. New home sales rose modestly in December, but remain below the pace earlier in the year. The growth rate of the median price of existing and new home sales also fell. Still, mortgage purchase applications have risen modestly in recent weeks, which suggest that the slowing in the market may not be unusually severe compared to the historical response to a monetary tightening.

Business fixed investment rose a modest 2.8% (annual rate) in Q4, which was below our expectations. In particular, the 3.5% increase in equipment and software was the smallest increase since 2003Q1. Nevertheless, monthly business spending indicators generally had been strong in Q4. Shipments of nondefense capital goods excluding aircraft in Q4

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were 3.5% above their Q3 average; orders for these goods indicate favorable near-term momentum.

Inventory investment contributed 1.5 percentage points to Q4 GDP growth, almost a full percentage point below our expectations. Even though business expenditures were rather weak in Q4, manufacturing production rose a brisk 8% (annual rate) in the quarter. The increase in production partly reflects a rebound from hurricane disruptions and a Boeing strike. Production growth in the IT sector continued to be robust, which is consistent with the growth in our Tech Pulse index.

*Labor market.* Although payroll employment rose only 108,000 in December, there was a substantial upward revision from 215,000 to 305,000 for November and a modest downward revision for October. The numbers thus now show that the hurricane recovery was concentrated in November. With regard to the December numbers, manufacturing employment gained while retail employment fell—most likely because of sluggish holiday hiring relative to assumed seasonal factors. Like employment, hours were soft as the aggregate hours index fell. Despite the December drop, aggregate hours rose at an annual rate of 1.8% in Q4, just under the Q3 pace. The unemployment rate fell 0.1 percentage point to 4.9% in December. The labor force participation rate fell slightly to 66.0%, while the employment-population ratio held steady. Unemployment insurance claims data suggest a firm labor market. Both initial claims and continuing claims showed a marked drop at the beginning of the year. However, the decline in claims may reflect a combination of seasonal factors and the lower pace of holiday hiring this past year, and thus may not be expected to persist. If they do maintain these lower levels, it would signify a firmer labor market than our current assessment.

The wage component of labor compensation appears to be firming a bit. Average hourly earnings rose 0.3% in January, with the 12-month change at 3.1%. This is above the 12-month gains of 2.7% observed during the first half of 2005. However, the drop in hours in December offset the gain in hourly wages, leaving average weekly earnings unchanged and suggesting modest growth for private wages and salaries.

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*Surveys.* Consumer confidence indicators continued to climb in December and early January, and are either nearing or surpassing their pre-Katrina levels. Lower energy prices have likely played a key role in the rebound in consumer sentiment. Business survey indicators continue to hold up well, although they have shown some retreat from recent levels. The ISM manufacturing and non-manufacturing indices, the Chicago ISM index, the Empire state Index, and the Philadelphia Fed Index continue to paint a positive picture. The one exception has been the Richmond Fed manufacturing index, which has turned slightly negative. However, further analysis of this development resulted only in a very small downward revision to our advance GDP estimate for Q4. The prices paid index associated with each of the surveys generally declined some, indicating only a modest abatement in price pressures.

### **Global**

The outlook for the foreign major economies in 2006 is somewhat more favorable since the last FOMC. Data have been favorable worldwide and suggest the global economy is currently performing well. The two key differences in the outlook concern China and Mexico. In the case of China, upward revisions of past GDP data have increased the estimate of the country's potential growth rate, raising the forecast for 2006 from 8.5 percent to 9.0 percent (Q4/Q4). With Mexico, strong production data through November has led to an upward revision of the outlook, particularly in the near-term.

*Industrial Countries.* The euro area economy rebounded in the second half of last year and recent data point to a fair amount of momentum entering 2006. Industrial production jumped in November after a soft October reading, while orders increased again in November and continued along the upward trend that started in mid-2005. Export growth accelerated to 10 percent over year-ago levels in November. The index of industrial confidence continued its improvement through December and readings from Germany suggest the index will again move higher in January. The outlook is unchanged since the last FOMC outlook, as the data are not yet strong enough to suggest above-potential growth.



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Recent Japanese data indicate that the economy is continuing to expand in 2005Q4, although there are some concerns. Industrial production and exports grew smartly in October and November, and business confidence continues to improve. However, the unemployment rate rose to 4.6 percent in November, up 0.4 percentage points in two months. Consumption indicators were also weak in November. Price data indicate a slow ending of deflation. The change in core CPI over its year-ago level was just above zero in November, the first increase in two years.

The Canadian economy continues to perform well, supported by its commodity-based industries. The United Kingdom is having a moderate-paced recovery. Unlike in previous quarters, however, good news came from consumption, while the labor market offered cause for concern.

*Emerging Economies.* China's growth was strong in 2005 and should be robust again this year, with a continuing shift in its growth composition from net exports to domestic demand. The growth forecast for 2006 has been raised to reflect revisions to the historical GDP series that have increased our estimate of trend growth. Data for end-2005 generally were strong, particularly for domestic demand. Notably, import growth surged to 28 percent (annual rate) in Q4, and has remained above 20 percent since mid-2005. Going forward, the new Five Year Plan, coming in March, may further boost growth if the government works to spur the development of non-tradable sectors.

For the NIEs, growth in 2005 is estimated to have come in at 6.0 percent (Q4/Q4), above our previous forecast of 5.2 percent. The upgrade is a response to strong Q4 GDP data for Korea and Singapore, and robust production and export data across the region. Looking forward, domestic demand in the region is expected to continue its recent firming trend, with export growth moderating from the elevated pace of the past few months. The 2006 forecast is unchanged at 4.3 percent.

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After their strong Q3 performance, Mexico and Argentina reported robust data for Q4, leading to another upward revision of the growth forecasts for these countries. Even with this upward revision, Mexican growth is still expected to moderate over the course of the year due to uncertainties surrounding the upcoming elections and the resulting political transition. Although the outlook for Argentina is more favorable, a significant deceleration in growth is expected this year due to capacity constraints and efforts to contain double digit inflation. In Brazil, activity recovered in October and November after a very weak third quarter. The pace of recovery, though, looks to have been somewhat slower than what had been anticipated. Easing monetary policy, some fiscal loosening, and a supportive external environment are expected to sustain the recovery in 2006.

### **Trade**

The U.S. trade deficit broke its string of several high readings and fell from \$68.1 billion in October to \$64.2 billion in November. The decline was caused by a rise in export volumes, lower oil prices, and a drop in imports of consumer goods.

From September on, volatile energy prices have caused imports to fluctuate to an unusual degree: Up in September and October, then down again in November when lower prices caused oil imports to fall by \$1 billion from the previous month. Growth in the volume of imports has been fairly steady and moderate.

Real net exports are reported to have taken 1.2 percentage points off GDP in 2005Q4 and are forecasted to take 0.4 percentage points off growth in 2006Q1. The large drag for Q4 was due to a rebound in real imports, particularly in consumer goods, automobiles, and oil. Real export growth was weak for the second quarter in a row, due softness in sales of industrial supplies and capital goods. Over the four quarters of 2006, the assumption of strong U.S. domestic demand growth leads to a forecast of a drag from net exports on GDP growth of roughly 0.5 percentage points.

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## Financial

### *Domestic markets*

TIPS implied inflation at the 2-year horizon increased from 2.17% on December 12 to 2.45%, while at the 5-year horizon it rose from 2.34% to 2.46% over the same time period [Exhibit B-1]. These increases reflected carry effects; once inflation expectations are adjusted for carry, they declined from 2.69% to 2.57% at the 2-year horizon and from 2.55% to 2.49% at the 5-year horizon [Exhibit B-2].

Since the last FOMC meeting, the nominal yield curve out to five years has flattened and even has inverted on some inter-meeting dates. The flattening of the yield curve has been driven by a rise in short-term rates and a decline in long-term rates [Exhibit B-3]. On December 12<sup>th</sup>, the 3-month yield was 3.92% and the 5-year yield was 4.47%. Currently, the 3-month yield is 4.43% and the 5-year yield is 4.43%. The closely watched 3-month to 10-year spread has narrowed from 54 basis points after the last meeting to 8 basis points. The narrow spread at this stage of the tightening cycle has been related historically to declining real activity and rising unemployment [see the special topic “Monetary Tightening Cycles and Real Activity”].

To some extent, these changes in the nominal curve are also reflected in the real yield curve. The carry-adjusted term structure of real yields remains upward-sloping out to 20 years, but this part of the curve has flattened since the last meeting due to a rise in yields at the short end. Beyond 20 years, the real yield curve is now downward-sloping.

Based on Fed Funds futures prices, market participants expect a 25 basis point increase in the funds rate to 4.50% (94% probability) at the February meeting. A further rate increase to 4.75% at the March meeting is viewed as likely but not certain based on the Desk’s dealer survey (60% probability) and Fed Funds options (63% probability). The expected Fed Funds rate path peaks in July 2006 at 4.70%, which is consistent with some uncertainty about whether the FOMC will tighten further after the upcoming meeting. The funds rate then is expected to decline steadily to 4.38% in May 2008. Although

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expectations about rate changes through July have not changed substantially since the last meeting, the market now appears to have priced the possibility of an additional 25 basis point rate cut in late 2007/early 2008[Exhibit B-4]. However, a somewhat different view emerges from the Desk's primary dealer survey which reports an expected funds rate of 4.75% through 2007.

Implied skewness has risen about 0.50% since the last meeting, which is consistent with concerns about unexpected tightening; this usually occurs during a period of declining Fed Funds rates [Exhibit B-5]. Corporate spreads over Treasuries have not changed significantly in the inter-meeting period with BBB, BB, and B spreads moving by 1, -17, and -1 basis points, respectively.

Interest rate volatility is expected to remain at relatively low levels. Since the last meeting, implied 10-year and 30-year Treasury volatility have declined slightly (about 10 basis points) to 4.76% and 7.410% respectively. Eurodollar implied volatilities are also low compared to the past; the one-month implied volatility is around 100 basis points [Exhibit B-6]. In contrast, equity market volatility has risen over the inter-meeting period. Implied S&P500 volatility is up from 11.47% after the previous FOMC meeting to 12.42%, while NASDAQ implied volatility increased from 14.83% to 17.55%. It remains to be seen whether these higher levels of equity volatility will persist.



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*Monetary Policy and Global Bond Markets*

Differences in monetary policy cycles between the United States and its main partners and renewed upward pressure on energy prices shaped global financial developments in the inter-meeting period.

In Europe, stronger economic data and a stream of anti-inflation ECB rhetoric strengthened expectations of higher short-term rates for 2006. The next policy rate hike is seen as unlikely before March, but the modal rate for end-2006 implied in option prices is now 3 percent, or 75 basis points above its current level. In response to higher short-term rates, the spread between 10- and 2-year German sovereign debt yields narrowed over the inter-meeting period, reaching multi-year lows, as long-term yields remained largely unchanged. The curve may flatten further over the year, as the ECB tightens policy and well-anchored inflation expectations restrain long-term rates.

The Bank of Japan is still on hold, awaiting the end of deflation. The Bank continues to allow for temporary shortfalls of banks' reserve balances below their target range, but expectations persist that quantitative easing will be abandoned before end-2006 and replaced by a zero-interest-rate target. Meanwhile, after the Government quashed earlier concerns of premature tightening by the Bank of Japan, JGB yields fell, especially at the long end of the curve.

Monetary tightening gained momentum in Asia, with Korea, Taiwan and Thailand raising rates in December, and Thailand hiking again earlier this month. The Bank of Canada raised its policy rate 25 basis points for the fourth straight time, to 3.5 percent, pressured by buoyant markets for primary commodities and an economy running at near-full capacity.

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Bucking the trend towards monetary tightening is Latin America, where rates were cut in Mexico and Brazil and loose conditions persist in Argentina. The next move by the Bank of England is also expected to be a rate cut, as reflected by falling long rates.

### *Equity Markets*

Stock markets were jittery during the inter-meeting period, rattled by higher prices for energy products and local developments – especially in Asia. European indices started the year strongly, and then gave up some of their gains, ending 5 percent above their level at the last FOMC on January 27. Japanese markets were also volatile, falling sharply in mid-January on news of alleged securities law violations by a popular internet start-up company, Livedoor. Indices recovered later, led by domestic-related sectors, and ended on January 27 about 4 percent above their level at the last FOMC. In Emerging Markets, the MSCI equity index continued to rise, while the spread on the EMBI+ bond index narrowed to record lows.

### *Exchange Rates and Capital Flows*

Global saving continues to flow unabated to the United States, with oil-exporting countries, Japan, and China continuing to fund most of the U.S. inflows. However, the inter-meeting period saw the re-mergence of dollar weakness, whose role in accommodating continued inflows to the United States had been recently overshadowed by policy tightening in the United States. The approaching end of the U.S. tightening cycle, contrasting with higher rates and favorable economic news abroad, is triggering a change in investor sentiment. Option-based volatility quotes point to greater investor uncertainty about future rates among major currencies, especially the yen/dollar pair.

The euro appreciated against the dollar over the inter-meeting period, reaching \$/euro 1.22 on January 27. The yen also strengthened, especially early in January, though it lost some of its gains in the wake of local financial turbulence and as perceptions strengthened of still low yen interest rates ahead. Still, on January 27, the yen was 3

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percent stronger against the dollar than at the time of the last FOMC. The Brazilian real and the Mexican peso stabilized after previous depreciation, while other Emerging Asian currencies appreciated against the dollar. China's yuan continued to move in a very narrow range, but changes in China's foreign exchange market, including the introduction of an over-the-counter and market-making system, augur further – albeit modest – yuan appreciation ahead. Asian currencies' appreciation would have been even stronger, had regional central banks not stepped up their reserve purchases in January to an extent not seen since last spring. The effect of these movements was a depreciation of the dollar relative to main partner currencies of nearly 3 percent since the last FOMC meeting.

### *Oil Market Developments*

Solid global demand for energy products combined with supply-side disruptions to lift oil prices during the inter-meeting period. Energy markets were tormented by tensions between Russia and Ukraine, raising concern about Russia's reliability as an energy supplier, as well as by production shortfalls in Iraq and Nigeria and concern with political developments in Iran. After averaging \$58.36 in November, the price of West Texas Intermediate peaked at about \$67 per barrel in January, and averaged \$64.60 per barrel in the first three weeks of the month. Oil demand is projected to accelerate to 2.2 percent in 2006 from 1.3 percent in 2005, and will likely sustain high prices in 2006, despite a recovery in U.S. oil production. Modest production increases are expected in Former Soviet Union countries and OPEC, while African producers should boost their output during the year. Oil price assumptions based on average futures prices are for WTI prices of \$67.50 in Q4 2006 and \$67.00 in Q4 2007, up from \$60.00 and \$60.50 at the time of the last cycle.

### **Second District**

Our Indexes of Coincident Economic Indicators for December indicate tepid growth in New York City and New Jersey and a modest decline in New York State [Exhibit E-1].



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Looking ahead to the next nine months, our leading indexes predict weak to moderate growth throughout the region: economic activity is projected to grow about 2% (annual rate) in New Jersey and less than 1% in both New York State and New York City [Exhibit E-2]. Local-area inflation moderated somewhat at the end of 2005—as of December, metropolitan New York City's Consumer Price Index (CPI) was up 3.6% from a year earlier, compared with 3.9% in November. The core CPI also decelerated slightly: the 12-month change was 2.6% versus 2.2% nationally.

*Labor Markets.* The region's job market showed signs of softening at year end. Based on the establishment survey, private-sector employment was up only marginally in both New York and New Jersey, rising less than 1% (annual rate). Between December 2004 and December 2005, private-sector employment was up roughly 1% in both states, while New York City registered a somewhat stronger gain [Exhibit E-3]. Looking at the household survey, New Jersey's jobless rate continued to edge up in December, while New York State's rate dipped. Still, unemployment rates in both states generally have trended up since mid-2005.

*Real Estate.* Commercial real estate markets across the New York City metropolitan region showed greater strength in the fourth quarter of 2005. Vacancy rates fell by roughly a full percentage point or more in Midtown Manhattan, Downtown Manhattan, and Fairfield County (CT); and were little changed throughout the rest of the metropolitan region [Exhibit E-4]. Asking rents were up moderately. Industrial markets were relatively steady, on balance, in the fourth quarter. One exception was in Long Island, where the vacancy rate fell to a five-year low. In the residential sector, prices of single-family homes as well as Manhattan co-ops and condos continued to post double-digit year-over-year gains in the fourth quarter. However, unit sales slipped well below year-earlier levels; in Manhattan, apartment sales reportedly fell to its lowest quarterly level in more than eight years.

*Surveys and Other Business Activity.* Recent surveys indicate steady and fairly strong levels of business confidence in the region as well as a rebound in consumer confidence.

January's Empire State Manufacturing Survey indicated a slight deceleration in manufacturing activity but more widespread optimism about the six-month outlook. Meanwhile, both Siena College's monthly survey of New York State residents and the Conference Board's survey of regional residents (NY, NJ, PA) show consumer confidence extending its rebound (from a post-Katrina slump) in December, ending the year at a five-month high.

### 3. Outlook

#### FRBNY's Central Forecast

There are three fundamental factors behind our central projection [see Exhibits A-1 to A-5].

1. Inflation expectations are well-contained.
2. There is little if any slack remaining in resource utilization. Therefore, if there are no large shocks, future growth will be near its potential rate of approximately 3¼-3½% (2¼-2½% long-run productivity growth plus 1% labor force growth).
3. Long-term interest rates will remain relatively low.

Recent developments have not led us to change these underlying assumptions for the central forecast. However, the low real GDP growth and higher inflation in Q4 as well as the flat yield curve have raised the uncertainty about our forecast. As such, the forecast will be more sensitive to the incoming data than it has been recently.

*Inflation.* Monthly changes in headline price indexes were low or negative in the inter-meeting period, as energy costs declined and non-energy inflation stayed near recent levels. Despite the recent run-up in oil prices, we expect little net change in oil prices and in overall energy prices over the forecast horizon. We continue to assume that, in an environment of flexible product and labor markets as well as continued FOMC credibility, there will be only modest pass-through of the jump in energy prices to other areas. Therefore, we expect core PCE inflation to be around 2% in 2006. With flat

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energy prices, overall PCE inflation should also come in around 2%. In 2007, a slow moderation begins as FOMC credibility and monetary tightening effects begin to take hold, causing core PCE inflation to decline slowly as it returns gradually toward its implicit target.

*Real Activity.* We continue to expect the economy to maintain a growth rate around our estimate of potential (3¼%-3½%) over the forecast horizon. The slowdown in residential investment now becoming evident may be a factor reducing domestic demand growth below what we have seen over the last few years. Rebuilding from the storms may lead to slightly higher output growth in the first half of this year, counterbalancing the retrenchment in housing during this period. We still see the modest growth in consumption during Q4 to be a temporary phenomenon, and thus we anticipate real consumption growth to be around 3-3½% over the forecast horizon. We expect capital spending growth to be maintained, although the weak numbers in Q4 make this more uncertain. With real growth around potential growth over the forecast horizon, we expect the unemployment rate to remain near 5%.

### Comparison with Greenbook Forecasts

*GDP and Inflation Forecast.* The January Greenbook (GB) forecast is conditioned on a monetary policy stance more restrictive than the one assumed in December. The path of the federal funds rate is assumed to increase 25 basis points at the first two meetings of this year and remain constant at 4.75% until mid-2007, when it is assumed to decline 25 basis points (this reduction is motivated as a response to declining inflation). Despite the tighter policy stance, both inflation and output growth projections are slightly higher than those presented in December.

- Overall and core PCE inflation are revised up by 0.2 and 0.1 percentage point respectively for 2006 (they are now 2.3% and 2.5% respectively). In 2007 only the overall PCE deflator is revised up by 0.1%.
- Real GDP growth, while revised down for 2005 Q4/Q4, because of a much slower

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than anticipated Q4, is revised up by 0.2 percentage points for 2006 (3.7% vs. 3.5%).

- Structural labor productivity growth remains unchanged, but potential GDP growth for 2007 is raised by 0.1 percentage point.
- Actual productivity growth is lower for 2005 (2.7% vs. 3.2%), but is higher for 2006 (3.1% vs. 2.7%), and unchanged for 2007. Together with the projected potential GDP growth, this would suggest some narrowing of the output gap projection relative to December. However, the GB raised its estimate of the gap at the end of 2005. As such, even though the path of the output gap remains similar – it narrows in 2006 and widens again in 2007 – it is 0.1% larger than the one in the December GB in both 2006 and 2007.
- The projections of private payroll, unemployment rate and participation rate are essentially unchanged.

Our projected path for GDP growth is smoother than the GB path. While we project a decline from 3.6% in 2005 to 3.4% and 3.3% respectively in 2006 and 2007, the GB, as described above, still sees relatively robust growth in 2006 and relatively slow growth in 2007. The factors slowing the economy by the end of the forecast horizon in the GB are the tighter stance of monetary policy, the waning fiscal stimulus, and smaller gains in household wealth; but it is not completely clear what brings a rebound of GDP growth in the current year.

The GB inflation projections are slightly more optimistic than those of our staff. While we also anticipate a decline in the overall and core measures of PCE inflation, the GB puts both measures at 1.8% for 2007, whereas the staff forecast has overall PCE inflation at 2% and core PCE inflation at 1.8%.

Compensation, productivity, and labor costs differ more significantly. While we predict a smooth path of compensation per hour throughout the forecast horizon, slightly higher than the December forecast, the GB compensation projections are 2 percentage points higher in 2006 and 2007 relative to 2005. This is interpreted in the GB as a return to a more normal path of compensation increases, whereas 2005 is seen as an anomaly.

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Together with a lower projected productivity growth, the higher compensation growth translates into higher labor costs in the GB versus our forecast.

Finally, a significant difference remains between the FRBNY and the GB forecasts of payroll employment, both in the level and in the path of adjustment. We expect a large drop in 2006, and a further small decline in 2007, while the GB predicts a marginal adjustment down in 2006 and a very dramatic drop in 2007.

*Alternative Board Scenarios.* The January GB analyzes five different scenarios. The implications for output, inflation, and unemployment are examined under the assumed baseline path for the federal funds rate, and under the alternative assumption that the Fed reacts to economic developments according to a Taylor rule. Finally, the GB also reports the outlook of the baseline scenario under the lower path for the federal fund rate implied by financial markets.

The scenarios considered are slightly different from the December GB, but similarly chosen to consider both downside and upside risk on inflation and output going forward. The first three are alternative spending scenarios that primarily affect real output growth, while the last two alter some of the baseline supply side assumptions with effects primarily on inflation.

*Scenario 1: Increase in long term interest rate*

This scenario assumes that the term premium raise sharply in the first half of 2006, boosting the long term interest rate a full percentage point relative to the baseline. Spending contracts especially from the second half of 2006 onward, causing a significant decline in GDP growth, respectively down to 1.8% in 2006-H2, and to 1.3% in 2007. Unemployment jumps to 5.3% and 6.2% in the same periods, while core PCE inflation comes down to 2% and 1.5% respectively. The contraction is moderately mitigated when a policy response is assumed.

*Scenario 2: Demand more robust than anticipated*

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This scenario assumes away the slowdown in residential investment and the increase in the savings rate incorporated into the baseline. All categories of spending are assumed instead to grow enough to raise the equilibrium real rate 1½ percentage point over its baseline value. In this situation the baseline path of the federal fund rate is more accommodative, which pushes output growth above 4% in 2006 and 2007, and unemployment below 5%. Inflationary pressures are largely contained by expectations of future monetary tightening, and core PCE inflation is only 0.1 percentage point higher than the baseline. In this scenario, a monetary policy response would contain somewhat both the output expansion and the fall of the unemployment rate.

*Scenario 3: Rapid increase in the saving rate*

This scenario assumes a saving rate 1 percentage point higher than in the baseline. The effects are the flip side of *scenario 2*, and not surprisingly imply a deceleration of output growth, and an increase in unemployment, although not nearly as dramatic as in *scenario 1*. Again, there is no significant effect on inflation.

*Scenario 4: Lower NAIRU*

The baseline scenario puts the NAIRU at 5%. This scenario assumes instead a NAIRU at 4.25%, about one standard error below baseline estimate. The intent is to explore the implications of current policy when the amount of slack in the economy is underestimated. Output growth is now a touch higher because underlying growth in potential is stronger, but the most notable effect is on inflation. With or without a monetary policy response, core PCE inflation is about 0.2 percentage point below the baseline over the forecast period.

*Scenario 5: Unanticipated cost-push shock*

As happens in *scenario 4*, adverse cost shocks may lead to significantly higher inflation. Under the assumption that a set of supply shocks of the size of those experienced in 2004 hit the economy – an additional \$10 increase in the price of oil and a 4% increase in intermediate material prices – core PCE inflation rises to close to 2.5% in 2006-H2 and

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2007. Although there is no significant effect on output growth, unemployment edges up slightly.

*Scenario 6: Less tight policy stance*

The last scenario returns to the baseline, but conditions on the market implied path for the federal funds rate, which is about 20 basis points lower than the baseline through 2007. The less tight policy stance boosts modestly real activity in 2006-H2 and 2007, shaving off 0.1 percentage point from the unemployment rate and adding 0.1 percentage point to inflation in 2007.

The usual caveats for the interpretation of these scenarios apply: they tell an economic story about what could go wrong in the outlook, but it is difficult to attach any probability to these scenarios or to feel confident in the estimates of parameters such as the wealth effect embedded in them. It is notable that a monetary policy in the form of a Taylor rule, which is quite aggressive in response to output gap, is very moderately effective. It would be interesting to know which path of the federal funds rate this rule implies.

*Foreign Outlook.* The key differences with the Board's outlook concern the forecasts for China and Mexico. For China, the Board expects substantial slowing from 9.9 percent (Q4/Q4) in 2005 to 7.7 percent in 2006. Our slowing is more modest, to 9.0 percent as we do not see factors which would push growth below our estimate of China's potential growth rate. The Board has a more favorable outlook for Mexico. We have revised up our forecast in response to recent data, but still expect political uncertainty to cause a modest deceleration in growth this year. The Board expects some acceleration this year based on a strong finish to 2005.

*U.S. Trade.* The Board's forecast has less of a drag on GDP growth from net exports in 2006. For 2006, they forecast a -0.1 percentage point drag from net exports (Q4/Q4) while we forecast a -0.5 percentage point drag. The export forecasts are similar, while the Board has less import growth. One reason is that they assume a decline in oil imports this year, while we have oil imports rising for the year as a whole. We assume U.S.

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consumption increases relative to the recovery to domestic production despite higher oil prices. A second difference with the import forecast is due to the Board's dollar assumption which leads to higher import prices and lower real import growth.

### **Alternative Scenarios and Risks**

*Alternative 1: Global Deflation.* This scenario is related to changes in the world economy, particularly the growth of the Chinese economy and the stagnation of the economies of Europe and Japan. The growth of the Chinese economy represents a shift in the aggregate supply curve, leading to higher growth and lower inflation in the US. On the other hand, the stagnation of the European and Japanese economies represent a shift in the aggregate demand curve, leading to lower inflation and lower growth in the US. The net effect of these shifts has been unambiguous in terms of lowering inflation and lowering long-term yields. These developments have been supportive of recent growth in the US. However, the downside risk in this scenario comes from an abrupt slowdown in Chinese growth without a compensating increase in Europe or Japan, thereby generating an unfavorable deflationary shock to the world economy. While recent reported improvements in Chinese economic performance and revisions in their national accounts act to lower slightly the probability of this scenario, the decline in real interest rates over the inter-meeting period suggests the probability should not be lowered much.

*Alternative 2: Productivity.* In the post-war era, the United States has experienced three productivity epochs (pre-1973, High I; 1973 to mid-1990s, Low I; and mid-1990s onward, High II). Our current central projection for productivity in the medium-term assumes a growth rate similar to the pre-1973 epoch. There are two alternatives to this projection. One of these alternatives, introduced further below, is intended to capture a risk similar to that implied by a yield curve inversion.

#### *2a. Productivity Boom*

The developments in the labor market and the continued strength of labor productivity over the longer-term—despite the recent short-term moderation—suggest that firms have become more efficient in using labor. As such, strong productivity growth could persist,



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which would imply that the potential growth rate is higher than our current estimates. Strong productivity growth would also limit labor cost pressures, and thereby help to keep inflation subdued. Fourth quarter projections of productivity growth (based on the advance GDP release) is less supportive of this scenario. However, the scenario is still supported by the continued strength in IT industrial production growth, the FRBNY Tech pulse index, and hi-tech equipment and software expenditure indicators.

### *2b. Productivity Slump*

It is possible that the source of the recent upswing in productivity is temporary. Further, the persistent increase in the level and volatility of energy prices as well as the reallocation of resources produced by recent natural disasters in the US could also be associated with lower labor productivity growth. The fourth quarter estimate of a decline in productivity is supportive of this scenario.

*Alternative 3: Overheating.* The extremely accommodative policy adopted in the US and other countries since the global slowdown of 2000-2003 may produce a persistent move in inflation above implicit targets with an abrupt slowdown in real output growth starting in early 2006. There are two potentially connected channels at work here. The first is a continued underestimate of the equilibrium real rate (i.e., an overestimate of slack in the economy) and the second is higher energy prices. Sustaining the real policy rate below the equilibrium rate for a long time will tend to switch the impact of monetary policy from increasing real output to raising inflation due to an eventual increase in inflation expectations. The recent evidence from core inflation reports has not been supportive of this viewpoint. TIPS implied inflation rates give no indication that markets are pricing in a large increase in underlying inflation, and the UIG also does not indicate a large increase. Further, household inflation expectations have come back down with the decrease in retail gasoline prices and there is some evidence of an ordered slowdown in the housing market. However, it is possible that some of the moderation in total consumption expenditure will turn out to be more than just weather and auto-incentive related, and that the slowdown in housing may be more severe. If so, then this scenario would receive more weight going forward.

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*Alternative 2b': More Intense Productivity Slump.*

We adopt Alternative 2b as a starting point, but we now assume a much larger fall in output. This scenario along with the changed risk assessment we describe below can produce the likelihood for a recession similar to that implied by the current near yield curve inversion. The higher inflation produced in this alternative tends to mitigate the risk of nominal defaults in the corporate sector. Thus, it attempts to explain the lack of a recession signal from corporate credit spreads. Further, since the appropriate monetary policy response to the slump is attenuated by the opposite movements of activity and inflation, it is also consistent with the low implied volatility in Eurodollar options.

*Additional Uncertainties*

*Foreign Outlook.* Positive output indicators for the major foreign economies at the end of 2005 were encouraging evidence that the global economy was successfully managing high energy prices. A key question is whether this resilience can be maintained in response to the recent spike in energy prices. Another concern is the health of the U.S. economy which has been a key source of global demand. The weak preliminary GDP data for 2005Q4, particularly in consumption and fixed investment spending, is a new risk to the global growth outlook.

An upside risk for the euro area is that the economy grows significantly above potential in 2006, closing the output gap that has developed since 2000. Investment spending has been encouraging, but above potential growth will require significantly more robust consumer spending than has occurred in recent years. The downside risk is also centered on consumer spending, with the concern that higher oil prices will have a greater-than-expected impact on real spending going forward.

One upside risk to the forecast for Japan is that record corporate profits will lead to greater-than-expected investment spending in 2006. In addition, the landslide victory of Prime Minister Koizumi in the September 11th election bodes well for future reforms of

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the Japanese economy. However, the possibility still remains that a premature fiscal or monetary tightening could derail the expansion.

The Chinese authorities have let the RMB appreciate against the dollar at only a 1.2 percent annualized pace since the initial revaluation in July. The Chinese authorities' marked preference for gradualism raises the risk that future currency moves will be too small to forestall trade tensions with major partners.

Many currencies in Emerging Asia came under renewed appreciation pressures earlier in January. The region could see a new round of worries about the stability of local currency arrangements, along with potentially destabilizing capital inflows.

In Latin America, the concern is how financial markets will react to developments related to upcoming elections. In Mexico, the July election will be closely contested and will probably be followed by a period of uncertainty until the new government takes office in December 2006. In Brazil, the approach of presidential elections in October 2006 has already triggered increased criticism of economic policy and created momentum behind proposed stimulus measures, including a significant increase in public sector salaries and the minimum wage.

*U.S. Trade Forecast.* There is notable uncertainty about when petrochemical and refinery-related plants will return to normal production levels. Price declines in petrochemicals due to new capacity in the Middle East and China may reduce incentives for some U.S. plants to return to full operation, leading to higher imports and lower exports of chemicals in 2006. A second uncertainty is how the recent dollar appreciation will affect the trade balance. The dollar's rise against the yen and the euro may have a larger effect than anticipated in markets where U.S. firms compete with Japanese and European firms.

*Quantifying the Risks.* The incoming data has been less consistent with our central scenario. Therefore, we are lowering the current probability assessment of the central

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scenario to 67% (it was 68% for the December FOMC). We assume that the most likely alternative scenario is the productivity slowdown at 12% (8% in December), followed by the productivity surge at 10% (12% in December), then overheating at 6% (6% in December), and finally global deflation at 2% (3% in December). The remaining 3% (3% in December) is split evenly between upside and downside risks. The implied dynamic balance of risks is shown in Exhibit C-1. For the case of the more intense productivity slowdown, we have dramatically increased its likelihood and now assign it a probability of 20%.

The forecast distributions for core PCE inflation and GDP growth produced by the standard risk assessments are shown in Exhibits C-4 and C-5. The Bank forecast has been extended through the end of 2008 under the assumption that output grows at the potential rate of 3.3% and inflation converges back to the implicit inflation target of 1.5%. The probability of core PCE inflation exceeding 2.5% by the end of 2008 is now 55% (50% in December) (this probability is produced by considering the share of inflation paths that exceed 2.5% and cannot be obtained directly from the forecast distribution presented in Exhibit C-4). The probability that the expansion continues through the end of 2008 is unchanged at 95%. Under the alternative set of simulations with a higher probability of a more intense productivity slowdown, the probability that the expansion continues across all scenarios drops to 80% and the probability of core PCE inflation exceeding 2.5% by the end of 2008 increases to 60%.

The FRBNY “confidence intervals” are analogous to those presented in the Greenbook under our standard risk assessment. In general we have a similar level of confidence in our output forecast, but less confidence in the inflation forecast. For example, the Greenbook has a 70% probability interval of 0.9% to 2.8% for core PCE inflation in 2007, while our interval ranges from 0.6% to 3.6%.

## 4. Policy Alternatives

Under our main forecast and risk assessment, the FFR should be raised by 25 basis points at the upcoming meeting. Under an alternative simulation with a more intense productivity slowdown, the argument to raise the FFR to 4.50 in January is not as strong. The argument for not raising rates at the January meeting is further supported by two special topics in the policy alternatives section. The first box critically analyzes recent arguments that the term spread has lost its predictive value. The second box develops an argument that the benefits of increasing the FFR to 4.50 in January are outweighed by the risks, independent of our current assessment of the state of the economy.

At this juncture and in light of the extent of the previous increases in the FFR, as well as the current narrow spread between short-term and long-term interest rates, it is appropriate that policy decisions become increasingly driven by the underlying flow of the data and its affect on the forecast; a view consistent with recent FOMC commentary. The recent numbers have only slightly altered our central forecast, which remains consistent with a terminal value of 4.50 to 4.75 for the FFR. On the other hand, we view the risks as having increased and this development accentuates the sensitivity of future policy decisions to incoming data. It is important that this sensitivity be communicated to markets.

To provide a quantitative analysis of these issues we examine the prescription of three different policy rules:

1. *Dove (below market expectations)*. Increase 25 basis points in January, signal no future increases: data dependent signal noting moderation of inflationary pressures and strength of productivity growth.
2. *Dual (at market expectations)*. Increase 25 basis points in January with a mixed signal of an increase in March.
3. *Inflation Hawk (above market expectations)*. Increase 25 basis points with a strong signal of reducing core inflation to (implicit) target or range on a sustained basis.

The preamble to the D-Exhibits contains a description of how the various rules react to incoming data.

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Exhibit D-1 contains the results of averaging the prescription of these three rules over the Bank forecast. It shows the implied (quarterly average path) of FFR through the end of 2006 compared to that currently priced into markets.

Both the *Inflation Hawk* and *Dual* rules produce a higher level for the FFR at the end of 2006 than presently is priced into financial markets. Further, the gap between the market expectation and the expected values prescribed by these two rules is larger than in December using the metrics introduced in the September Blackbook as shown in Exhibit D-6.

Exhibit D-5 shows there is a high probability that 4.75% represents a ceiling for the FFR under the *Dual* rule, and that the *Dove* rule puts more weight on rate cuts in 2006. There continues to be some positive skewness in the distribution of FFR implied by our rules (that is, the expected value is above the median as can be seen in the Exhibits D-5 and D-6). There is no evidence that such positive skewness is priced into markets [see Exhibit B-5], but the positive skewness is consistent with Fed commentary concerning risks to price stability. Under the alternative simulation, the implied variability of the FFR is only slightly higher than the standard simulation as inflation and output move in opposite directions muting the response.

If we focus on the *Dual* signal, which appears to be most consistent with market expectations for the next two meetings, then the alternative scenario of global deflation continues to have very different implications for policy in 2006 and 2007. Exhibit D-2 contains the path of the nominal FFR and Exhibit D-3 contains the path of the real FFR for our four main alternative scenarios.

As seen in Exhibit D-2, the projected path of the FFR is much higher under the overheating scenario in 2006 than under our central projection or the market-implied path. The path of the FFR under the global deflation scenario is very different, even in the short-run, from the other paths as the Fed reacts quickly to signs of deflationary

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pressures. The productivity slump scenario is relatively easy to identify because of its differential effects on output and inflation [see Exhibits C-2 and C-3]. The identification would be even easier in the case of the alternative simulation that includes a more intense productivity slowdown.

Exhibit D-4 shows the result of running our standard policy rule (setting the initial FFR at its value in 2004Q4) with a 1.5% inflation target and with a 1.75% inflation target. The path derived from the 1.5% target closely follows the actual FFR increases in 2005, albeit with less steepness to its slope. The expected endpoint is lower than that from our three policy rules discussed above and provides some evidence that “gradualism” embedded in the three policy rules we examine is currently producing a tighter stance of policy, compared to looser stance of policy it prescribed in 2004.

# Special Topic II

## Is the Yield Curve a Foolproof Indicator?

January 27th, 2006  
 Arturo Estrella <sup>Redacted</sup> Jonathan McCarthy <sup>Redacted</sup>

In his reply to an inquiry from Representative Saxton on the signals from the recent flattening of the yield curve, Chairman Greenspan wrote: "Although the slope of the yield curve remains an important indicator, it needs to be interpreted carefully. In particular, a flattening of the yield curve is not a foolproof indicator of future economic weakness."

The need for careful interpretation of any indicator is indisputable. The claim in the second sentence is supported by two separate analyses presented in the document. The first is a case study of the period from 1992 to 1994 that suggests that the yield curve produced a misleading signal. The second identifies three basic factors that affect the slope of the yield curve and analyzes the possible effects of these factors. Only one of the factors is seen to have reliable predictive characteristics, but the predictive relationship is deemed not to be causal. This box examines these analyses in somewhat greater detail.

### 1. Empirical Evidence from 1992 to 1994

Greenspan's reply states that "the yield curve narrowed sharply over the period 1992-1994 even as the economy was entering the longest sustained expansion of the postwar period." The narrowing of the term spread during this period was much more apparent for that between the 10-year and 2-year rates. The spread between 10-year and 3-month rates, used in most of the published empirical analysis of the relationship between the yield curve and economic activity and for which the indicator properties are more robust, changed relatively little during this period; it did not begin to decline significantly until late 1994 and 1995.

Moreover, it is the level of the term spread – not its change – that provides an indicator for future activity. Thus, a sharp drop by itself would not necessarily be a precursor to a recession or a substantial slowdown in real growth. In fact, the term spread remained quite positive during this episode as well as through the subsequent tightening. The difference in the current episode is that the term spread is at a level that indicates a substantial risk of rising unemployment [see the special topic "Monetary Tightening Cycles and Real Activity"].

### 2. Three Factors that Affect the Slope

The three factors affecting the slope of the yield curve identified in the reply are expected changes in (1) real interest rates, (2) expected inflation, and (3) risk premiums. Underlying statistical analysis is purported to show that the predictive power stems mainly from the first component. The reply also provides conceptual reasons why only this component should reliably exhibit the observed predictive relationship, but notes that this link is not causal. Two points should be made about this analysis. First, previous research has shown that the predictive relationship is more related to nominal rather than real interest rates. Second, the possibility that the relationship is not causal speaks more to our limited knowledge of the links between the spread and real activity rather than the reliability of the indicator. For example, some theoretical analysis suggests a relationship between the term spread and real activity through expectations of future monetary policy.

Although past results are no guarantee of future performance, one should not ignore strong and persistent empirical relationships. Therefore, it is important not to discount what the yield curve may be telling us at this time.

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<sup>1</sup> Harvey (1988) uses the real term spread as a predictor and the empirical results are not robust. More recently, Ang, Piazzesi and Wei (forthcoming) find that predictive power stems from the expected inflation component.

<sup>2</sup> Eijffinger, Schaling and Verhagen (2000), Hardouvelis and Malliaropulos (2004), and Estrella (2005) are examples



# Special Topic III

## The Case for a Pause

January 27th, 2006

Jim Kahn <sup>Redacted</sup> and Joe Tracy <sup>Redacted</sup>

For the first time in nearly two years, the arguments for postponing a rate increase have become substantive, as has the case for signaling that, whether or not the Committee decides to boost the funds rate this time, the likelihood of an increase in March is no more than 50%.

The case for no rate increase at this meeting rests on the following set of arguments:

- Current policy may already be somewhat contractionary; this reflects not just concerns about inverting the yield curve, but more broadly the uncertainty about the current level of the “equilibrium real interest rate.”
- The full effects of policy changes often occur later and are stronger than expected. This means that the lack of current indicators of a slowdown is not decisive on the question of whether policy is currently contractionary or not. If we wait until we see more such indicators, it may be too late.
- The communication challenge involved in a pause would seem to be mitigated in the current circumstance. The data over the next couple of months will likely be quite informative as to whether the weakness in fourth quarter GDP is temporary or if it is the beginning of a series of weaker quarters. If, as expected, the flow of data points to a strong first quarter, then the committee can raise the funds rate 25 bp with more confidence that this is appropriate.
- There is little upside to further tightening right now. While it is possible that a yield curve inversion will not lead to a recession, with output close to potential and inflation expected to be within the comfort zone, it is difficult to make a persuasive case for taking the risk.

Amplifying on the last point, toward the end of a tightening phase, policymakers have to balance the risks of two kinds of mistakes. They can raise the rate too high and bring about a recession, or they can stop too soon and end up with an increase in inflation. If these two bad outcomes are symmetric—that is, they

are equally costly—then rate increases should stop when the probabilities of each are approximately equal. Thus if an increase of the funds rate to 4.5 percent is seen as bringing about a recession with a 40 percent chance, but would also leave a 40 percent chance of a sustained inflation increase, then 4.5 would be an appropriate stopping point. However, there are good reasons to think the two scenarios are not symmetric. History suggests that once a downturn begins, monetary policy cannot generally prevent it from turning into a recession. Beginning in January 2001 the funds rate was brought down relatively quickly (300 basis points by August), but a recession occurred anyway. By contrast, history does not suggest that, starting from a situation in which inflation is currently—and is expected to remain—within the comfort zone (albeit on the high side), leaving the rate too low for one meeting cycle could cause such an increase in inflation pressures that the damage could not be undone in the next meeting. This is especially true if policymakers have high credibility on inflation. Such credibility provides policymakers with the luxury of a more “wait-and-see” approach.

This argument also is stronger if it is hard to reverse course from one meeting to the next. This makes the recession scenario even more costly, while affecting the inflation scenario little. In late 2000 when it became clear the economy was deteriorating, the FOMC was reluctant to jump straight from an upward balance of risks to a rate cut, so it just changed the balance to downward, and then had an inter-meeting cut in January 2001.

The conclusion from this analysis is that even if the likelihood of recession associated with raising the rate to 4.5 percent is relatively low compared to the cost of leaving the rate too low, the asymmetry in the magnitude of the costs implies that the best course is to pause and await more data.

Alternatively, given forecasts that the real economy and inflation will stay in satisfactory shape, and that market anticipants have widely anticipated a rate increase and already incorporated it into their economic decision-making, the Committee could decide to increase the funds rate by 25 basis points, but communicate that further increases are not very likely. This would represent an easing of policy relative to market expectations, and would signal that the risks to inflation and output are balanced. This presumes that a 4.5 percent funds rate represents moderately contractionary policy, so as to keep inflation contained but not slow the economy much.

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## A. Forecast Details

### **Exhibit A-1. Actual and Projected Percentage Changes in GDP, Prices, and the Unemployment Rate**

Summary of the FRBNY forecast for the current FOMC cycle as well as the previous two cycles. Provides the forecasts of real GDP growth, change in the GDP deflator, change in the PCE deflator, the change in core PCE deflator, and the level of the unemployment rate. Data frequencies are both quarterly and yearly over the forecast horizon.

*Source: MMS Function, FRBNY*

### **Exhibit A-2. Detailed Comparison of FRBNY and Greenbook Forecasts**

Summary of the baseline FRBNY and Board forecasts for the current FOMC cycle as well as the previous cycle. Besides variables included in Exhibit A-1, there are forecasts for some broad components of GDP, some measures of productivity and wages, labor force participation, payroll employment growth, and some financial market variables.

*Source: MMS Function, FRBNY; Board staff*

### **Exhibit A-3. Judgment Table**

History and forecasts of the primary variables in the FRBNY forecast. This includes the detailed judgments, such as those for interest rates, profit growth, productivity, and real activity, that are behind our forecasts for aggregates such as real GDP and inflation.

*Source: MMS Function, FRBNY*

### **Exhibit A-4. Real GDP and components (growth contributions)**

History and forecasts of the contributions to real GDP growth of the broad components of expenditures. Growth contributions are in percentage points.

*Source: MMS Function, FRBNY*

### **Exhibit A-5. Alternative GDP and Inflation Forecasts**

Real GDP growth and CPI inflation forecasts from a variety of sources. Besides the FRBNY forecast, the table includes the medians from two surveys of forecasters (Blue Chip and Survey of Professional Forecasters [SPF]), the forecasts from Macroeconomic

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Advisers, and the forecast from a small model (PSI model) that uses business activity and sentiment as the primary independent variables.

*Source: MMS Function, FRBNY; Blue Chip Economic Indicators; FRB Philadelphia Survey of Professional Forecasters; Macroeconomic Advisers*

#### **Exhibit A-6 (1, 2, & 3). Recent Behavior of Inflation**

The three tables in this exhibit are included as reference: they show the actual changes in inflation over 1, 3, 6, 12, and 24 months.

*Source: Bureau of Economic Analysis and Bureau of Labor Statistics*

#### **Exhibit A-7. Underlying Inflation Gauge (UIG) and Implied Inflation from the TIPS**

The chart displays measures of inflation expectations from the UIG, and compares them to the TIPS measure over the same horizon (a non-technical description of the construction of this measure is in Appendix to Exhibit A-7 below. A non-technical description of the construction of inflation expectations from the TIPS is in Appendix to Exhibit B-1).

*Source: MMS Function, FRBNY and Swiss National Bank.*

#### **Exhibit A-8. Comparison of Alternative Measures of Trend Inflation**

These charts display widely used measures of trend inflation. The measures of CPI inflation include the core, the median, the trimmed mean (Cleveland Fed) and the UIG measure. The measures of PCE inflation are core and the trimmed mean (Dallas Fed).

*Source: FRB Cleveland, FRB Dallas, MMS Function, FRBNY and Swiss National Bank.*

#### **Appendix to Exhibit A-7. Construction of UIG (Underlying Inflation Gauge)**

The Underlying Inflation Gauge is a measure of underlying inflation that incorporates information from a very broad set of nominal and real variables. It is constructed using a dynamic factor model to extract a common component from the chosen set of variables, and then removes the high frequency movements (fluctuations whose frequency is up to one year) from this component. This filtering reflects our view that monetary policy is primarily interested in shocks with a medium-term impact on inflation. In terms of units, the UIG maps into a measure of consumer price index.

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We use this factor model to determine the oscillations of the UIG about its long-term level. Assuming that long-term expectations are well anchored, we set the long-term level of the UIG to 2.25%, the average inflation rate since 1994, which can be interpreted as an implicit inflation target.

## A. Forecast Details

## Exhibit A-1: Actual and Projected Percentage Changes of GDP, Prices, and the Unemployment Rate

	Real GDP		Chain Type				Core PCE		Unemployment Rate					
	Oct05	Jan06	GDP Price Index		PCE Deflator		Oct05	Jan06	Oct05	Jan06				
	Dec05	Jan06	Oct05	Dec05	Jan06	Oct05	Dec05	Jan06	Dec05	Jan06				
2005 Q1	3.8	3.8	3.1	3.1	3.1	2.3	2.3	2.3	2.4	2.4	5.3	5.3	5.2	
2005 Q2	3.3	3.3	2.6	2.6	2.6	3.3	3.3	3.3	1.7	1.7	5.1	5.1	5.1	
2005 Q3	3.8	4.3	3.1	3.0	3.3	3.7	3.6	3.7	1.3	1.2	5.0	5.0	5.0	
2005 Q4	3.8	3.3	1.1	2.8	3.5	3.0	3.3	3.1	1.8	1.8	4.9	5.0	4.9	
2006 Q1	3.6	3.8	4.0	2.7	2.8	3.2	2.2	1.8	1.9	1.9	4.9	4.9	4.9	
2006 Q2	3.4	3.4	3.2	2.3	2.1	2.3	2.2	2.2	2.0	2.0	4.9	4.9	4.9	
2006 Q3	3.1	3.1	3.4	2.0	2.2	2.3	2.0	2.1	2.1	2.1	4.9	4.9	4.9	
2006 Q4	3.1	3.0	2.8	2.2	2.2	2.3	2.1	2.1	2.1	2.1	4.9	4.9	4.9	
2007 Q1	3.3	3.3	3.3	2.3	2.3	2.4	2.1	2.1	2.0	2.0	4.9	4.9	4.9	
2007 Q2	3.4	3.4	3.4	2.0	2.0	2.1	1.9	1.9	1.8	1.9	4.9	4.9	4.9	
2007 Q3	3.3	3.3	3.5	2.0	2.0	2.1	2.0	2.0	1.8	1.8	4.9	4.9	4.9	
2007 Q4	3.3	3.3	3.2	1.9	2.0	2.0	1.9	1.9	1.7	1.8	4.9	4.9	4.9	
2003 Q4 to 2004 Q4	3.8	3.8	3.8	2.9	2.9	2.9	3.1	3.1	3.1	2.2	2.2	-0.4	-0.4	-0.5
2004 Q4 to 2005 Q4	3.7	3.7	3.1	2.9	3.0	3.0	3.1	3.1	3.0	1.8	1.8	-0.5	-0.4	-0.5
2005 Q4 to 2006 Q4	3.3	3.3	3.4	2.3	2.3	2.5	2.1	2.1	2.3	2.0	2.0	0.0	-0.1	0.0
2006 Q4 to 2007 Q4	3.3	3.3	3.3	2.0	2.1	2.1	2.0	2.0	2.0	1.8	1.9	0.0	0.0	0.0

\* Q4 to Q4 absolute change Notes: Columns reflect the date of a forecast. Italics indicate a data release prior to date of a forecast

## A. Forecast Details

## Exhibit A-2: Detailed Comparison of FRBNY and Greenbook Forecasts

	FRBNY				Board							
	2005		2006		2005		2006		2007			
	DEC	JAN	DEC	JAN	DEC	JAN	DEC	JAN	DEC	JAN		
REAL GDP (Q4/Q4)	3.7	3.1	3.3	3.4	3.3	3.3	3.7	3.4	3.5	3.7	3.0	3.0
GROWTH CONTRIBUTIONS(Q4/Q4)												
FINAL SALES TO DOMESTIC PURCHASERS	3.8	3.4	3.7	3.9	3.6	3.7	3.7	3.7	3.8	3.8	3.3	3.1
CONSUMPTION	2.1	2.1	2.2	2.4	2.2	2.2	2.1	2.1	2.5	2.5	2.4	2.3
BFI	0.8	0.7	1.0	1.0	1.0	1.0	0.7	0.7	0.9	0.8	0.6	0.6
STRUCTURES	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1
EQUIPMENT & SOFTWARE	0.8	0.6	0.8	0.9	0.8	0.8	0.6	0.6	0.6	0.6	0.5	0.5
RESIDENTIAL INVESTMENT	0.4	0.5	-0.1	-0.2	-0.1	-0.1	0.5	0.5	0.0	0.1	0.0	-0.1
GOVERNMENT	0.5	0.2	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3
FEDERAL	0.3	0.1	0.2	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.0	0.0
STATE & LOCAL	0.2	0.1	0.4	0.4	0.4	0.4	0.2	0.2	0.3	0.3	0.3	0.3
INVENTORY INVESTMENT	-0.1	-0.2	0.2	0.0	0.1	0.1	0.0	0.0	-0.1	-0.1	0.2	0.2
NET EXPORTS	-0.1	-0.2	-0.4	-0.5	-0.4	-0.4	-0.1	-0.2	-0.3	-0.1	-0.5	-0.3
INFLATION/PRODUCTIVITY/WAGES (Q4/Q4)												
GDP DEFLATOR	3.0	3.0	2.1	2.5	2.1	2.1	2.7	2.9	2.3	2.2	1.9	2.0
PCE	3.1	3.0	2.1	2.3	2.0	2.0	2.8	2.9	2.1	2.3	1.7	1.8
CORE PCE	1.8	1.9	2.0	2.0	1.9	1.8	1.8	1.8	2.1	2.2	1.8	1.8
COMPENSATION PER HOUR	4.1	4.1	4.6	4.5	4.5	4.5	3.6	3.3	5.3	5.3	5.1	5.2
OUTPUT PER HOUR	3.4	3.3	3.0	3.0	3.0	3.0	3.2	2.7	2.7	3.1	2.8	2.8
UNIT LABOR COSTS	0.7	0.8	1.6	1.5	1.5	1.5	0.4	0.6	2.5	2.1	2.3	2.4
EMPLOYMENT VARIABLES												
UNEMPLOYMENT RATE (Q4 LEVEL)	5.0	4.9	4.9	4.9	4.9	4.9	5.0	5.0	5.0	5.0	5.0	5.1
PARTICIPATION RATE (Q4 LEVEL)	66.1	66.1	66.2	66.1	66.2	66.1	66.1	66.1	66.0	66.0	65.8	65.8
NONFARM PAYROLL EMPLOYMENT (Q4/Q4 CHANGE)												
TOTAL, IN THOUSANDS	1896	1993	1293	1464	1318	1373	2000	2000	1900	1800	1000	1000
AVERAGE PER MONTH, IN THOUSANDS	158	166	108	122	110	114	167	167	158	150	83	83
FINANCIAL MARKET VARIABLES												
FED FUNDS RATE (PERCENT)	3.96	3.97	4.75	4.75	4.70	4.75	4.25	4.25	4.50	4.75	4.50	4.50
BAA BOND YIELD (PERCENT)	6.4	6.3	6.8	6.6	6.8	6.6	6.0	6.3	6.0	6.3	5.9	6.4
EFFECTIVE EXCHANGE RATE (Q4/Q4 % CHANGE)	-0.6	-2.4	-1.6	-1.6	N/A	N/A	2.7	2.6	-1.5	-2.9	N/A	N/A

Note: FRBNY forecast incorporates BEA advanced estimate of Q4 GDP, while Board forecast does not.

## A. Forecast Details

## Exhibit A-3: Judgment Table

	2005:01	2005:02	2005:03	2005:04	2006:01	2006:02	2006:03	2006:04	2007:01	2007:02	2007:03	2007:04	2004	2005	2006	2007
<b>REAL GDP AND COMPONENTS (% Change, AR)</b>																
GDP.....	3.8	3.3	4.1	1.1	4.0	3.2	3.4	2.8	3.3	3.4	3.5	3.2	3.8	3.1	3.4	3.3
CHANGE IN INVENTORIES (GROWTH CONTRIBUTION) 1).....	0.3	-2.1	-0.4	1.5	-0.2	0.1	0.1	0.0	-0.1	0.1	0.2	0.0	0.2	-0.2	0.0	0.1
DOMESTIC PRIVATE PURCHASES.....	4.0	2.1	4.0	2.2	4.1	3.6	3.8	3.1	3.4	3.6	3.7	3.3	4.5	3.1	3.7	3.5
CONSUMPTION EXPENDITURES.....	3.5	3.4	4.1	1.1	3.6	3.4	3.5	3.3	3.2	3.2	3.2	3.2	3.8	3.0	3.5	3.2
BUSINESS FIXED INVESTMENT.....	5.7	8.8	8.4	2.8	9.1	9.1	10.6	9.9	9.2	8.7	8.7	8.7	10.9	6.4	9.7	8.8
RESIDENTIAL INVESTMENT.....	9.5	10.8	7.3	3.5	4.7	-2.6	-2.2	-9.5	-3.8	1.4	0.7	-2.5	6.6	7.7	-2.5	-1.1
NET EXPORTS (GROWTH CONTRIBUTION) 1).....	-0.4	1.1	-0.1	-1.2	-0.4	-0.6	-0.6	-0.5	-0.4	-0.4	-0.4	-0.4	-0.9	-0.2	-0.5	-0.4
EXPORTS.....	7.5	10.7	2.5	2.4	9.0	6.6	6.9	6.7	6.6	6.6	6.6	6.6	6.1	5.7	7.3	6.6
IMPORTS.....	7.4	-0.2	2.4	9.1	8.0	7.9	7.8	7.1	6.5	6.5	6.5	6.5	10.6	4.6	7.7	6.5
FEDERAL GOVERNMENT.....	2.3	2.4	7.5	-7.0	7.3	3.3	2.0	2.0	5.5	1.5	1.5	1.5	4.2	1.2	3.6	2.5
STATE & LOCAL GOVERNMENTS.....	1.6	2.6	0.2	0.4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	0.9	1.2	3.0	3.0
<b>INTEREST RATE ASSUMPTIONS (%)</b>																
FEDERAL FUNDS RATE (TARGET).....	2.44	2.92	3.43	3.97	4.46	4.75	4.75	4.75	4.75	4.75	4.80	4.50	1.94	3.97	4.75	4.5
YIELD ON 10-YR GOVERNMENT.....	4.3	4.2	4.2	4.5	4.6	4.6	4.7	4.7	4.8	4.8	4.8	4.8	4.2	4.5	4.7	4.8
BAA BOND YIELD.....	6.0	6.0	6.0	6.3	6.4	6.5	6.5	6.6	6.6	6.6	6.6	6.6	6.2	6.3	6.6	6.6
<b>INCOME (% Change, AR)</b>																
PERSONAL INCOME.....	2.0	4.5	1.8	9.4	8.2	6.4	7.5	4.3	7.8	6.3	7.5	4.5	7.5	4.4	6.6	6.5
REAL PERSONAL DISPOSABLE INCOME.....	-3.4	0.2	-2.0	7.0	5.7	4.0	5.3	1.9	5.9	4.4	5.6	2.4	4.1	0.4	4.2	4.6
PERSONAL SAVING RATE (% OF DPI).....	0.5	-0.2	-1.8	-0.4	0.0	0.1	0.5	0.1	0.6	0.8	1.3	1.1	1.7	-0.5	0.2	1.0
CORPORATE PROFITS BEFORE TAXES.....	24.5	19.7	-15.2	72.8	-5.5	0.9	1.0	-1.4	-1.0	0.8	0.9	0.6	9.6	21.6	-1.3	0.3
<b>PRICES &amp; PRODUCTIVITY (% Change, AR)</b>																
GDP IMPLICIT DEFLATOR.....	3.1	2.6	3.3	3.0	3.2	2.3	2.3	2.3	2.4	2.1	2.1	2.0	2.9	3.0	2.5	2.1
PERSONAL CONSUMPTION EXPENDITURES.....	2.3	3.3	3.7	2.6	2.5	2.4	2.2	2.2	2.1	1.9	2.0	1.9	3.1	3.0	2.3	2.0
CORE PERSONAL CONSUMPTION EXPENDITURES.....	2.4	1.7	1.3	2.1	2.0	2.0	2.0	2.0	1.9	1.8	1.8	1.8	2.2	2.2	2.0	1.9
CONSUMER PRICE INDEX.....	2.4	4.2	5.1	3.2	2.1	2.8	2.5	2.4	2.3	2.3	2.2	2.2	3.4	3.7	2.4	2.2
CORE CONSUMER PRICE INDEX.....	2.6	2.0	1.5	2.3	2.1	2.2	2.3	2.3	2.2	2.1	2.1	2.0	2.1	2.1	2.2	2.1
COMPENSATION PER HOUR (NONFARM BUSINESS).....	5.5	0.9	3.7	6.5	4.6	4.5	4.4	4.4	4.5	4.4	4.4	4.5	5.8	4.1	4.5	4.5
OUTPUT PER HOUR (NONFARM BUSINESS).....	3.2	2.1	4.7	3.2	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.6	3.3	3.0	3.0
UNIT LABOR COST (NONFARM BUSINESS).....	2.2	-1.3	-1.0	3.3	1.6	1.5	1.4	1.4	1.5	1.4	1.4	1.5	3.2	0.8	1.5	1.5
<b>REAL ACTIVITY</b>																
CAPACITY UTILIZATION (MANUFACTURING, %).....	78.7	78.6	78.5	79.6	79.8	80.1	80.5	81.2	81.6	82.0	82.2	82.4	77.1	78.8	80.4	82.1
CIVILIAN UNEMP RATE (%) 2).....	5.2	5.1	5.0	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	5.4	4.9	4.9	4.9
PRIVATE HOUSING STARTS (THOUS. AR).....	2083	2044	2101	2035	2025	1960	1925	1910	1905	1900	1895	1880	1950	2066	1955	1895
LIGHT VEHICLE SALES (MIL\$, AR) 3).....	16.5	17.2	17.9	15.9	16.4	16.9	17.0	17.0	17.1	17.1	17.1	17.2	16.9	16.9	16.8	17.1
FEDERAL SURPLUS/DEFICIT (Unified Basis, Bil\$, NSA) 4).....	-176.6	45.2	-69.2	-119.3	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	-412.1	-318.6	-346.3	-281.4

NOTE: All series other than interest rates and the federal deficit are seasonally adjusted. Italics indicates a reported value. 1) Growth contribution to real GDP 2) Annual values are end of Q4 levels 3) Includes domestic and foreign auto and light truck sales 4) Yearly numbers are based on the fiscal year

## A. Forecast Details

## Exhibit A-4: Real GDP and Components (Growth Contributions)

	2005				2006				2007			Q4/Q4 % CHANGE/Q4 LEVEL				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2004	2005	2006	2007
<b>REAL GDP (Growth, Annual Rate)</b> .....	<b>3.8</b>	<b>3.3</b>	<b>4.1</b>	<b>1.1</b>	<b>4.0</b>	<b>3.2</b>	<b>3.4</b>	<b>2.8</b>	<b>3.3</b>	<b>3.4</b>	<b>3.5</b>	<b>3.2</b>	<b>3.8</b>	<b>3.1</b>	<b>3.4</b>	<b>3.3</b>
<i>Contributions to GDP growth:</i>																
<b>FINAL SALES TO DOMESTIC PURCHASERS</b> .....	<b>3.9</b>	<b>4.4</b>	<b>4.7</b>	<b>0.9</b>	<b>4.6</b>	<b>3.8</b>	<b>3.9</b>	<b>3.3</b>	<b>3.7</b>	<b>3.7</b>	<b>3.7</b>	<b>3.5</b>	<b>4.5</b>	<b>3.4</b>	<b>3.9</b>	<b>3.7</b>
CONSUMPTION EXPENDITURES.....	2.4	2.4	2.9	0.8	2.5	2.4	2.4	2.3	2.2	2.2	2.2	2.2	2.7	2.1	2.4	2.2
BUSINESS FIXED INVESTMENT.....	0.6	0.9	0.9	0.3	1.0	1.0	1.1	1.1	1.0	1.0	1.0	1.0	1.1	0.7	1.0	1.0
RESIDENTIAL INVESTMENT.....	0.5	0.6	0.4	0.2	0.3	-0.2	-0.1	-0.6	-0.2	0.1	0.0	-0.1	0.4	0.5	-0.2	-0.1
FEDERAL GOVERNMENT.....	0.2	0.2	0.5	-0.5	0.5	0.2	0.1	0.1	0.4	0.1	0.1	0.1	0.3	0.1	0.3	0.2
STATE & LOCAL GOVERNMENTS.....	0.2	0.3	0.0	0.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.1	0.1	0.4	0.4
<b>NET EXPORTS</b> .....	<b>-0.4</b>	<b>1.1</b>	<b>-0.1</b>	<b>-1.2</b>	<b>-0.4</b>	<b>-0.6</b>	<b>-0.6</b>	<b>-0.5</b>	<b>-0.4</b>	<b>-0.4</b>	<b>-0.4</b>	<b>-0.4</b>	<b>-0.9</b>	<b>-0.2</b>	<b>-0.5</b>	<b>-0.4</b>
EXPORTS.....	0.7	1.1	0.3	0.3	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.6	0.8	0.7
IMPORTS.....	-1.1	0.0	-0.4	-1.4	-1.3	-1.3	-1.3	-1.2	-1.1	-1.1	-1.1	-1.1	-1.5	-0.7	-1.3	-1.1
<b>CHANGE IN INVENTORIES</b> .....	<b>0.3</b>	<b>-2.1</b>	<b>-0.4</b>	<b>1.5</b>	<b>-0.2</b>	<b>0.1</b>	<b>0.1</b>	<b>0.0</b>	<b>-0.1</b>	<b>0.1</b>	<b>0.2</b>	<b>0.0</b>	<b>0.2</b>	<b>-0.2</b>	<b>0.0</b>	<b>0.1</b>

Note: Contributions may not add up to GDP growth due to rounding.



## A. Forecast Details

## Exhibit A-5: Alternative GDP and Inflation Forecasts

		GDP					
		2006-Q1		2006-Q2		2006-Q3	
Release Date		Prev*	Jan	Prev*	Jan	Prev*	Jan
FRBNY	1/27/2006	3.8	4.0	3.4	3.2	3.1	3.4
PSI Model	1/27/2006	4.2	3.7	--	3.3	--	--
Blue Chip	1/10/2006	3.5	3.6	3.4	3.4	3.1	3.1
Median SPF	11/14/2005	3.3	3.7	3.4	3.3	3.3	3.2
Macro Advisers	1/12/2006	4.2	4.3	3.6	3.5	3.4	3.4
CPI							
		2006-Q1		2006-Q2		2006-Q3	
Release Date		Prev*	Jan	Prev*	Jan	Prev*	Jan
FRBNY	1/27/2006	2.3	2.1	2.3	2.8	2.4	2.5
Blue Chip	1/10/2006	2.2	2.0	2.4	2.3	2.3	2.2
Median SPF	11/14/2005	2.4	2.4	2.5	2.3	2.4	2.4
Macro Advisers	1/12/2006	2.0	1.9	1.9	1.7	1.8	1.8
Core CPI							
		2006-Q1		2006-Q2		2006-Q3	
Release Date		Prev*	Jan	Prev*	Jan	Prev*	Jan
FRBNY	1/27/2006	2.1	2.1	2.2	2.2	2.3	2.3
Macro Advisers	1/12/2006	2.0	2.2	2.1	2.0	2.1	2.2

Notes: Previous release of SPF is August and of all others is December.

## A. Forecast Details

Exhibit A-6: Reference Table 1 - CONSUMER PRICE INDEX DATA AS OF DECEMBER 2005

	Annualized Percent Change Over Indicated Interval					Weights (December 2003)
	24 Month	12 Month	6 Month	3 Month	1 Month	
<b>Consumer Price Index</b>						<b>Total</b>
Energy	3.4	3.4	3.7	-1.6	-0.6	100.00
	16.7	17.0	20.0	-35.2	-23.8	7.08
<b>All Items Ex Energy</b>						
Food	2.2	2.2	2.2	2.8	2.4	14.38
Food Away From Home	2.5	2.4	2.4	3.0	1.9	6.13
	3.1	3.2	2.9	2.9	2.5	
<b>All Items Ex Food and Energy</b>	2.2	2.2	2.1	2.8	2.4	78.54
Core Chain-Weight CPI (NSA)	1.9	1.7	1.1	0.7	-2.1	100.00
<b>Core Goods</b>						
Apparel	0.4	0.1	-0.1	-0.3	0.0	22.25
Medical Care Commodities	-0.7	-1.1	-1.2	-2.3	-4.0	3.98
Durable Goods	4.3	4.3	3.9	5.1	1.5	1.50
New Vehicles	0.0	-0.5	-1.2	-1.4	-2.1	11.28
Used Vehicles	0.1	-0.4	-1.7	0.9	-1.7	4.82
	3.1	1.4	-1.0	-6.3	-1.7	2.01
<b>Core Services</b>						
Rent of Primary Residence	2.9	3.0	3.1	3.9	3.1	56.28
Owners' Equivalent Rent	3.0	3.1	3.1	3.1	1.6	6.16
Lodging Away from Home	2.4	2.5	2.3	2.4	3.1	23.38
Medical Care Services	4.3	3.3	5.5	25.3	11.5	2.95
Transportation Services	4.7	4.4	3.8	4.9	1.1	4.58
	2.3	2.7	2.5	0.7	-0.5	6.32

## A. Forecast Details

Exhibit A-6: Reference Table 2 - PCE DEFLATOR DATA AS OF NOVEMBER 2005

	Annualized Percent Change Over Indicated Interval				
	24 Month	12 Month	6 Month	3 Month	1 Month
<b>PCE Deflator</b>	3.0	2.7	2.7	2.5	-5.0
<b>Market Based PCE Deflator</b>	2.8	2.7	2.8	2.5	-5.9
<b>Durable Goods</b>	-0.7	-0.9	-2.4	-0.5	-2.0
Motor Vehicles and Parts	1.5	1.4	-0.3	3.6	2.2
<b>Nondurable Goods</b>	3.9	3.1	3.2	0.1	-20.3
Clothing and Shoes	-0.9	-1.5	-2.2	-0.8	2.8
<b>Services</b>	3.3	3.2	3.6	4.4	3.1
Housing	2.6	2.6	2.4	2.4	3.3
Transportation	2.7	3.2	3.7	2.0	2.0
Medical Care	3.1	2.7	2.7	3.1	3.1
<b>PCE Deflator Ex Food and Energy</b>	2.0	1.8	1.5	2.0	1.6
<b>Market Based Core PCE Deflator</b>	1.7	1.6	1.3	1.8	1.9
Personal Business Services-Market Based	3.1	2.3	2.1	1.9	3.1
Personal Business Services-Not Market Based	3.0	1.9	2.3	1.3	0.4

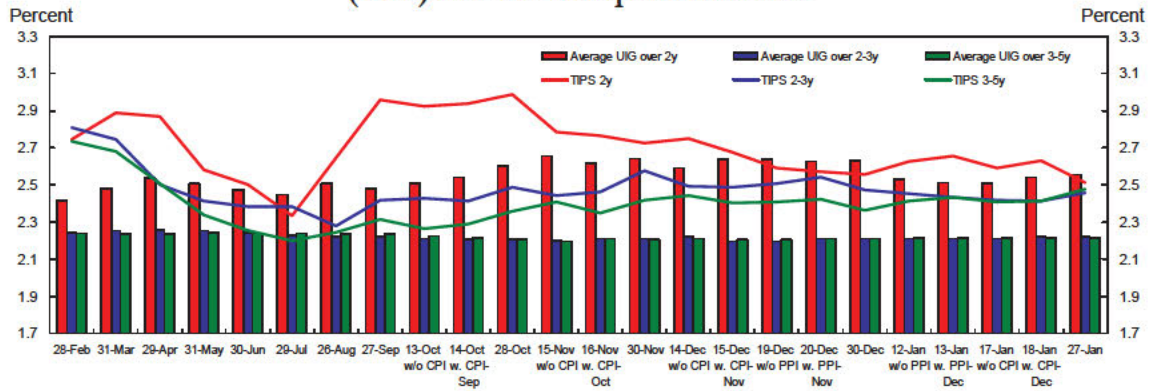
## A. Forecast Details

Exhibit A-6: Reference Table 3 - PRODUCER PRICE DATA AS OF DECEMBER 2005

	Annualized Percent Change Over Indicated Interval				
	24 Month	12 Month	6 Month	3 Month	1 Month
<b>Finished Goods</b>					
<b>Finished Consumer Goods</b>					
Finished Consumer Goods Ex Food	5.0	5.7	8.8	3.6	11.1
Nondurables Ex Food	6.1	7.1	11.3	5.0	14.8
Durables	7.6	9.5	14.5	4.9	16.1
Capital Equipment	10.3	13.3	20.4	8.2	21.9
Electronic Computers (NSA)	1.0	-0.2	-0.1	-3.7	1.8
Communication and Related Equipment (NSA)	1.8	1.3	0.8	-0.8	0.8
	-17.8	-22.9	-18.5	-18.3	-25.3
	-1.3	-0.5	-0.2	1.6	7.3
<b>Finished Goods Ex Food and Energy</b>	2.0	1.7	1.2	0.0	1.5
<b>Finished Consumer Goods Ex Food and Energy</b>	2.1	2.0	1.2	0.5	1.5
<b>Intermediate Materials</b>					
Intermediate Materials Ex Food and Energy	8.9	8.5	12.7	8.1	2.3
<b>Crude Materials</b>					
Crude Materials Ex Food and Energy	6.4	4.4	6.4	8.5	3.9
	19.7	21.7	51.0	12.2	-24.8
	12.4	4.5	34.7	17.2	-0.5

## A. Forecast Details

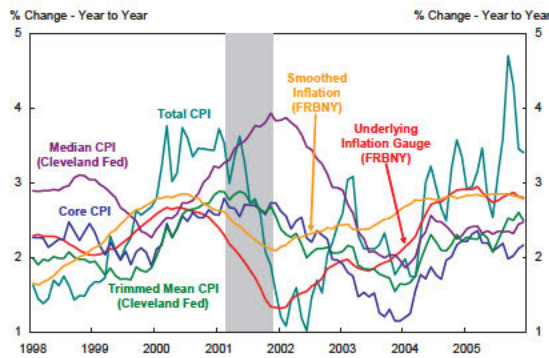
### Exhibit A-7: Underlying Inflation Gauge (UIG) and TIPS Implied Inflation



Source: Bloomberg, 8:40AM quotes, MMS Function (FRBNY)

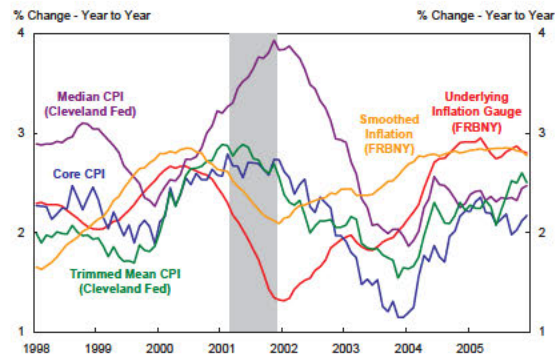
### Exhibit A-8: Underlying Measures of Trend Inflation

#### Measures of CPI Inflation



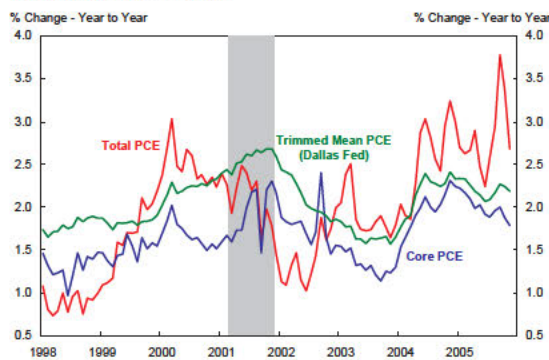
Source: Bureau of Labor Statistics, Cleveland Fed, and FRBNY

#### Measures of CPI Inflation



Source: Bureau of Labor Statistics, Cleveland Fed, and FRBNY

#### Measures of PCE Inflation



Source: Bureau of Economic Analysis and Dallas Fed

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## B. Financial Markets

### Exhibit B-1. TIPS Implied Inflation at Various Horizons

The first chart in this exhibit gives the time series of implied expected CPI inflation from the TIPS market. (a non-technical description of the construction of this measure is in Appendix to Exhibit B-1 below). The second chart shows the computed change in carry-adjusted measures from December 12<sup>th</sup>, 2005 to January 26<sup>th</sup>, 2006.

*Source: Capital Markets Function FRBNY*

### Exhibit B-2. Breakeven Inflation Table

The breakeven inflation table reports yields on the most recently issued five- and ten-year nominal Treasury securities and Treasury inflation indexed securities as well as the spreads between comparable maturities.

*Source: Capital Markets Function FRBNY*

### Exhibit B-3. Smoothed Treasury Yield Curve and Implied Forward Rate Curve

The charts in this exhibit show the change in the smoothed (off the run) Treasury yield curve since the day before the last FOMC meeting and the implied forward rate curve.

*Source: Monetary Affairs BofG*

### Exhibit B-4. Expected Path of Fed Funds Target Rate Derived from Futures

The chart in this exhibit shows the changes in expected path of the Fed Funds target rate since the last FOMC meeting, derived from Fed Funds and Eurodollar futures. A constant term premium risk adjustment is made in these calculations but there is no allowance for time-varying risk.

*Source: MMS Function, FRBNY chart; Monetary Affairs, BofG data*

### Exhibit B-5. Implied Skewness and Implied volatility (percentages)

The chart in this exhibit shows the recent behavior of a measure of implied skewness derived from Eurodollar options. Positive (negative) implied skewness means that a tightening (easing) surprise around expected rate is expected to be larger than an easing

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(tightening) surprise. In addition implied volatility in percentages is plotted. Both measures are averages of 3-, 6- and 9-month values. No risk adjustment is made.

*Source: Capital Markets, FRBNY*

#### **Exhibit B-6. Implied Volatility on Eurodollar Options (Basis Points)**

The charts in this exhibit show the current and historical behavior of the 90% confidence interval (i.e., financial markets expect 90% of the time the actual FFR at the specified date will be in this interval) for the Fed Funds Target implied from financial markets options. The first two charts show how the 90% confidence interval has changed since the last FOMC meeting. The next chart shows the current confidence interval around the expected path. The final two charts show a long history of the behavior of the confidence interval at the 6- and 12-month horizon. No risk adjustment is made.

*Source: Monetary Affairs, BofG*

#### **Exhibit B-7. Dollar Exchange rates**

This exhibit contains 4 charts showing the behavior of the dollar in the last 5 years. All series are defined so that a decline in the index represents a depreciation of the dollar. Effective rates are computed by the Board of Governors using a “narrow” set of weights, for 16 major exchange rates.

*Source: BofG, BIS, International Research Function FRBNY*

#### **Exhibit B-8. Implied volatility on Yen/Dollar and Euro/Dollar Exchange Rates**

The first set of charts in this exhibit contains the one month ahead implied volatility on Yen/Dollar and Euro/Dollar exchange rates normalized to the width of a 90 percent confidence interval. The second set of charts show the change in the expected implied volatility over the next six months.

*Source: Markets Group, FRBNY, Reuters*

#### **Exhibit B-9. Energy Futures Curves**

This exhibit contains charts showing futures curves for gasoline, heating oil, natural gas, and crude oil. August 26 represents the state of the futures markets just before Hurricane

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Katrina. The next date represents the post-Katrina peak in energy markets. December 19 represents a recent trough in crude oil market and January 26 represents current data.

*Source: Bloomberg.*

### **Appendix to Exhibit B-1. Construction of Implied Inflation from TIPS**

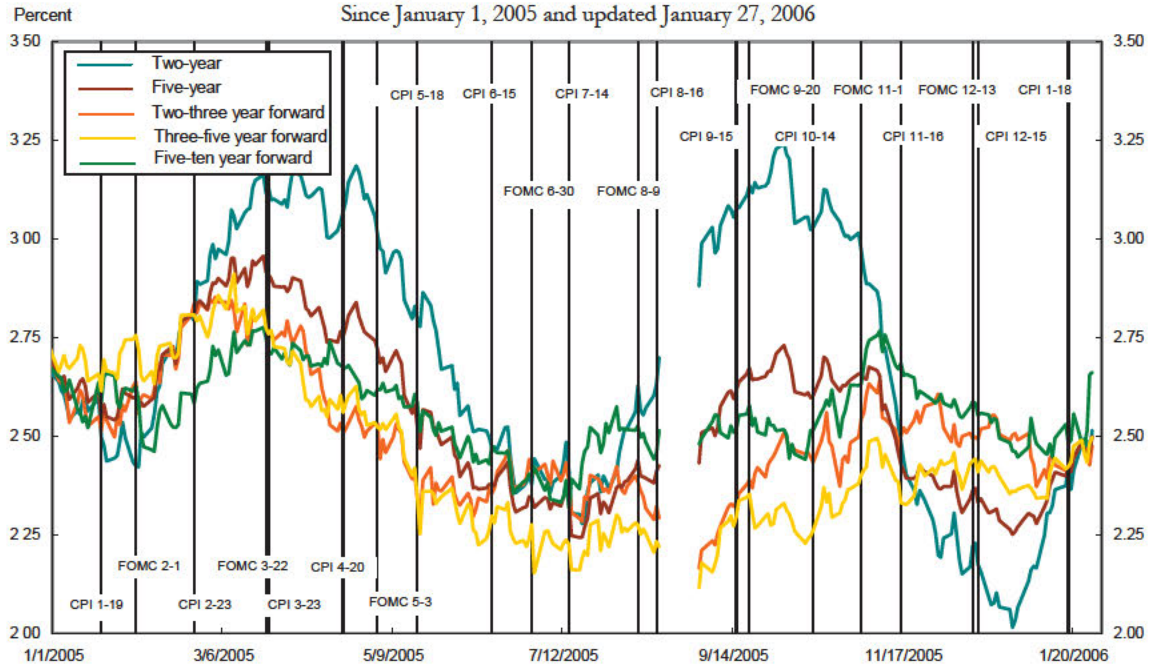
The implied inflation series are estimates of the inflation expectations derived from TIPS and nominal Treasury securities, not accounting for risk premia or other technical factors. They differ from the simpler breakeven inflation rates which just subtract the real yield on TIPS securities from the on-the-run treasury yield with the same maturity. For each individual TIPS, we solve for the inflation rate that equates the discounted payments of the TIPS to its price, where the discount rates are derived from off-the-run nominal Treasury securities. We then calculate two-, three-, and five-year inflation rates as the inflation rate corresponding to a TIPS with duration of two, three or five years respectively. Finally, we compute approximate forward rates from the rates at the shorter and longer dated durations. For example, the two-to-three year forward rate is computed from the two-year and three-year implied inflation values. The five-to-ten year forward rate uses the five-year implied inflation value and the implied inflation rate on the most recently issued ten-year TIPS.

The carry-adjusted implied inflation series are measures of inflation expectations that remove the impact of forecast inflation accrual in NSA CPI over the 2.5 month indexation lag period in TIPS. Since inflation over that period is either known or largely predictable, it induces predictable variation in the unadjusted implied inflation series that is not necessarily related to future expected inflation. Our adjustment is derived from the forecast of NSA CPI implicit in same day CME CPI futures contracts.



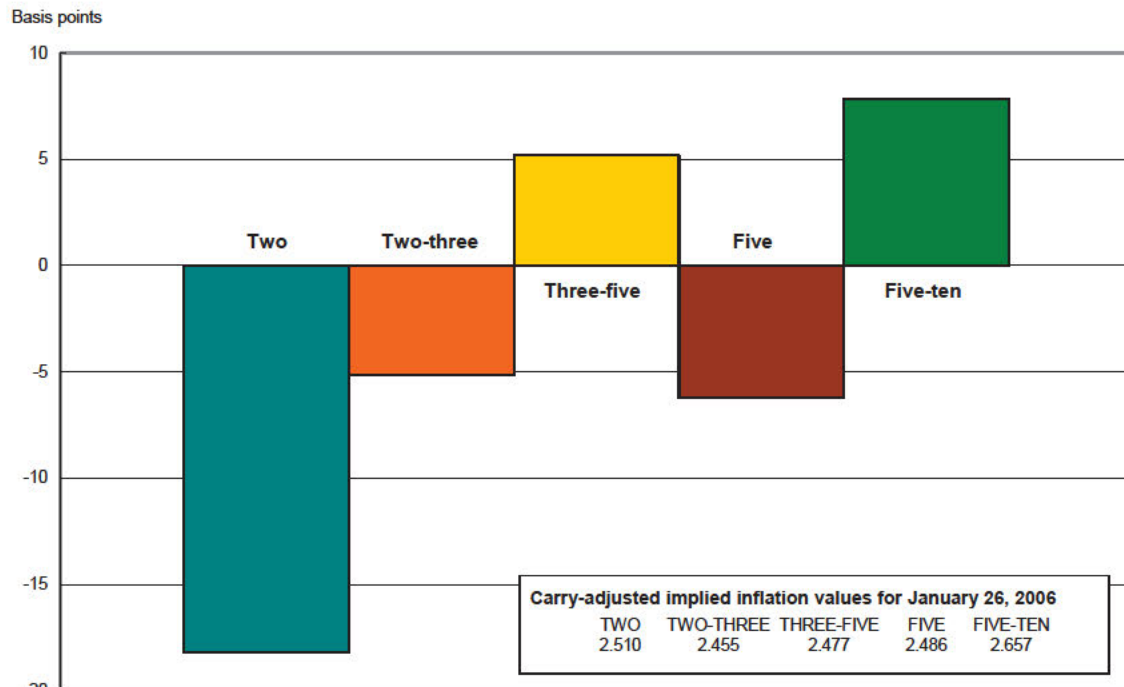
## B. Financial Markets

**Exhibit B-1:  
TIPS Implied Inflation at Various Horizons**  
Since January 1, 2005 and updated January 27, 2006



Implied inflation values between 8-18 and 8-31 are not reported because of data reliability problems.  
Data based on FRBNY calculations using 8:40am quotes. Tony Rodrigues Redacted

**Change in Carry-adjusted TIPS Implied Inflation Since Last FOMC Meeting**  
Change in implied inflation measure from December 12, 2005 to January 26, 2006



Source: FRBNY

## B. Financial Markets

### Exhibit B-2: Breakeven Inflation Table

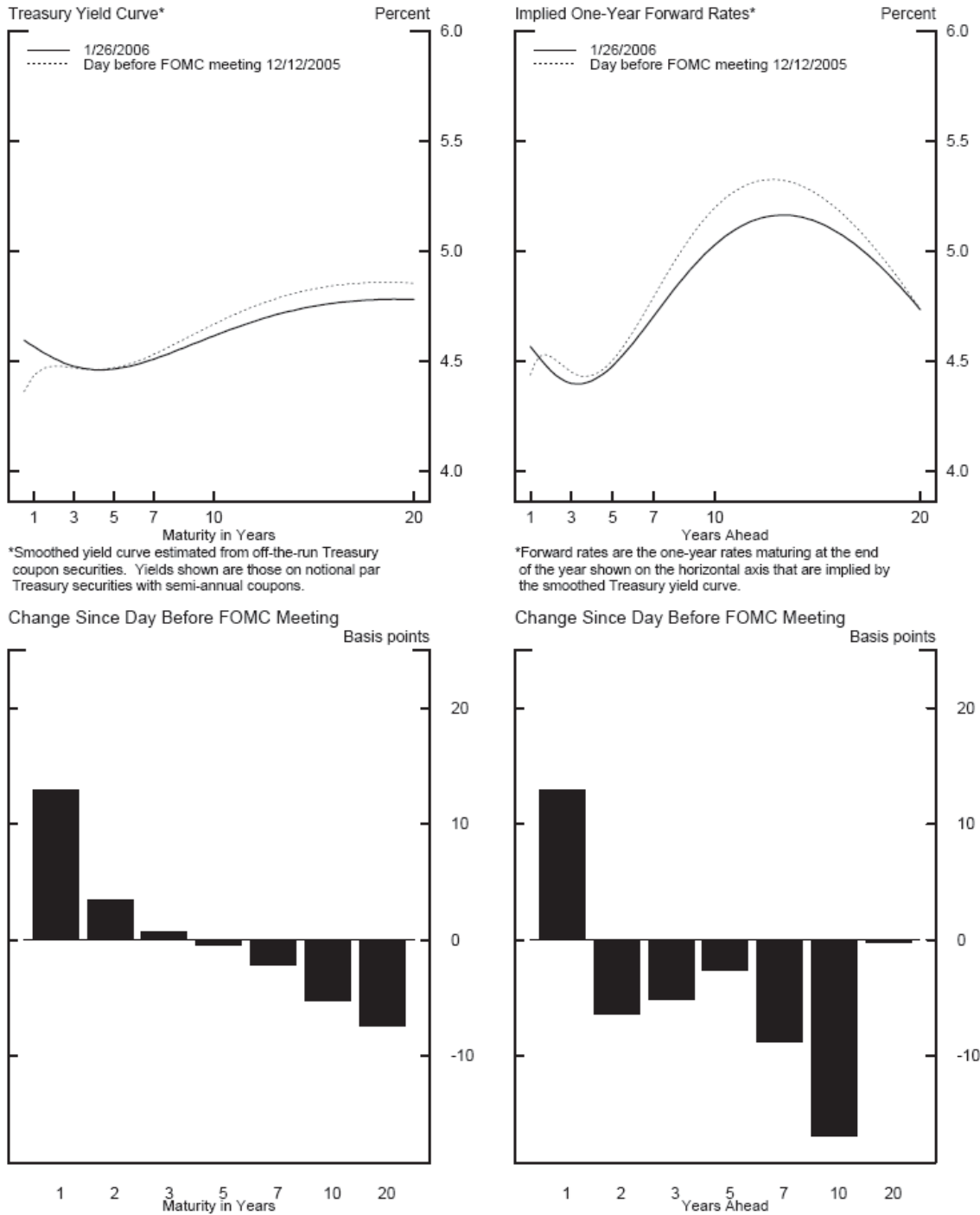
#### Real and Nominal Yield Spreads

	31-Jan-05	30-Jun-05	29-Jul-05	31-Aug-05	30-Sep-05	31-Oct-05	30-Nov-05	30-Dec-05	27-Jan-06
Five-year Spread (%)	2.55	2.35	2.32	2.47	2.72	2.65	2.37	2.23	2.47
Ten-year Spread	2.48	2.31	2.33	2.38	2.55	2.57	2.37	2.31	2.51
Five-year Real Yield (%)	1.17	1.38	1.74	1.47	1.43	1.81	2.01	2.08	1.95
Ten-year Real Yield	1.67	1.66	1.88	1.69	1.74	2.01	2.09	2.04	1.99
Five-year Nominal Yield	3.72	3.73	4.06	3.94	4.15	4.46	4.38	4.31	4.42
Ten-year Nominal Yield	4.15	3.97	4.21	4.07	4.29	4.58	4.46	4.35	4.50

Source: FRBNY, 8:40am quotes.

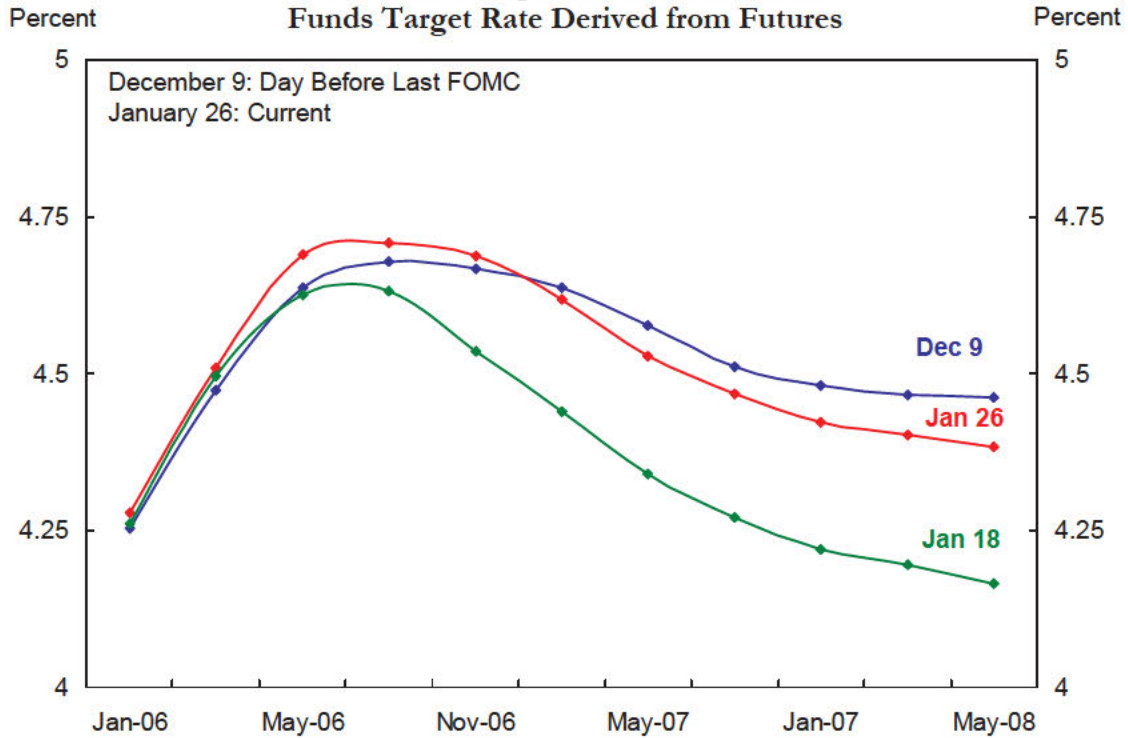
## B. Financial Markets

**Exhibit B-3:  
Treasury Yield Curve**



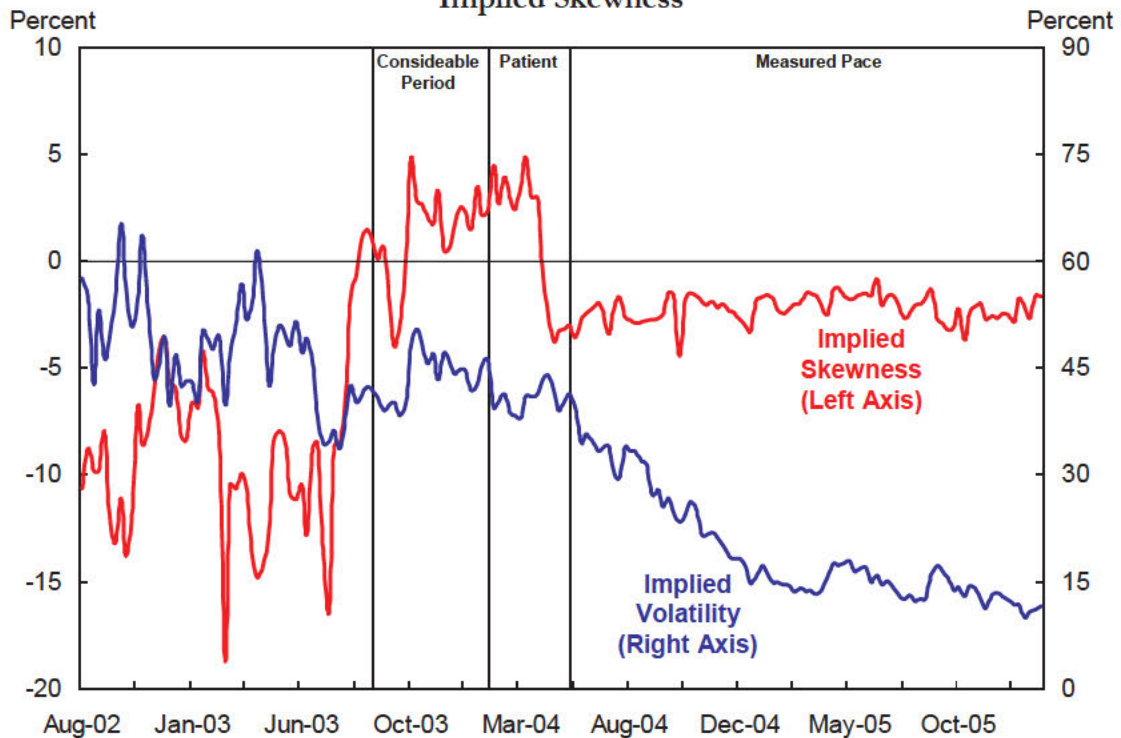
## B. Financial Markets

**Exhibit B-4: Expected Path of the Fed Funds Target Rate Derived from Futures**



Source: Federal Reserve Board

**Exhibit B-5: Implied Skewness**



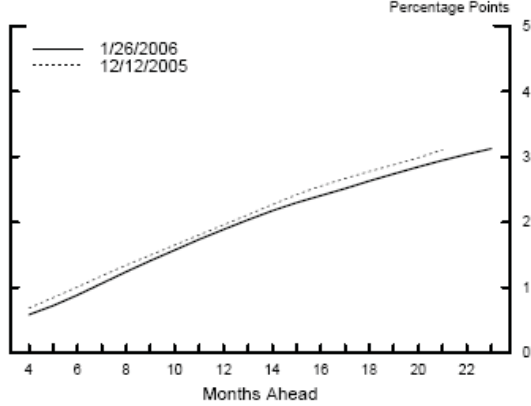
Source: CME and Author's Calculations

Joshua Rosenberg Redacted

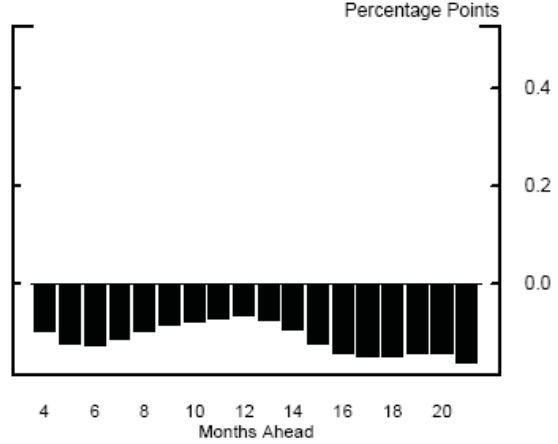
## B. Financial Markets

### Exhibit B-6: Implied Volatility on Fed Funds Options

**Eurodollar Implied Volatility Term Structure\***

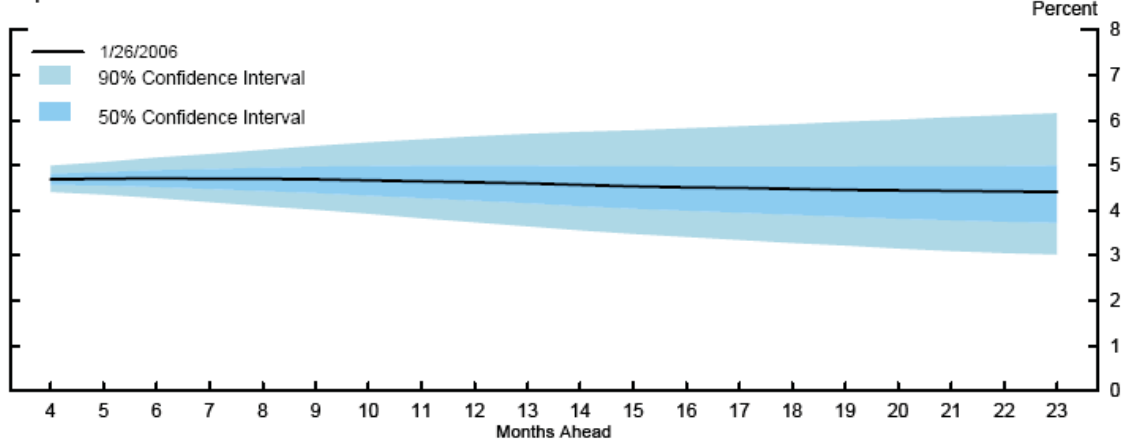


**Change Since Day Before FOMC Meeting**

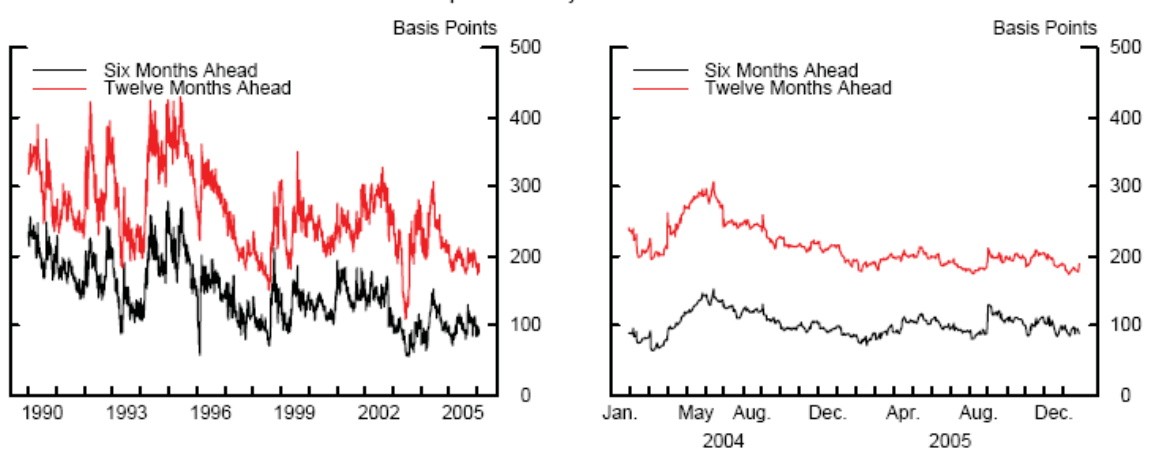


\*Width of a 90 percent confidence interval computed from the term structures for the expected federal funds rate and implied volatility.

**Expected Federal Funds Rate Path and Confidence Intervals**



**Eurodollar Implied Volatility at Selected Maturities\***

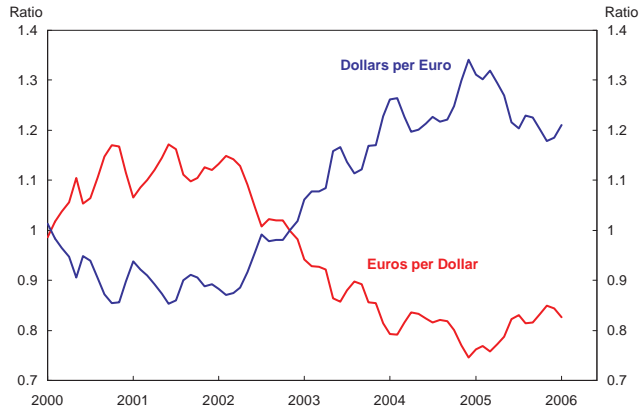


\*Width of a 90 percent confidence interval computed from the term structures for the expected federal funds rate and implied volatility.

## B. Financial Markets

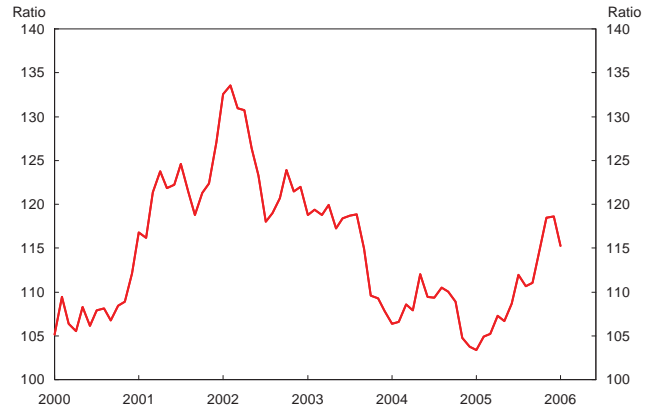
### Exhibit B-7: United States Exchange Rates

Dollar-Euro Exchange Rates



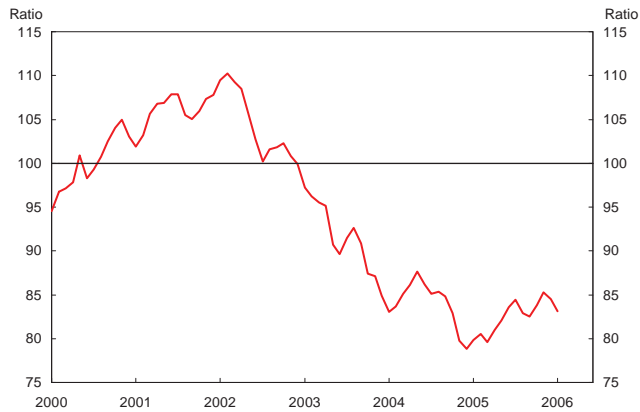
Source: Reuters

Yen per Dollar



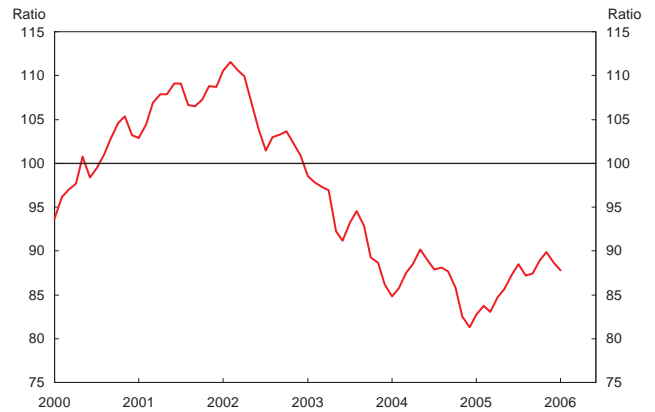
Source: Reuters

Nominal Effective Exchange Rate  
Major Currency Narrow Index, 2000=100



Source: Reuters

Real Effective Exchange Rate  
Major Currency Narrow Index, 2000=100

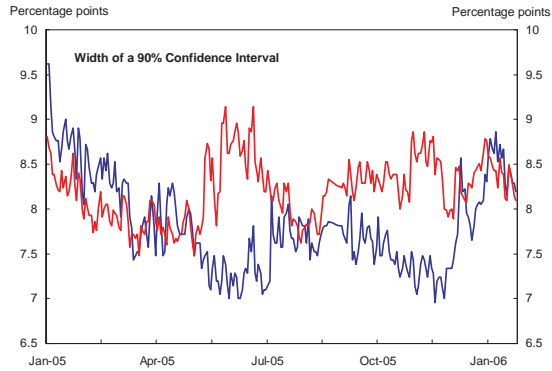


Source: Reuters

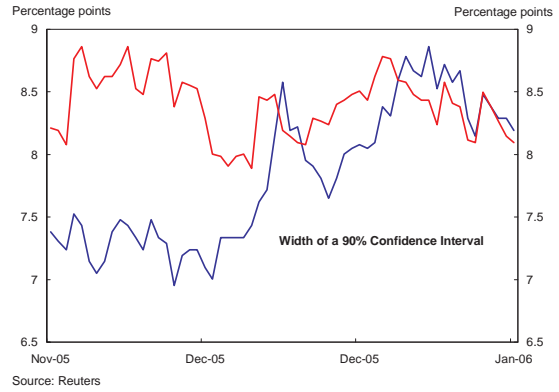
## B. Financial Markets

**Exhibit B-8:**  
**Euro and Yen Implied Option Volatility**  
**Euro options are in red and Yen options are in blue**

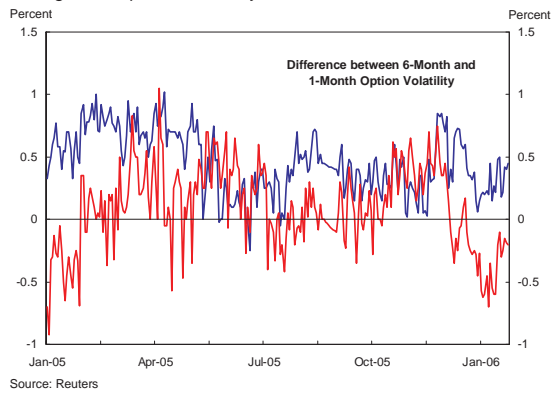
One-Month Volatility – Past Year



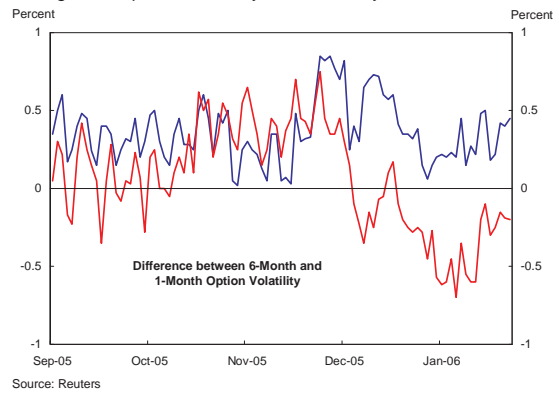
One-Month Volatility – Past 60 Days



Changes in Expected Volatility – Past Year



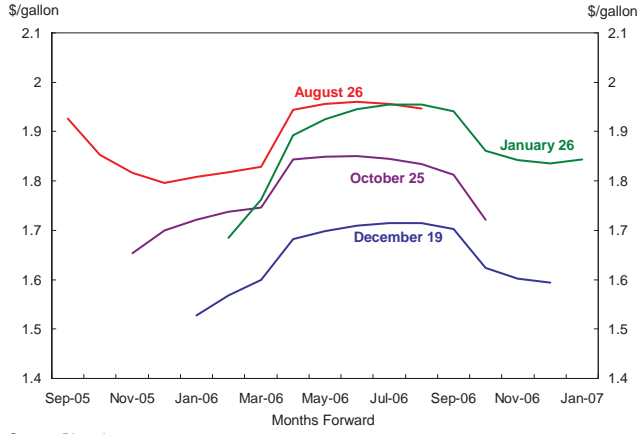
Changes in Expected Volatility – Past 60 Days



## B. Financial Markets

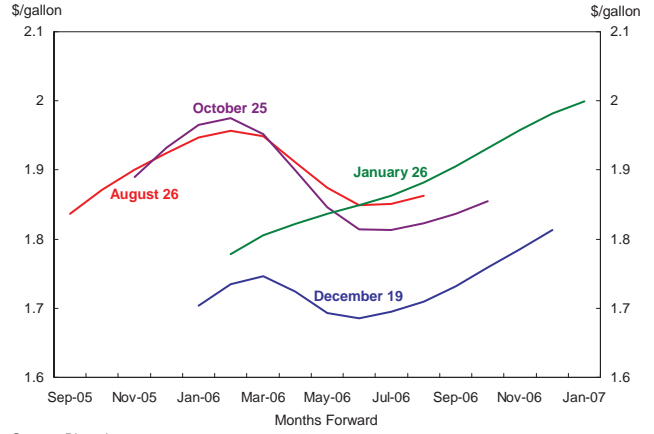
### Exhibit B-9: Energy Futures Curves

**Gasoline Futures**



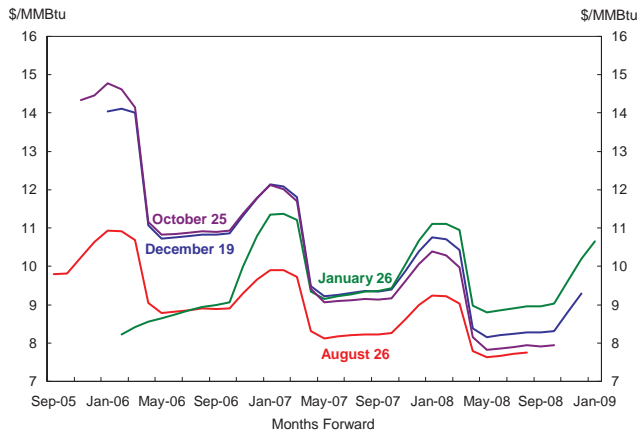
Source: Bloomberg

**Heating Oil Futures**



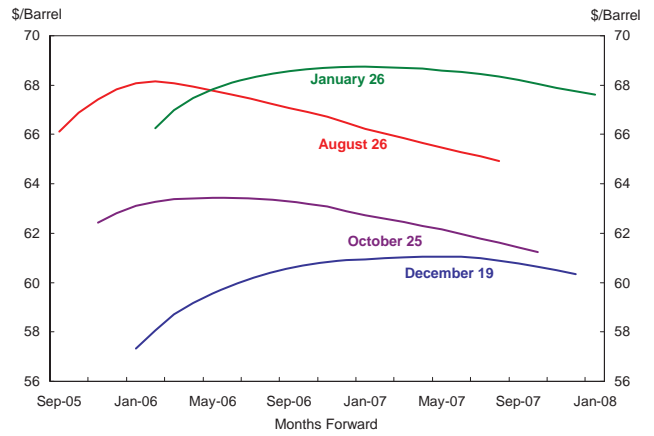
Source: Bloomberg

**Natural Gas Futures**



Source: Bloomberg

**Crude Oil Futures**



Source: Bloomberg



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## C. FRBNY Forecast Distributions

### Background

The FRBNY forecast distributions are a generalization of techniques used at the Bank of England and other central banks to show future uncertainties and the balance of risks. The generalization allows for a dynamic balance of risks that is jointly assessed over inflation and output. There are two classes of shocks to current central projections that are of interest to central banks: supply shocks, which move inflation and output in opposite directions, and demand shocks, which move inflation and output in the same direction. Instead of providing a static assessment of the risks we use a dynamic one that allows the probability of a deviation to build over time. After a deviation, it is assumed that the economy returns to its average long run behavior centered at the implicit inflation target and potential growth. Although this is not a substitute for a dynamic model with an explicit transmission mechanism for monetary policy, it can have good properties in mimicking the behavior of an economy where the central bank has sufficient credibility to achieve its long run inflation target while pursuing short run stabilization policy.

### Exhibit C-1: Risks

This exhibit shows the “balance of risks” for the individual scenarios and the central scenario contained in the Bank’s forecast. Two types of measures of the balance of risk are shown. One type indicates the probability of being in a particular scenario at a specific date. These scenarios are mutually exclusive so at any specific date they add up to one.

A second type calculates the probability of ever being in a particular scenario through 2008, with the exception of the central scenario where the probability shown is for not deviating from this scenario through 2008. Hence, one minus this probability is the risk of deviating from the central scenario at some point over the forecast horizon and this is equal to the sum of the probabilities of the other scenarios occurring.

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### **Exhibit C-2 & C-3: Alternative Scenarios**

These exhibits take the balance of risks for each scenario and show their implications for GDP growth and core PCE inflation. They plot the expected path (calculated by averaging all paths that have at least one quarter in that scenario) of 4-quarter changes in the core PCE deflator and real GDP under the central scenario and the alternative scenarios.

The global deflation scenario assumes that output is slower than the central scenario and inflation is dramatically lower. The overheating scenario assumes that for 2 quarters the economy grows quicker than expected under the central scenario, with both inflation and output higher than our central forecast. Then the real economy slows dramatically but inflation continues to be above the central forecast.

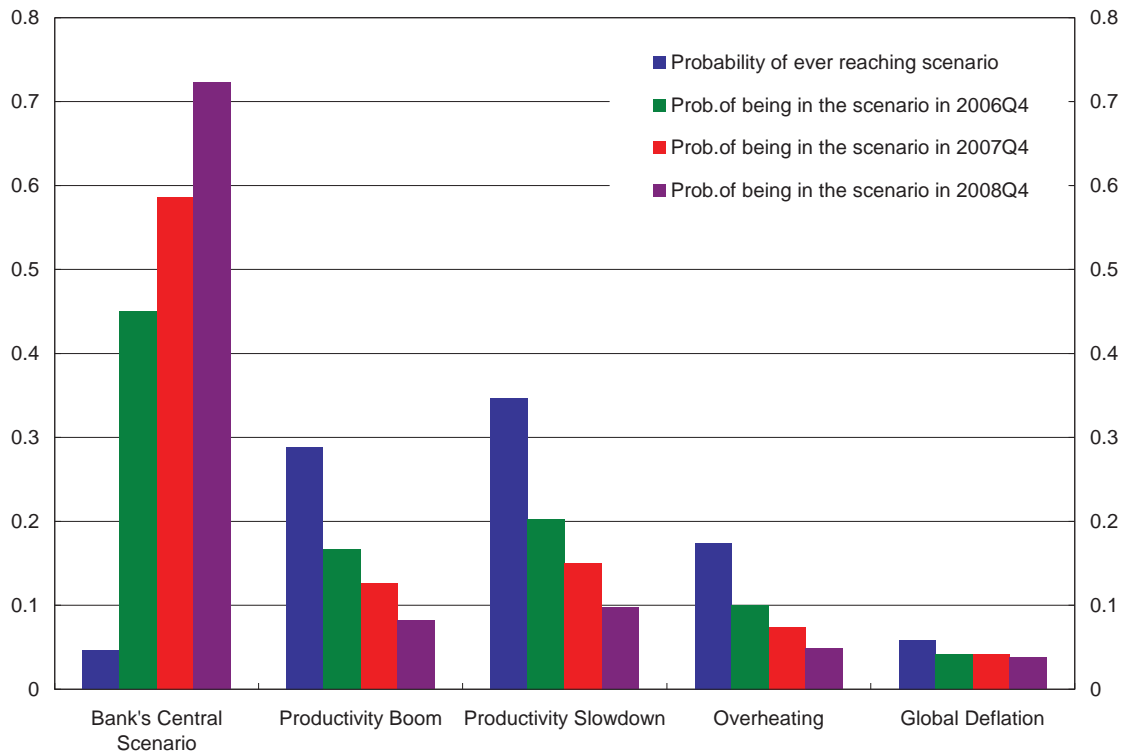
### **Exhibit C-4 & C-5: Fan Charts**

Fan charts are shown for the core PCE deflator (Exhibit C-4) and real GDP (Exhibit C-5). These charts are constructed to represent the overall uncertainty contained in our main scenario and our alternative scenarios. They combine the information contained in the previous exhibits with the additional uncertainty that we cannot predict perfectly the path of the economy, even if we knew which scenario were true. The amount of total uncertainty in the forecast distributions is now calibrated to imply fundamental interest rate volatility lower than that given by the implied Eurodollar forward volatility curve averaged across possible policy rules from a market perspective (see the text for Exhibit D-4 ). In addition the expected value for each of the two forecast distributions is included in the fan chart. These expected values are computed as averages over the realizations across all possible scenarios considered in Exhibit C-1. The difference between this profile and the central bank scenario is another measure of the balance of risks. If they are equal the risks are balanced; if the expected value is above the central bank scenario, there is upside risk; if it is below, there is downside risk.

*Source: MMS Function, FRBNY*

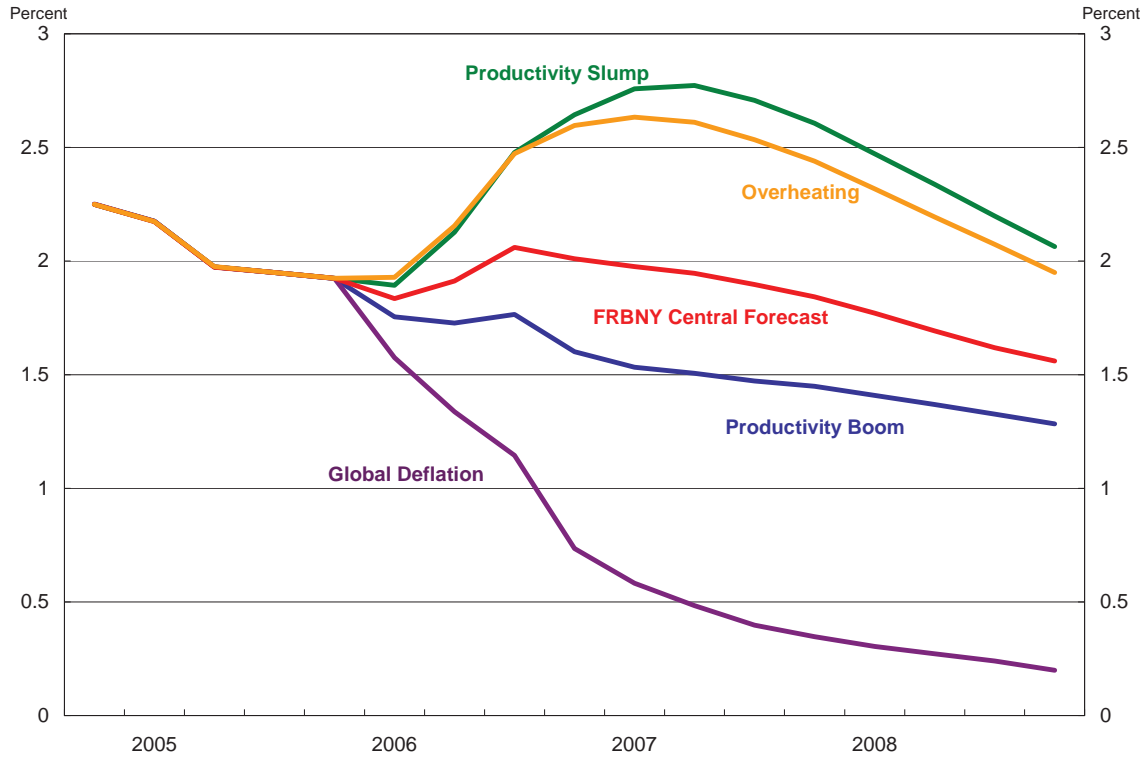
## C. FRBNY Forecast Distributions

Exhibit C-1:  
Risks

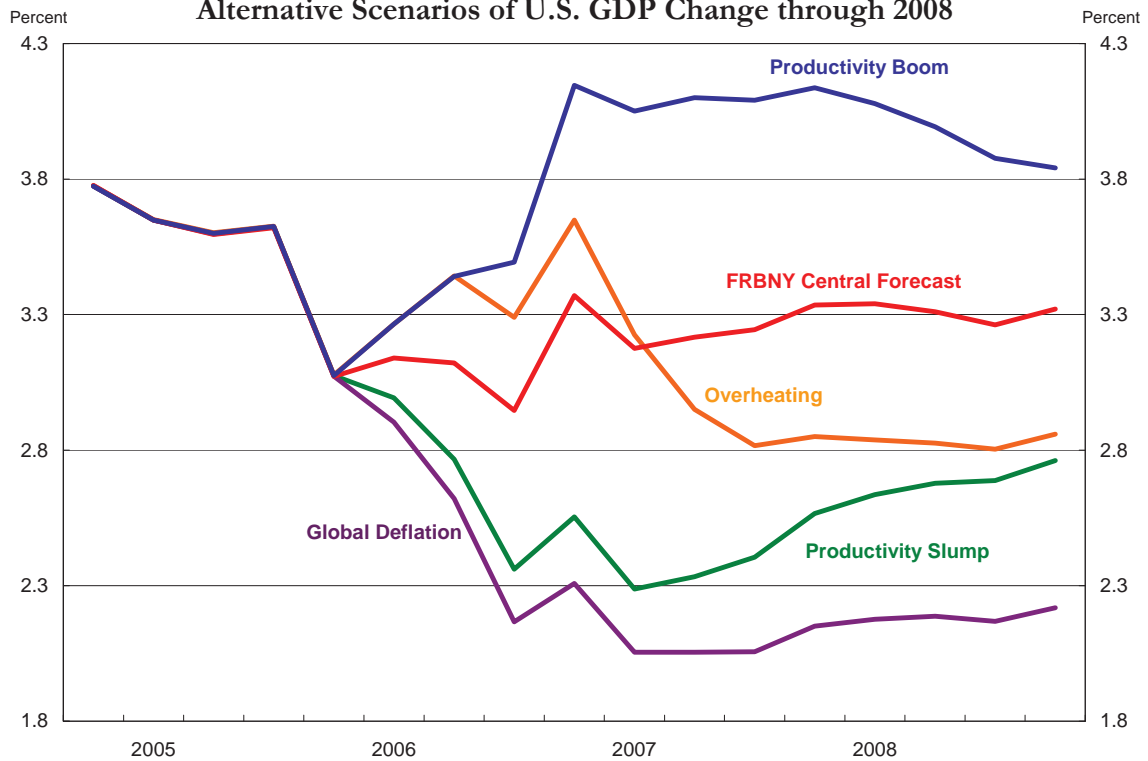


## C. FRBNY Forecast Distributions

**Exhibit C-2:  
Alternative Scenarios of U.S. Core PCE Inflation Change through 2008**

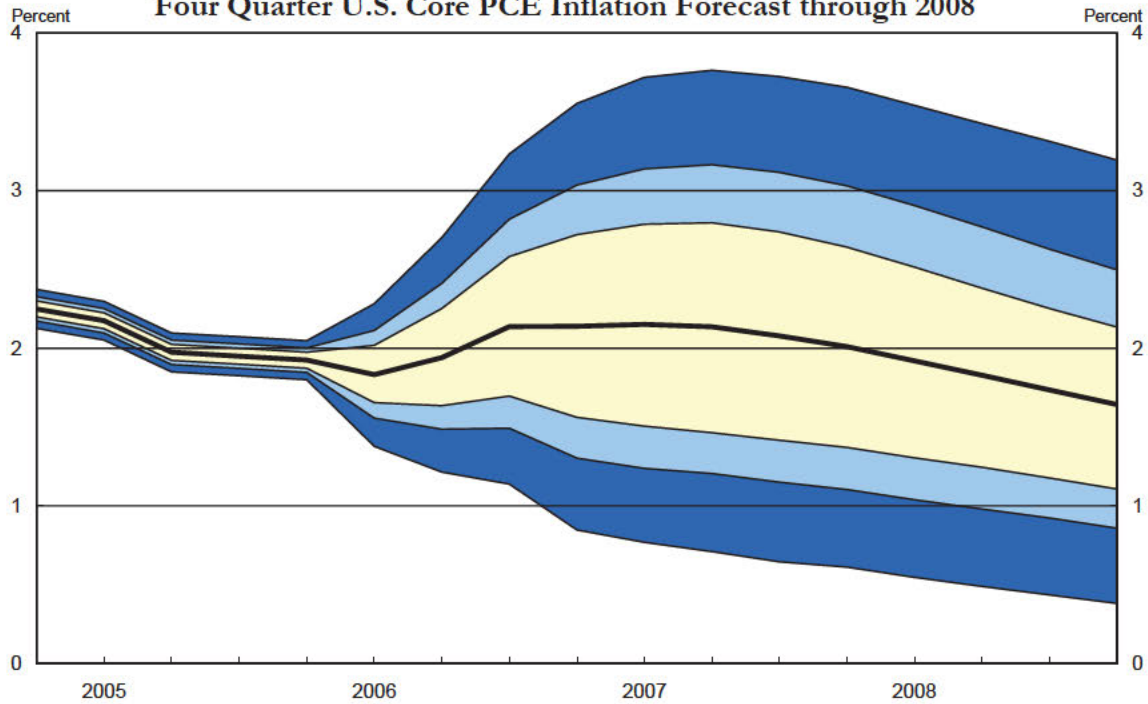


**Exhibit C-3:  
Alternative Scenarios of U.S. GDP Change through 2008**



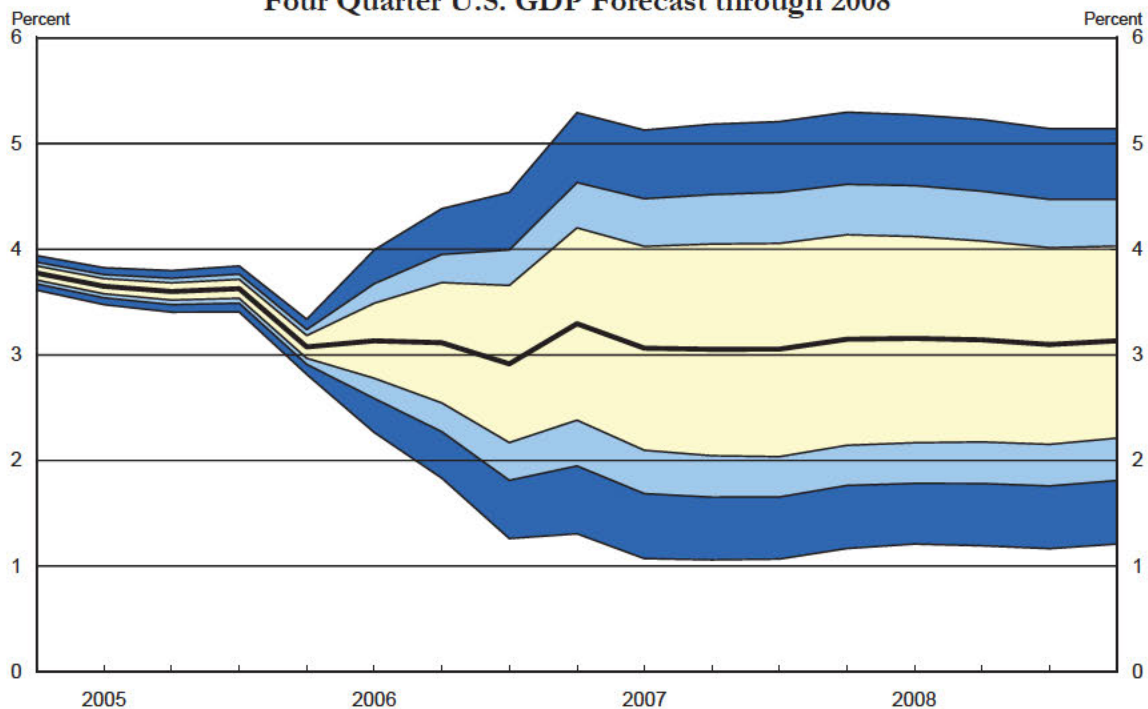
## C. FRBNY Forecast Distributions

Exhibit C-4:  
Four Quarter U.S. Core PCE Inflation Forecast through 2008



The probability interval shows the 50, 75, and 90 percent chance that the four quarter change in Core PCE will be within the respective range. The thick black line represents the expected value of the forecast.

Exhibit C-5:  
Four Quarter U.S. GDP Forecast through 2008



The probability interval shows the 50, 75, and 90 percent chance that quarterly GDP change will be within the respective range. The thick black line represents the expected value of the forecast.

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## D. FRBNY Fed Funds Rate Projections

The exhibits in this section are constructed using the policy rules given below, the Bank forecast distribution, and information from Fed Funds futures and Eurodollar futures. The policy rules convert the uncertainty over future inflation and output into uncertainty about future values of the Fed Funds rate. This allows us to use information from financial markets to calibrate the type and amount of uncertainty.

We consider 3 different short-run restrictions to our standard policy rule in this cycle.

1. *Dove*
2. *Dual*
3. *Inflation Hawk*

The short-run restriction is enforced in the rules by calculating the FFR without restriction from our standard policy rule described below. Then this value is compared to the prescription of the different short-run rules. If the results are “similar” then the prescription of the short-run rule is followed. For example, under “dual” the FFR is increased by increments of 25 bp and 12.5 bp for the next 2 meetings respectively unless the standard rule produces a prescription for the FFR outside of the interval 1% around the measured firming rate. The inflation hawk rule follows the prescription of the continued measured firming unless the inflation rate increases above a 2% rate.

### **Exhibit D-1: Implications of Different Policy Rules for Nominal Fed Funds Rate**

Exhibit D-1 evaluates the three different policy rules at each of the draws from the forecast distribution of output and inflation and then averages them to produce an expected path if the rule is followed. The results are compared to the most recent implied market path from Exhibit B-5.

### **Exhibit D-2 & D-3: Alternative Forecast Scenarios: Nominal and Real Federal Funds Rate**

In these exhibits, we focus on the policy rule “dual” and evaluate it at the Bank’s central projection, productivity slowdown and boom, overheating and global deflation scenarios.

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Exhibit D-3 presents the average of FFR over paths containing these scenarios. Exhibit D-4 presents the average ex post real rate obtained by subtracting the 4-quarter lagged change of core PCE inflation from the paths of the nominal rate.

#### **Exhibit D-4: Implications of Different Inflation Targets**

This exhibit shows the effect of different inflation targets and gives a measure of how the recent actual path of the FFR has differed from the prescription of our policy rule. The policy rule paths are calculated using the actual FFR at the end of 2004. It also plots an average over the three rules evaluated this cycle, with weights of 0.25, 0.65 and 0.10 respectively.

#### **Exhibit D-5: FFR Distributions**

In this exhibit we examine the distribution of the FFR under the 3 different policy rules through the first quarter of 2007. We also include the market distribution by assuming it has a normal distribution centered at the market path from Exhibit B-5 with a standard deviation derived from Exhibit B-6. The distribution is represented by a boxplot to this allow more direct comparison of the implications of different policy rules. The box represents the 50% probability interval, the line in the box the median and the tails the 90% probability interval.

*Source: MMS Function, FRBNY*

#### **Exhibit D-6: Comparing Market Beliefs to FRBNY**

In this exhibit, two metrics of measuring the distance between the market implied path and the FRBNY implied path are shown:

:

1. The percentile of the market distribution of the prediction from our policy rule.
2. The percentile of our policy rule distribution of the expected path priced into markets.

There are many other sources of differences between the two paths. One important consideration is the adjustment for risk in constructing the market path. We use an

adjustment from the Board that is constant over time but there is some evidence that the adjustment may be time varying. Furthermore, the market faces uncertainty over the policies and targets used by the FOMC. We can attempt to capture this uncertainty but again it might vary over time.

*Source: MMS Function, FRBNY*

*Policy Rule: Baseline Specification*

$$i_t = \rho i_{t-1} + (1 - \rho) [i^* + \varphi_\pi (\pi_t - \pi^*) + \varphi_x x_t]$$

$$\rho = 0.8$$

$$i_{2005Q2} = 2.91$$

$$i^* = 4.0$$

$$\pi = 1.5 \text{ (Core PCE y/y)}$$

$$\pi^* = 1.5$$

$$\varphi_\pi = 1.5$$

$$\varphi_x = 0.5$$

$$\pi_t : \text{Core PCE y/y}$$

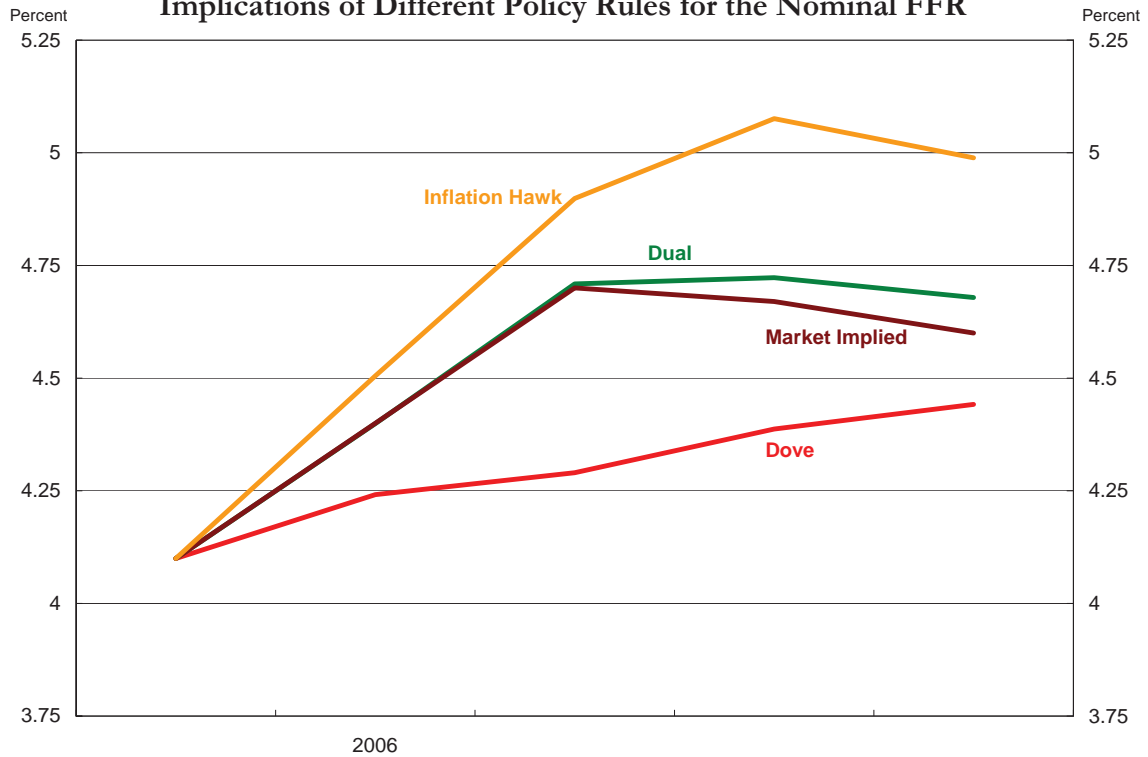
$$x_t : \text{Output Gap}$$

*Source: MMS function, FRBNY*

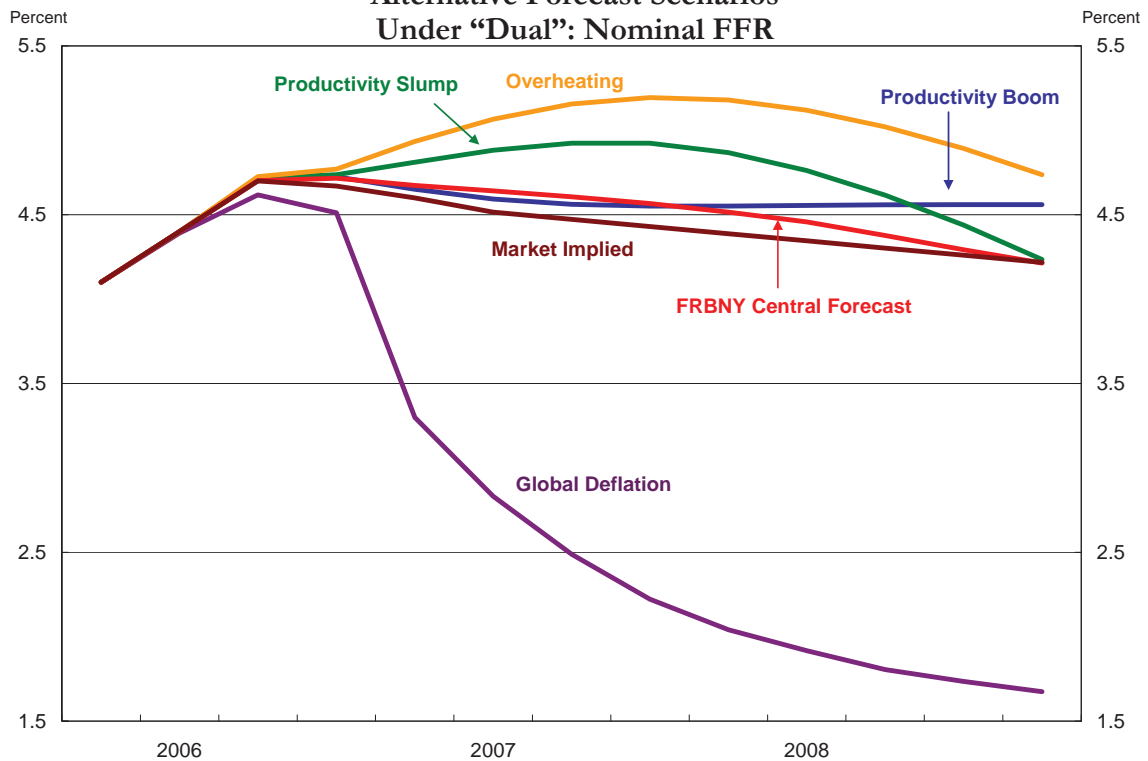


## D. FRBNY Fed Funds Rate Projections

**Exhibit D-1:  
Implications of Different Policy Rules for the Nominal FFR**

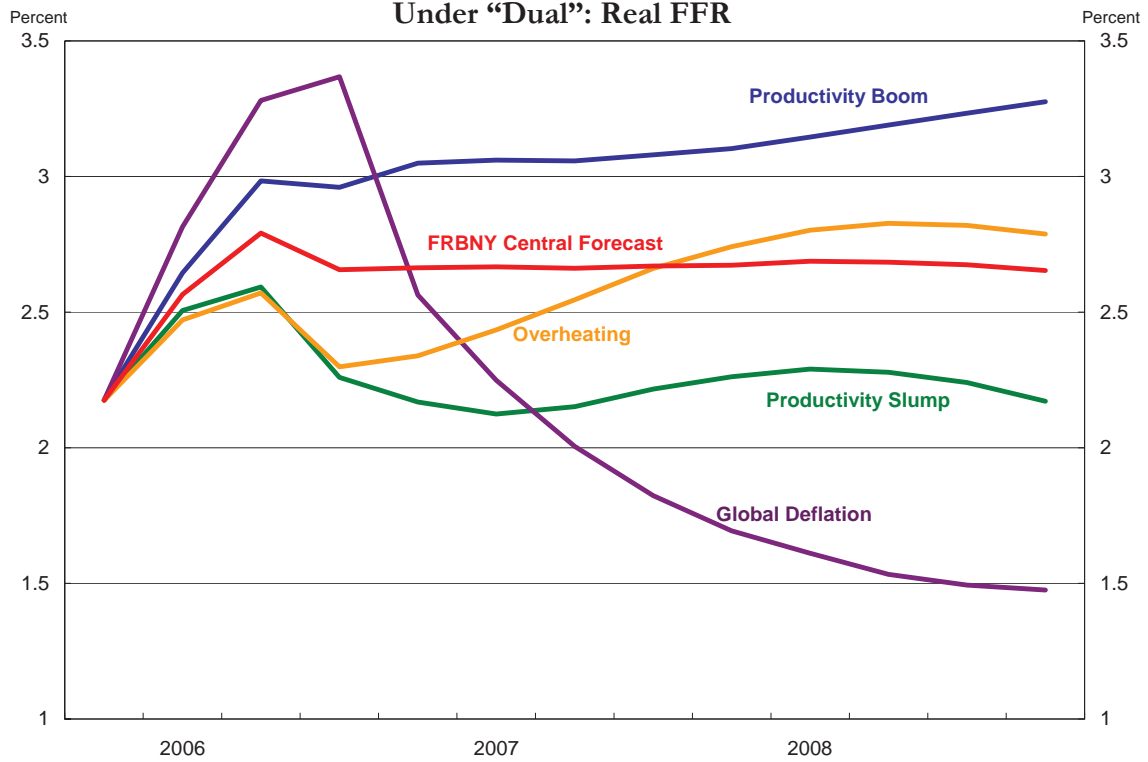


**Exhibit D-2:  
Alternative Forecast Scenarios  
Under "Dual": Nominal FFR**

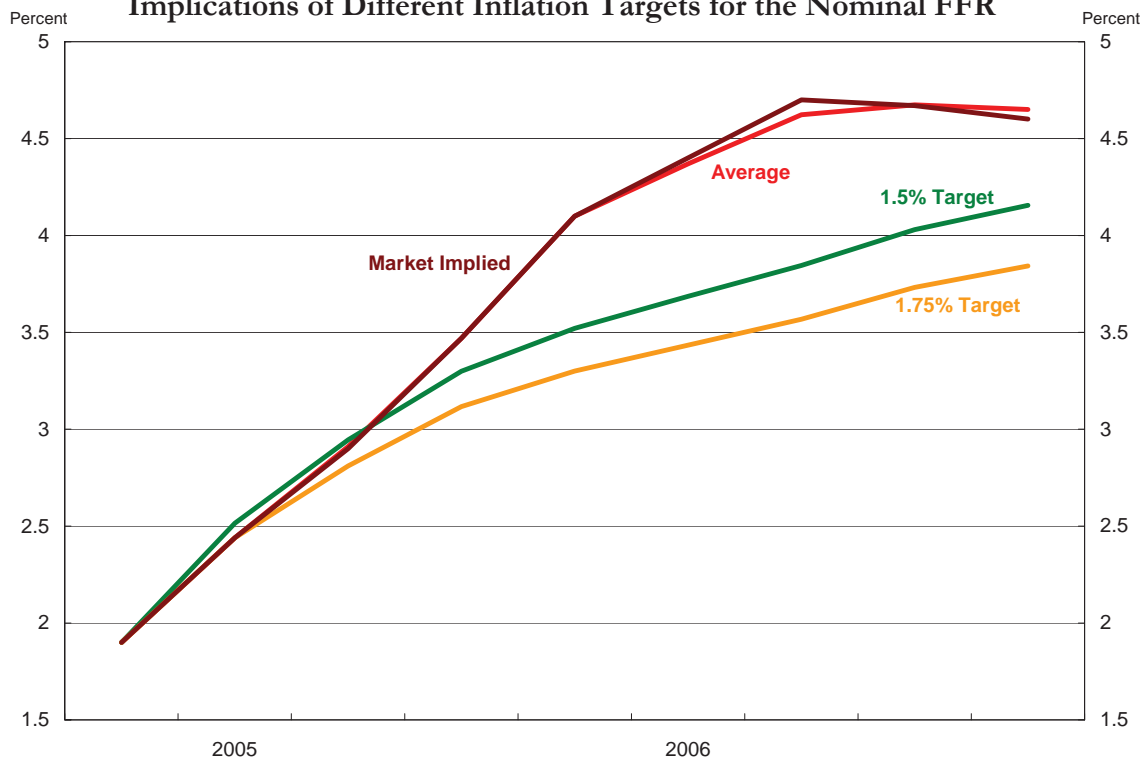


## D. FRBNY Fed Funds Rate Projections

**Exhibit D-3:  
Alternative Forecast Scenarios  
Under "Dual": Real FFR**

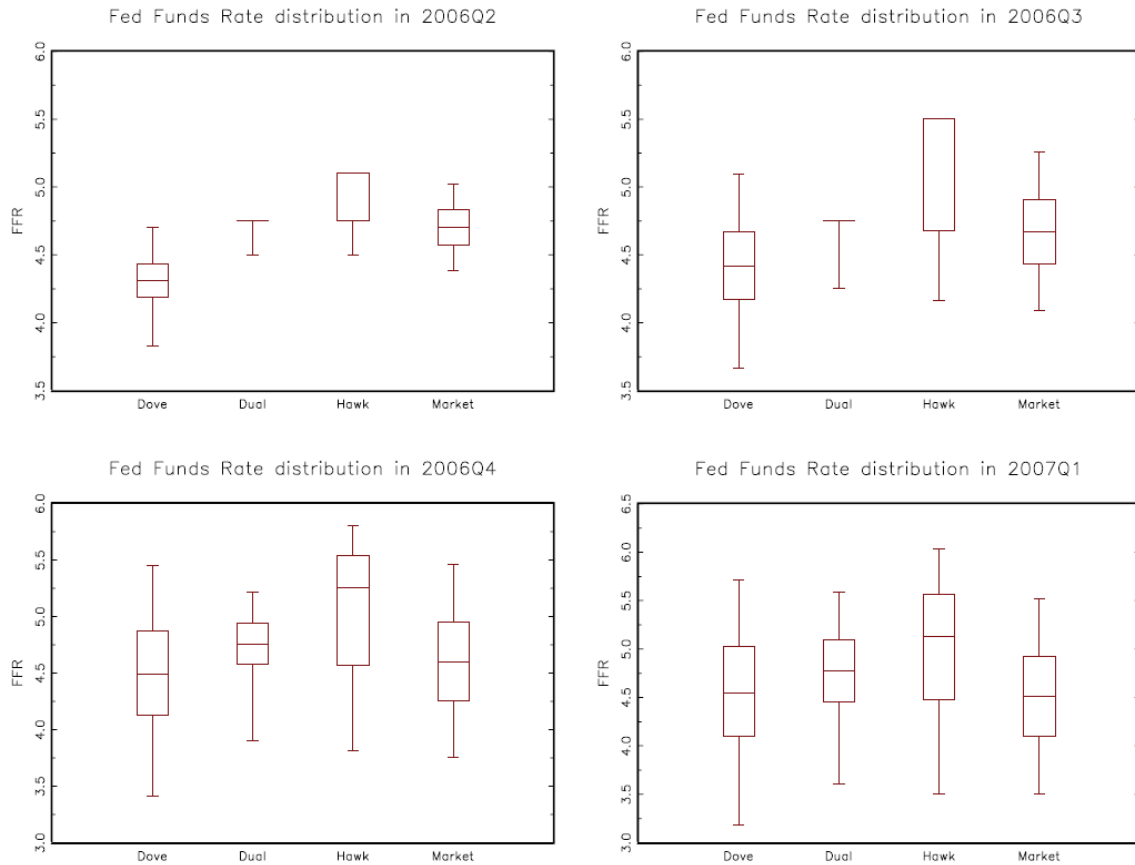


**Exhibit D-4:  
Implications of Different Inflation Targets for the Nominal FFR**



## D. FRBNY Fed Funds Rate Projections

### Exhibit D-5: Fed Funds Rate Distributions



### Exhibit D-6: Market Expectations of Future FFR and FRBNY Outlook for FFR

	Percentile of FRBNY Expectation in Market Distribution	Percentile of Market Expectation in FRBNY Distribution
<i>Dove</i>	37	58
<i>Dual</i>	56	27
<i>Inflation Hawk</i>	77	27

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## E. Regional Charts

### **Exhibit E-1. Federal Reserve Bank of New York's Indexes of Coincident Economic Indicators**

The chart in this exhibit shows our monthly coincident indexes for New York, New Jersey and New York City up through December 2005. The indexes are a composite of 4 economic indicators: payroll employment, unemployment rate, average weekly hours in manufacturing, and real wage & salary earnings.

More details on the methodology and construction of these indexes can be found at [http://www.ny.frb.org/research/regional\\_economy/coincident\\_summary.html](http://www.ny.frb.org/research/regional_economy/coincident_summary.html)

*Source: MaRS Function, FRBNY*

### **Exhibit E-2. Federal Reserve Bank of New York's Indexes of Leading Economic Indicators**

This chart shows the growth in our monthly leading indexes for New York, New Jersey and New York City through November 2005. The growth in the index for a given month represents a forecast of the growth in the coincident index 9 months ahead. The components used in these three indexes differ slightly, but include: housing permits, stock prices, the national leading index, the lagged coincident index.

*[NOTE: This index is not released publicly.]*

More details on the methodology and construction of these indexes can be found at: [http://www.ny.frb.org/research/regional\\_economy/coincident\\_summary.html](http://www.ny.frb.org/research/regional_economy/coincident_summary.html)

*Source: MaRS Function, FRBNY*

### **Exhibit E-3. Private-Sector Job Growth in the U.S. and the Region**

This chart shows the 12-month growth rate of private-sector employment for New York-New Jersey (combined), New York City, and the U.S. (bars) from 1996 to present.

Underlying data can be found at:

<http://stats.bls.gov/news.release/laus.t06.htm> and  
<http://stats.bls.gov/news.release/metro.t02.htm>

*Source: U.S. Bureau of Labor Statistics*

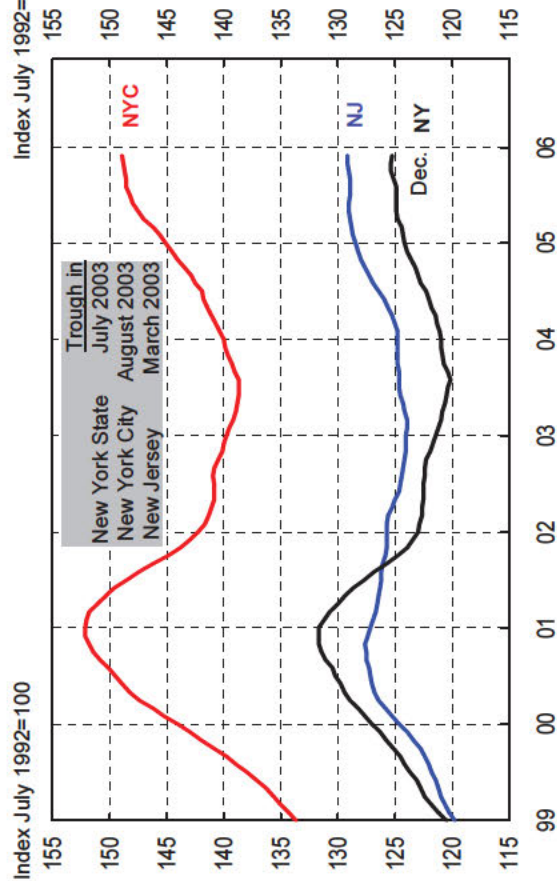
**Exhibit E-4. Office Vacancy Rates**

This chart shows the quarterly vacancy rates for Midtown Manhattan, Lower Manhattan, Long Island, Northern + Central New Jersey, Westchester County and Fairfield County from 1996 to present.

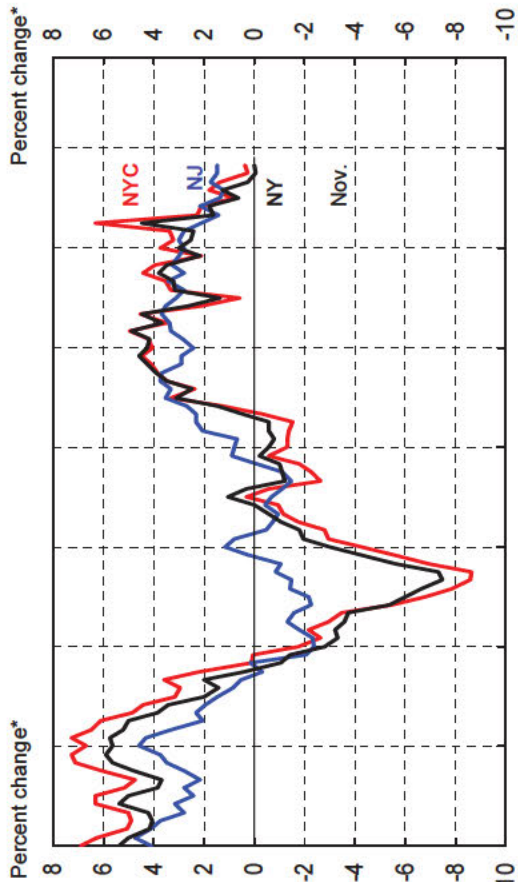
*Source: Cushman and Wakefield*

## E. Regional Charts

E1: INDEX OF COINCIDENT ECONOMIC INDICATORS

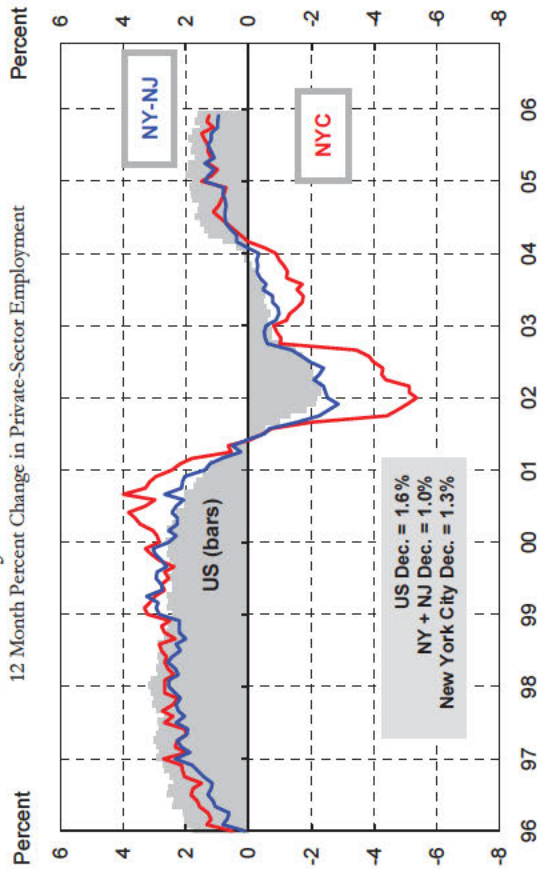


E2: INDEX OF LEADING ECONOMIC INDICATORS



\* The percent change in this index represents the forecasted growth in the Coincident Index over the next 9 months.

E3: PRIVATE-SECTOR JOB GROWTH: U.S. AND THE REGION



E4: OFFICE VACANCY RATES

