FRBNY Blackbook

RESEARCH AND STATISTICS GROUP

FOMC Background Material

October 2006

CONFIDENTIAL(FR) Class II FOMC

FRBNY BLACKBOOK

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CONTENTS

EXHIBITS

1. Overview

The principle adjustments to our central forecast over the inter-meeting period have been to lower real GDP growth in 2006 and decrease slightly our forecast for both overall and core inflation over the entire forecast horizon. We still expect growth at potential in 2007 and 2008. In addition, we see slightly less upside risk to inflation and slightly less downside risk to output now compared to September. On balance, these changes to our central forecast and risk assessment lead us to argue for holding the FFR target constant at 5.25% in October. While we have left the point estimate of our policy path unchanged, we see less of a need to signal a bias toward further tightening in the October meeting statement.

The Greenbook forecast has adjusted in a manner similar to ours, leaving the quantitative and qualitative differences between our two forecasts largely the same as they were in September; the Board staff still expects greater weakness in real activity and persistently higher inflation than we do. The factors driving the differences between our forecasts are also broadly unchanged. The Board staff still incorporates stronger effects on spending from the decline in housing wealth associated with the slowdown in that sector, as well as substantially weaker labor force participation growth; they also still have substantially more structural inertia embedded in the dynamics of core inflation. In addition, this Greenbook forecasts a fairly sizable jump in overall inflation in 2007 due to a significant rebound in energy prices. We see less in the way of an energy price rebound in 2007 at this juncture, and we have marked down our projection for overall inflation in 2007.

Over the inter-meeting period, no significant change in broad financial market conditions has occurred. The yield curve has remained inverted over this period, but no corroborating signal has emerged from other indicators, meaning that the market continues to give no clear picture of its assessment of recession risk. TIPS implied inflation at the very short horizons has edged down in recent weeks, presumably as a result of the drop in the spot price for crude oil, but there was little evidence of significant declines at longer horizons. We have also seen no meaningful rise in interest rate implied

volatilities. The lack of visible signs of uncertainty, particularly with regard to the future course of monetary policy, continues to be somewhat surprising.

This Blackbook includes three special topics, one that lays out the case for the maintenance of a bias toward tightening in the October FOMC statement language and two others that provide some preliminary insights into the potential uses of our newly developed DSGE model for policy purposes.

2. Recent Developments

U.S.

Summary. The economic releases during the inter-meeting period indicate continued upside risk to the implicit inflation target and downside risk to real activity. While year-over-year measures of core inflation remain elevated, more recent readings suggest some moderation. Monthly indicators suggest that real GDP growth in 2006Q3 slowed to around 1.3% (annual rate) but do not suggest changes in the medium-term outlook. Housing indicators offer some signs that the sharp downturn may be near its end, with activity beginning to level out. Payroll and hours growth continue to indicate some slowing relative to earlier in the year, though job growth for recent months was revised upward. Consumer and business surveys remain consistent with the medium-term outlook.

Inflation. Core inflation measures generally remain elevated compared to desired levels, signaling continued upside risks. Nevertheless, the most recent monthly data show some moderation and are consistent with our view that core inflation peaked in Q2 [Exhibit A-6]. The core CPI rose 2.95% (annual rate) in Q3, still high but considerably below the 3½% growth rate in Q2. Some of the moderation, however, occurred in the more transitory components of the index, such as apparel. The 12-month change in core CPI was 2.9% in September. The one-month change in the core PCE deflator ticked up in August to 2.8%. This increase also appears to be concentrated in some of the more

transitory components of the index and can thus be expected to moderate. The 3-month change in the core PCE deflator stood at 2.3% in August, and the 12-month change at 2.5%. With the exception of September 2002 (when statistical quirks associated with 9/11 raised this change), this latter number is the highest 12-month change since 1995.

Declining energy prices in September significantly impacted headline inflation, with the overall CPI falling by 5.7% (annual rate) during the month. By contrast, the August one-month changes in the overall CPI and the overall PCE deflator were 3.0% and 2.9% (annual rates), respectively. The 12-month change in the overall CPI fell to 2.1% in September, the lowest reading since March 2004. We expect a similar drop for the September PCE deflator.

Alternative measures of underlying inflation indicate that inflation pressures remain elevated, though they may be showing signs of moderation [Exhibits A-7 and A-8]. The 12-month change in the median CPI has continued to rise over the past couple of months, reaching 3.5% in September. The trimmed mean CPI and PCE, however, were stable in August, and the trimmed mean CPI fell slightly in September. Our smoothed inflation measures and Underlying Inflation Gauge (0-2 year horizon) have edged down recently. Long-term financial market expectations of inflation have recently shown modest declines; shorter-term expectations have declined more as energy prices have fallen. Similarly short-term household survey measures declined in September after having increased in August. These fluctuations appear to reflect reactions to changes in gasoline prices. Overall, surveys suggest that household expectations remain contained.

Real activity. Real GDP growth in 2006Q2 was revised down modestly to 2.6% (annual rate). Productivity growth in the quarter was a fairly subdued 1.6% (annual rate), but the four-quarter change in productivity was 2.5%, near our estimate of trend growth. Monthly indicators released during the inter-meeting period suggest that real GDP growth in 2006Q3 slowed substantially to around 1.3%, well below our estimate of potential growth (3%). Although these data have not led us to change our medium-term outlook for real activity, they do suggest continued downside risk.

Real PCE in August was sluggish but still consistent with consumption growth in Q3 slightly above that of Q2. Durable goods expenditures fell on a month-to-month basis, weakened by poor auto sales. Nondurable goods expenditures were also weak, while those on services were more robust. However, motor vehicle sales, particularly light-truck sales, bounced back in September; Q3 vehicle sales were up relative to Q2 but still below Q1's pace. Retail sales excluding autos fell 0.5% in September, but an alternative core measure excluding autos, gasoline (because of price swings), and building materials (because they are included in residential investment rather than consumption) increased a solid 0.8%. In all, the data suggest a small rebound in consumer spending in Q3 after rather slow growth in Q2. Income growth was soft in August, as expected after a solid July. The data still suggest that income growth remains sufficient to sustain consumer spending growth at a level consistent with our outlook.

Housing indicators remain tenuously consistent with an orderly slowing in the market. Housing starts increased 5.9% in September, but building permits fell again; the overall decline in these figures since the housing market peak in 2005Q3 roughly parallels the housing market slowdown of the mid-1990s, though it is somewhat sharper. The data remain at the lower end of ranges consistent with our outlook, signifying greater downside risks to the orderly cooling relative to the last Blackbook; the decline in starts must level off in coming months to remain consistent with our outlook. The declines in sales of new and existing homes show some signs of moderating; in fact, August new home sales were up slightly. The path of these series also roughly parallels previous housing slowdowns and does not yet suggest a more severe downturn. Mortgage applications fell moderately in August but have recovered somewhat through early October, which portends only moderate further declines in sales. With the drop in starts and small up-tick in sales, the new home inventories-sales ratio dropped slightly off its July peak, which had been its highest level since 1995. Home price appreciation has also shown significant moderation; the four-quarter change in the "purchase-only" OFHEO repeat sales index has fallen from 11.3% in 2005Q3 to 8.3% in 2006Q2. Median sales

prices have moderated to a greater extent and are currently showing only minimal appreciation, although this may reflect a changing mix in sales.

Business investment indicators moderated in August after showing some strength in July. Shipments of non-defense capital goods excluding aircraft, as well as the industrial production index for computer equipment, had modest gains in the month, indicating resumed growth in equipment spending in Q3 after the Q2 decline. Nonresidential construction continued to be strong. Inventory accumulation in August grew relative to July, but the Q3 pace still suggests slower growth than in Q2, indicating that inventory investment will likely be a significant negative contributor to real GDP growth in Q3. Inventory-sales ratios were little changed at low levels. Manufacturing production slipped a bit in September after moderate increases in July and August. Although its 12-month change remained near the upper end of its range over the past two years, Q3 on the whole represents some slowing relative to the first half of the year. The capacity utilization rate also slipped a notch but remained near its highest level since mid-2000. IT production growth was relatively modest for the second month in a row; our Tech Pulse index also reflected this moderation.

Labor market. After showing some strength early in the year, job growth has slowed in recent months. For the three months through September, it has averaged 117,000 per month, about 60,000 below the Q1 pace. The weakness has been most pronounced in manufacturing, retail trade, and temp services, suggesting that payroll growth will be moderate in the second half of 2006. Capped by a decline in September, the growth in aggregate hours in Q3 was considerably below the pace of the first half of the year. However, the unemployment rate fell by 0.1 for the second month in a row for a September level of 4.6%. The employment-population ratio was flat in September, and the labor force participation rate was unchanged for the fourth consecutive month; both are modestly above their levels from the beginning of the year. Initial claims for unemployment insurance have been stable, indicating little deterioration in the labor market. The 12-month change in average hourly earnings remained near its cyclical high. The continued large year-to-year increases in average hourly earnings, together with the

upward revisions in hourly compensation growth reported last month, offer some indication of a tighter labor market, though with relatively low participation. Recent upward revisions to prior months' payroll numbers, along with the announcement of the upcoming revision to the level of March 2006 payroll employment, also contribute to the idea that the labor market has been somewhat tighter than we thought in 2005 and early 2006. With below-potential growth expected for 2006H2, however, we expect the unemployment rate to edge up slightly from its current low level.

Surveys. Likely reflecting fluctuations in energy prices, consumer confidence measures were up in September and early October after declines in August. Their levels remain consistent with a moderately optimistic consumer outlook. With the exception of the Philadelphia survey, the levels of business survey indices generally indicate continued steady growth in the manufacturing and service sectors. The price paid indices in these surveys generally fell in September and early October, although their levels remain relatively high.

Global

The foreign outlook is essentially unchanged since the last FOMC. The global economy continues to do well, although not as well as in the first half of 2006. The forecast is for slowing in the euro area and China after both regions enjoyed strong growth in the first half of 2006.

Industrial Countries. Euro area growth is expected to slow to just below 2.5 percent in the second half of 2006 after near 3.5 percent growth in the first half of the year. Industrial production improved in August, while exports continue to be supported by sales to the U.S. and to oil exporters. The industrial confidence index recovered in September after a small August dip. The pace of improvement in the index that took hold in mid-2005, however, has moderated in recent months. Credit growth continues at a healthy rate but is no longer accelerating. In addition, the trend decline in the unemployment rate that started in 2005 seems to have come to an end, with

unemployment stabilizing in recent months at just below 8.0 percent. Consumer price inflation eased to 1.7 percent over the year in September, helped by the recent decline in energy prices. Core inflation was steady at 1.5 percent. A German sales tax increase will put significant upward pressure on euro area inflation in January 2007.

Japanese growth slowed in Q2, with GDP up only 1.0 percent after increasing 3.3 percent in the previous quarter. The economy is expected to rebound modestly in the second half of the year and stabilize at around 1.5 percent in early 2007. Business confidence remains robust. Industrial production strengthened in recent months, growing 6 percent over the year in August. Shipments are also showing strength, up 11 percent over the year in August, while exports were up 16 percent. The exit from deflation remains tentative. The overall consumer price index rose 0.9 percent over the year in August, with the increase coming from higher prices for food and energy. Excluding these categories, consumer prices fell 0.4 percent.

Canadian growth is expected to have improved somewhat in Q3 following a sluggish Q2 performance. Inflation is easing to near 2.0 percent. GDP growth in the U.K. looks set to be slightly above trend growth, helped by strong consumer spending. Inflation remains at the upper end of the tolerance range.

Emerging Economies. Growth remains strong in China despite signs that official steps to cool the economy are having an impact. GDP was up 10.4 percent over the year in Q3, a slowdown from 11.3 percent in Q2. Money, credit, production and investment growth, while still robust, have all slowed since mid-year. China's trade surplus continues to rise, surpassing its 2005 total in the first nine months of 2006. The surplus is expected to be near $150 billion for 2006 as a whole. Elsewhere in emerging Asia, there is tentative evidence of firmer growth after a weak Q2. Trade data remain strong, supporting improvement in domestic production after weakness in the first half of the year. Singapore's advance Q3 GDP release came in slightly above expectations, offering evidence of continuing solid growth. Going forward, NIE growth is projected to remain

near trend, with renewed strength in domestic demand offsetting some softening in external demand.

Mexico and Argentina continue to grow at a robust pace, and Brazil has snapped back from its weak Q2 performance. Mexican industrial production and general activity indices showed strong gains in Q3, although the pace of activity is expected to moderate in Q4. The near-term inflation outlook has worsened somewhat, in part from weather damage to some agricultural products. Core inflation, however, appears to be relatively unaffected. In Brazil, Q3 data point to a rebound after a weak Q2. Industrial production expanded 9 percent in both July and August with capital and intermediate goods showing particular strength. Actual and expected inflation continue to fall, with the 2006 (Q4/Q4) CPI forecast revised down to 3.0 percent. Economic activity remains strong in Argentina. Industrial production was up 8.2 percent over the year in August, near recent growth rates.

Trade

The trade deficit came in above consensus at $70 billion in August, up from $68 billion in July. The increase largely stemmed from higher prices and volumes of oil imports.

Rising oil prices remain the main cause of the widening nominal trade deficit over the past year. The August deficit was up almost 20 percent from a year ago, largely because of a 25 percent rise in oil prices.

The increase in both oil and non-oil import volumes in the July-August period after little growth in Q2 suggests that net exports will take 0.4 percentage point off Q3 GDP growth. The previous forecast had a neutral contribution from net exports.

The forecast sees exports continuing to grow at a healthy rate while demand for non-oil imports remains moderate. As a result, net exports are projected to be neutral for GDP growth in Q4 and for 2006 as a whole before becoming a small drag (0.2 percentage point) over the course of 2007.

The current account deficit was $874 billion in 2006Q2 and is projected to reach $911 billion (6.75 percent of GDP) in 2006Q4. For 2007, the deficit is projected to reach $926 billion, which, as a share of GDP, is roughly equal to the 2006 total.

Financial

Domestic Markets. Since the last FOMC meeting, Treasury yields of all maturities have increased slightly [Exhibit B-1]. Following a weaker-than-expected Philadelphia Fed survey, the benchmark 10-year yield fell to a low of 4.54% on September 25th. However, it began a rapid recovery on October 6th following the labor market report, reaching a high of 4.80% after the release of the FOMC minutes and retail sales data. It finished at 4.76%, 2 basis points above its level on September 19th.

Increased expectations of a steady target rate through the December FOMC meeting were a significant factor behind the rise in Treasury yields. The expected policy path initially shifted down, reaching its lowest level on September 25th, the same day the 10-year yield reached its low [Exhibit B-4]. Subsequent data releases led to sharp increases in the expected policy path, leaving the expected rate two years out about 7 basis points higher on October 18th than before the September FOMC meeting. The implied probability of a 5.00% target following the December FOMC meeting initially increased to 26% (from 8% prior to the September FOMC), then gradually decreased to 5% on October 18th. Meanwhile, the implied probability of a 5.25% target following the October meeting rose steadily and now stands at 96%.

TIPS-implied long-term inflation expectations declined during the inter-meeting period. At the 5-10 year horizon, the nominal forward rate decreased by 1 basis point while the real forward rate increased by 8 basis points, leaving carry-adjusted implied inflation expectations 9 basis points lower [Exhibit B-2]. At the 4-5 year horizon, the nominal forward rate decreased by 6 basis points while the real forward rate increased by 1 basis point, but carry-adjusted inflation expectations were essentially unchanged. Implied

inflation at the 0-5 year horizon also remained unchanged. The breakeven rate for the 10-year TIPS fell by 8 basis points during the period. Although one might expect the fall in long-term inflation expectations to reduce the 10-year yield, this did not occur, as changes in expected future short rates seemed to dominate this effect.

The yield curve remained inverted throughout the inter-meeting period [Exhibit B-1]. The spread between the 10-year and 3-month yields averaged –28 basis points over this period, compared with –21 basis points during the previous inter-meeting period. According to the Estrella-Hardouvelis-Mishkin model, the September spread of -21 basis points indicates a 33% probability of recession 12 months from now**.** The largest inversion occurred on September 25th, when the 10-year yield reached its lowest point of the inter-meeting period. As of October 18th, the spread was –33 basis points

Since the last FOMC meeting, major equity indices have increased. The S&P 500 index has gained 3.6% during the inter-meeting period, and the NASDAQ index has gained 5.2% [Exhibit B-7]. The gain in the stock indices reflects both increased investor confidence that the Fed is unlikely to raise the target rate and the recent increase in investor optimism about the economy and corporate profit growth. Compared to its level before the last increase of the target rate in June, the S&P 500 index is up 7.3%, contradicting the recessionary signal from the inverted yield curve.

During the inter-meeting period, risk measures in equity and fixed income markets remained low by historic standards. The implied volatilities calculated from options on the S&P 500 and NASDAQ 100 indices stayed well below their June levels [Exhibit B-7]. The implied volatilities calculated from Eurodollar options decreased slightly in the short term but increased slightly in the long term [Exhibit B-5]. Corporate credit risk measures, such as credit spreads and default rates, did not show any upward trend [Exhibit B-8]. The junk bond premium, as measured by the spread between BB-rated and A-rated bonds, even declined significantly during the past two weeks.

Monetary Policy and Global Bond Markets. Global financial markets continued on their recent benign path, aided by falling energy prices, abating concerns about a sharp U.S. slowdown, and stable policy expectations.

With the euro area posting steady growth rates, the ECB raised its policy rate to 3.25 percent on October 5th, leaving the rate 1.25 percentage points higher than at the beginning of the tightening cycle started in December 2005. Another rate hike is likely in December, as the Bank views its stance as still accommodative. The pace of subsequent rate hikes will hinge on incoming data confirming the strength of euro area growth in 2007. Current expectations are for at least one more hike in 2007, after which markets price a significant possibility of a rate cut before the end of 2007.

The Bank of Japan left its key policy rate unchanged at 0.25 percent at its October meeting but left the possibility open for a rate increase before year end. Swap data, however, implies that March-April 2007 is the most likely time for the next rate increase.

Emerging Asia outside China is nearing the end of the current tightening cycle, with only modest rate hikes expected by year end. (Indonesia has already begun to ease policy, and the Philippines may soon follow.) China's central bank has used administrative measures to tighten domestic credit, but such measures conflict with the bank's tight grip on the exchange rate, which requires continued large reserve purchases and, in turn, sterilization efforts. Elsewhere, the Bank of Mexico is holding its policy rate steady after completing its easing cycle in April, while Brazil's central bank continues on its easing path. Policy remains accommodative in Argentina, despite a rise in rates of approximately 350 basis points over the past year.

Concern about U.S. growth pushed global long-term rates down early in the inter-meeting period. As fears of a sharp U.S. slowdown abated, rates recovered and ended the period higher, by about 5 and 12 basis points in Europe and Japan, respectively [Exhibit B-10]. The firmer response of Japanese rates also reflects strong local economic news, especially a strong Q3 Tankan report. Yield curves steepened in both Europe and Japan,

although euro area spreads between long and short rates remain near recent lows. In emerging markets, the EMBI+ spread narrowed 13 basis points since the last FOMC meeting and continues to hover around historical lows [Exhibit B-9].

Data from inflation-linked bonds indicate that the rise in global long-term rates is wholly attributable to higher real rates [Exhibit B-10]. Indeed, inflation expectations implied in European and Japanese bonds fell marginally during the period, largely under the impetus of falling oil prices, albeit by less than expectations implicit in U.S. bonds.

Foreign Equity Markets. Equity prices recorded solid gains in the inter-meeting period, as abating concerns about U.S. growth and falling energy prices outweighed higher interest rates [Exhibit B-9]. Expectations of corporate earnings growth in the euro area and Japan were also supported by the continued weakness of the euro and yen against the dollar, lifting major European and Japanese indices between 4 and 6 percent in the inter-meeting period. Markets in Latin America were especially buoyant, with the Mexican Bolsa and Brazilian Bovespa gaining 5 and 11 percent, respectively. Emerging Asia markets also performed well, rising 3 percent over the period and shaking off risk factors such as the coup d'etat by the Thai military and North Korea's nuclear tests.

Exchange Rates and Capital Flows. Net capital flows to the United States are continuing smoothly, with oil-exporting countries, Japan, and China continuing to act as the main sources of net saving. The 2006 saving surplus of oil exporters is now projected to reach $530 billion, up from $385 billion in 2005–a somewhat lower projection than at the time of the last FOMC–while Japan's and China's surpluses should reach $160 billion and $200 billion, respectively, in 2006. The United States will absorb most of this surplus, with its net inflow now being expected to reach $872 billion in 2006, up from $786 billion in 2005. Much of this net inflow continues to come from official sources, although reserve accumulation by Asian central banks' has tapered off after a strong 2006H1.

Major exchange rates were stable during the period, and option-implied volatilities indicate that they are expected to remain so in the near future [Exhibit B-9]. Supported by reduced investor conviction that the FOMC will cut rates in early 2007, the dollar held up its recent gains, rising 1¼ percent against the euro, the yen, and in effective terms, and showing stability relative to emerging market currencies, including China's yuan. Contrasting the current lead role of cyclical developments, concern with the U.S. trade remained off markets' focus during the inter-meeting period.

Energy Market Developments. Reflecting the conjunction of seasonal softening of global oil demand and an increase in global oil supply in the second half of 2006, oil prices fell from an average of $64 a barrel in September to an average of $59 a barrel in the first two weeks of October. New fields in the former Soviet Union and Africa were key to the larger supply. Looking ahead, a key risk factor is the potential response of OPEC if prices do not rise with the onset of winter.

Global oil demand is projected to increase 1.4 percent in 2006, near last year's pace, including near-zero growth in the United States for the second consecutive year. China is projected to remain an important source of demand pressure, likely accounting for a third of global demand growth in 2006. Demand for oil from Middle East countries is also up significantly.

The oil price assumption for the FRBNY economic outlook is based on recent futures prices and projects WTI prices to increase to $59.75 in 2006Q4 and to $66.50 in 2007Q4. These levels are far lower than the previous assumptions of $70.25 and $74.75 for the end of 2006 and 2007, respectively.

Second District

Our Indexes of Coincident Economic Indicators for August indicate continued brisk economic growth in New York City and some pickup in growth in New York State but ongoing stagnation in New Jersey [Exhibit E-1]. Looking ahead to the next nine months, our leading indexes predict growth of 3.3% (annual rate) in New York City and 1.8% in

New York State, both a deceleration from the recent pace; our index for New Jersey suggests continued stagnant activity [Exhibit E-2]. Local-area inflation retreated sharply in September, reflecting the drop in energy prices: the 12-month change in metropolitan New York City's headline CPI dropped from 4.7% in August to 3.3% in September, whereas 12-month core inflation rose from 3.8% in August to 4.2% in September. Both local inflation measures were more than a full percentage point above their respective U.S. rates. The divergence between local and national inflation has mainly been driven by local shelter costs, which rose 7.4% over the past 12 months, compared with 4.2% nationally.

Labor Markets. The district's labor markets were mixed in September. Private-sector employment in the New York-New Jersey region as a whole was virtually unchanged in September, after expanding at a roughly 1% pace in August. Over the past year, private-sector job growth has averaged 1.6% in New York City but somewhat less than 1.0% in both New York State and New Jersey [Exhibit E-3]. At the same time, New York State's unemployment rate fell to a cyclical low of 4.4% in September, while New York City's rate tumbled to an 18-year low of 4.5%; New Jersey's unemployment rate edged down from 5.3% to 5.2%. However, in all three cases, the decline in unemployment was driven by a drop in labor force participation; overall, the district saw fewer people looking for work, as opposed to more people working. Still, in New York State and especially New York City, both the number of residents employed and the employment-population ratio remained near record highs. In New Jersey, however, both these measures slipped to their lowest levels in more than a year.

Real Estate. Office markets in and around New York City were steady to tighter in the third quarter. In both Midtown and Lower Manhattan, office vacancy rates edged down, while both asking rents and purchase prices rose sharply. Office markets strengthened modestly in Long Island, Westchester, and Fairfield Counties but were little changed in northern New Jersey. In contrast, housing markets were mixed to weaker in the third quarter. Based on data from the New York Association of Realtors, the market for single-family homes remained somewhat sluggish in August, with sales continuing to run

roughly 10% below a year earlier and prices up just 2½%—down from nearly 4% in July and 8% in the second quarter. However, the market for Manhattan co-ops and condos showed resilience in the third quarter; despite a large inventory of unsold homes, both the number of apartments sold and the price per square foot were up roughly 6 percent from a year earlier. Manhattan's rental market has also shown further signs of tightening. Residential construction trends have been somewhat similar in recent months, with single-family permits falling sharply but multi-family permits remaining high [Exhibit E-4].

Surveys and Other Business Activity. Recent surveys indicate mixed but generally favorable levels of business sentiment, as well as a pickup in consumer confidence. Surveys of purchasing managers in the Buffalo, Rochester, and New York City areas all indicate that activity continued to increase in September, though to a less widespread degree than in August. More recently, however, results from our October Empire State Manufacturing Survey suggest increasingly widespread improvement, while our October Business Leaders' Survey of non-manufacturing firms in the district points to steady, moderate growth. Regional household surveys point to a pickup in consumer confidence in September; the Conference Board's survey of Middle Atlantic region (NY, NJ, PA) residents shows confidence climbing to its highest level since April, led by the public's assessment of current conditions, which surged to a 5-year high; Siena College's survey of New York State residents shows a more modest rise in confidence, with the index reaching a 3-month high.

3. Outlook

FRBNY's Central Forecast

Three fundamental factors underlie our central projection [Exhibits A-1 to A-5]:

1. Inflation expectations are likely to remain contained.
2. There is little, if any, slack remaining in resource utilization. If there are no large

shocks and if fiscal and monetary policies maintain a near-neutral stance, growth over the medium term will be near its potential rate of approximately 3% (with 2% long-run productivity growth [GDP basis] plus 1% labor force growth).

3. The term premium is expected to remain low.

These underlying assumptions for the central forecast, about which we remain reasonably confident, are generally similar to those of the last Blackbook. Longer-term inflation expectations in financial markets and household surveys have been essentially stable or lower during the inter-meeting period, suggesting that they remain contained.

Regarding the assumed monetary policy path, our forecast is consistent with a Fed funds target rate of 5¼% through 2007Q3, declining to 5% at the end of 2007 and to 4.75% by the end of 2008. This path is the same as assumed in the last Blackbook and only slightly lower than that underlying the Greenbook forecast.

*Inflation.*Oil prices have declined significantly during the inter-meeting period, although it is not clear that these declines will persist. Indeed, longer-dated oil futures prices continue to suggest increases above current levels, although from a lower starting point. Recent monthly changes in core price indices came in somewhat lower than we were expecting and are consistent with a 2.3% (annual rate) increase in the core PCE deflator for 2006Q3, down from 2.7% in the second quarter. This decline, combined with developments in real activity, has led us to lower our projection of 2007 (Q4/Q4) core PCE inflation from 2.0% to 1.9%. We expect core inflation to slow somewhat further in 2008.

Real Activity. Real output is expected to grow at a below-potential rate in the second half of 2006, largely due to the ongoing slowdown in housing market activity. Since the last Blackbook we have marked down the second-half growth rate, reflecting somewhat weaker-than-expected housing data, stronger-than-expected imports, and slower-than-expected inventory investment. However, for 2007 and 2008, with the housing correction expected to be near its end and no other factors expected to push the economy off path, our forecast is for growth to be at its potential rate of around 3%. The below-

potential growth of the second half of 2006 induces a modest increase in the unemployment rate over that period. But because real growth remains close to its potential rate, we expect no further increases in the unemployment rate in 2007 and 2008.

A key assumption of our central forecast is that the housing correction has largely run its course, with single-family housing starts expected to bottom out at 1.3 million units (annual rate) in 2006Q4 and then gradually recover in 2007 and 2008. This is a somewhat deeper decline than was assumed in the last Blackbook. Another key assumption is that there will be relatively little in the way of spillover effects into consumer spending from the cooling of housing market. Both of these assumptions represent downside risks to the forecast.

Comparison with Greenbook Forecasts

GDP and Inflation Forecast. The Greenbook forecast has evolved in a manner similar to ours over the inter-meeting period; we both now project more weakness in real growth for 2006 than previously assumed and have made few changes in the inflation and output trajectories thereafter. The Greenbook forecast thus continues to project more weakness in real activity over the forecast horizon and stronger overall and core inflation in 2007 and 2008. Consistent with this, the policy assumption in the Greenbook is slightly tighter than ours in 2007 and nearly 50 basis points above ours in 2008.

The main factors behind the relative weakness in real activity in the Greenbook outlook for 2007 and 2008 are weaker consumption spending, slightly weaker equipment and software spending, and weaker state and local government spending. The continuing effects of the residential investment slowdown partially drive this weakness in consumption and business investment. We find it hard to reconcile their expected weakness in the state and local government spending with our understanding of the degree to which conditions in that sector have improved and are expected to keep improving. The Board staff continues to use a lower estimate of potential growth than we do, as well as a substantially lower estimate of the trend labor force participation rate.

On inflation, the Greenbook assumptions for energy prices induce more notable swings in overall PCE inflation over the forecast horizon. For instance, their estimate of headline PCE inflation in 2007 is 2.7% while ours is 2.1%. The 2007 surge in PCE inflation is driven by a rapid run up in energy prices, an assumption presumably based on their reading of energy price futures. In contrast, the considerable inertia that characterizes their inflation dynamics keeps core PCE above 2.0% over the forecast horizon. These high core inflation readings persist through 2008 despite the relative weakness of their projection for output growth and the higher path for the FFR target.

Alternative Greenbook forecasting scenarios. The Board staff presents a range of alternatives to their baseline forecast in the Greenbook. The scenario that generates the most weakness in real activity is the "housing correction with spillovers." This scenario entails a sharper "correction" in housing, both in terms of price declines and building activity, and a substantial depletion of household wealth results. This wealth decline generates sharper declines in both consumption and investment than are expected in the baseline scenario. This scenario thus implies a substantially weaker path for real growth over the forecast horizon but has little impact on inflation.

The Greenbook also has two potentially interesting inflation scenarios. The "less-persistent inflation" scenario assumes that the degree of inflation inertia, whether for structural reasons or because of enhanced policy credibility, is lower than in their baseline scenario. This generates a path for inflation and policy more in line with our forecast, though output growth remains relatively weak, perhaps because of their lower estimate of potential. Another inflation scenario, "higher expected inflation", assumes that inflation expectations have deteriorated and have moved up from 2.0% to approximately 2.5%. The outcome-based Taylor rule used in the simulations does not generate a particularly strong response from monetary policy, implying a rise in rates to only about 5.50%. However, it is reasonable to believe that a more aggressive rule would be employed in the event of such a meaningful deterioration in inflation expectations, resulting in a higher path than shown here.

Foreign Outlook. Key differences between our projections and those of the Board staff in the near term concern the euro area and Mexico. For the euro area, the Board staff assumes that an increase in Germany's sales taxes in 2007Q1 will cause a surge in consumption in 2006Q4, significantly boosting GDP in that quarter and depressing output in the following quarter. In fact, the Board forecasts a decline in German output in the first quarter of next year. Our forecast downplays the impact of the tax increase on quarterly growth rates. Both forecasts predict very similar levels of euro area output by 2007Q2. We also have a more favorable outlook for Mexico in 2006H2. Mexican investment spending was very strong in the first half of the year. We expect spending to level off, while the Board staff projects investment spending to fall significantly, bringing output for the year closer to trend growth. The forecasts for 2007 are similar. One final notable difference is that we project a more modest slowdown in China.

U.S. Trade. The only major difference between our trade projection and that of the Greenbook lies in 2006Q4. The Greenbook projects real imports to slow sharply in the fourth quarter on account of weaker oil imports. Oil import volumes were unexpectedly high in Q3, and the Greenbook assumes a substantial payback in Q4, while we do not. As a result, our forecast for the Q4 net exports contribution is unchanged at -0.1 percentage point, while the Greenbook forecast has been revised from -0.1 percentage point in September to a positive contribution of 0.26 percentage point now. Our 2007 forecast for the net exports contribution does not differ significantly from the Greenbook forecast.

Comparison with Private Forecasters

Our forecast for real activity is somewhat weaker than that of the private sector, while our inflation projections are essentially comparable. Our Q3 GDP growth forecast of 1.3% is substantially weaker than all other forecasts. While some of the difference may be due to differing release dates, even the Macro Advisers forecast, which was released fairly recently, is, at 1.8%, 0.5 percentage point higher than our central forecast. The difference between our forecast and the others for Q4 is similarly large, with our forecast again

being the weakest. Our real activity projection for 2007Q1, however, appears to represent more of a median viewpoint, though there remains a considerable spread. In contrast, our inflation forecast is similar to most other forecasts over the next three quarters. While our forecast for headline CPI in Q4 is somewhat higher, any differences likely stem from differing assumptions on the movements of energy prices. Our core CPI forecast is essentially identical to those from the private sector for all quarters.

FRBNY Alternative Scenarios and Risks

In addition to the central projection discussed at the beginning of this section, we consider a number of alternative scenarios that have different implications for monetary policy. Our approach differs from the one in the Greenbook in that we attach probabilities to our alternative scenarios and usually maintain the same scenarios across FOMC cycles. This allows us to interpret more easily the forecast distribution for output and inflation, as well as analyze the impact from variation in the probabilities over time. Once introduced, we retain an alternative scenario until we assess its likelihood to be minimal; for example, in the June Blackbook we removed the global deflation scenario introduced in May 2005 and replaced it with an over-tightening scenario.

We also can generate when necessary other forecast distributions that place a greater probability on a specific alternative scenario in order to examine its implications for policy. This was done in January 2006 in response to the near inversion of the yield curve and the surprisingly low advance reading on 2005Q4 GDP growth. To capture these developments, we produced a forecast distribution in which we doubled the probability of a productivity slowdown.

In future we will be using an estimated DSGE model to assist in the interpretation and construction of our alternative scenarios, as well as in determining their policy implications. The special topic *The DSGE at Work: What is Behind the Productivity Slowdown?* illustrates the potential contributions of the DSGE model by considering its interpretation of the productivity slowdown scenario.

We describe some features of the scenarios next. In these descriptions we continue to spend more time on the overheating scenario because it has the most significant consequences for appropriate policy.

FRBNY Alternative 1: Overheating. There are two potentially connected forms of this alternative. The first is a more standard scenario in which the extremely accommodative policy stance adopted in the U.S. and other countries in response to the global slowdown of 2000-2003 produces a persistent move of inflation above implicit targets, with an abrupt slowdown in real output growth starting in mid-2006. If central banks have consistently underestimated the equilibrium real rate (i.e., overestimated the slack in the global economy), this will lead to excess aggregate demand growth and, ultimately, to an increase in inflation and inflation expectations. The recent declines in energy prices and inflation expectations provide evidence against this scenario. Counteracting these signals, however, was the announcement of upcoming revisions to the level of payroll employment, which suggest a tighter labor market in 2005-6.

The second form of this scenario (described in the special topic *The Free Lunch* in the May Blackbook) highlights the possibility that the U.S. economy could be overheating but that the overheating might not manifest itself immediately in high domestic consumer inflation rates (i.e., a rate well in excess of the FOMC's implicit target). If the dollar is not freely floating and, moreover, if the dollar is being boosted by capital inflows whose purpose is to keep the dollar strong relative to other currencies, then it is possible that market interest rates could be held below what might be reasonably viewed as the equilibrium rate for a significant period of time.

Under this scenario, the low market rates should induce "over-consumption" today at the expense of future consumption. There is now less evidence suggesting that is occurring in the U.S. The most direct evidence in favor of this view was the apparent non-sustainability of the U.S. current account deficit, the fiscal imbalances in the U.S., and strong home price appreciation. The recent stabilization of the U.S. real trade deficit and

the short-run improvement in the fiscal position both suggest that less weight should be placed on this version of the scenario. However, the recent U.S. housing data have increased the risk of a less orderly housing market slowdown, raising the possibility of a more severe aggregate growth slowdown that would be consistent with this scenario.

FRBNY Alternative 2: Productivity Shifts. 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). The July NIPA revisions produced a drop in the estimate of potential growth in our central forecast. Therefore, our current central projection for productivity in the medium-term assumes a growth rate slightly lower than that of the pre-1973 epoch. There are two alternatives to this projection.

2a. Productivity Boom. The developments in the labor market and the continued strength of labor productivity over the longer term suggest that firms have become more efficient in using labor. As such, strong productivity growth could persist, which would imply that the potential growth rate is higher than our current estimate. Strong productivity growth would also limit labor cost pressures and thereby help to keep inflation subdued. However, the upcoming large upward revision to the level of payrolls in March 2006 will lower the growth of productivity in 2005 and 2006. Furthermore, productivity growth is likely to be weak in the third quarter. Thus, we have lowered the likelihood of the productivity boom scenario.

2b. Productivity Slowdown. It is possible that the upswing in productivity that began in the early 2000s may not be sustained. Furthermore, the persistent increases in the level and volatility of energy and commodity prices could result in lower productivity growth. The NIPA revisions of July 2006 combined with the expected revisions in the level of payrolls imply less robust productivity growth over the last three years than previously thought. In addition, the NIPA revisions suggest a higher profile for the growth of unit labor costs. This pattern provides support for the view that more of the strong productivity growth in the last few years was cyclical, meaning that total factor productivity growth has not been as robust.

FRBNY Alternative 3: Over-Tightening. Our outlook is based on the assumption that the neutral policy rate is between 4% and 4.25%, with an implicit target for core PCE inflation of 1.5%. Recent inflation data have core PCE inflation running above 2%. If sustained, this development is consistent with a fed funds rate above 5%. However, there is a risk that the recent acceleration in inflation is a lagging indicator of demand pressures and that the economy will slow significantly below potential. The behavior of inflation expectations, which remain contained and have fallen recently despite a long period of headline inflation at or above 3%, supports this view. Furthermore, the Fed has been increasing the FFR for two years, with a cumulative increase of 425bp. The yield curve has now been inverted for almost 3 months, apparently driven by expectations of an FOMC easing in 2007. While the yield curve nearly inverted in early 2006 due to the low levels of long forward rates, the current situation seems different from that experience and more reminiscent of prior periods of a Fed-induced yield curve inversion. However, other financial market indicators, such as the stock market and junk bond premia, have been giving very different signals. Thus, we have decreased the weight on the over-tightening scenario.

Foreign Outlook. An upside risk to the euro area outlook is that the notable acceleration in productivity growth in 2006H1 might reflect the economy's shift to a higher potential growth path. Some catch up may finally be in store after ten years of weak productivity growth relative to the United States. A downside risk is that investment spending slows more than projected from its unsustainable 2006H1 rate. In addition, the forecast may be too optimistic in assuming that tighter fiscal policy in Germany and Italy will not be enough to keep the euro area economy from growing near its potential rate in 2007.

The Japanese economy has not yet solidly escaped from deflation. The overall price index is increasing only because of higher prices for food and energy, while core prices have been falling at nearly a 0.5 percent rate since the beginning of 2005. The September drop in energy prices could push the headline index back below zero.

An additional risk is that the Japanese economy remains vulnerable to a slowdown in the global cycle. While domestic demand has been the engine of growth in the last two quarters, Q3 growth is expected to rely on a sizable contribution from foreign demand to offset weakness in private consumption. While the outlook for investment remains strong, the ability of the economy to continue growing without strong consumer spending remains in question.

Growth in emerging Asia outside China remains geared to the global cycle. Recoveries in the region would be at risk if a significant slowdown in global growth were to occur. The recent slowing in U.S. growth highlights this risk. On the positive side, solid fundamentals leave emerging Asia less vulnerable than most other emerging market economies to cycles in global risk appetite. Indonesia and the Philippines may be exceptions. In China, it remains uncertain how effective official measures to reign in overheated investment will ultimately prove. China could cycle from boom to bust, with unwelcome spillover effects for the rest of Asia.

Key watch points for Latin America continue to be the financial market reactions to political developments in Mexico and Brazil. In Mexico, Calderón will have to exercise considerable skill in putting together a governing coalition that can pass needed reforms. In Brazil, President Lula remains the frontrunner in the presidential election, despite the emergence of a scandal that prevented him from winning outright in the first round. His inclination and ability to push ahead with needed reforms during his likely second term remain unclear.

U.S. Trade Forecast. Oil prices represent a risk in both directions. Based on oil futures, the forecast assumes that oil prices will decline in Q4 and start rising steadily in 2007. Geopolitical developments could push oil prices higher than currently anticipated, causing the trade deficit to be larger than currently forecast.
Alternatively, the recent softness in oil prices could be a sign of further declines.

Domestic demand may grow more slowly than currently forecast in Europe, Canada, and Japan. If so, U.S. exports would receive a lower-than-expected boost in the rest of 2006 and in 2007.

Quantifying the Risks. The inflation data over the inter-meeting period have been broadly consistent with our central scenario, while the real activity data have been roughly consistent with the soft landing implicit in our central forecast. Furthermore, our confidence in this outlook has been increased by the absence of any significant upward inflation surprises, the well-maintained labor market, and the lack of a recessionary signal from any other financial indicator aside from the yield curve. Therefore, we have raised the likelihood of the central scenario to 65% (62% in September). The increase in the probability associated with the central scenario results from various changes in the weights we place on the alternative scenarios. We assume that the two most likely alternative scenarios are overheating at 10% (7% in September) and over-tightening at 10% (13% in September), followed by the productivity slowdown at 7% (9% in September), and lastly the productivity boom at 5% (6% in September). The remaining 3% (3% in September) is split evenly between upside and downside risks. The implied dynamic balance of risks is shown in Exhibit C-1. Note that because of the assumed structure of the overheating scenario, it is dynamically slightly more likely than the over-tightening scenario to occur.

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 projects through the end of 2009 under the assumptions that output grows at the potential rate of 3.0% and core PCE inflation eventually converges back to the implicit inflation target of 1.5%. We discussed the assumption behind this extension in the special topic *Forecast Errors and Implications for Policy* in the June Blackbook.

The probability of core PCE inflation exceeding 2.5% during any quarter through the end of 2008 is now 65% (75% in September); this probability is produced by considering the share of inflation paths that have at least one four-quarter inflation rate exceeding 2.5%

and cannot be obtained directly from the forecast distribution presented in Exhibit C-4. This reduction in probability is mainly a result of the slight decrease in our point forecast and the small downward revision to core PCE in 2006Q2. The probability that the expansion continues through the end of 2008 is 85% (80% in September). The recession risk has dropped with the decrease in the weight placed on the over-tightening scenario.

The FRBNY "confidence intervals" can be compared to those presented in the Greenbook. In general we have a similar level of confidence as the Board staff for 2006 but less confidence in 2007 on inflation. For example, the Greenbook has a 70% probability interval of width 1.4 percentage points for core PCE inflation in 2007, while our 70% interval has a width of 1.6 percentage points. Thus, though we have a more benign central forecast for inflation in 2007, the 85th percentile of the distributions are approximately equal. The source of the wider interval around our forecast is the weights we place on our alternative scenarios. These scenarios do not receive the same weights in the historical data since 1986, from which the Greenbook derives its forecast errors.

To help gauge the importance of the differences between our outlook and the Greenbook we calculate the percentile of the baseline Greenbook forecasts for outlook and inflation in our forecast distributions. The results are shown in the table below. We are slightly more optimistic than the Greenbook on output growth going forward and significantly more optimistic on inflation. This latter statement is particularly true in 2008, when the 85th percentile of our inflation distribution is 2.6%, while that for the Greenbook is 3.0%. These substantive differences stem from our assumption of a lower level of inflation persistence.

Table: Percentile of Greenbook Forecast in FRBNY Forecast Distribution

	Core PCE	**Output**
2006	55 (54)	52 (44)
2007	63 (67)	40 (42)
2008	66 (70)	44 (44)

Special Topic

The DSGE at Work: What is Behind the Productivity Slowdown?

October 19th, 2006
Argia Sbordone Redacted *Andrea Tambalotti*
Krishna Rao and Kieran Walsh

This Special Topic uses our DSGE m d l investigate the structural origins of the pro uctivity slowdown scenario described in the FRBNY Alternative Scenarios and Risks section. This analysis is useful for two reasons. First, the economic structure built into the DSGE model allows us to trace the propagation of a productivity shock through the behavior of households, firms, and the policy authority to its impact on output and inflation. Second, the general equilibrium nature of the model allows us to characterize the response of policy to the unfolding of the scenario, in light of the estimated historical interest rate rule, and to study how this response in turn affects the scenario.

We begin our analysis with some background on the DSGE model, especially as compared to the statistical models that have so far provided the basis for the scenario analysis carried out in the Blackbook. From a purely mathematical perspective, a DSGE model is a device that maps exogenous shocks, such as changes in demand, productivity or costs, into economic outcomes. In our DSGE model, the mapping is based on a set of economic relationships that describe the behavior of agents such as consumers, firms, and policymakers. This stands in contrast with current practice at FRBNY, at least in the context of scenario analysis, in which this same mapping is provided by a set of purely statistical models. The main advantage of this statistical approach is that it is likely to fit the data better, since it imposes less theoretical structure. Its drawback is that the exogenous shocks can only be interpreted through their effect on economic outcomes. For example, the productivity slowdown scenario is currently defined as a situation in which output growth declines and inflation rises.

In our DSGE model, on the other hand, the exogenous shocks have a direct interpretation as economic events. For example, the level of output produced by firms depends on the amount of labor they employ and on the productivity of that labor. Therefore, a productivity slowdown can be modeled directly as a situation in which labor productivity growth falls by a certain amount over a certain period of time. The model then allows us to trace the effect of this productivity slump on firms' output, costs, and pricing decisions. Therefore, whether or not a productivity slowdown ultimately generates a fall in growth and a rise in inflation is a result of the reaction of economic agents in the model to the unfolding of the shock, rather than an assumption.

This description might suggest that the natural approach to analyzing a productivity slowdown scenario with the DSGE model would be from the bottom-up. One could directly "calibrate" a negative shock to labor productivity and report the effect of such a shock on the variables of interest. This is (approximately) the approach followed in the Greenbook. In this Special Topic, we chose instead to follow a top-down approach, with the aim of complementing the set of scenarios that are familiar from previous Blackbooks. In particular, we take as given the paths of output and inflation that define the productivity slowdown introduced as alternative scenario 2b in the FRBNY Alternative Scenarios and Risks section. We then ask: what combination of

shocks is most likely to produce those paths as an outcome of the DSGE model? If the answer is primarily a negative productivity shock, we can conclude that the scenario as it currently stands is well "calibrated," at least from the perspective of the DSGE model. At the same time, investigating what other shocks might also hide behind the scenario can help us refine its interpretation.[1]

We begin our analysis with figure 1, which compares the productivity slowdown scenario to the forecast distribution from the DSGE model. In each panel, the black line denotes data through 2006Q2 and the expected value of the model's forecast after that date. The red line represents path of inflation and output growth under the productivity slowdown scenario using a statistical approach (first and second panel).[2] For the interest rate (third panel), the red line represents the value of the Fed funds target rate that the FOMC would choose if the scenario materialized, according to the historical interest rate rule estimated by the model.

Two observations are notable. First, the scenario's profile for inflation is somewhat less likely than its profile for output growth. The latter is within the yellow (50 percent probability) band, with the exception of 2006Q3, while the former is mainly in the pale blue (75 percent probability) area. If a negative productivity shock were alone responsible for generating the effects of this scenario, we would expect output and inflation to be displaced by amounts that are, according to the model, equally likely to occur. We can infer from this that some other force must be pushing up inflation without depressing output.

Secondly, according to the historical interest rate rule estimated by the model, the paths of inflation and real growth that characterize the productivity slowdown scenario would be accompanied by a profile of the Fed funds rate that is initially shallower than the model's mean forecast. This policy easing is a reaction to the fact that GDP growth falls significantly in 2006Q3, and it ends as GDP growth partly recovers and inflation begins to rise in the medium term. At the same time, this drop in interest rates is one of the forces pushing medium-term inflation higher. This simultaneity, in which monetary policy both affects and is affected by developments in the economy, is what we often refer to as a "general equilibrium effect."

Figure 2 presents the combination of shocks that is most likely to be behind the productivity slowdown, according to the DSGE model. As in the previous figure, the black line represents the mean forecast of the shocks, while the red line represents the shocks corresponding to the scenario. The discrepancy between the red and black lines is a measure of which shocks are "working harder" to generate the scenario.

What we notice immediately is that the productivity slowdown is, indeed, largely a productivity phenomenon. The onset of the scenario corresponds

[1] As a matter of accounting, we need at least two shocks to reproduce exactly any given scenario involving two variables, in our case output growth and inflation In this application, we consider all four shocks in the model Therefore, we fully expect that other shocks besides productivity will be contributing to the scenario The relevant metric to asses the scenario is thus the relative contribution of different shocks

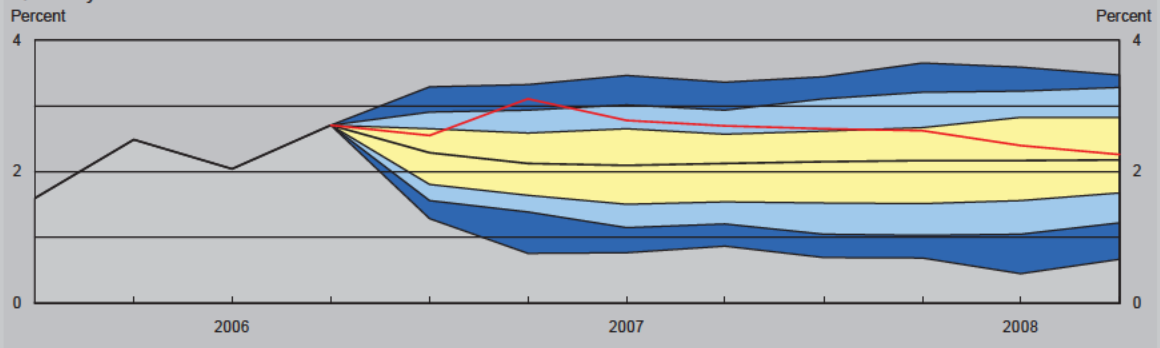
[2] Note the red lines pictured here will not be identical to the productivity slump lines pictured in Exhibits C-2 and C-3, as these are annualized quarterly changes instead of four-quarter changes

throughout the forecast horizon (top right panel). This is by far the largest discrepancy between expectation and scenario in the four panels. At the same time, the cost push shock exhibits a slight hump in 2006Q4 (bottom left panel), which corresponds to the hump in inflation in the scenario. Finally, a marginal contribution to the rise in inflation in the scenario comes from an increase in the inflation target of approximately 30 basis points above the mean forecast (bottom right panel).

Our conclusion is that the productivity slowdown scenario presented under FRBNY Alternative Scenarios and Risks is successfully validated by the DSGE model. A shock that persistently reduces labor productivity in the model by 1% over the forecast horizon would result in a drop in real growth and an increase in inflation very similar to those hypothesized in the scenario. However, in the scenario inflation rises somewhat more than what we would expect from the drop in productivity alone. What accounts for the difference is a temporary policy easing that the model estimates as the most likely response of the monetary authority to the unfolding of the scenario.

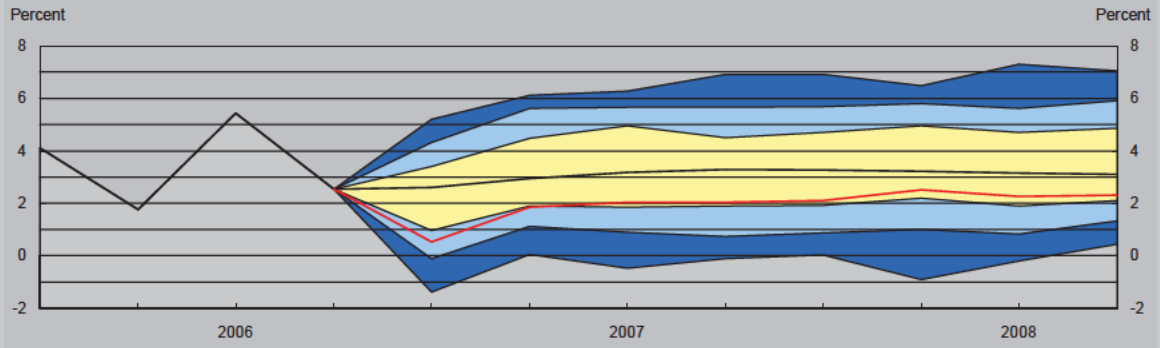
Forecast Distribution and Productivity Slump

Quarterly Core PCE Inflation Forecast



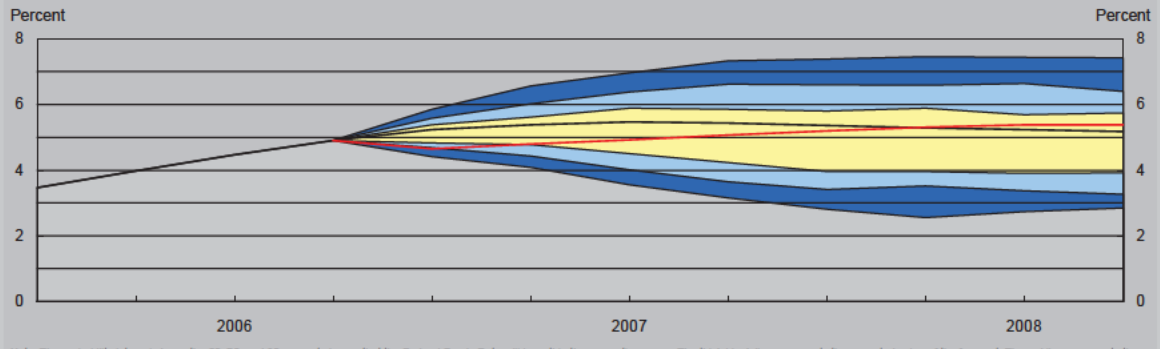
Note The probability interval shows the 50, 75, and 90 percent chance that quarterly Core PCE inflation will be within the respective range. The thick black line represents the expected value of the forecast. The red line represents the path of quarterly Core PCE inflation under the productivity slump scenario.

Quarterly Real GDP Growth Forecast



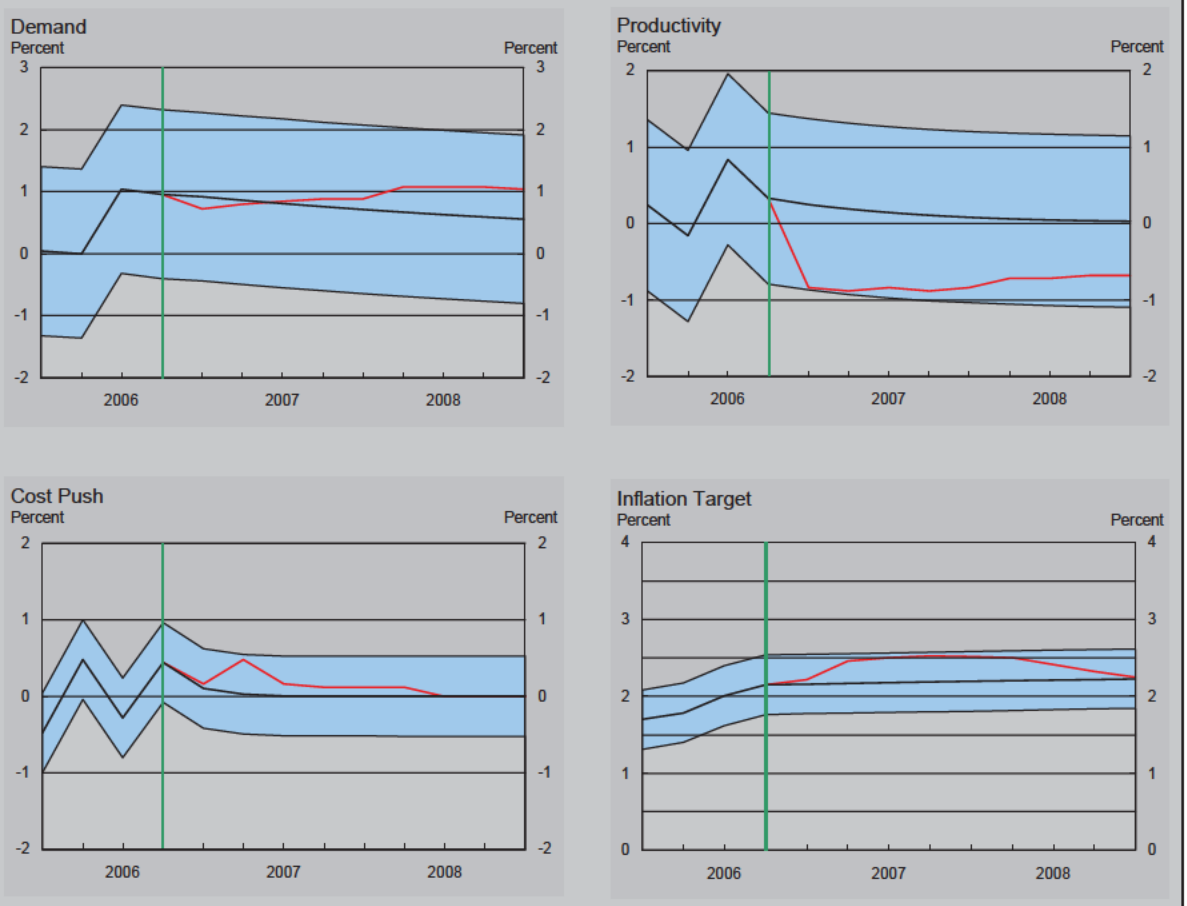
Note The probability interval shows the 50, 75, and 90 percent chance that quarterly real GDP growth will be within the respective range. The thick black line represents the expected value of the forecast. The red line represents the path of quarterly real GDP growth under the productivity slump scenario.

Federal Funds Rate Forecast



Note The probability interval shows the 50, 75, and 90 percent chance that the Federal Funds Rate will be w thin the respective range. The thick black line represents the expected value of the forecast. The red line represents the path of the Federal Funds Rate under the productivity slump scenario.

Estimated Shocks



Note: The thick black line represents the expected value of the shocks, and the blue shaded area represents a 68% probability interval The red line represents the path of the shocks under the productivity slump scenario The vertical green line represents the last observation in the sample

4. Policy Alternatives

Our main forecast and risk assessment is consistent with holding the target FFR at 5.25% at the upcoming meeting. Our path for the target FFR going forward is unchanged from the September Blackbook, with a 5.00% target at the end of 2007 and a 4.75% target at the end of 2008, but the evolution of our outlook for output and inflation suggests a less asymmetric signal for the October statement language. Thus, our overall prescription for policy, including both the path and the signal, has moved down somewhat.

Late in September, following weak housing data and a surprisingly low reading on manufacturing confidence in the third district, we switched to a flat (symmetric) signal for the near-term, though we maintained the expected near-term FFR of 5.25%; we have retained this policy assumption since then. Consistent with the changes in our forecast over the past five weeks, this is now also the policy prescription from our *Baseline* rule [Exhibit D-1]. In contrast, the path implied by the *Opportunistic Disinflation* rule suggests the advisability of maintaining a signal that indicates the FOMC is more likely to tighten than to ease in the near term; the special topic *The Case for Retaining a Tightening Bias* provides a rationale for maintaining this upward tilt. One rationale for leaving the language unchanged is our inability to sufficiently calibrate the language to achieve a movement in the path that would capture such a subtle change in our views. The challenges presented by crafting the signal-appropriate language are illustrated by the recent differences between the path priced into markets and the path consistent with our forecast. It is possible that removing the upward tilt from the language at this juncture would not maintain the market path but would instead push it back to its level of several weeks ago.

Our *Baseline* rule now implies a path closer to what is currently priced into markets. The main changes in our central forecast that lead us to argue for a neutral signal are the weaker-than-anticipated growth in 2006H2 and the reduction in our core PCE forecast for 2007. Also contributing to this shift is a recent reduction in the uncertainty around our central forecast, particularly a reduction in some of the upside inflation risk. Although most measures of underlying inflation remain above the comfort zone for an implicit

target, the FRBNY measures of underlying inflation, including both the smoothed CPI and Underlying Inflation Gauge, as well as the trimmed mean CPI appear to be declining [Exhibit A-7]. Both the sustained decrease in the TIPS-implied inflation at short-to-medium horizons and the decline in energy prices over the last two months support this improvement in inflation prospects.

Further closing the gap between our policy path and the markets has been the increase in the market's expectations for the 2007 FFR over the past five weeks. Corroborating the market's apparent reduction in the risk of recession in 2007, equity markets have continued to increase, and the exchange value of the dollar has firmed. This apparent financial market optimism has occurred despite the faster-than-expected decline in housing activity.

The net effect of all these changes has been to reduce the significant difference over the last two cycles between the policy path consistent with our forecast and that priced into markets. The distance between these paths has declined both in terms of the *Baseline* policy rule's prescription and the path consistent with our central forecast. As it has been since August, our *Baseline* policy prescription is closer to the dealer survey than to the path priced into markets; by moving down our overall prescription, we have moved in the same direction as the dealer survey since September.

To provide a quantitative analysis of the germane policy alternatives, we examine the prescriptions implied by three policy rules:

1. *Baseline Policy Rule (at near-term market expectations).* Hold the FFR at 5.25% in October and send a neutral signal regarding future actions. Closest to the path underlying our central forecast and the market in 2007.

2. *Opportunistic Disinflation Rule (above near-term market expectation).* Hold the FFR at 5.25% in October and send a clear signal of tighter policy until four-quarter core PCE inflation drops below 2%.

3. *Dove Rule (below near-term market expectations).* Possibility of a cut in October or December and signal the possibility of further rate cuts in response to signs of weakness in real activity.

The preamble to the Section D exhibits has a description of how the various rules react to incoming data.

The *Opportunistic Disinflation* rule is designed to provide a profile of the FFR path for policymakers who want to signal a more aggressive stance on inflation. Under this rule the policymaker raises the FFR in accordance with the *Baseline* rule but lowers the FFR more slowly than the *Baseline* rule prescribes, which keeps the real rate higher for a longer period at the end of a tightening cycle. The *Dove* rule, meanwhile, generates the profile of an FFR path for policymakers who want to signal a stronger reaction to weakness in real activity. When the output gap is negative, the *Dove* rule places equal weight on deviations of inflation from target and output below potential.

Exhibit D-1 contains the prescriptions implied by each of these three rules when averaging over the Bank's forecast distribution; the prescriptions thus reflect the range of our alternative scenarios, as well as to the probabilities we attach to those scenarios. The figure shows the implied (quarterly average path) of FFR through the end of 2009 for each rule and for the path currently priced into markets.

The *Opportunistic Disinflation* rule increases the FFR to 5.5% over the forecast horizon and maintains it there for some time. The effectiveness of such a policy path depends on the policymaker having established credibility in fighting inflation. To understand this assertion, consider two policymakers, both with the same preferences, but one enjoying (exogenously assigned) perfect credibility while the other has to "earn" it. The policymaker with the luxury of not having to ensure against a loss of credibility would likely choose to respond to inflation and inflation forecasts above target according to the *Opportunistic Disinflation* rule. In contrast, the other policymaker, needing to establish credibility, would respond more aggressively to inflation data above the comfort zone and choose a more hawkish (and volatile) policy path.

The *Dove* rule implies lower rates in 2007 and some chance of a cut in late 2006. The projected FFR falls slightly below the market-implied rate in 2006 and diverges further as the horizon extends.

As indicated above, the *Baseline* rule is more consistent with holding the FFR at 5.25% through the summer of 2007. Then it suggests that the FFR should start a slow decline toward 4.125% (our current assumption for the neutral level) in 2008 and 2009. This behavior is mainly based on our central forecast, which has inflation returning to target and output growing at potential in the latter part of the forecast horizon.

Exhibit D-2 and Exhibit D-3 show, respectively, the nominal and real FFR implied by our four alternative scenarios under the *Baseline* rule. The scenarios that imply significantly different paths from that currently priced into markets are the over-tightening (below the market path) and overheating/productivity slowdown (above the market path) scenarios. This dichotomy between the paths implied by different scenarios is also present for the other two rules (not pictured); in particular, the overheating and productivity slowdown scenarios imply higher levels of FFR under the *Opportunistic Disinflation* rule, while the over-tightening scenario suggests lower levels of FFR under the *Dove* rule. These scenarios show clear differences in inflation outcomes, as shown in Exhibit C-2; thus, incoming inflation data will continue to be important in determining the likelihood of these alternative scenarios going forward.

Exhibit D-4 shows the results of using our *Baseline* rule from 2004Q4 to the present—setting the initial FFR at its average value of 1.9% in 2004Q4—with a 1.5% inflation target and a 2.0% inflation target. (See the preamble to Exhibit D for more information on the standard policy rules as well as this exercise.) The paths derived from the 1.5% target and the 2.0% target both follow the actual FFR path closely until the middle of 2005. From this point on, the slope of actual policy has been considerably steeper than that implied by the *Baseline* rule under either target. While the policy rule with the 1.5% inflation target is closer to the implied market path at the end of 2007 than is the rule with

the 2.0% target, neither target implies policy as tight (or a terminal rate as high) as that which is currently priced into markets. In fact, at the end of 2006 and into 2007, the market path is about 50 basis points higher than either path.

The exhibit also includes the implications of averaging our three policy rules, with the weights used to generate the average chosen to match the market-implied expected path as closely as possible. This exercise matches the market more closely than in the September Blackbook because path implied by the Baseline rule is now closer to the market's expected path. The special topic *The DSGE at Work: The Pickup in Inflation in 2004H1* analyzes a particular experience in recent history and a range of possible policy actions from the perspective of our DSGE model. The DSGE model allows us to examine the effects of various counterfactual policies in a rigorous manner.

Exhibit D-5 contains a probabilistic metric for comparing the market-implied paths of the FFR with those of our policy rules through the end of 2007Q3. For the first time since June the difference between our *Baseline* rule and that priced into markets has declined.

Exhibit D-6 compares the implied distributions of FFR from the three rules and the average across rules with the distribution currently priced into markets. Again, combining our forecast distributions with the *Opportunistic Disinflation* rule implies a higher path for the FFR than the market in 2007. The *Dove* rule is now below the market and has a strong negative skewness that is not currently apparent in options markets. The combination of our forecast distribution and *Baseline* policy rule produces a distribution of future FFR very similar to that currently priced into markets.

Special Topic

The Case for Retaining a Tightening Bias

October 19th, 2006
Richard Peach Redacted

Inter-meeting data on inflation have been encouraging. Core inflation slowed in the third quarter, in line with our forecast, while energy prices fell sharply during the month of September. In addition, growth of real GDP in the second half of 2006 looks to be weaker than previously expected, implying a somewhat greater easing of overall resource utilization than we had anticipated.

These developments, combined with the closing of the gap between our expected FFR path and that of the market, prompt us to consider whether we should now remove the phrase "inflation risks remain skewed to the upside" from the FOMC statement. There are three factors that argue against removing the phrase at this time.

First, while it appears that GDP growth will be well below potential in the third quarter of 2006, reducing the overall level of resource utilization, we do not know how long below-potential growth will persist nor do we know how sharply growth is likely to rebound. The growth of unit labor costs in the non-farm business sector picked up in late 2004 and early 2005, when the unemployment rate was between5% and 5 ½%, suggesting the economy may have been operating above potential for some time. Even more pessimistic forecasts than our central outlook do not foresee an unemployment rate much above 5% by the end of 2007. It is possible that a short spell of below-potential growth will not open up enough slack to subdue all of the existing inflation pressures. Indeed, given our central forecast for growth of real GDP through the end of 2008, traditional Phillips curve models predict that core inflation will move modestly higher over the forecast horizon.

Second, part of the basis for expecting core inflation to slow over the forecast horizon is the belief that inflation is now more strongly influenced by forward-looking inflation expectations than is suggested by traditional models. While those expectations have come down of late, lower energy prices may be substantially driving their decline. Moreover, even with the recent decline, it is unclear whether the current level of inflation expectations is consistent with the FOMC's implicit target and comfort zone. Removing the signal of a bias toward tightening at this stage risks raising those expectations.

Third, markets might interpret the removal of the upward tilt during a period of falling energy prices as a sign of excessive response to headline inflation dynamics. Such a movement would be confusing and ultimately counterproductive, as our communication strategy has emphasized the desirability of stabilizing the core.

Special Topic

The DSGE at Work: The Pickup in Inflation in 2004H1

October 16, 2006

Argia Sbordone Redacted *Andrea Tambalotti* Redacted
Krishna Rao and Kieran Walsh

After flirting with levels close to 1% between 2002 and 2003, quarterly core PCE inflation started moving up in the middle of 2003. This pickup accelerated significantly in the first half of 2004, when core inflation moved from about 1.5% to above 2%, where it remains today. This special topic analyzes the pickup in inflation in 2004H1 through the lens of our DSGE model. We ask three questions. First, was the surge in inflation forecastable? Second, what accounts for the discrepancy between the model's forecast and the observed paths of inflation, output growth, and the Fed funds rate? Third, could monetary policy have achieved a smooth transition to inflation rates below 2% and, if so, at what cost in terms of volatility of output and interest rates?

Figure 1 shows forecasts of quarterly core PCE inflation, real GDP growth, and the Fed funds rate, starting in 2003Q1. In each panel, the black line represents the expected value of the forecast, while the red line shows the realized data. We forecast from 2003Q1, when inflation reached 1.1% (annual rate), its lowest level following the recession of 2001.

The model performs well in its forecast of output and the Fed funds rate, especially in the medium term. Inflation, however, is close to the median forecast in 2003 but well above it in 2004 and beyond. These misses roughly correspond to the "considerable period" era from June 2003 to June 2004, when the FOMC kept the Fed funds rate constant at 1% to guard against the risk of deflation. Notice that the model does identify the behavior of the Fed funds rate in this period as deviating from the historical policy stance; its forecast predicts a slow rise in interest rates over 2003 and 2004, when the FOMC instead maintained the Fed funds rate at 1%.

This forecast suggests that part of the observed acceleration in inflation during this period might be attributed to the unusually loose stance of policy in 2003 and 2004. However, the pickup in inflation is significantly more "unusual" than the deviation of the Fed funds rate from its historical norm. Actual inflation in 2004 is mostly outside the yellow band (the 50% probability interval of the forecast), while the actual Fed funds rate remains well within it. Moreover, the acceleration in inflation is not accompanied by unexpectedly high real growth, suggesting that this traditional channel of transmission (from an overheated economy to higher inflation) does not fully explain the acceleration.

Figure 2 tries to identify this unknown factor by analyzing the exogenous shocks that might have contributed to the acceleration in inflation. We conduct a similar exercise in the DSGE analysis of the productivity slump scenario. In each panel of the figure, the black line represents the evolution of the shocks associated with the mean forecast, while the red line represents the combination of shocks corresponding to the actual realization of inflation, output, and the interest rate.

The contribution of three shocks stands out. The first is the demand shock, shown in the upper left panel, which we see recovering from almost -4% to around -1%. This movement is particularly pronounced during 2004,

the same time that inflation is picking up. However, its profile is broadly consistent with the expectation represented by the black line and thus only helps explain the cyclical component of the recovery in inflation and GDP growth. The productivity shock, shown in the upper right panel, is also broadly in line with the expectation with the exception of 2003Q3; this spike in productivity simply accounts for the corresponding spike in growth in that quarter.

The most significant and direct contribution to the surge in inflation comes from a sizable upward movement in the inflation target. In the model, the inflation target is implicit in the interest rate rule that describes the behavior of the Fed. This target moves by about 80 basis points, from below 1% to above 1.5%. The movement in the implicit target provides the missing link for a unified explanation of the pickup in inflation, the "considerable period" monetary policy, and the absence of a concomitant acceleration in growth. In the model, the inflation target is the main driver of movements in inflation expectations; inflation expectations, together with the amount of slack in the economy, then combine to drive pricing behavior by firms. In other words, the model attributes a significant fraction of the inflation acceleration to a change in inflation expectations, driven by a perceived increase in the Fed's implicit inflation target. This increase in the target reflects how agents in the model interpreted the unusually loose monetary policy during the "considerable period" era.

Now that we have looked at the dynamics of the inflation pickup, we examine how the Fed might have prevented inflation from moving above 2% in 2004, given the shocks that hit the economy at that time. As shown in figures 3 and 4, the answer depends crucially on the policy strategy used to implement this soft landing scenario. In figure 3 we present the "no communication" strategy, while figure 4 depicts the "full communication" strategy. Under the no communication strategy, the Fed sets the interest rate each period at the value which is necessary to keep core inflation through 2004 at 1.6%, its level at the end of 2003. This inflation path is achieved through "surprise" departures from the historical rule. In contrast, under the full communication strategy, the Fed implements the same path for inflation by announcing an inflation target that is consistent with the desired evolution of inflation. The crucial difference between the two scenarios stems from the design of the model; inflation expectations are immediately affected by the announcement of an inflation target under the full communication strategy. These expectations in turn have a direct effect on actual inflation without requiring a painful contraction in real activity to force businesses to contain their price increases. Under the no communication strategy, on the other hand, inflation expectations remain at their historical level. As a result, inflation can only be controlled by increasing interest rates to contain GDP growth.

It is important to stress that the full communication scenario is quite extreme. In actuality, expectations would be unlikely to adjust instantaneously, even if the Fed were completely transparent about its inflation target. Nevertheless, the differences between the results of the two policy strategies are striking. In the no communication case, inflation is brought under control only by tightening monetary policy significantly (bottom panel). The cost is higher volatility in the interest rate and in output

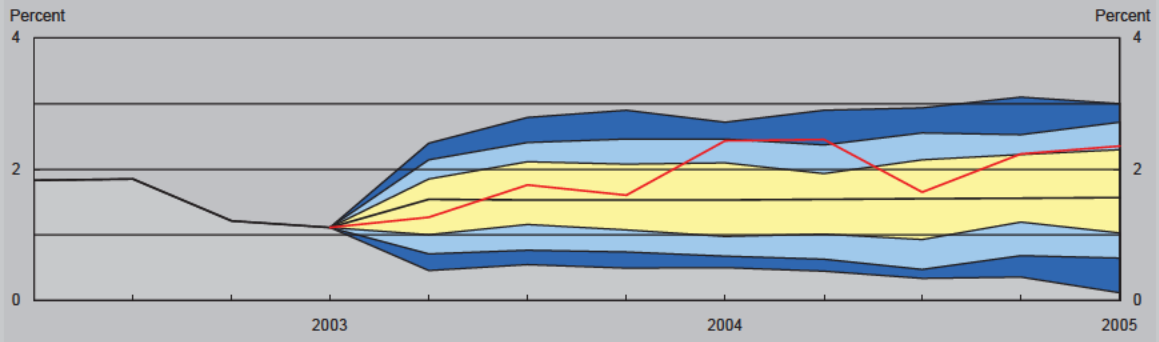
growth.[1] Under full communication, in contrast, the same path for inflation can be achieved with much less pronounced fluctuations in real growth and an almost imperceptible tightening of policy relative to the actual path. Interest rates do not need to rise, and output does not need to fall significantly, because a shift in expectations brought about by clear communication of the Fed's inflation objective largely brings inflation under control.

It is important to interpret the results of these counterfactual exercises with caution. The objective of these exercises is not to prescribe an alternative to the policy followed in 2004. Instead, we wish only to investigate how we might have achieved a different, and not necessarily better, path for inflation in 2004. The model suggests that achieving a lower path for inflation would have been possible. However, achieving this lower path would have had some costs in terms of output stability. At the same time, though, clearly communicating the Fed's inflation objective could have achieved the inflation goal with a reduced amount of tightening and lower output volatility. The model's indication that it would have been possible implies nothing about its desirability; instead, using the model for this type of exercise enables us to present the policymaker with a menu of what is possible and of the tradeoffs involved in these possibilities.

[1] The quantitative details of the evolution of output and interest rates under the counterfactual simulations should not be taken literally, since they depend significantly on the details of the model and of the estimated shocks However, the qualitative pattern of higher volatility under "no communication" is a robust feature of models in which expectations matter

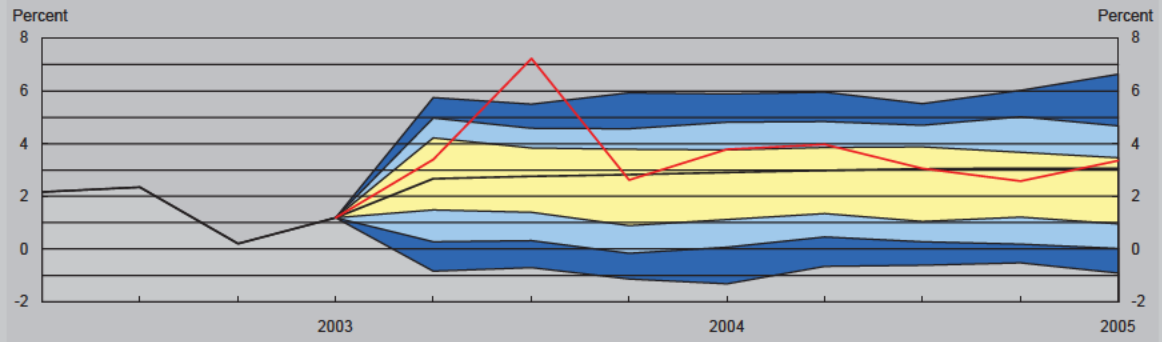
Forecast Distributions

Quarterly Core PCE Inflation Forecast



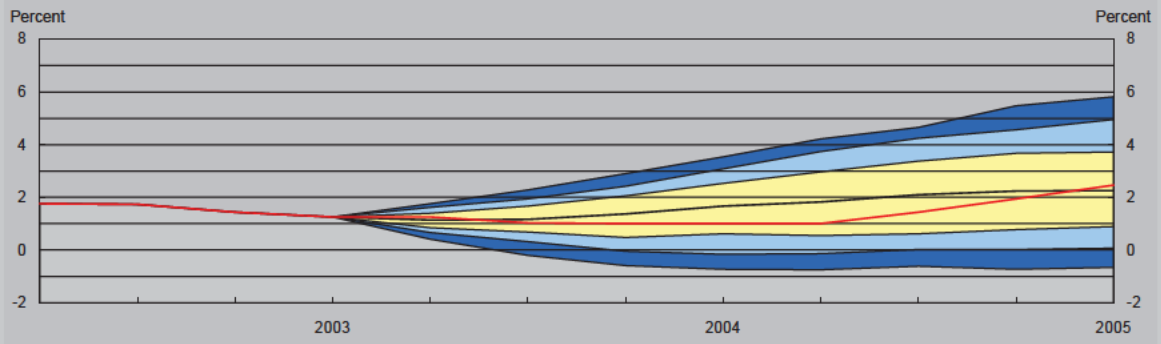
Note The probability interval shows the 50, 75, and 90 percent chance that quarterly Core PCE inflation will be within the respective range. The thick black line represents the expected value of the forecast. The red line represents the realized path of quarterly Core PCE inflation.

Quarterly Real GDP Growth Forecast



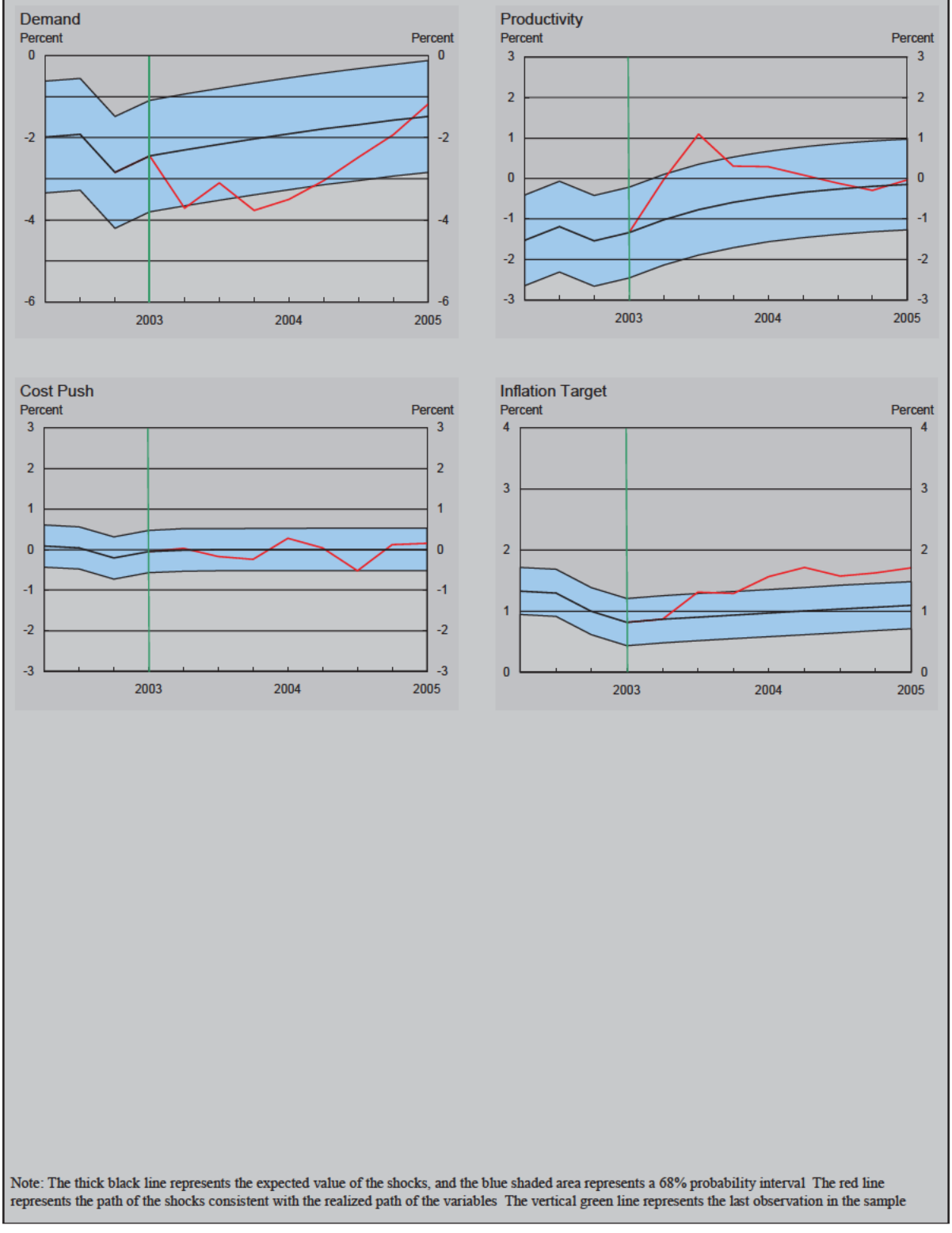
Note The probability interval shows the 50, 75, and 90 percent chance that quarterly real GDP growth will be within the respective range. The thick black line represents the expected value of the forecast. The red line represents the realized path of quarterly real GDP growth.

Federal Funds Rate Forecast



Note The probability interval shows the 50, 75, and 90 percent chance that the Federal Funds Rate will be within the respective range. The thick black line represents the expected value of the forecast. The red line represents the realized path of the Federal Funds Rate.

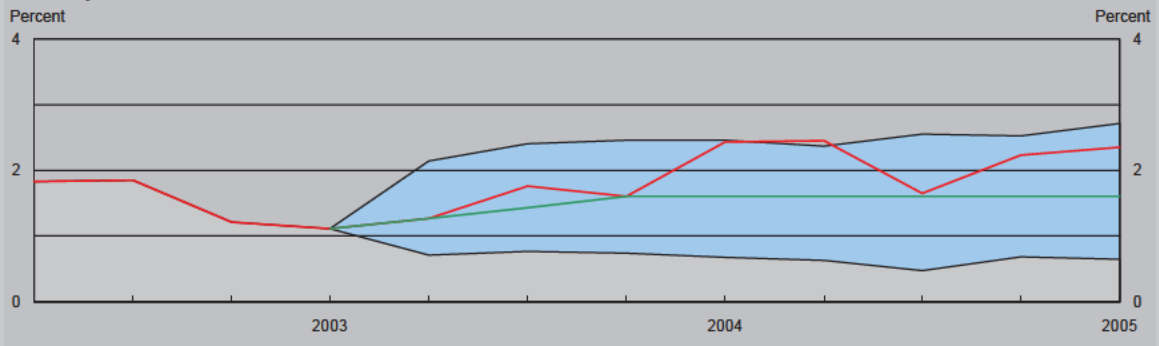
Estimated Shocks



Note: The thick black line represents the expected value of the shocks, and the blue shaded area represents a 68% probability interval The red line represents the path of the shocks consistent with the realized path of the variables The vertical green line represents the last observation in the sample

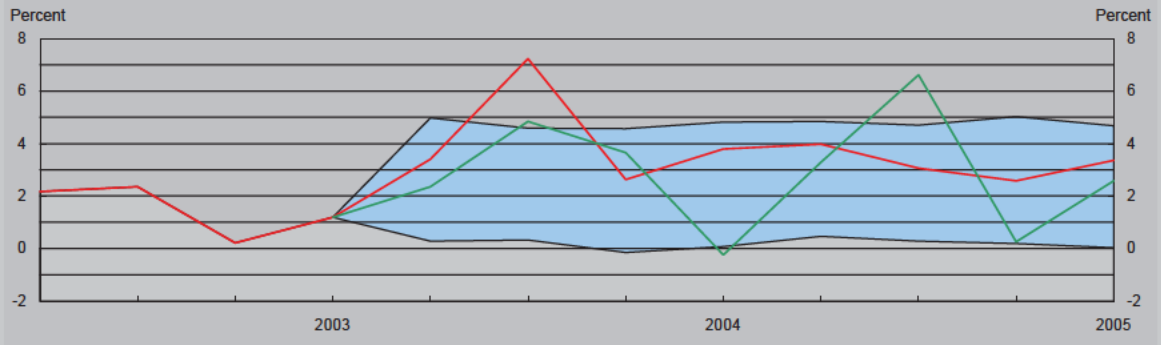
Counterfactual: "No Communication" Strategy

Quarterly Core PCE Forecast



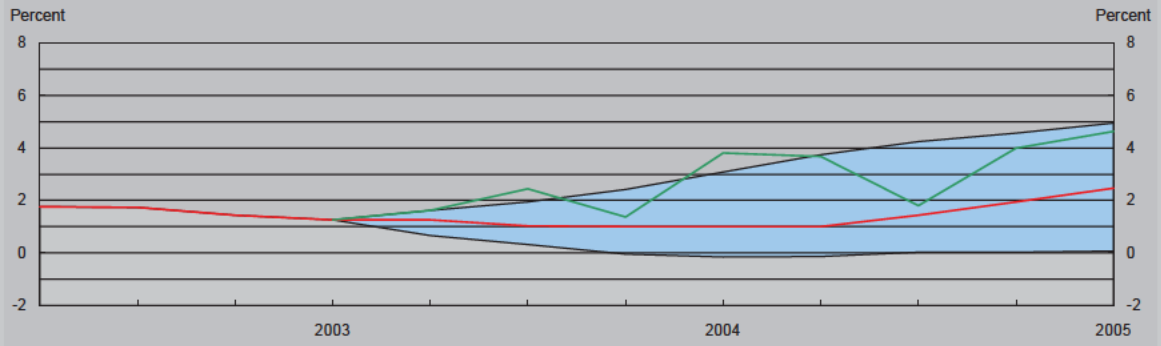
Note The probabi ity interval shows the 75 percent chance that the Federal Funds Rate will be within the respective range. The green line represents the desired path of inflation. The red line represents the realized path of quarterly core PCE inflation.

Quarterly Real GDP Growth Forecast



Note The probability interval shows the 75 percent chance that the Federal Funds Rate w ll be within the respective range. The green line represents the "No Communication" scenario. The red line represents the realized path of quarterly real GDP growth.

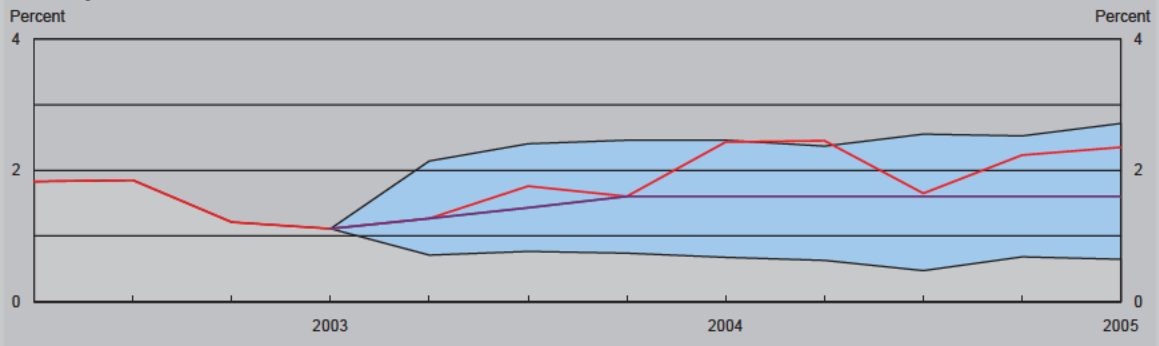
Federal Funds Rate Forecast



Note The probability interval shows the 75 percent chance that the Federal Funds Rate will be within the respective range. The green line represents the "No Communication" scenario. The red line represents the realized path of the Federal Funds Rate.

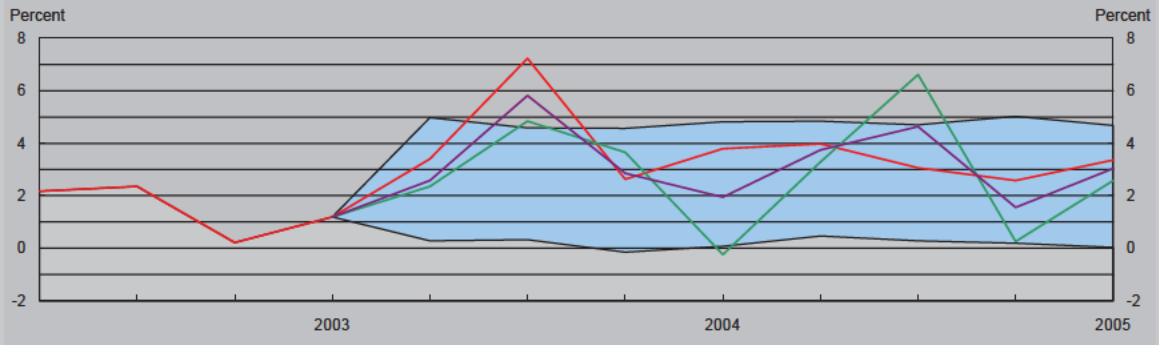
Counterfactual: "Full Communication" Strategy

Quarterly Core PCE Forecast



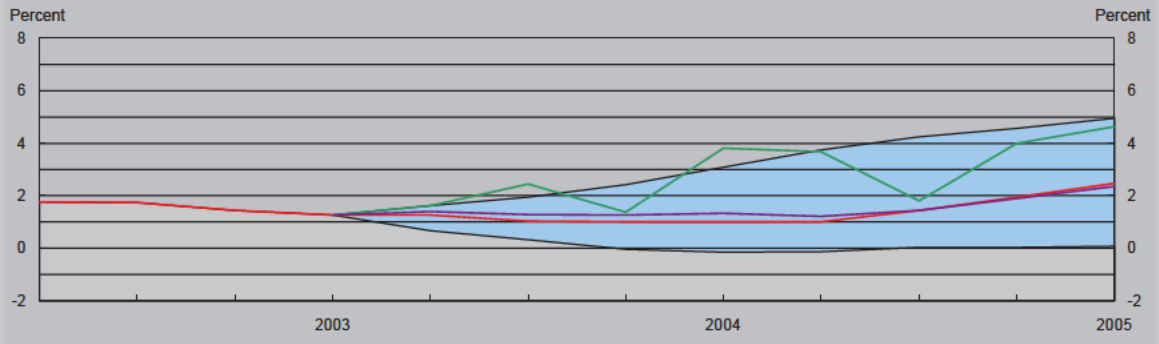
Note The probability interval shows the 75 percent chance that the Federal Funds Rate will be within the respective range. The purple line represents the desired path of inflation. The red line represents the realized path of quarterly core PCE inflation.

Quarterly Real GDP Growth Forecast



Note The probability interval shows the 75 percent chance that the Federal Funds Rate will be within the respective range. The green line represents the "No Communication" scenario, and the purple line represents the "Full Communication" scenario. The red line represents the realized path of quarterly real GDP growth.

Federal Funds Rate Forecast



Note The probability interval shows the 75 percent chance that the Federal Funds Rate will be within the respective range. The green line represents the "No Communication" scenario, and the purple line represents the "Full Communication" scenario. The red line represents the realized path of the Federal Funds Rate.

A. Forecast Details

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

This table summarizes the FRBNY forecast for the current FOMC cycle and the previous two cycles. It provides the forecasts of real GDP growth, the change in the GDP deflator, the 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 (Q4/Q4) over the forecast horizon.

Source: MMS Function, FRBNY

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

This table summarizes the baseline FRBNY and Board forecasts for the current FOMC cycle and the previous cycle. In addition to variables included in Exhibit A-1, there are forecasts for the growth contributions of some broad components of GDP, the growth of some measures of productivity and wages, labor force participation, payroll employment growth, and some financial market variables. Data frequencies are yearly (Q4/Q4 or Q4 level) over the forecast horizon.

Source: MMS Function, FRBNY; and Federal Reserve Board staff

Exhibit A-3. Judgment Table

This table gives history and current forecasts of the primary variables in the FRBNY forecast over the forecast horizon. This includes the detailed judgments—such as those for interest rates, profit growth, productivity, and real activity—that are behind the FRBNY forecasts for aggregates such as real GDP and inflation. Data frequencies are both quarterly and yearly (Q4/Q4 or Q4 level).

Source: MMS Function, FRBNY

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

This table provides history and current forecasts of the real GDP growth contributions for the broad components of expenditures. Growth contributions are in percentage points.

Source: MMS Function, FRBNY

Exhibit A-5. Alternative GDP and Inflation Forecasts

This table compares the FRBNY forecast with real GDP growth and CPI inflation forecasts from other sources. In addition to the FRBNY forecast, the table includes the median forecasts from two surveys of forecasters (Blue Chip and Survey of Professional Forecasters [SPF]), the forecast from Macroeconomic Advisers, and the forecast from a small internal model (PSI model) that uses business activity and sentiment measures as the primary independent variables.
Source: MMS Function, FRBNY; Blue Chip Economic Indicators; FRB Philadelphia Survey of Professional Forecasters; and Macroeconomic Advisers

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

The three tables in this exhibit show the changes in the overall price indices and various components for the most recent month of released data, as measured by the PCE deflator, CPI, and PPI. Growth rates (at annual rate) are taken over 1, 3, 6, 12, and 24 months.
Source: Bureau of Economic Analysis and Bureau of Labor Statistics

Exhibit A-7. Measures of Trend Inflation

These charts display various measures of trend inflation. The alternative measures of CPI inflation are the core, the median, the trimmed mean (Cleveland Fed), a smoothed measure (from overall CPI inflation using a time series model estimated at FRBNY), and the Underlying Inflation Gauge (UIG) measure. (A non–technical description of the construction of this measure is in the Appendix to Exhibit A-7 and A-8 below.) The alternative measures of PCE inflation are the core, the trimmed mean (Dallas Fed), and a smoothed measure (calculated in a manner similar to the smoothed CPI measure). Also included are charts showing the annualized change in the core CPI and PCE over the 24-, 12-, 6-, and 3-month horizons. The horizontal lines show the implied target range used by Macroeconomic Advisers.
Source: FRB Cleveland; FRB Dallas; MMS Function, FRBNY; and Swiss National Bank

Exhibit A-8. Expected Inflation: Underlying Inflation Gauge (UIG) and TIPS Implied Inflation

The chart displays compares inflation expectations over various horizons as measured by the UIG and TIPS (A non–technical description of the construction of the UIG is in the Appendix to Exhibit A-7 and A-8 below. A non–technical description of the construction of inflation expectations from TIPS is in the Appendix to Exhibit B-2).
Source: MMS Function, FRBNY; and Swiss National Bank

Appendix to Exhibit A-7 and A-8. Construction of UIG (Underlying Inflation Gauge)

The Underlying Inflation Gauge is a measure of underlying inflation that incorporates information from a broad set of nominal and real variables. It uses a dynamic factor model to extract a common component from the set of variables and then removes the high frequency movements (fluctuations with a frequency of up to one year) from this common component. This filtering reflects our view that monetary policy is primarily concerned with shocks that impact inflation in the medium-term. The level of the UIG is designed to map into the level of the CPI.

A. Forecast Details

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

	Real GDP			Chain Type GDP Price Index			PCE Deflator			Core PCE			Unemployment Rate		
	Aug06	Sep06	Oct06	Aug06	Sep06	Oct06	Aug06	Sep06	Oct06	Aug06	Sep06	Oct06	Aug06	Sep06	Oct06
2006 Q1	*5.6*	*5.6*	*5.6*	*3.2*	*3.2*	*3.2*	*2.0*	*2.0*	*2.0*	*2.1*	*2.1*	*2.1*	*4.7*	*4.7*	*4.7*
2006 Q2	*2.5*	*2.9*	*2.6*	*3.3*	*3.3*	*3.3*	*4.1*	*4.1*	*4.0*	*2.9*	*2.9*	*2.8*	*4.6*	*4.6*	*4.6*
2006 Q3	3.4	2.3	1.3	3.4	2.6	2.0	2.9	2.6	2.5	2.5	2.4	2.3	4.7	4.7	*4.7*
2006 Q4	2.2	2.6	2.0	1.7	1.7	3.1	2.3	2.3	2.0	2.2	2.2	2.2	4.7	4.7	4.8
2007 Q1	3.1	3.0	2.9	2.3	2.0	2.0	2.3	2.3	2.1	2.1	2.1	2.0	4.7	4.7	4.8
2007 Q2	2.9	3.0	2.9	2.4	2.4	1.9	2.2	2.2	2.1	2.0	2.0	1.9	4.7	4.7	4.8
2007 Q3	3.5	3.1	3.2	2.4	2.4	2.1	2.2	2.2	2.1	1.9	1.9	1.9	4.7	4.7	4.8
2007 Q4	2.4	3.0	2.7	2.0	1.9	1.8	2.2	2.2	2.1	1.9	1.9	1.8	4.7	4.7	4.8
2008 Q1	3.5	3.0	2.8	2.2	2.4	2.2	2.2	2.2	2.1	1.8	1.8	1.8	4.7	4.7	4.8
2008 Q2	3.2	3.0	3.1	2.5	2.6	2.4	2.2	2.2	2.1	1.8	1.8	1.7	4.7	4.7	4.8
2008 Q3	2.9	3.0	3.2	2.3	2.4	2.2	2.2	2.2	2.0	1.8	1.8	1.7	4.7	4.7	4.8
2008 Q4	2.6	3.0	2.8	1.9	2.0	1.9	2.2	2.2	2.0	1.8	1.8	1.7	4.7	4.7	4.8
2004 Q4 to 2005 Q4	*3.1*	*3.1*	*3.1*	*3.1*	*3.1*	*3.1*	*3.1*	*3.1*	*3.1*	*2.1*	*2.1*	*2.1*	*-0.5*	*-0.5*	*-0.5*
2005 Q4 to 2006 Q4	3.4	3.3	2.9	2.9	2.7	2.9	2.8	2.7	2.6	2.4	2.4	2.3	-0.3	-0.2	-0.1
2006 Q4 to 2007 Q4	3.0	3.0	3.0	2.3	2.2	2.0	2.2	2.2	2.1	2.0	2.0	1.9	0.0	0.0	0.0
2007 Q4 to 2008 Q4	3.0	3.0	3.0	2.2	2.4	2.2	2.2	2.2	2.0	1.8	1.8	1.7	0.0	0.0	0.0

Notes: Columns reflect the date of a forecast. Italics/blue font 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					
	2006		2007		2008		2006		2007		2008	
	SEP	OCT	SEP	OCT	SEP	OCT	SEP	OCT	SEP	OCT	SEP	OCT
REAL GDP (Q4/Q4)	3.3	2.9	3.0	3.0	3.0	3.0	3.0	2.8	2.1	2.2	2.4	2.5
GROWTH CONTRIBUTIONS(Q4/Q4)												
FINAL SALES TO DOMESTIC PURCHASERS	3.3	3.0	3.2	3.1	3.2	3.2	2.9	2.9	2.3	2.4	2.5	2.6
CONSUMPTION	2.4	2.3	2.1	2.1	2.1	2.1	2.3	2.3	1.8	1.9	1.9	1.9
BFI	0.9	0.9	0.7	0.7	0.6	0.6	0.9	0.9	0.5	0.5	0.3	0.4
STRUCTURES	0.3	0.4	0.2	0.2	0.2	0.2	0.4	0.5	0.1	0.2	0.0	0.0
EQUIPMENT & SOFTWARE	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.4	0.3	0.3	0.4	0.4
RESIDENTIAL INVESTMENT	-0.6	-0.8	-0.3	-0.3	0.0	0.0	-0.8	-0.8	-0.4	-0.4	0.1	0.1
GOVERNMENT	0.7	0.5	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.2	0.2
FEDERAL	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.0	0.0
STATE & LOCAL	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.2
INVENTORY INVESTMENT	-0.1	-0.1	0.0	0.0	0.1	0.0	0.0	-0.1	0.0	0.1	0.2	0.2
NET EXPORTS	0.1	0.0	-0.2	-0.2	-0.3	-0.2	0.1	0.0	-0.1	-0.2	-0.3	-0.4
INFLATION/PRODUCTIVITY/WAGES (Q4/Q4)												
GDP DEFLATOR	2.7	2.9	2.2	2.0	2.4	2.2	2.7	2.5	2.6	2.7	2.4	2.5
PCE	2.7	2.6	2.2	2.1	2.2	2.0	2.2	1.9	2.5	2.7	2.0	2.1
CORE PCE	2.4	2.3	2.0	1.9	1.8	1.7	2.4	2.4	2.3	2.3	2.1	2.1
COMPENSATION PER HOUR	7.4	7.2	5.1	4.2	5.0	4.1	6.5	6.5	5.3	5.1	5.1	4.9
OUTPUT PER HOUR	2.5	2.1	2.5	2.5	2.5	2.5	1.9	1.7	2.4	2.5	2.7	2.7
UNIT LABOR COSTS	4.9	5.2	2.6	1.7	2.5	1.6	4.5	4.7	2.8	2.6	2.3	2.2
EMPLOYMENT VARIABLES												
UNEMPLOYMENT RATE (Q4 LEVEL)	4.7	4.8	4.7	4.8	4.7	4.8	4.8	4.7	5.1	5.1	5.2	5.1
PARTICIPATION RATE (Q4 LEVEL)	66.2	66.2	66.2	66.2	66.2	66.2	66.1	66.1	65.7	65.8	65.5	65.5
NONFARM PAYROLL EMPLOYMENT (Q4/Q4 CHANGE)												
TOTAL, IN THOUSANDS	1654	1504	1321	1232	1355	1293	1600	1600	400	600	500	700
AVERAGE PER MONTH, IN THOUSANDS	138	125	110	103	113	108	133	133	33	50	42	58
FINANCIAL MARKET VARIABLES												
FED FUNDS RATE (PERCENT)	5.25	5.25	5.00	5.00	4.75	4.75	5.25	5.25	5.25	5.25	5.00	5.00
BAA BOND YIELD (PERCENT)	6.8	6.8	6.8	6.8	6.8	6.8	6.5	6.5	6.6	6.6	6.7	6.7
EFFECTIVE EXCHANGE RATE (Q4/Q4 %CHANGE)	-6.5	-4.9	-1.5	-1.6	-1.7	-1.6	-3.5	-3.0	-0.9	-1.2	-1.4	-1.2

A. Forecast Details

Exhibit A-3: Judgment Table

	2006:01	2006:02	2006:03	2006:04	2007:01	2007:02	2007:03	2007:04	2008:01	2008:02	2008:03	2008:04	Q4/Q4 % CHANGE/Q4 LEVEL/ANNUAL AVERAGE 2005	2006	2007	2008
REAL GDP AND COMPONENTS (% Change, AR)																
GDP	*5.6*	*2.6*	1.3	2.0	2.9	2.9	3.2	2.7	2.8	3.1	3.2	2.8	*3.1*	2.9	3.0	3.0
CHANGE IN INVENTORIES (GROWTH CONTRIBUTION) 1\	*0.0*	*0.4*	-0.8	0.1	0.1	-0.1	-0.1	0.2	-0.2	-0.1	0.0	0.3	*-0.1*	-0.1	0.0	0.0
DOMESTIC PRIVATE PURCHASES	*5.3*	*2.0*	1.7	2.0	3.0	2.8	3.0	3.1	3.0	2.8	2.9	3.2	*3.1*	2.7	3.0	3.0
CONSUMPTION EXPENDITURES	*4.8*	*2.6*	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	*2.9*	3.4	3.0	3.0
BUSINESS FIXED INVESTMENT	*13.7*	*4.4*	10.6	8.6	7.3	7.0	6.7	6.7	5.7	5.7	5.4	5.4	*5.6*	9.3	6.9	5.5
RESIDENTIAL INVESTMENT	*-0.3*	*-11.1*	-12.0	-25.0	-10.0	-4.6	-0.7	-4.3	-0.8	-0.8	-0.8	-0.8	*9.0*	-12.5	-5.0	-0.8
NET EXPORTS (GROWTH CONTRIBUTION) 1\	*0.0*	*0.4*	-0.4	-0.1	-0.2	0.0	0.1	-0.6	-0.4	0.1	0.1	-0.6	*-0.1*	0.0	-0.2	-0.2
EXPORTS	*14.0*	*5.1*	7.1	8.5	8.5	7.4	7.1	6.6	6.9	8.6	9.5	7.7	*6.7*	8.6	7.4	8.2
IMPORTS	*9.1*	*0.6*	7.2	6.3	7.0	4.6	4.3	7.8	6.8	5.0	5.6	8.8	*5.2*	5.7	5.9	6.5
FEDERAL GOVERNMENT	*8.8*	*-4.5*	-0.5	3.0	5.0	1.5	2.0	2.0	5.5	1.5	1.5	1.5	*2.1*	1.6	2.6	2.5
STATE & LOCAL GOVERNMENTS	*2.7*	*4.1*	2.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	*0.8*	2.9	3.0	3.0
INTEREST RATE ASSUMPTIONS (%)																
FEDERAL FUNDS RATE (TARGET)	*4.43*	*4.90*	*5.25*	5.25	5.25	5.25	5.00	5.00	5.00	5.00	4.75	4.75	*3.97*	5.25	5.00	4.75
YIELD ON 10-YR GOVERNMENT	*4.6*	*5.1*	*4.9*	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	*4.5*	5.0	5.0	5.0
BAA BOND YIELD	*6.3*	*6.7*	*6.6*	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	*6.3*	6.8	6.8	6.8
INCOME (% Change, AR)																
PERSONAL INCOME	*9.4*	*6.9*	6.1	3.3	5.4	5.4	6.6	3.3	6.4	6.2	6.9	3.6	*4.6*	6.4	5.2	5.8
REAL PERSONAL DISPOSABLE INCOME	*4.6*	*1.7*	4.0	1.5	3.7	3.7	6.5	1.1	4.4	4.0	5.0	1.4	*0.3*	2.9	3.7	3.7
PERSONAL SAVING RATE (% OF DPI)	*-0.3*	*-0.6*	-0.3	-0.7	-0.5	-0.4	0.4	-0.1	0.2	0.3	0.8	0.3	*-0.4*	-0.5	-0.2	0.4
CORPORATE PROFITS BEFORE TAXES	*60.8*	*5.9*	*-36.0*	1.3	-0.8	0.9	0.2	-1.3	-3.4	0.0	0.0	-1.2	*12.8*	2.5	-0.2	-1.2
PRICES & PRODUCTIVITY (% Change, AR)																
GDP IMPLICIT DEFLATOR	*3.2*	*3.3*	2.0	3.1	2.0	1.9	2.1	1.8	2.2	2.4	2.2	1.9	*3.1*	2.9	2.0	2.2
PERSONAL CONSUMPTION EXPENDITURES	*2.0*	*4.0*	2.5	2.0	2.1	2.1	2.1	2.1	2.1	2.1	2.0	2.0	*3.1*	2.6	2.1	2.0
CORE PERSONAL CONSUMPTION EXPENDITURES	*2.1*	*2.8*	2.3	2.2	2.0	1.9	1.9	1.8	1.8	1.7	1.7	1.7	*2.1*	2.3	1.9	1.7
CONSUMER PRICE INDEX	*2.2*	*5.0*	3.1	2.8	2.6	2.6	2.4	2.4	2.3	2.3	2.3	2.3	*3.7*	3.3	2.5	2.3
CORE CONSUMER PRICE INDEX	*2.4*	*3.5*	3.0	2.8	2.6	2.5	2.4	2.3	2.2	2.2	2.2	2.2	*2.1*	2.9	2.4	2.2
COMPENSATION PER HOUR (NONFARM BUSINESS)	*13.7*	*6.6*	4.2	4.6	4.5	4.1	4.1	4.1	4.1	4.1	4.0	4.1	*4.1*	7.2	4.2	4.1
OUTPUT PER HOUR (NONFARM BUSINESS)	*4.3*	*1.2*	0.8	2.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	*2.5*	2.1	2.5	2.5
UNIT LABOR COST (NONFARM BUSINESS)	*9.4*	*5.4*	3.4	2.6	2.0	1.6	1.6	1.6	1.6	1.6	1.5	1.6	*1.6*	5.2	1.7	1.6
REAL ACTIVITY																
CAPACITY UTILIZATION (MANUFACTURING, %)	*80.3*	*80.8*	81.1	81.0	81.3	81.5	81.6	81.7	81.8	81.9	82.0	82.1	*78.9*	80.8	81.5	82.0
CIVILIAN UNEMP RATE (%) 2\	*4.7*	*4.6*	*4.7*	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	*4.9*	4.8	4.8	4.8
PRIVATE HOUSING STARTS (THOUS, AR)	*2123*	*1873*	1735	1640	1665	1690	1715	1740	1740	1740	1740	1740	*2073*	1843	1703	1740
LIGHT VEHICLE SALES (MIL UNITS, AR) 3\	*16.9*	*16.3*	16.6	16.6	16.7	16.7	16.7	16.7	16.8	16.8	16.8	16.8	*16.9*	16.6	16.7	16.8
FEDERAL SURPLUS/DEFICIT (Unified Basis, Bil$, NSA) 4	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	*-317.7*	-357.2	-298.6	-297.6

NOTE: All series other than interest rates and the federal deficit are seasonally adjusted. Italics/blue indicate a reported value. 1\ Growth contribution to real GDP 2\ Annual values are end of Q4 levels 3\ Includes domestic and imported 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)

	2006				2007				2008				Q4/Q4 % CHANGE/Q4 LEVEL			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	2005	2006	2007	2008
REAL GDP (Growth, Annual Rate)	*5.6*	*2.6*	**1.3**	**2.0**	**2.9**	**2.9**	**3.2**	**2.7**	**2.8**	**3.1**	**3.2**	**2.8**	*3.1*	**2.9**	**3.0**	**3.0**
Contributions to GDP growth:																
FINAL SALES TO DOMESTIC PURCHASERS	*5.7*	*1.7*	**2.6**	**2.0**	**3.0**	**3.0**	**3.2**	**3.1**	**3.4**	**3.1**	**3.1**	**3.1**	*3.4*	**3.0**	**3.1**	**3.2**
CONSUMPTION EXPENDITURES	*3.4*	*1.8*	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	*2.0*	2.3	2.1	2.1
BUSINESS FIXED INVESTMENT	*1.4*	*0.5*	1.1	0.9	0.8	0.7	0.7	0.7	0.6	0.6	0.6	0.6	*0.6*	0.9	0.7	0.6
RESIDENTIAL INVESTMENT	*0 0*	*-0.7*	-0.7	-1.6	-0.5	-0.2	0 0	-0.2	0.0	0.0	0.0	0.0	*0.5*	-0.8	-0.3	0 0
FEDERAL GOVERNMENT	*0 6*	*-0.3*	0.0	0.2	0.3	0.1	0.1	0.1	0.4	0.1	0.1	0.1	*0.1*	0.1	0.2	0 2
STATE & LOCAL GOVERNMENTS	*0 3*	*0.5*	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	*0.1*	0.4	0.4	0.4
NET EXPORTS	*0.0*	*0.4*	**-0.4**	**-0.1**	**-0.2**	**0.0**	**0.1**	**-0.6**	**-0.4**	**0.1**	**0.1**	**-0.6**	*-0.1*	**0.0**	**-0.2**	**-0.2**
EXPORTS	*1.4*	*0.5*	0.8	0.9	0.9	0 8	0 8	0.7	0.8	1.0	1.1	0.9	*0.7*	0.9	0.8	1 0
IMPORTS	*-1.5*	*-0.1*	-1.2	-1.0	-1.2	-0.8	-0.7	-1.3	-1 2	-0 9	-1.0	-1.5	*-0.8*	-0.9	-1.0	-1.1
CHANGE IN INVENTORIES	*0.0*	*0.4*	**-0.8**	**0.1**	**0.1**	**-0.1**	**-0.1**	**0.2**	**-0.2**	**-0.1**	**0.0**	**0.3**	*-0.1*	**-0.1**	**0.0**	**0.0**

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-Q3		2006-Q4		2007-Q1	
	Release Date	Prev*	Oct	Prev*	Oct	Prev*	Oct
FRBNY	10/19/2006	2.3	1.3	2.6	2.0	3.0	2.9
PSI Model	10/16/2006	2.1	2.3	2.3	2.2	--	--
Blue Chip	10/10/2006	2.7	2.3	2.4	2.4	2.6	2.6
Median SPF	8/14/2006	3.1	2.7	3.0	2.9	2.9	2.9
Macro Advisers	10/11/2006	2.5	1.8	2.5	2.7	3.1	3.4

CPI

		2006-Q3		2006-Q4		2007-Q1	
	Release Date	Prev*	Oct	Prev*	Oct	Prev*	Oct
FRBNY	10/19/2006	3.9	3.1	2.8	2.8	2.7	2.6
Blue Chip	10/10/2006	3.4	3.2	2.3	1.7	2.6	2.7
Median SPF	8/14/2006	2.6	3.6	2.4	2.8	2.3	2.7
Macro Advisers	10/11/2006	3.3	3.2	1.0	0.0	2.7	2.5

CORE CPI

		2006-Q3		2006-Q4		2007-Q1	
	Release Date	Prev*	Oct	Prev*	Oct	Prev*	Oct
FRBNY	10/19/2006	2.9	3.0	2.8	2.8	2.7	2.6
Macro Advisers	10/11/2006	2.8	2.9	2.7	2.9	2.7	2.5

Notes: Previous release of SPF is May and of all others is September.

A. Forecast Details

Exhibit A-6: Reference Table 1 - CONSUMER PRICE INDEX DATA AS OF SEPTEMBER 2006

	Annualized Percent Change Over Indicated Interval					Weights (December 2005)	
	24 Month	12 Month	6 Month	3 Month	1 Month	Total	Core
Consumer Price Index	3.4	2.1	2.9	0.8	-5.7	100.00	
Energy	13.5	-4.5	2.2	-15.6	-59.0	8.69	
All Items Ex Energy	2.5	2.9	3.1	2.8	3.0		
Food	2.5	2.6	2.6	3.5	3.7	13.94	
Food Away From Home	3.0	3.0	3.0	2.6	1.8	5.95	
All Items Ex Food and Energy	2.4	2.9	3.2	2.7	2.9	77.37	100.00
Core Chain-Weight CPI (NSA)	2.2	2.7	2.0	2.1	3.2		
Core Goods	0.5	0.5	0.4	0.0	-0.8	22.32	28.85
Apparel	0.2	0.9	2.2	1.3	7.2	3.79	4.89
Medical Care Commodities	4.1	4.3	3.8	3.7	4.0	1.46	1.88
Durable Goods	-0.2	-0.8	-0.9	-1.0	-6.1	11.58	14.96
New Vehicles	0.5	0.4	-1.0	-0.3	-1.7	5.16	6.66
Used Vehicles	1.6	-0.4	1.4	-1.4	-11.2	1.80	2.33
Core Services	3.2	3.9	4.2	3.8	4.0	55.06	71.16
Rent of Primary Residence	3.4	3.9	4.4	4.5	4.9	5.83	7.54
Owners' Equivalent Rent	3.1	4.0	4.7	3.9	3.6	23.44	30.30
Lodging Away from Home	3.1	8.4	2.7	3.9	9.2	2.61	3.37
Medical Care Services	4.4	4.4	4.2	4.1	4.9	4.76	6.16
Transportation Services	2.6	2.1	3.3	2.6	1.6	5.71	7.38

A. Forecast Details

Exhibit A-6: Reference Table 2 - PCE DEFLATOR DATA AS OF AUGUST 2006

	Annualized Percent Change Over Indicated Interval				
	24 Month	12 Month	6 Month	3 Month	1 Month
PCE Deflator	3.1	3.2	3.8	2.9	2.9
Market Based PCE Deflator	3.0	3.1	3.9	2.9	3.0
Durable Goods	-0.7	-0.7	-0.5	-0.6	0.6
Motor Vehicles and Parts	1.4	1.3	0.6	0.7	1.1
Nondurable Goods	4.2	4.0	7.2	4.0	4.1
Clothing and Shoes	-0.6	-0.1	2.8	-0.9	13.9
Services	3.3	3.6	3.0	3.1	2.8
Housing	3.2	3.9	4.8	4.3	3.3
Transportation	4.0	3.7	4.0	3.8	-1.0
Medical Care	3.1	3.1	3.1	3.5	3.0
PCE Deflator Ex Food and Energy	2.2	2.5	2.6	2.3	2.8
Market Based Core PCE Deflator	1.9	2.1	2.5	2.1	2.9
Personal Business Services-Market Based	2.1	1.2	0.4	-1.8	6.0
Personal Business Services-Not Market Based	2.4	2.4	1.8	1.3	4.3

A. Forecast Details

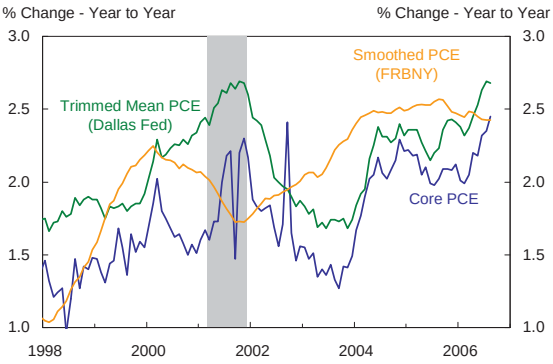
Exhibit A-6: Reference Table 3 - PRODUCER PRICE DATA AS OF SEPTEMBER 2006

	Annualized Percent Change Over Indicated Interval				
	24 Month	**12 Month**	**6 Month**	**3 Month**	**1 Month**
Finished Goods	3.7	0.9	0.9	-4.4	-14.5
Finished Consumer Goods	4.3	0.6	0.6	-6.1	-21.2
Finished Consumer Goods Ex Food	5.2	0.1	-1.2	-10.5	-29.3
Nondurables Ex Food	7.1	0.2	-1.5	-13.3	-40.8
Durables	0.6	-0.2	-0.1	-2.3	15.1
Capital Equipment	1.8	1.4	1.5	0.5	7.6
Electronic Computers (NSA)	-23.2	-24.0	-28.1	-25.1	-27.9
Communication and Related Equipment (NSA)	0.0	0.8	1.8	1.2	6.0
Finished Goods Ex Food and Energy	1.9	1.3	1.0	-0.3	7.0
Finished Consumer Goods Ex Food and Energy	1.9	1.1	0.6	-1.0	6.7
Intermediate Materials	6.7	4.7	4.0	-1.9	-15.9
Intermediate Materials Ex Food and Energy	5.5	7.4	7.0	5.0	1.5
Crude Materials	9.4	-7.8	7.2	8.0	-33.6
Crude Materials Ex Food and Energy	13.0	19.7	25.1	-1.9	12.7

A. Forecast Details

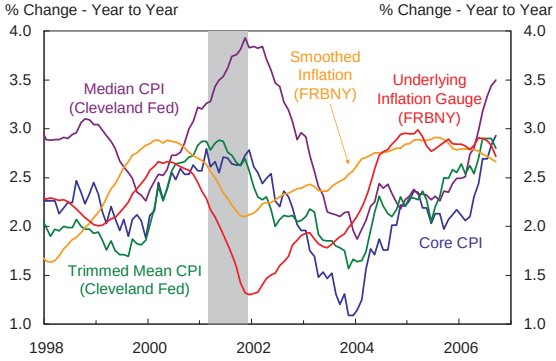
Exhibit A-7: Measures of Trend Inflation

Alternative Measures of PCE Inflation



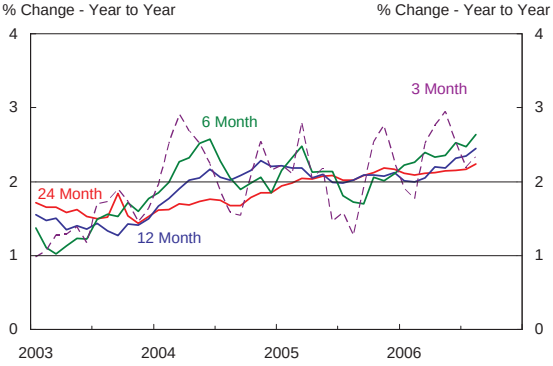
Source: Bureau of Economic Analysis, Dallas Fed, and FRBNY

Alternative Measures of CPI Inflation



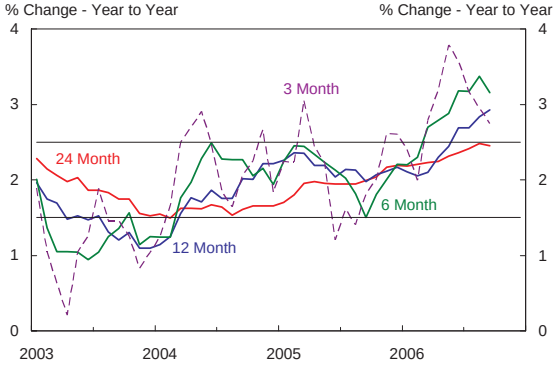
Source: Bureau of Labor Statistics, Cleveland Fed, and FRBNY

Core PCE over Various Horizons



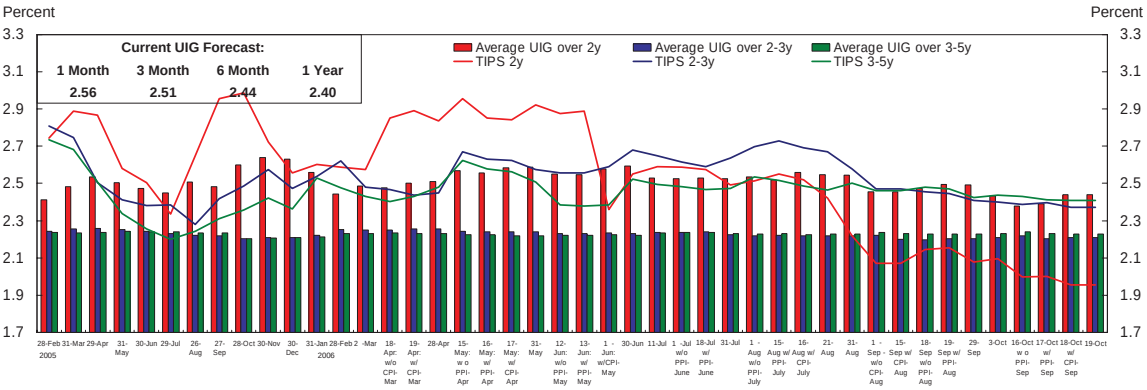
Source: Bureau of Economic Analysis

Core CPI over Various Horizons



Source: Bureau of Labor Statistics

Exhibit A-8: Underlying Inflation Gauge (UIG) and TIPS Implied Inflation



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

Note: Shading represents NBER recessions.

B. Financial Markets

Exhibit B-1. Treasury Yields

The top two charts in this exhibit plot the yields of the on-the-run 3-month and 10-year Treasury securities daily over the past three years and intraday over the inter-meeting period. The middle two charts plot the Treasury yield curve and implied one-year forward rates, as estimated using off-the-run securities. The bottom two charts plot real and nominal forward rates over the past three years for the 4-5 and 5-10 year horizons.
Source: Bloomberg and CM Function, FRBNY

Exhibit B-2. Inflation Expectations

The top two charts in this exhibit plot the time series of carry-adjusted expected CPI inflation over the past three years, as estimated from nominal and inflation-protected Treasury securities (see the Appendix to Exhibit B-2 below for a description of the construction of the FRBNY version of this measure). The left chart displays data over the 0-5 year horizon; the right chart displays data over the 4-5 and 5-10 year horizons. The third chart plots the 10-year breakeven inflation rate (not carry adjusted) over the inter-meeting period using intraday data.
Source: Bloomberg; Federal Reserve Board; and CM Function, FRBNY

Exhibit B-3. Economic Releases

This exhibit shows the response of the implied fed funds futures rate, the 10-year Treasury yield, and the 10-year breakeven inflation rate to macroeconomic announcements. Market expectations for the releases are derived from the forward price for the economic derivatives auction, which concludes 30-60 minutes before the release. The surprise, measured in standard deviations, is calculated using the at-the-money implied volatility from the auctions. Yield changes are measured from 5 minutes before to 30 minutes after the release.
Source: Bloomberg and CM Function, FRBNY

Exhibit B-4. Policy Expectations

The charts in this exhibit show market expectations of policy as derived from fed funds and Eurodollar futures, as well as from options on fed funds futures. The top left chart plots the expected path of the fed funds target rate allowing for a time-invariant term premium risk adjustment. The top right chart plots the implied September fed funds rate over the inter-meeting period using intraday data (without an adjustment for any term premia). The middle left chart plots the implied probability of no change in the funds rate versus the probability of a 25 basis point easing at the next meeting (allowing for a time-invariant term premium risk adjustment). The last two charts plot the implied probabilities of various policy rates following the next two meetings.
Source: Bloomberg; FRB Cleveland; Federal Reserve Board; and CM Function, FRBNY

Exhibit B-5. Policy Uncertainty I

The top left chart in this exhibit plots the width of the ranges within which the 3-month Eurodollar rate is expected to remain (with 90% confidence) over the next 3 and 6 months, as estimated from Eurodollar futures options. The top right chart plots the width of the ranges within which the 1-year swap rate is expected to remain (with 90% confidence) over the 1-2 and 4-5 year horizons, as estimated from swaptions. The last chart plots implied skewness and implied volatility in percentages, as derived from Eurodollar futures options. Both measures are averages of 3-, 6- and 9-month values. Positive (negative) implied skewness means that a tightening (easing) surprise around the expected target rate is expected to be larger than an easing (tightening) surprise.
Source: CME; Datastream; and CM Function, FRBNY

Exhibit B-6. Policy Uncertainty II

The top left chart in this exhibit plots the width of the range within which the 3-month Eurodollar rate is expected to remain (with 90% confidence) in the future relative to today. The top right chart shows the changes in the width of these ranges since the day before the last FOMC meeting. The middle chart shows the 50% and 90% confidence intervals around the expected policy path. The last two charts plot time series of the

width of the ranges within which the 3-month Eurodollar rate is expected to remain (with 90% confidence) over the next 6 and 12 months.
Source: Federal Reserve Board

Exhibit B-7. Equity Markets

The top left chart in this exhibit plots the daily closes of the S&P 500 and NASDAQ Composite indices over the past three years. The top right chart plots the S&P 500 over the inter-meeting period using intraday data. The bottom two charts plot implied annualized volatilities for the S&P 500 and NASDAQ Composite indices over the next month and 12 months.
Source: Bloomberg, CBOE, and OptionMetrics

Exhibit B-8. Corporate Credit Risk

The left chart in this exhibit plots corporate credit spreads over the past three years for A- and BB-rated securities. The right chart plots corporate bond default rates over time, measured over the preceding 12-month interval and distinguishing between all and speculative-grade issues.
Source: Merrill Lynch and Moody's

Exhibit B-9. Exchange Rates, Foreign Equity, and Bond Spreads

The top two charts in this exhibit display the exchange rate of the dollar against the euro (in the left panel, with higher values of the index indicating dollar depreciation) and against the yen (in the right panel, with lower values of the index indicating dollar depreciation). The middle-left panel displays the nominal effective exchange rate of the dollar, computed by the Federal Reserve Board using a "narrow" set of weights for 16 major foreign currencies (lower values of the index indicate dollar depreciation). The middle-right chart displays a measure of volatility implied by options on Yen/Dollar and Euro/Dollar rates; each line shows the width of the range (in percentage points) around the current exchange rate within which the exchange rate is expected to fall in one month (with 90 percent confidence). The bottom-left chart displays normalized equity indices for the euro area and Japan. The bottom-right chart displays J.P. Morgan's EMBI+ index of 16 emerging markets' bond spreads over U.S. Treasury yields. (The index includes

below-investment-grade bonds issued in dollars by a selected group of sovereign and quasi-sovereign issuers.)
Source: Federal Reserve Board; BIS; International Function, FRBNY; Reuters; and J.P. Morgan

Exhibit B-10. Foreign Interest Rates

The top two charts in this exhibit display short- and long-term interest rates for the euro area and Japan. The middle two charts display the three-month interest rate futures curves for the euro area and Japan, including the most recent curve. The bottom two charts display "real" yields on specific inflation-linked bonds for the euro area (OAT bonds from France) and Japan; the charts also display inflation expectations implied in these securities, computed as the spread of the yield on inflation-linked bonds over sovereign bonds of comparable maturity.
Source: BIS; Federal Reserve Board; International Function, FRBNY; and Barclays

Exhibit B-11. Energy Futures Curves

This exhibit displays futures curves for gasoline, heating oil, natural gas, and crude oil. The June 30th curve offers a historical reference. Also included are curves for the dates prior to the last two FOMC meetings and a curve for the most recent date.
Source: Bloomberg

Appendix to Exhibit B-2. Estimation of Implied Inflation from TIPS

The implied inflation series are estimates of inflation expectations derived from nominal Treasury securities and Treasury inflation-protected securities (TIPS). These differ from the simpler breakeven inflation rates that merely subtract real TIPS yields from on-the-run nominal yields of 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 securities. We then calculate 2-, 4-, and 5-year inflation rates corresponding to TIPS with those durations. Lastly, we compute approximate forward rates from the rates at the shorter- and longer-dated durations. For example, the 4-5 year forward rate is computed from the 4- and 5-year

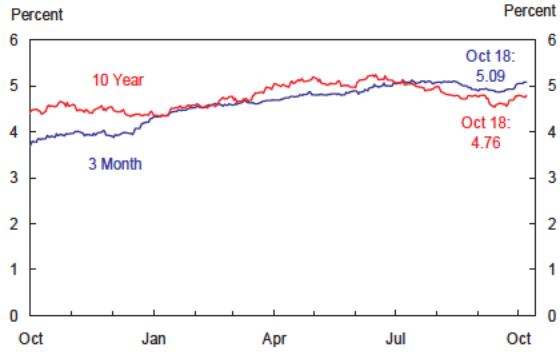
implied inflation values. The 5-10 year forward rate uses the 5-year implied inflation value and the implied inflation rate on the most recently issued 10-year TIPS.

The implied inflation series are also carry adjusted to remove the effect of expected inflation accrual in not seasonally adjusted CPI over the 2½-month indexation lag period in TIPS. Since inflation over this 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 not seasonally adjusted CPI implicit in the same day CPI futures contract traded on the CME. No adjustments are made to the implied inflation measures to account for risk premia or other technical factors.

B. Financial Markets

Exhibit B-1:
Treasury Yields

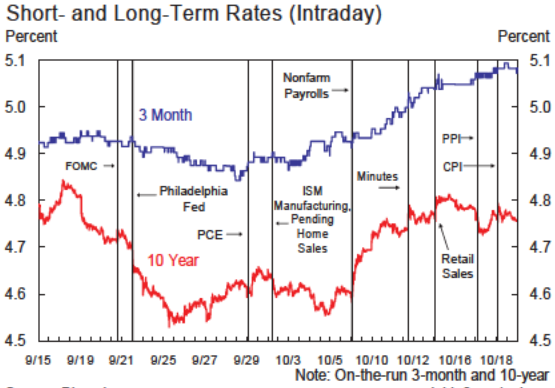
Short- and Long-Term Rates



Source: Bloomberg

Note: Yields of on-the-run securities

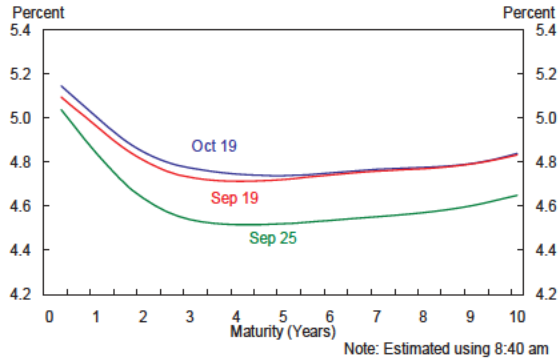
Short- and Long-Term Rates (Intraday)



Source: Bloomberg

Note: On-the-run 3-month and 10-year yield, 8 am to 4 pm

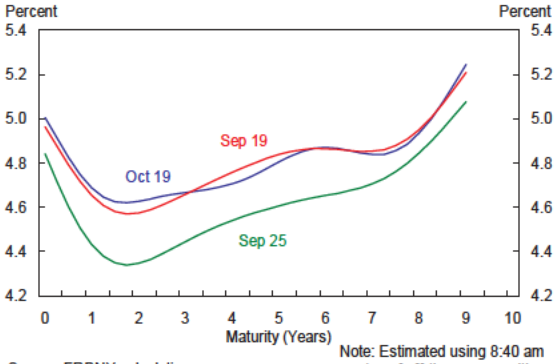
Yield Curves



Source: FRBNY calculations

Note: Estimated using 8:40 am quotes of off-the-run securities

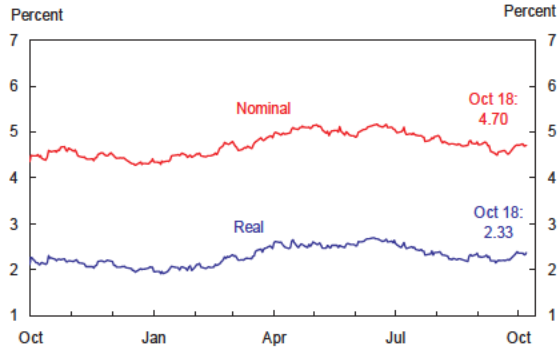
Yield Curves: Implied One-Year Forward Rates



Source: FRBNY calculations

Note: Estimated using 8:40 am quotes of off-the-run securities

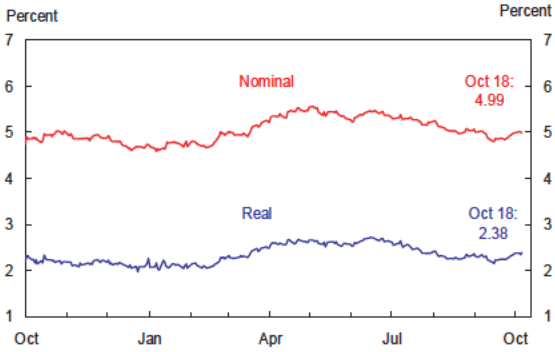
4-5 Year Forward Rates



Source: FRBNY calculations

Note: 8:40 am quotes

5-10 Year Forward Rates



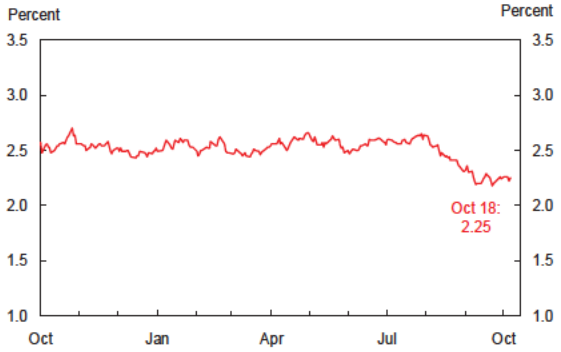
Source: FRBNY calculations

Note: 8:40 am quotes

B. Financial Markets

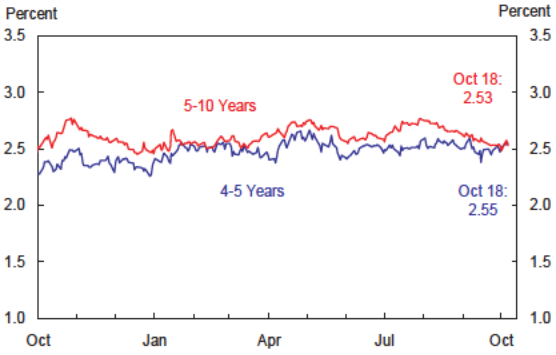
Exhibit B-2:
Inflation Expectations

TIPS Implied Inflation: 0-5 Year Horizon



Source: Federal Reserve Board

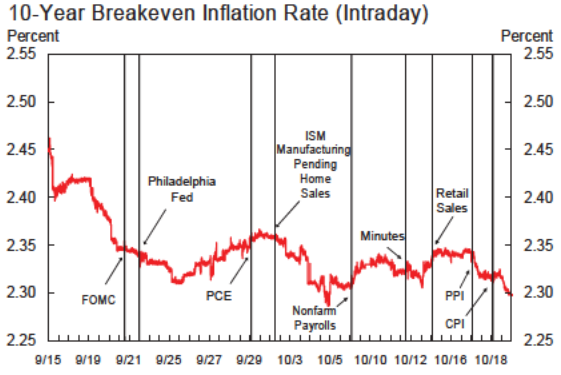
TIPS Implied Inflation: 4-5, 5-10 Year Horizons



Source: FRBNY calculations

Note: 8:40 am quotes

10-Year Breakeven Inflation Rate (Intraday)



Source: Bloomberg

Note: Calculated as difference between on-the-run 10-year Treasury and 10-year TIPS yield. 8 am to 4 pm.

Exhibit B-3:
Economic Releases

Market reaction to macro releases, market expectations using economic derivatives

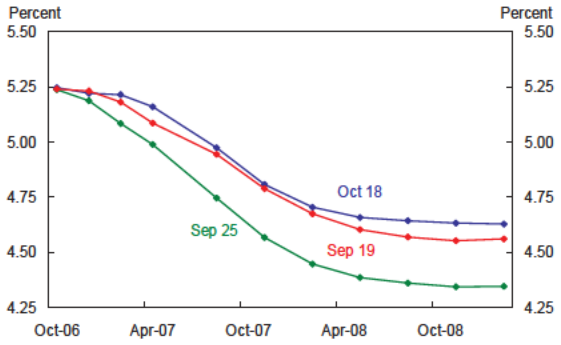
						Yield Change (bps)		
Release Type	Release Date	Actual Release	Market Expectation	Surprise	Surprise (≈'s)	October FF Futures	Ten Year	Ten-Year Breakeven
Initial Jobless Claims, 1000s	10/19	299	310	-11	-0.8	0	1	0
Core CPI, %	10/18	0.24	0.22	0.02	0.6	0	2	0
Retail Sales Less Autos, %	10/13	-0.4	-0.09	-0.31	-0.8	0	4	1
Trade Balance, $billions	10/12	-69.9	-67.1	-2.8	-1.0	0	-1	0
Initial Jobless Claims, 1000s	10/12	308	312	-4	-0.3	0	-1	0
Change in Nonfarm Payrolls, 1000s	10/6	51	103	-52	-0.7	0	6	1
Initial Jobless Claims, 1000s	10/5	302	315	-13	-1.0	0	0	0
ISM Manufacturing, index level	10/2	52.9	53.3	-0.4	-0.2	0	0	0
Initial Jobless Claims, 1000s	9/21	318	313	5	0.4	0	-1	0
Core CPI, %	9/15	0.24	0.24	0.00	0.0	0	-2	-1

Source: Bloomberg and FRBNY calculations
Note: Market expectations are from the forward price from the most recent economic derivatives auction, which concludes 30-60 minutes before the release. Surprise in standard deviations is calculated using the at-the-money implied volatility from the auction. Yield changes are for the interval from 5 minutes before to 30 minutes after the release.

B. Financial Markets

Exhibit B-4:
Policy Expectations

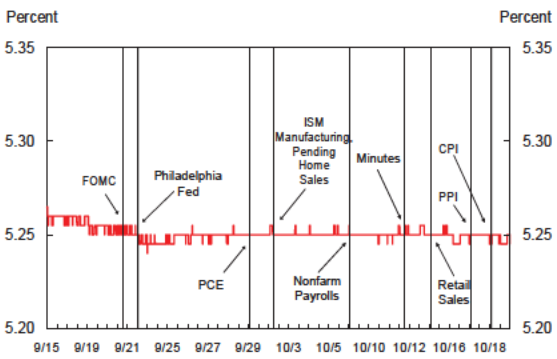
Expected Fed Funds



Source: Federal Reserve Board

Note: Curves estimated using Fed Funds and Eurodollar futures. Sep 19 is an 8:30AM estimate.

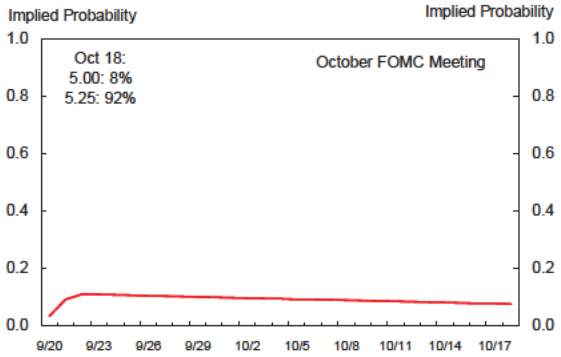
Implied October Fed Funds (Intraday)



Source: Bloomberg

Note: Calculated using Fed Funds futures

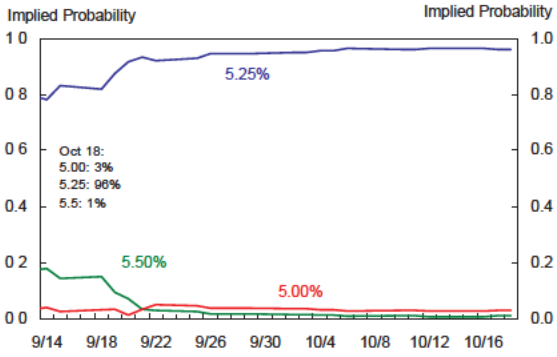
Probability of 5.00 Target vs. 5.25 Target



Source: FRBNY calculations

Note: Estimated using Fed Funds futures

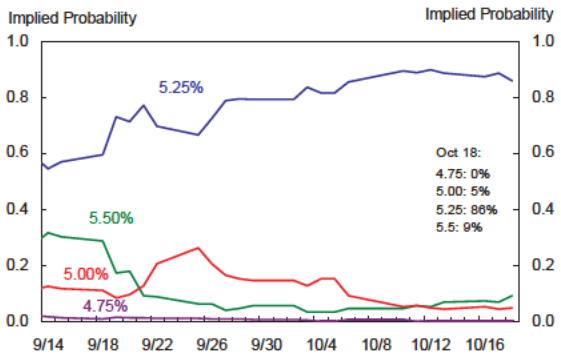
October 2006 FOMC



Source: Cleveland FRB

Note: Estimated using options on Fed Funds futures

December 2006 FOMC



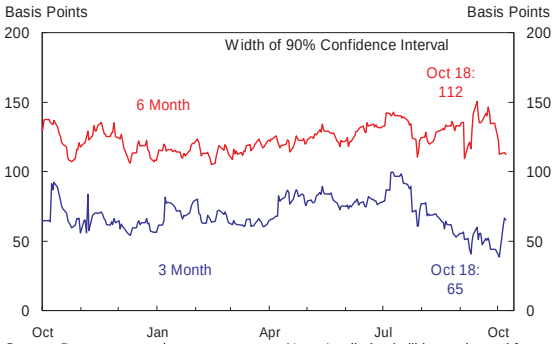
Source: Cleveland FRB

Note: Estimated using options on Fed Funds futures

B. Financial Markets

Exhibit B-5:
Policy Uncertainty I

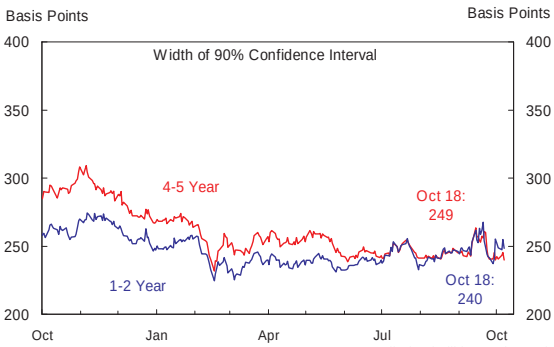
Interest Rate Volatility: Short-Term



Source: Datastream and FRBNY calculations

Note: Implied volatilities estimated from Eurodollar futures options

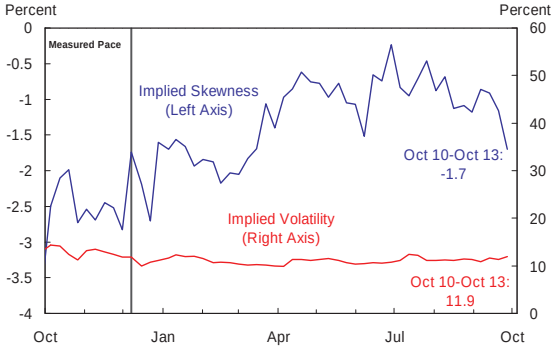
Interest-Rate Volatility: Long-Term



Source: FRBNY calculations

Note: Implied volatilities estimated from swaptions

Implied Skewness and Volatility



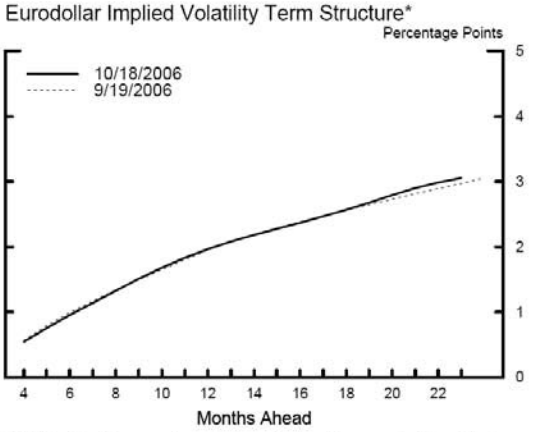
Source: CME and FRBNY calculations

Note Weekly averages based on 3-9 month implied volatilities from Eurodollar futures options

Financial Markets

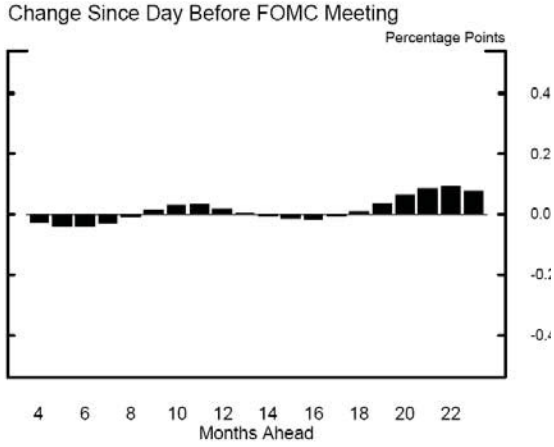
Exhibit B-6:
Policy Uncertainty II

Eurodollar Implied Volatility Term Structure*

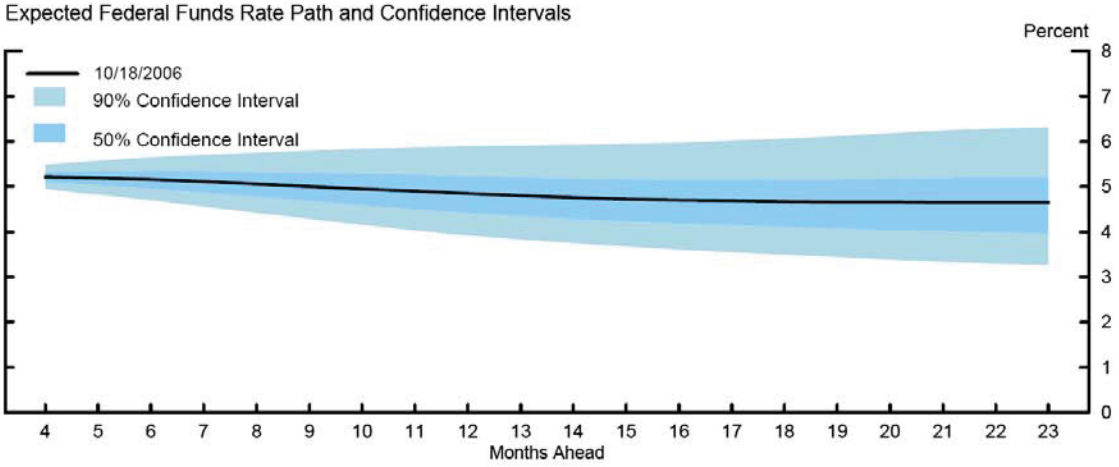


*Width of a 90 percent confidence interval computed from the term structures for the expected federal funds rate and implied volatility.

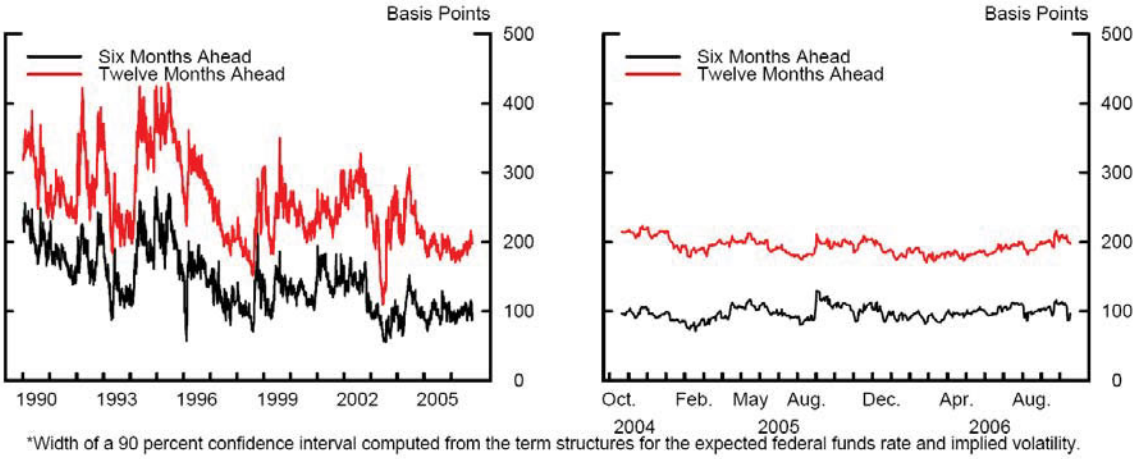
Change Since Day Before FOMC Meeting



Expected Federal Funds Rate Path and Confidence Intervals



Eurodollar Implied Volatility at Selected Maturities*

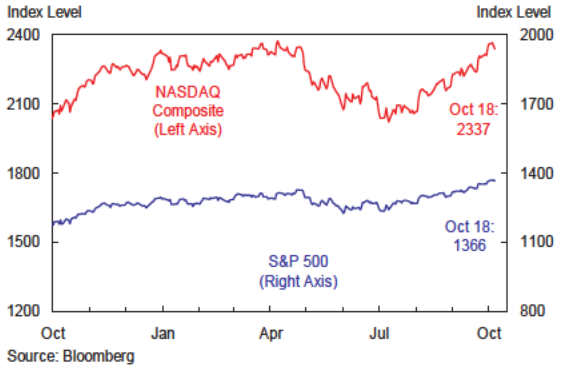


*Width of a 90 percent confidence interval computed from the term structures for the expected federal funds rate and implied volatility.

B. Financial Markets

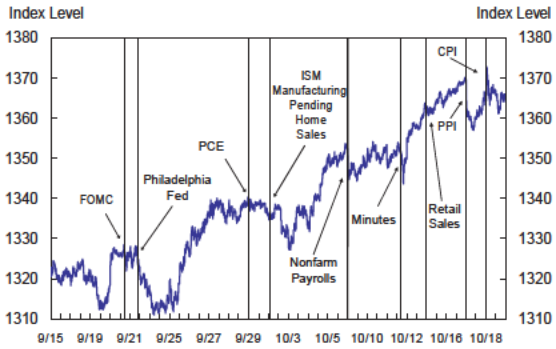
Exhibit B-7: Equity Markets

Performance



Source: Bloomberg

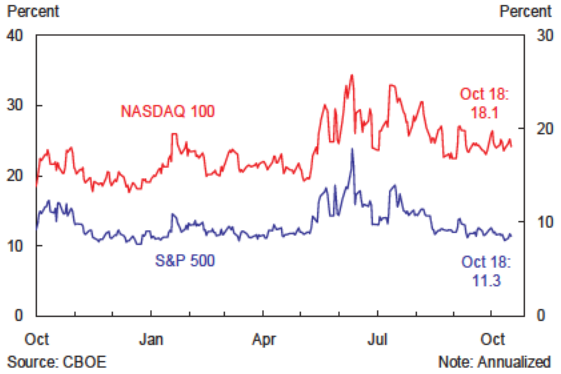
S&P 500 (Intraday)



Source: Bloomberg

Note: Data between 9:30 am and 4:00 pm

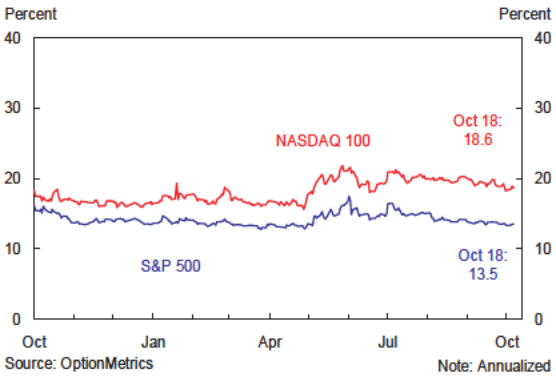
Implied Volatility: 1 Month



Source: CBOE

Note: Annualized

Implied Volatility: 12 Months

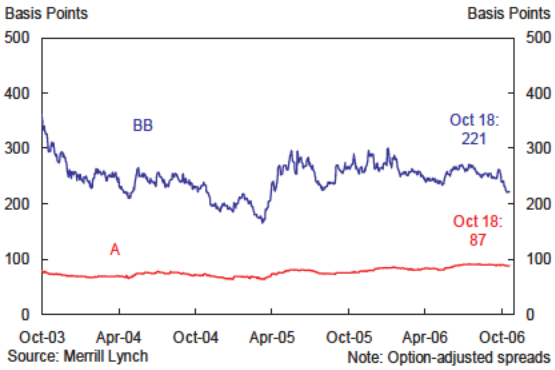


Source: OptionMetrics

Note: Annualized

Exhibit B-8: Corporate Credit Risk

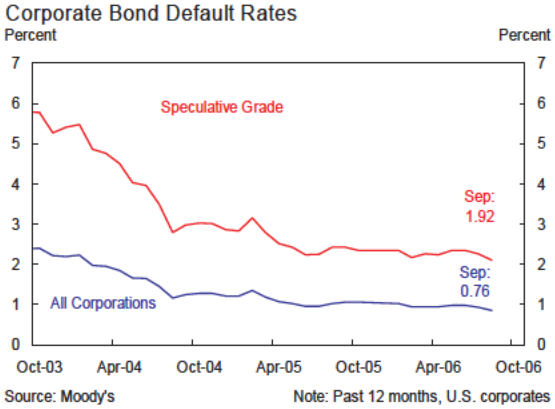
Corporate Credit Spreads



Source: Merrill Lynch

Note: Option-adjusted spreads

Corporate Bond Default Rates



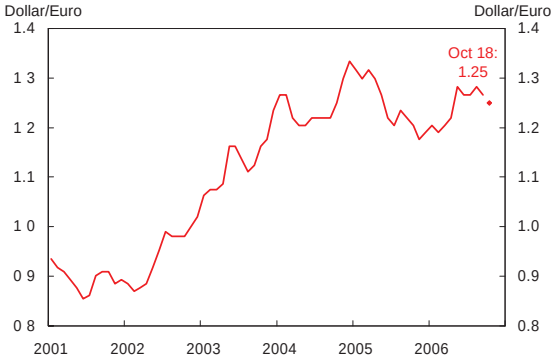
Source: Moody's

Note: Past 12 months, U.S. corporates

B. Financial Markets

Exhibit B-9:
Exchange Rates, Foreign Equity, and Bond Spreads

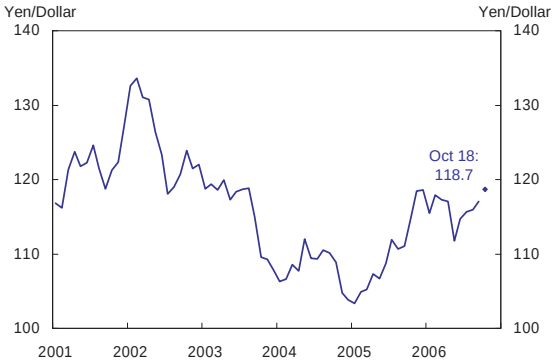
Euro-Dollar Exchange Rates



Source: BIS

Note: Data are monthly averages.

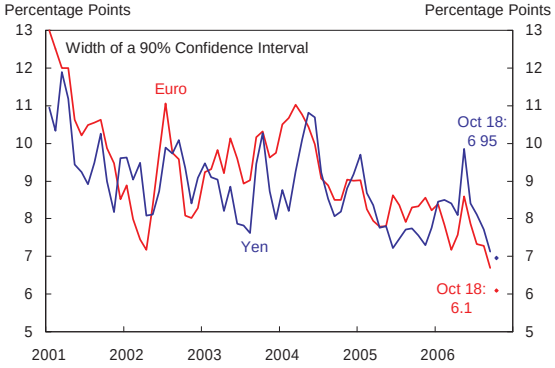
Yen-Dollar Exchange Rates



Source: BIS

Note: Data are monthly averages.

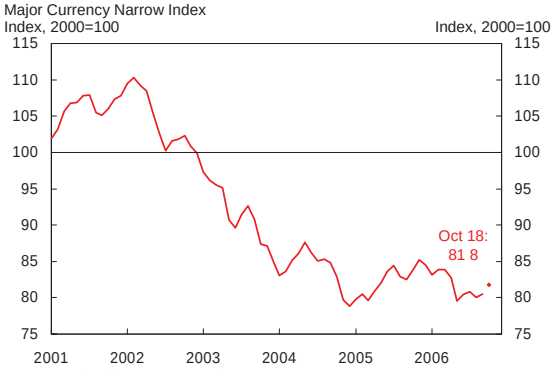
Euro and Yen One-Month Implied FX Option Volatility



Source: Reuters

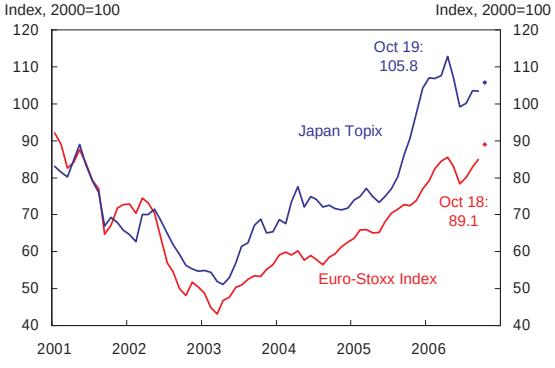
Note: Data are monthly averages.

Nominal Effective Exchange Rate



Source: Federal Reserve Board

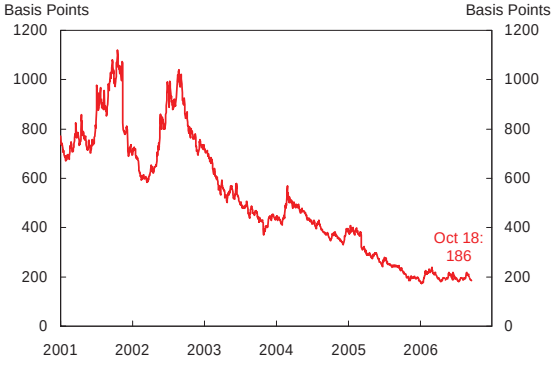
Euro Area and Japan Equity Indices



Source: BIS and Bloomberg

Note: Data are monthly averages.

J.P. Morgan EMBI+ Sovereign Spread



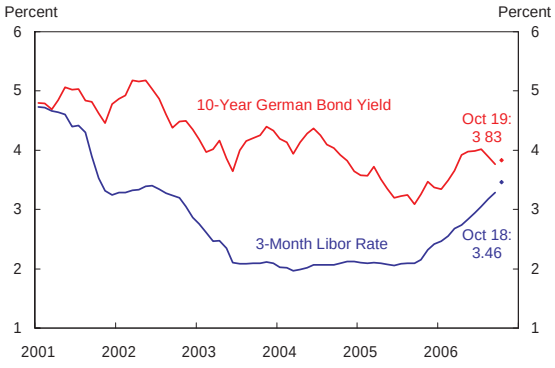
Source: Bloomberg

Note: Data are daily observations.

B. Financial Markets

Exhibit B-10:
Foreign Interest Rates

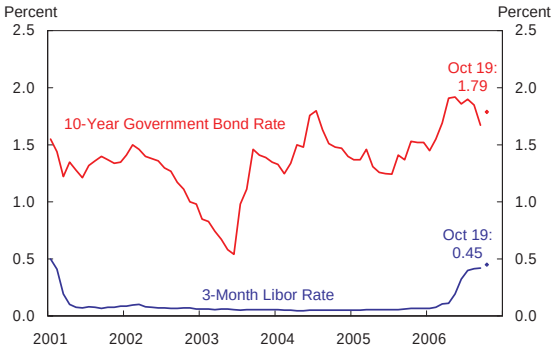
Euro Area Short-Term and Long-Term Interest Rates



Source: BIS and Federal Reserve Board

Note: Data are monthly averages.

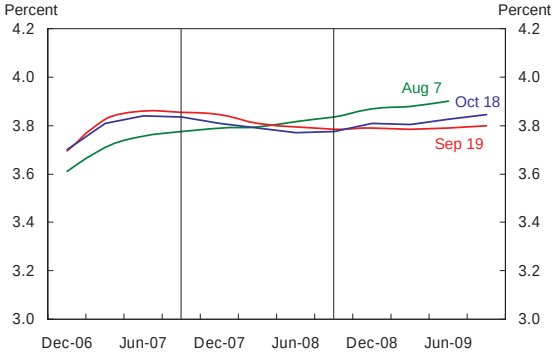
Japan Short-Term and Long-Term Interest Rates



Source: Bloomberg and Federal Reserve Board

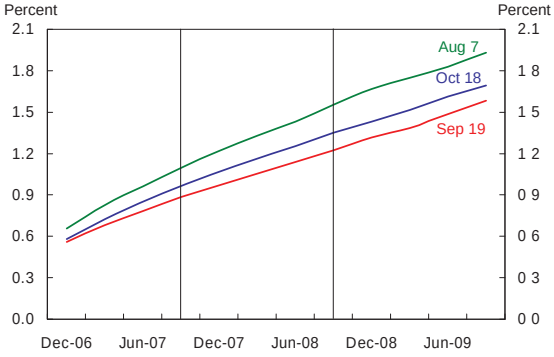
Note: Data are monthly averages.

Three-Month Eurocurrency Futures Rates: Euro



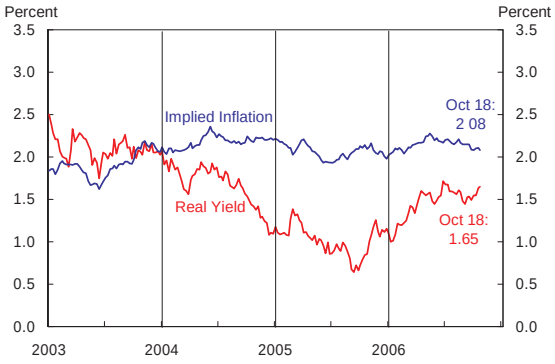
Source: Datastream

Three-Month Eurocurrency Futures Rates: Yen



Source: Datastream

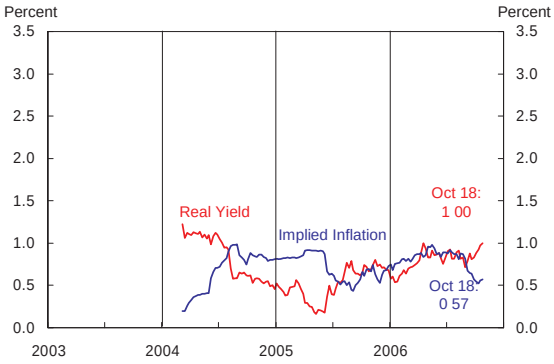
Euro Area Inflation-Linked Bonds



Source: Barclays

Note: OAT, July 2012

Japanese Inflation-Linked Bonds



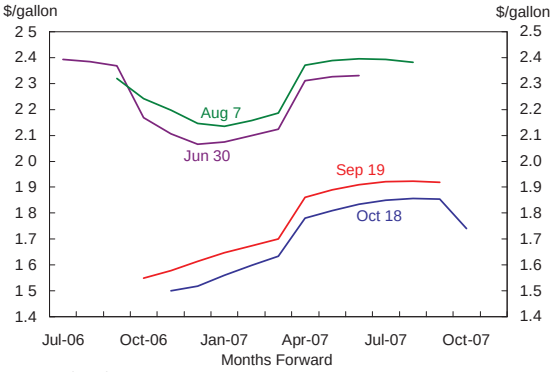
Source: Barclays

Note: JGB, March 2014

B. Financial Markets

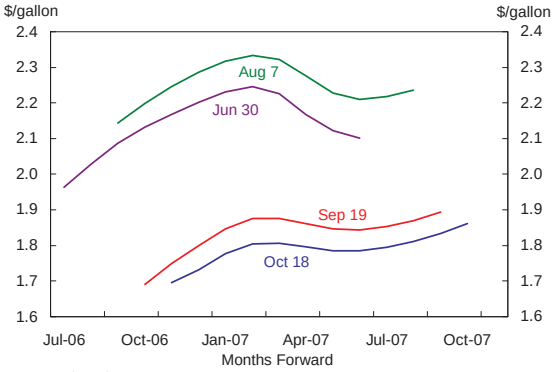
Exhibit B-11:
Energy Futures

Gasoline Futures



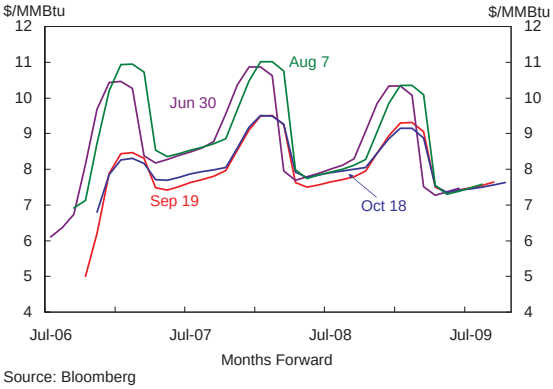
Source: Bloomberg

Heating Oil Futures



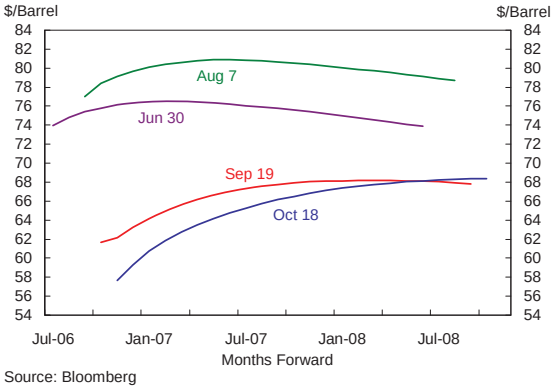
Source: Bloomberg

Natural Gas Futures



Source: Bloomberg

Crude Oil Futures



Source: Bloomberg

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. We use a dynamic assessment of the risks that allows the probability of a deviation to build over time. We center long-run behavior at the implicit inflation target and potential growth rate and assume that, after a deviation into an alternative scenario, the economy eventually returns to this average long-run behavior. 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 alternative scenarios listed in Section 3 ("FRBNY Alternative Scenarios and Risks") and the central scenario contained in the Bank's forecast. Two measures of the balance of risks are shown. One is the probability of being in a particular scenario at a specific date. These scenarios are mutually exclusive, so the probabilities add up to one at any specific date. However, please note that two nonspecific scenarios representing general upside and downside risks to the FRBNY forecast are not pictured; thus, the values included the exhibit do not add up to exactly one.

For most scenarios, the second measure is the probability of being in a particular scenario at any time through 2009. For the central scenario, however, we show the probability of not deviating from this scenario at any time through 2009. Hence, one minus this latter

probability is the likelihood of deviating from the central scenario at some point over the forecast horizon, which is equal to the sum of the probabilities of the other scenarios, including the general upside and downside scenarios not pictured.

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 of four-quarter changes in the core PCE deflator [Exhibit C-2] and real GDP [Exhibit C-3] under the central scenario and the alternative scenarios. A path is defined as falling under an alternative scenario if it has at least one quarter in that scenario.

The over-tightening scenario assumes that output growth is substantially slower than the central forecast and inflation is sometimes lower. The overheating scenario assumes that for two quarters the economy grows more quickly than in the central forecast, with both inflation and output higher than in the central forecast. Then, the real economy slows dramatically, but inflation continues to be above the central forecast. For this cycle we have increased the probability that overheating was occurring before 2006Q2.

The productivity boom scenario assumes that inflation is below the forecast, while output growth is above. The productivity slump takes the reverse; inflation is above the forecast, while output growth is below.

Exhibit C-4 & C-5: Fan Charts

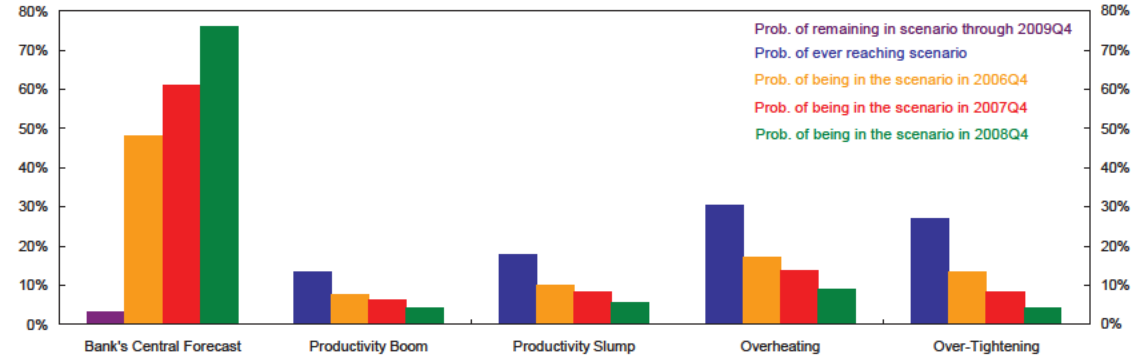
Fan charts are shown for the core PCE deflator [Exhibit C-4] and real GDP growth [Exhibit C-5]. These charts are constructed to represent the overall uncertainty contained in our main scenario and alternative scenarios. They combine the information contained in the previous exhibits with the additional 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 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 and the

two central bank scenarios are included in the fan chart. The expected values are computed as averages over the realizations across all possible scenarios considered in Exhibit C-1.The difference between the expected value profiles and the central bank scenarios 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

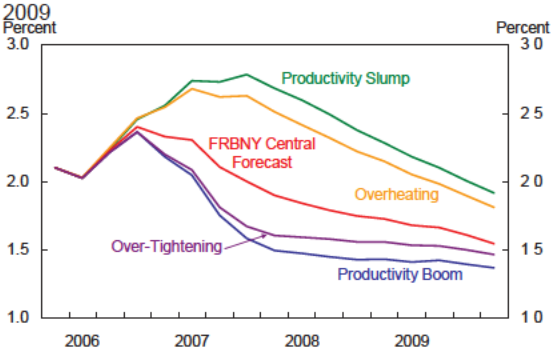
C. FRBNY Forecast Distributions

C-1: Risks



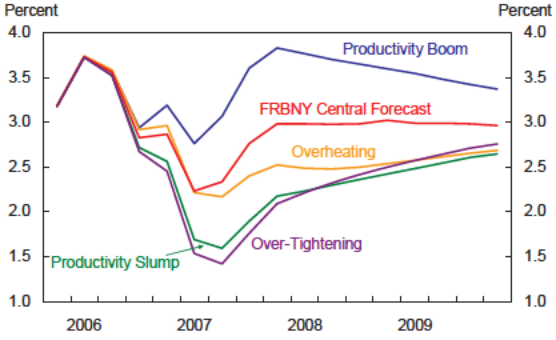
Source: MMS Function (FRBNY)

C-2: Alternative Scenarios of Core PCE Inflation through 2009



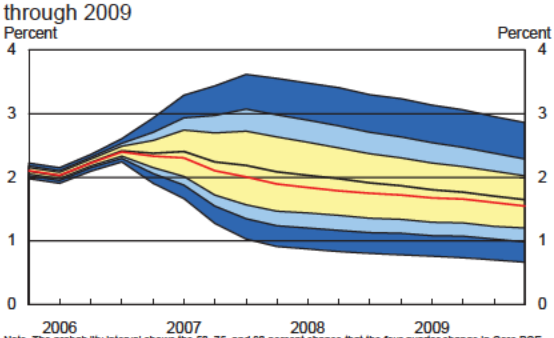
Source: MMS Function (FRBNY)

C-3: Alternative Scenarios of GDP Change through 2009



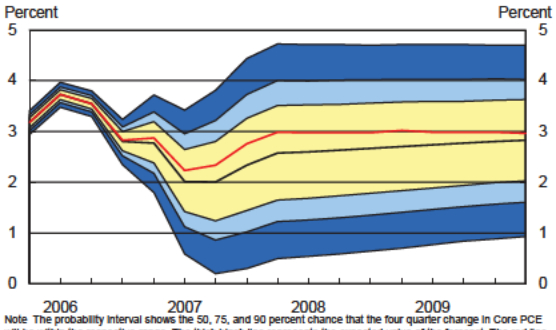
Source: MMS Function (FRBNY)

C-4: Four-Quarter Core PCE Inflation Forecast through 2009



Note 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. The red line represents the actual FRBNY forecast.
Source: MMS Function (FRBNY)

C-5: Four-Quarter GDP Growth Forecast through 2009



Note 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. The red line represents the actual FRBNY forecast.
Source: MMS Function (FRBNY)

D. FRBNY Fed Funds Rate Projections

The exhibits in this section are constructed using the baseline specification of the policy rule detailed below, two modifications of the baseline policy rule, 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 level of uncertainty.

In all specifications the policy rate responds to deviation of inflation from target and output from potential GDP and incorporates some degree of inertia. We draw the future paths of these deviations from the forecast distribution of inflation and output. (We specify an implicit inflation target of 1.5% and assume potential output growth is 3%.)

Policy Rule – Baseline Specification:

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

$$\rho = 0.8$$

$$i_{2006Q2} = 4.9$$

$$i^* = 4.125$$

$$\pi^* = 1.5$$

$$\varphi_\pi = 1.5$$

$$\varphi_x = 0.5$$

π_t : Core PCE 4 Q average

x_t : Output Gap using 3% potential growth rate

Source: MMS function, FRBNY

For the next quarter we amend the prescription of the baseline policy rule to capture some of the discreteness in the movement of the FFR. We translate the prescription of the baseline rule using the following table:

Baseline Policy Rule Prescription	Average FFR in 2006Q4
r* < 3.00	r*
3.00 < r* < 3.75	4.0
3.75 < r* < 4.00	4.5
4.00 < r* < 4.25	4.75
4.25 < r* < 4.5	4.75
4.5 < r* < 4.75	4.75
4.75 < r* < 5.00	5.0
5.0 < r*<5.25 5.25< r*<5.5 5.5< r*<5.75 5.75<r*<6 r*>6	5.25 5.25 5.5 5.5 r*

The two modifications of this amended baseline rule that we use this cycle are labeled *Opportunistic Disinflation* and *Dove.* The *Opportunistic Disinflation* rule reacts more strongly to inflation data above the upper bound of the implicit target range (taken to be 2%) than the baseline policy rule. It lowers the policy rate more slowly than the baseline prescription if inflation is slowing but still above the target range. For the *Opportunistic Disinflation* rule, we follow the prescription of the baseline policy rule if the four-quarter average of core PCE inflation in the last quarter is below 2%. If the four-quarter average through the last quarter is above 2%, then we compare this value to the four-quarter average through the current quarter. If the value for this quarter is higher than the value for the last quarter, then the prescription of the baseline rule is followed. However, if the four-quarter average declines when compared to its value in the previous quarter, then last quarter's value is substituted for the current quarter value in the baseline policy rule. This rule is followed for the horizon of the forecast.

The *Dove* policy rule amends the baseline rule by reacting much more strongly to deviations of output below potential. If the output gap is negative then the response to deviations of inflation from target and output below potential are equal and set to 1. Thus,

the rule does not satisfy the Taylor Principle when output falls below potential. This rule is followed for the horizon of the forecast.

Exhibit D-1: Nominal Fed Funds Rate Under Different Policy Rules

Exhibit D-1 shows the expected path of the FFR under the three rules described, together with the most recent implied market path from Exhibit B-4. The paths under each rule are constructed by first evaluating the policy rule at each of the draws from the forecast distribution of output and inflation and then averaging them to produce an expected path under that particular rule.

Exhibit D-2 & D-3: Nominal and Real Fed Funds Rate Under Baseline in Alternative Scenarios

In these exhibits, we focus on the baseline policy rule and evaluate it under the Bank's central projection, as well as under the alternative scenarios of a productivity slowdown, a productivity boom, overheating and over-tightening. Each path is obtained by evaluating the baseline policy rule at each of the draws from a forecast distribution of output and inflation under that particular scenario and averaging them to produce an expected path. The baseline rule is also evaluated using the Bank's central forecast. Exhibit D-2 presents the implications for the nominal FFR. Exhibit D-3 presents the implications for the average ex-post real rate. This real rate is calculated by subtracting the four-quarter lagged change of core PCE inflation from the path of the nominal rate.

Exhibit D-4: Baseline Policy Rule with 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. This is implemented by running the baseline policy rule with two different inflation targets. First, we use the 1.5% target typically used by the baseline policy rule; then, we calculate the expected nominal rate using a 2.0% target, while also increasing the neutral rate by 50bp. Neither simulation uses the information about the 13 most recent increases in the FFR. Thus, these two policy rule paths are conditioned on the average FFR in 2004Q4 of 1.9%. The market implied path and the average, however, use the actual value of the FFR to date. The implied market path then uses the current FF futures values, while the

average takes the mean over the three rules evaluated during this cycle, using weights of 0.60 (*Baseline*), 0.25 *(Dove*) and 0.15 (*Opportunistic Disinflation*).

Exhibit D-5: Comparison between Market Expectations and FRBNY Expectations of the Federal Funds Rate

In this exhibit, we report two metrics for measuring the distance between the market-implied path and the FRBNY implied path in 2007Q3.

1. We take the expected value of each of our policy rules and calculate its corresponding percentile in the market's implied distribution.
2. We take the expected value of the market implied path and calculate its percentile in the distribution for each of our policy rules.

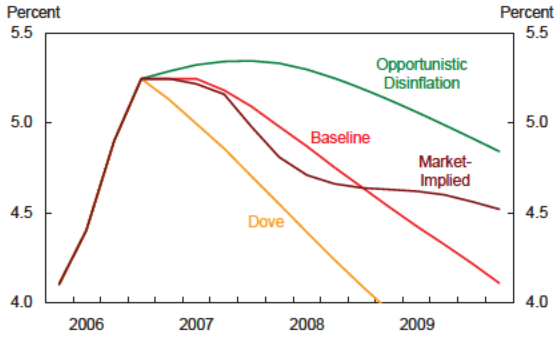
There are many other sources for differences between the two paths. One important consideration is the adjustment for risk in constructing the market path. We use an adjustment from the Board that is constant over time; there is some evidence, however, that the adjustment varies over time. Furthermore, the market faces uncertainty over the policies and targets used by the FOMC. We can attempt to capture this uncertainty, but again, it may vary over time.

Exhibit D-6: Federal Funds Rate Distributions

In this exhibit we examine the distribution of the FFR under the three different policy rules through the third 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 the data in Exhibit B-6. The distribution is represented by a boxplot to allow for a more direct comparison of the implications of different policy rules. The box represents the 50% probability interval (25^{th} to 75^{th} percentile), the line in the box the median, and the tails the 90% probability interval (5^{th} to 95^{th} percentile).
Source: MMS Function, FRBNY

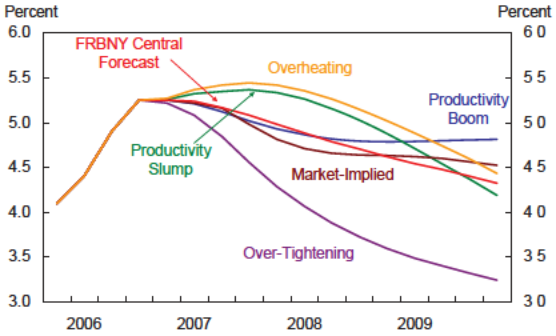
D. FRBNY Fed Funds Rate Projections

D-1: Nominal FFR under Different Policy Rules



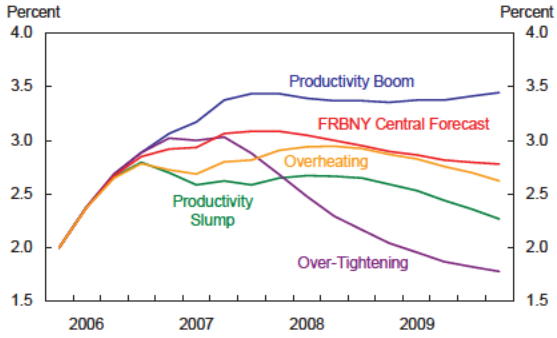
Source: MMS Function (FRBNY)

D-2: Nominal FFR under "Baseline" in Alternative Scenarios



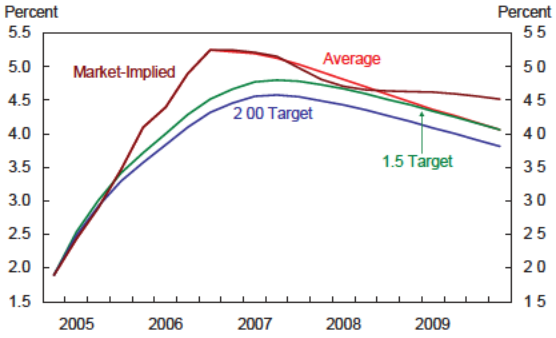
Source: MMS Function (FRBNY)

D-3: Real FFR under "Baseline" in Alternative Scenarios



Source: MMS Function (FRBNY)

D-4: Baseline Policy Rule with Different Inflation Targets



Source: MMS Function (FRBNY)

D. FRBNY Fed Funds Rate Projections

Exhibit D-5:
Comparison between Market Expectations and FRBNY Expectations of the Federal Funds Rate

	Percentile of FRBNY Expectation in Market Distribution	Percentile of Market Expectation in FRBNY Distribution
Baseline	56	40
Dove	31	57
Opportunistic Disinflation	71	21
Average	52	46

Note: "Average" weights baseline at .60, dove at .25, and opportunis ic disinflation at .15.

Exhibit D-6: Fed Funds Rate Distributions

E. Regional Charts

Exhibit E-1. FRBNY's Index of Coincident Economic Indicators

The chart in this exhibit shows our monthly coincident indices for New York, New Jersey, and New York City since 1999. The indices are a composite of four 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
Source: MaRS Function, FRBNY

Exhibit E-2. FRBNY's Index of Leading Economic Indicators

This chart shows the growth in our monthly leading indices for New York, New Jersey, and New York City since 1999. The growth in the index for a given month represents a forecast of the growth in the coincident index nine months ahead. The components used in these three indices differ slightly from index to index but include: housing permits, stock prices, the national leading index, and 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
Source: MaRS Function, FRBNY

Exhibit E-3. Private-Sector Job Growth: 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.
Source: Bureau of Labor Statistics

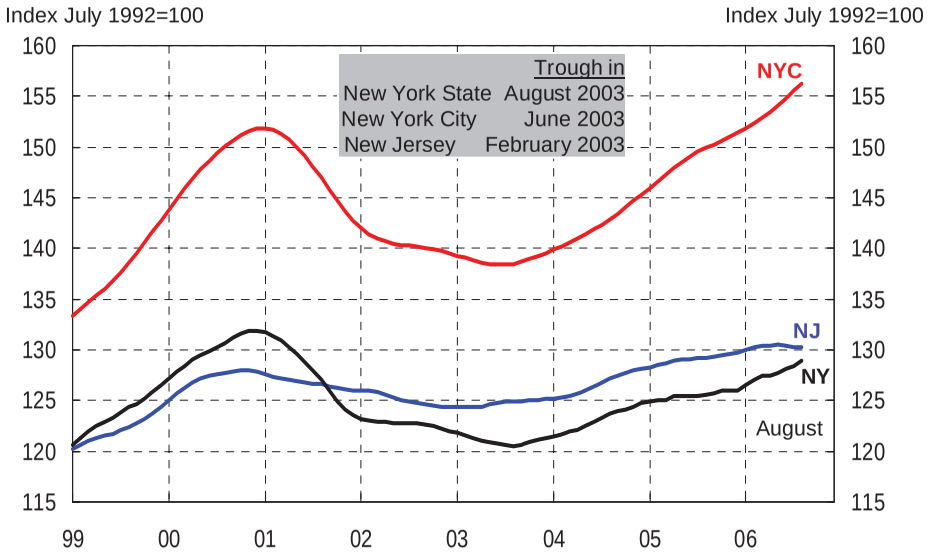
Exhibit E-4. Housing Permits in New York & New Jersey

This chart shows a 3-month moving average of the seasonally-adjusted number of housing units authorized—single-family and multi-family permits are shown separately—for New York and New Jersey combined from 1992 to present.

Source: Bureau of Labor Statistics, New York State Department of Labor, and the New Jersey Department of Labor

E. Regional Charts

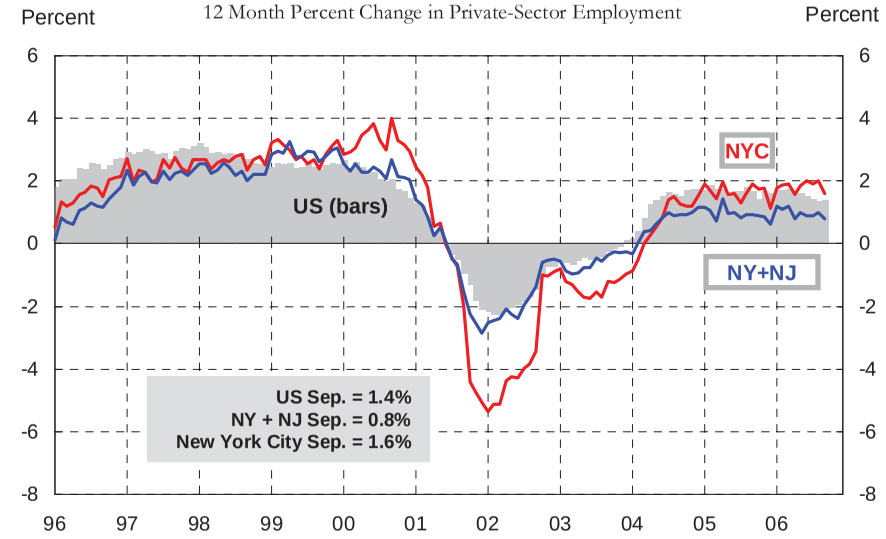
E1: INDEX OF COINCIDENT ECONOMIC INDICATORS



E2: INDEX OF LEADING ECONOMIC INDICATORS

** Percent change represents the forecasted growth in the Coincident Index, over the next 9 months, at an annual rate.*

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



E4: HOUSING PERMITS IN NEW YORK & NEW JERSEY