

**FRBNY Blackbook**

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**RESEARCH AND STATISTICS GROUP**

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# FRBNY BLACKBOOK

## January 2008

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## 1. Policy Recommendation and Rationale

Our policy recommendation for the upcoming FOMC meeting is to reduce the FFR (federal funds rate) 50 basis points (bps) to 3.00%. In our view this reduction is a logical continuation of the more aggressive easing embodied in the January 22 inter-meeting 75 bps reduction in the FFR and the downward tilt signaled in the accompanying statement. In addition, this move is consistent with the expectations currently priced in financial markets.

Under our recommendation, the FFR will have been reduced 125 bps since the December FOMC meeting. In recent months, the FOMC has communicated that it would act aggressively in the face of weak data on the real side; in particular, the minutes of the December meeting stated that an unfavorable feedback loop between credit market problems and the real economy would require a substantial further easing of policy. However, until recently, the economic data generally have not indicated that the financial market problems were contributing to a more substantial slowdown that could be a precursor to more troublesome scenarios. Therefore, we had refrained from recommending more aggressive cuts in the FFR in previous Blackbooks.

However, the developments over the inter-meeting period have indicated that the probability of a negative feedback loop between financial markets and the economy has risen considerably, which has prompted the change in our recommendation. On the economic front, the December labor market report indicated considerable softening in labor market conditions, with a rise in the unemployment rate from 4.7% to 5% and a decline in private payroll employment. Of particular concern was that the rise in the unemployment rate over 2007 was to the extent that typically portends to further sharp increases. The December ISM manufacturing index, together with some forward-looking indicators for business spending, suggests that the business sector has slowed substantially or is contracting, with expectations of a possible deeper downturn. The Philadelphia Fed survey also suggests deterioration in the regional manufacturing conditions and a strong shift towards increased pessimism.

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In the financial sector, credit spreads have continued to widen, suggesting that the constraints in the financial markets have increased. Tighter credit conditions also were confirmed by the latest Senior Loan Officers survey, which showed banks tightening credit standards further. Continued substantial write-downs and losses in the financial sector (including the bond guarantors), coupled with a decline of stock markets across the world, signal increasingly negative sentiment in financial markets. In particular, the recent decline in world stock markets suggests that the decoupling hypothesis between the U.S. and foreign economies appears less likely. We have responded to these events by lowering our near-term central forecast for real GDP growth, raising the probability of the *Credit Crunch* scenario, and reducing the probability of the *High Global Demand* scenario. These changes have led us to raise considerably the probability of a recession, with more weight to the possibility that such a recession may be more severe than the 1990-91 and 2001 recessions.

Beyond the upcoming FOMC meeting, our baseline projection for the policy rate has an additional 50 bps reduction in the FFR by the middle of 2008, after which the FFR will stay there for about a year. It is crucial for the effectiveness of policy that the FOMC communicates this downward tilt to policy in order to deter a possible negative feedback loop between financial market instability and the real economy.

Under our baseline, the combination of monetary easing and fiscal stimulus enables the economy to recover quickly from the negligible growth in 2008H1, with the recovery firmly established by mid-2009. At that point, with financial market functioning close to normal, we recommend that the FOMC begin the process of renormalizing the FFR, raising it to 3.5% by the end of 2009 and 4.25% by the end of 2010. This renormalization is quicker than that contained in the Greenbook. We believe it is essential that FFR is returned to near-neutral levels more quickly compared to the 2001-2005 episode in order to ensure that inflation expectations do not become unmoored and to deter the formation of possible speculative bubbles in financial markets. Again, it will be important for the FOMC to communicate the path and the rationale behind it to help ensure that agents do not misconstrue the policy and lead to some unwelcome outcome.

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There is significant uncertainty associated with this projected path, both on the upside and the downside. On the downside, a more aggressive easing may be required if financial market turbulence continues. As suggested by prior FOMC communications, our concern is the establishment of a negative feedback loop between ever lower asset prices, constrained credit, and weaker economic conditions. In this case, continued turmoil in financial markets would raise the probability of a more severe recession and call for a more aggressive easing to try to prevent such a scenario from developing. Another factor is the path of fiscal policy. In our baseline scenario we have incorporated a fiscal stimulus package of \$150 billion; about \$100 billion in personal tax rebates and \$50 billion in tax benefits to spur business equipment and software expenditures. With a tentative agreement on the general outlines of such a package, it appears increasingly likely. However, if a stimulus plan fails to be enacted in a timely manner, a more aggressive monetary policy stance may be needed.

The main upside risks to our projected FFR path is the possibility that inflation expectations become unmoored. Currently inflation expectations appear to be contained according to most of our measures. The Michigan survey suggests relatively stable household expectations, and the evidence from the TIPS market is broadly supportive of contained inflation expectations in financial markets. There is, however, a risk that inflation expectations could creep up, especially because of the additional recommended monetary easing and the possibility that the markets eventually may perceive the FOMC as overreacting to financial market events. It is thus prudent to communicate that the Fed will respond if there are large upside movements in inflation expectations, although this may pose a considerable communications challenge in the current environment.

Overall, our assessment of the current balance of risks is that the downside risks to output are sufficient to justify our recommended easing of policy. It is certainly possible that inflation may be somewhat elevated, at least in the short run. We should promptly address this possibility once the threat to financial stability and real growth subsides. We consider a short-run departure of inflation from the objective to be an acceptable risk compared to the more serious threat of a major economic disruption.

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## 2. Significant Developments

### 2.1 Economic Developments

The economic indicators released during the inter-meeting period impacted the near- and medium-term real activity outlook as well as our risk assessment. For the outlook, they have prompted a reduction to our 2008H1 real GDP growth forecast and an increase to the projections for 2008H2 and 2009. For our risk assessment, the data were a contributing factor to an increase in the already substantial downside risks. For inflation, the data suggest an increase in the near-term projection but little change in the medium-term projection of gradual moderation. However, the data also indicate a shift in the inflation risks to the downside from the roughly balanced risks in the December Blackbook.

**Inflation.** The behavior of core inflation measures indicate some increase in underlying inflation at the end of 2007, reversing some of the moderation from earlier in the year. Both core CPI (through December) and core PCE (through November) inflation are now somewhat elevated, with the 12-month change in the core PCE deflator moving above the mandate-consistent range of 1.5-2%.

Nevertheless, there are indications that a good deal of the recent increase in core inflation measures may reflect transitory factors. For example, apparel prices, which can be volatile has exhibited a downward trend in recent years but has risen in the past couple of months; given the reports of weakness in these sales, it is even more likely that these prices may fall in the coming months. Furthermore, our alternative inflation measures, such as the underlying inflation gauge (UIG) and signal components (SiCo) measure, have risen less than core inflation measures, and thus currently they indicate that much of the recent increase in core inflation has come from transitory factors.

Energy and food prices continued to pressure overall inflation measures, even though they did moderate some in December. Consequently, the 12-month changes in overall CPI (through December) and the PCE deflator (through November) were well above their

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corresponding core measures. Still, many of our alternative underlying inflation measures that take into account energy and food prices did not increase much during the inter-meeting period. Consequently, the inflation data appear consistent with our outlook of some near-term mild inflation pressures followed by a gradual moderation.

Inflation expectations measures appeared to remain contained during the inter-meeting period [Exhibits A-2 and A-3]. Based on the Board staff measures, long-term (5-10 year and 9-10 year) financial market inflation compensation rose moderately during the inter-meeting period, particularly after the January 22 FFR reduction, and are now above their highs after the September FOMC meeting. However, short-term compensation fell, and 4-5 year compensation was unchanged after the FFR rate reduction. This pattern, along with the financial market developments during this period, suggests that much of the increase in long-term compensation reflects rises in inflation risk premia (given the uncertainty about economic prospects and policy) rather than rises in inflation expectations, thus suggesting that expectations remain contained. However, given the unusual events of recent days, these developments will have to be monitored very closely to attempt to verify this hypothesis. Long-term (five-year) household expectations, as measured by the Michigan survey, remained within the narrow range (2.8-3.1%) that has been observed over the past 1½ years.

Import prices continued to be of some concern for the inflation outlook, as the recent depreciation of the dollar appeared to continue to have some impact on import prices. In particular, gradual price increases continued on Chinese imports, while import price inflation on European manufactured goods increased. Nevertheless, the import price effects on U.S. inflation still appear to be contained.

**Real activity.** The indicators of real activity generally suggested a weaker outlook than our expectations in the December Blackbook. As has been the case over the past year, one prominent weak sector has been housing, whose downturn remained substantial during the inter-meeting period. Single-family housing starts and building permits again fell considerably in November and December, a development that reflects the effects of

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tighter credit conditions, negative home price appreciation, and slower income growth. Both starts and permits are at their lowest levels since early 1991. The homebuilders index remained at a historic low, indicating continued pessimism from homebuilders. Sales of new (through November) and existing homes (through December) remained weak. Although existing home sales (as well as pending home sales) appear to have flattened in the past few months, providing some very tentative signs of stabilization in that part of the market, those of new home homes have continued to drop sharply. In both cases, sales are at levels not seen since the mid-1990s. The combination of continued weak sales and high inventories-sales ratios of new and existing homes suggest that the market will remain weak. Consequently, we see the slump as protracted, with the decline in residential investment continuing through most of 2008, although the lower interest rate environment may allow for some recovery in 2009 (see Section 3.1).

With sales activity weak, nominal home price appreciation became even more negative in the inter-meeting period by many measures. The 12-month changes in the Case-Shiller 10- and 20-metro area composite indices were -6.7% and -6.1%, respectively: for the 10-area index, which has a longer history (back to 1987), this changes was at a new historic low. The year-over-year change in the Radar Logic 25-metro area composite index, which is available at a daily frequency, is about -4%, considerably lower than it was during the last inter-meeting period. Futures prices based on this index indicate that market participants expect considerable depreciation (on the order of 20%) over the next couple of years. Because of their impact on real household wealth, these declines (along with those associated with equities) indicate downside risks due to potential spillovers from the housing market into consumption.

Conditions in mortgage markets remained stressed [Exhibit A-11]. Delinquencies and foreclosure rates on subprime and prime mortgages continued to rise, and they are approaching or exceeding previous highs. Further mortgage-related write-downs and losses at financial institutions along with losses and rating downgrades for some of the monoline bond insurers (resulting from losses associated with insuring MBS and CDO issues) led market participants to fear more substantial future losses. Consequently, they



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continued to be reluctant to hold mortgage-related assets; in part, this reluctance was reflected by renewed drops in the ABX indices of all rating to below previous lows. There still appears to be little securitization and origination of subprime mortgages. For prime jumbo mortgages, the spread between these rates and conforming mortgages remain wide; in addition, the spread of conforming mortgages to Treasuries (using the OAS [option-adjusted spread]) remained unusually wide. These developments continue to suggest the possibility of further negative impacts from tighter credit conditions on home sales, construction, and prices, and increase the potential of negative spillovers and thus greater downside risks to the real activity outlook.

Even with this potential risk to consumption, consumer spending indicators over the inter-meeting period provided mixed signals on the state of the consumer. The available data suggest that real PCE growth in 2007Q4 was only a little under the 2.8% (annual rate) recorded in 2007Q3. In particular, real PCE growth in October and November was solid: motor vehicle sales remained near recent levels in December, and the November-December average of retail sales excluding motor vehicles was fairly firm. However, the decline in December retail sales and reports of further weakness in sales into this year indicate that consumer spending has entered the current quarter with little momentum. In addition, consumer confidence indices remained at low levels (despite a rise in the Michigan index in mid-January), consumer credit markets appeared to be tighter, and labor market conditions looked to be softer. All these factors have contributed to reductions in the near-term consumption forecast to one of quite sluggish growth (see Section 3.1).

The business activity measures released during the inter-meeting period indicated that conditions remained rather soft, probably reflecting the impact of greater uncertainty and tighter financial conditions over recent months. Manufacturing production was unchanged in December and fell in 2007Q4 overall. A good deal of this weakness was in motor vehicle production, but there was considerable softness in manufacturing sectors outside of motor vehicles and IT. The lull in production suggests that firms cut back on inventory investment in 2007Q4 after inventory investment contributed considerably to

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real GDP growth in 2007Q3. The modest growth of inventories in October and November would be consistent with such a cutback; however, the low levels of inventories-sales ratios indicate that there appears to be little excess inventories, which would suggest that any such cutback would be limited. Business survey measures generally fell, and a number of measures are now at levels consistent with a contraction in the manufacturing sector and slow growth outside of it, in particular, the December ISM manufacturing index and the January Philadelphia Fed index. In contrast, our Empire State Index was at a level consistent with modest growth, although its expectations index fell sharply again in January.

Monthly capital spending indicators suggest more modest growth in equipment spending in 2007Q4 than it was in 2007Q3 (6.2%, annual rate). Capital goods shipments and orders in October and November were only modestly higher than they were in Q3, suggesting tepid equipment spending growth in 2007Q4. High-tech production had a solid gain in 2007Q4, but it was below the robust gain seen in 2007Q3 as well as the gains in the previous few years. The FRBNY Tech Pulse index also showed slower growth in 2007Q4, although its growth remained closer to the pace of the previous couple of years. Consequently, high-tech investment expenditures may have slowed modestly in 2007Q4 but were still fairly well maintained. Despite the weakness in residential construction, nonresidential construction remained robust through November.

**Labor market.** Another factor that contributed to the weaker outlook and continued substantial downside real risks was the labor market. The December labor market report indicated notable softening in conditions. Payroll employment rose only modestly in December, and private payrolls declined in the month. Even allowing for the possibility of technical factors holding down December, it is apparent that the pace of payroll growth has slowed considerably in the second half of 2007. Although much of this softness has been concentrated in housing- and mortgage-related industries, the December data indicate that the softness is spreading to other industries: the employment diffusion index fell again in December, and on a one-month basis is under 50 (i.e. more industries reported declines than reported increases in payrolls). The declines in private

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payrolls were still primarily in goods-producing industries, while employment at private service-producing industries was still fairly well maintained.

The softness indicated in the establishment survey was confirmed in the household survey. The unemployment rate rose to 5.0% in December; it has risen from 4.4% over the past year. Increases in the unemployment rate of that magnitude historically have been precursors to considerably more substantial increases, so this increase is a worrisome sign for the outlook. The labor force participation rate was unchanged at 66.0%, thus the rise in the unemployment rate was associated with a downturn in the employment-population ratio. Both the labor force participation rate and the employment-population ratio declined modestly over 2007, although the multi-year trend for the labor force participation rate is consistent with our assumption that it will remain near current levels over the next couple of years. Household employment growth on a payroll-comparable basis dropped sharply in December, and its growth in 2007 was well below that of payrolls, raising some concern that payroll growth was less than suggested by the establishment survey.

Initial claims for unemployment insurance edged up toward the top of recent prevailing ranges during the first part of the inter-meeting period, but declined to near 300,000 in the latter part of the period. As such, initial claims appear consistent with little further deterioration in the labor market; however, the slowdown in payrolls in the second half of 2007 along with initial claims remaining within recent ranges suggests that the softening of the labor market is associated with slower hiring rather than greater layoffs. The JOLTS data along with higher continuing claims appear to be mildly consistent with this hypothesis.

With the softening of the labor market, labor cost data indicated that labor cost pressures remained near recent levels. The 12-month change in average hourly earnings was 3.7% in December, which is at the low end of its range over the past year. Compensation per hour was revised downward, but its four-quarter change in 2007Q3 of 5.8% is still the highest since 2000. The difference between the two measures probably reflect the impact

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of option realizations and other incentive pay schemes that may have a somewhat lesser impact on future labor costs pressures.

**Trade.** The trade deficit increased in November from \$57.8 billion to \$63.1 billion, which was above the consensus of private forecasts, but had little effect on our outlook for net exports in 2007Q4. Imports rose in the month primarily because of higher oil prices and quantities. Real exports of goods also fell in November as capital goods fell; however, export growth over the past year remained robust.

**Foreign economies.** Foreign growth eased at the end of 2007, as we expected, but the economic data (in contrast to the financial market developments) do not yet point to any significant slowdown abroad. In the euro area, the preliminary German GDP data suggests euro area growth was around 1% in 2007Q4, with weak consumption offsetting growth in investment spending and exports. 2007Q4 data on the labor market and loans to businesses remained encouraging, while business confidence indicators were steady through January at relatively high levels. The January lending survey, though, revealed a significant tightening of credit standards. In Japan, data on shipments, exports, and employment were all solid in October and November, although industrial production growth faltered somewhat. The Japanese economy is appears to be recovering in 2008Q1 from the regulation-induced collapse in residential construction. China 2007Q4 data came in as expected, with output up 11.2% over the year. There has been a notable deceleration in export growth and both credit and money growth slowed at the end of 2007 as a result of tough credit controls. Inflation reached 6.9% in November (it fell back to 6.5% in December), and authorities have responded with price controls on food and energy.

## 2.2 Financial Markets

The turbulence in U.S. and global financial markets continued during the inter-meeting period, reflecting ongoing concerns about the severity of the U.S. mortgage and housing crisis, U.S. and global economic growth prospects, and mortgage-related balance sheet losses in the financial system as well as their implications for the real activity outlook and

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risk assessment. Trading conditions in some markets were quite strained, with many credit spreads exceeding levels from the August financial turmoil (and in some cases, the 2001 recession) and equity prices falling considerably throughout the world.

**U.S. Markets.** The expected FFR path fell considerably over the inter-meeting period, even before the 75 basis-point (bp) inter-meeting cut on January 22, as market participants anticipated that the apparent worsening of the real outlook and greater downside real risks would induce a greater and faster policy rate reductions from the FOMC. The implied expected FFR for February 2009 derived from futures markets declined over 90 bps to about 2.25%, which is the minimum of the futures curve [Exhibit A-5]. Before the January 22 reduction in the FFR, it had fallen by a similar amount; it fell further in the immediate aftermath of the inter-meeting cut, but it has risen afterwards on signs that measures were to be taken to help mitigate some of the downside risks. The implied FFR then is expected to rise only gradually to about 2.75% or a little higher by mid-2010. The effect of the inter-meeting cut was to accelerate the implied pace of reductions in the FFR.

Over the near term, market participants place a high probability of an additional reduction in the FFR at the January FOMC 2008 meeting (the implied probability of no further change in the FFR target is about 10%), although they are quite uncertain about the magnitude of the expected reduction. Based on options data, the implied probability of a 50 bps cut in the FFR at the January meeting is about 35%, that of a 25 bps cut is about 30%, and that of a 75 bps reduction is about 25%.

With continued uncertainty about the economic outlook and the FOMC response to economic and financial market developments, implied volatility about the future policy path remained elevated. Near-term implied volatility rose over the inter-meeting period, particularly in the last few days, and is now just below the August peaks. Long-term volatility generally increased over the period, with a notably sharp rise on January 22, and is well above the August levels. This pattern suggests that the inter-meeting FFR reduction induced greater uncertainty about the outlook for the economy and policy.

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The concerns about the real outlook and the apparent substantial downside real risks prompted market participants to engage in further risk averse behavior. These factors led to further substantial decreases in long- and short-term nominal Treasury rates over the inter-meeting period [Exhibit A-4]. The 10-year on-the-run nominal Treasury rate declined from about 4% to 3.7% over the inter-meeting period; it had fallen as low as 3.3% toward the end of the period before bouncing back in the past few days. The current level is still not that far above the lows from June 2003. With the January 22 FFR cut and the recent rebound of the 10-year rate, reflecting expectations that the problems of the credit guarantors would be addressed, the 10-year-FFR spread has finally become slightly positive, after being negative since August 2006. Historically, a negative 10-year-FFR spread precedes recessions.

Short-term nominal rates also dropped sharply over the inter-meeting period. The 3-month Treasury bill rate fell almost 70 bps over the inter-meeting period, with much of the drop occurring after the January 22 reduction in the FFR. The on-the-run 2-year Treasury rate was a little over 2.3% at the end of the period, near its lows since April 2004. Consequently, even with the inter-meeting reduction of the FFR, the yield curve is inverted at the short end: the 2-year-FFR spread is about -120 bps, which is only modestly narrower than it was before the recent FFR reduction and the level from just prior to the January 3, 2001 FFR reduction. Historically, a negative 2-year/FFR spread of this magnitude has preceded periods of substantial monetary easing.

Consistent with a weaker expected real outlook and continued substantial downside real risks, real Treasury yields fell substantially during the inter-meeting period. The carry-adjusted 5-year real yield fell 55 bps over the period to 0.87%; it had hit its lowest level since March 2004 in the early part of the week. The carry-adjusted 10-year real yield declined 49 bps to 1.45%, near its lows since March 2004. Real forward rates are below their levels from the summer, indicating greater concern from market participants about the longer-run real outlook.

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Credit spreads continued to increase over the inter-meeting period, with notably sharp increases in the spreads for financial institutions [Exhibit A-7]. The spreads for financial institutions are now well above their levels prior to the 2001 recessions and during the 1998 financial crisis. The CDS spreads for banks and securities firms also rose and are above their highs from the summer. Credit spreads for both investment-grade and speculative-grade nonfinancial corporate bonds rose through the period: those for investment-grade firms are above their peaks around the 2001 recession, while those for speculative-grade firms have approached their peaks during that recession (although they remain below the levels observed following the recession in 2002-2003). The rise in credit spreads is another sign of the concern of market participants about the real outlook.

Other credit spreads also remain at high levels [Exhibit A-11]. Spreads on all subprime MBS tranches remained near their recent highs. In addition, prices for all tranches of the ABX fell over the period and are at or near their historic lows, indicating expectations of further losses from subprime mortgages. Spreads on other consumer debt ABS tranches also remain elevated, which may be a sign of spreading default risk beyond the subprime mortgage market as well as the repricing of default risk.

Inter-bank lending markets improved considerably over the inter-meeting period, reflecting the introduction of the Term Auction Facility (TAF), coordinated liquidity injections by central banks, and the alleviation of year-end pressures [Exhibit A-11]. By mid-January, LIBOR-to-OIS spreads had returned to levels last seen in October, but these are still elevated compared to historical levels.

The slide in asset-backed commercial paper (CP) outstanding finally ended during the inter-meeting period, while unsecured CP outstanding was relatively stable [Exhibit A-7]. Commercial and industrial (C&I) loans grew robustly in the latter part of 2007; however, the latest Senior Loan Officers Survey (not yet publicly released) indicates a further tightening of standards that could portend slowing credit growth in the coming year.

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Equity markets dropped sharply during the inter-meeting period, with the S&P 500 index down 10.8% and the NASDAQ down 13.2%, even with a rebound in the past couple of days [Exhibit A-7]. The declines apparently reflected greater worries about the real growth outlook for the U.S. and foreign economies, especially about more serious recession scenarios that would impact profits substantially. These concerns were exacerbated toward the end of the period, as more problems for the credit guarantors were reported, raising concern about the functioning of and pricing in credit markets. Reports on January 23 that some of the capital problems of the guarantors may be addressed alleviated some of these concerns and contributed to a fairly sharp rally. With the global equity decline in January, implied volatilities rose substantially during the latter part of the period, temporarily exceeded their levels during the summer phase of the subprime financial crisis, and approached the levels reached in previous crises, such as the 1998 LTCM crisis.

**Foreign Markets.** Trading conditions improved in global money markets, supported by massive injections of liquidity by major central banks. However, growing concern about slowing U.S. and global growth weighed heavily on equity and bond markets and led to sharply lower expectations of future policy rates in the major foreign economies.

Industrial countries' equity prices fell substantially during the period, losing 10-15% in Europe and Japan, with evidence of slower growth influencing most heavily financial, exporting, and commodity-related firms. Bond markets also displayed behavior typical of slowing economic growth periods, with falling nominal and real long-term rates. Liquidity in short-term funding markets improved overall, with term spreads falling in most currencies, especially since the turn of the year. However, renewed financial turbulence at the end of the period increased uncertainty about the sustainability of recent money market improvements, and term spreads rose again marginally in the wake of the equity market sell-off.

Emerging financial markets held up reasonably well. Main emerging markets did not escape the end-period equity sell-off, but the decline in stock prices generally was less



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than that in industrial countries. Similarly, while emerging markets' external spreads remained elevated, they were still below their November peaks, and their increase since August 2007 was significantly less than that of U.S. and European high-yield spreads. Debt flows remain subdued compared to their pre-August 2007 levels, but recent public issues have been well received.

The U.S. dollar depreciated through mid-January but recovered in the latter part of the period, as investors seemingly sought safe haven in an increasingly turbulent financial environment. On net for the period, the dollar lost less than one percent in both nominal and real effective terms, though it depreciated more than 3% against the yen. Indeed, the main foreign currency news during the period was the yen's strength, especially against high-yield currencies, pointing to growing reluctance by global investors to engage in risky carry-trade positions in an increasingly uncertain global environment. Confirming this view, dollar-yen option-implied volatility reached multi-year highs during the period, while the rise in dollar-euro volatility was more moderate. The Chinese yuan continued to appreciate at a rapid rate (about 13% annualized in the past three months). This evolution and comments by Chinese officials suggest that the PBOC (Peoples' Bank of China) may lean towards allowing stronger yuan appreciation in the future. Market expectations of yuan appreciation, however, only partly reflect this view, with NDFs (non-deliverable forwards) pricing only a slightly elevated 8% appreciation of the yuan over the next 12 months.

Commodity markets were turbulent during the inter-meeting period, responding to growing uncertainty about global demand growth and concern about supply in critical regions. Oil prices broke through the \$100 per barrel level in December, amidst concern with stability in Nigeria and Kurdish Iraq as well as falling U.S. inventories. Since then, however, concern about global growth dominated, contributing to a decline in spot prices to about \$90 per barrel.

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## 2.3 Global Economic Policy

Most foreign central banks held policy rates steady during the period, facing contending pressures from slowing growth and rising inflation. (Only the Bank of Canada cut its policy rate by 25 bps on January 22, and the PBOC raised most interest rates it controls for the sixth time in 2007, continuing its efforts to normalize monetary conditions.) However, growing evidence of a global slowdown and financial turbulence brought a sharp decline in expected future policy rates at end-period. In Europe, official ECB (European Central Bank) commentary still points to a tightening bias. However, ECB officials may just need time to adjust their rhetoric without losing credibility: markets are already pricing a 25 bps cut over the next three months. The Bank of England may act even sooner and cut rates at its policy meeting next month. The Bank of Japan is not expected to move in the first half of 2008, but market expectations are now that its first move may be a rate cut.

Although policy rates were held steady, major central banks were active during the period in sustaining global liquidity. Coordinated effort by the Federal Reserve, the ECB, and the Swiss National Bank in December, and independent action by the Bank of England and Bank of Canada, sparked a period of massive liquidity injections that has helped alleviate end-of-year funding pressures and reportedly contributed to improving financing conditions in term markets.

Most emerging market economies continue to accumulate reserves. Reserve growth has recently strengthened in Asia and key oil-producing countries, but it has moderated in other regions.

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## 3. Evolution of Outlook and Risks

### 3.1 Central Forecast

**Conditioning assumptions.** The key conditioning assumptions underlying our central forecast have changed substantially since the December Blackbook. Inter-meeting developments in the real economy and financial markets have deteriorated much more than anticipated, prompting the FOMC to lower the FFR by 75 bps on January 22. In addition, we have built into our assumed policy path an additional 50 bp reduction in the FFR at the upcoming meeting, to be followed by an additional 50 bp decline over the period from the end of January through the end of 2008Q2. Thereafter, we expect the FFR to remain at 2.5% through mid-2009 then rise to 3.5% by the end of 2009. Thus, by the end of 2008, the level of the FFR is 125 bps lower than that assumed in the December Blackbook. This difference narrows to 75 bps by the end of 2009. Despite this much lower path for the FFR, downside risks to growth, and the probability of a recession, are substantial.

Our assumed path for the FFR is somewhat above that implied by prices in futures markets, which declined dramatically over the inter-meeting period. In contrast, our assumed path is below the assumed path in the Greenbook forecast for 2008; however, by the end of 2009, our assumed FFR is 50 bps above that in the Greenbook forecast. We continue to believe that over the medium term the neutral funds rate lies somewhere in the 3.75% to 4.75% range. However, we suspect that the recent tightening of credit conditions has temporarily lowered the neutral rate for the very near term, perhaps as low as 3% to 3.75%. Thus, we believe that under the current circumstances it is crucial to move policy quickly to an accommodative stance. However, as financial markets heal and the economy regains forward momentum, policy needs to move back relatively quickly toward neutral so as to avoid a serious unmooring of inflation expectations.

Another significant change in conditioning assumptions is that we now expect a fiscal stimulus package to be enacted over the next few months. The broad outlines of an agreement appear to be taking shape. Consistent with those outlines, we are assuming a

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package of about \$100 billion of tax rebate checks, to be mailed out over the course of 2008Q3, plus about \$50 billion of tax benefits intended to spur business investment in equipment and software. This is a somewhat larger stimulus package than assumed in the Greenbook forecast. We expect the unemployment rate to rise by roughly one-half percentage point over the first half of this year, increasing the likelihood that the package will be expanded, as it works its way through the legislative process.

Another meaningful change in conditioning assumptions is the assumed path of oil prices. Despite reports of relatively lean inventories of petroleum and refined products, spot oil prices have eased recently presumably due to the downgrading of growth prospects for the U.S. Given our forecast of essentially zero growth of real output for the first half of 2008, we expect oil prices to trend lower over the course of this year, averaging about \$86.50/barrel in 2008Q4, \$1.00 per barrel lower than in the December Blackbook. Then, even though we expect growth to rebound during the second half of 2008 and into 2009, we expect oil prices to edge lower, as supply and demand respond to the now generally higher level of energy prices. Our assumed path for oil prices is modestly lower than that assumed in the Greenbook forecast.

Another change in underlying assumptions is that the foreign growth outlook for 2008 has been lowered from 2.9% to 2.5% (GDP weighted) from the December Blackbook. Concerns about the U.S. economy, global financial turmoil, and signs that restrictive policies in China are taking a toll are behind the revised forecast. Projected growth for the NAFTA (North American Free Trade Agreement) countries has been marked down given their exposure to the U.S. economy. In Europe, the January bank lender survey revealed a significant tightening of credit standards by banks, suggesting that financial turmoil is starting to affect materially the real economy. In China, policy moves to restrain the economy have resulted in a significant deceleration in credit growth at the end of 2007. These policies, coupled with the expected slowing of growth in the U.S., reduced the outlook for growth in China and the rest of Asia.

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The remaining conditioning assumptions underlying our central forecast are similar to those of the December Blackbook. We maintain our estimate of potential GDP growth at 2.7%: 1.2% trend hours growth (although we assume it will begin to decline in 2009-2010) and 1.5% trend productivity growth (GDP basis, which is equivalent to 1.8% on a nonfarm business sector basis). We also believe that the economy is currently operating near potential. Given our estimate of potential, we expect an output gap approaching one percent of GDP to emerge over the course of 2008. About half of that output gap would then be closed over 2009. As always, there is substantial uncertainty around our estimate of potential GDP growth and estimates of output gaps.

We expect the lower inflation persistence evident since the early 1990s to continue; this assumption is in contrast to the greater inflation persistence assumed in recent Board staff forecasts. We also assume that long-run inflation expectations remain contained at or below current levels. This assumption is supported by the relative stability of zero to five year inflation expectations, despite the increase in core inflation over the second half of 2007 and the recent aggressive easing of policy. Within the context of our forecast for growth, these contained expectations result in the gradual moderation of inflation toward the midpoint of the FOMC's objective for core PCE inflation of 1.5% to 2%.

We expect the term premia to remain relatively low. As measured by the Board staff's three-factor model, term premia declined modestly over the inter-meeting period. As is our usual practice, our assumptions for equity prices and home prices are similar to those of the Greenbook. For nominal home prices, this means a cumulative decline of the OFHEO purchase-only home price index of between 6% and 7% from their peak by the end of 2009. Note that the corresponding decline of the Case-Shiller index is likely to be 2 to 3 times larger. As in the Greenbook, we expect the real-exchange value of the dollar to depreciate over the forecast horizon. However, given our lower near-term path for the FFR, our assumed depreciation is somewhat less than that in the Greenbook.

**Inflation.** After moderating substantially over the first three quarters of 2007, the 12-month change of the core CPI increased from around 2.1% to 2.4% over the fourth

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quarter. The primary source of this firming is a significant swing in core goods inflation. Core goods prices were falling 1% (annual rate) in 2007Q2 but as of December were rising 0.5% (annual rate). Two forces likely were at work to produce this path for core goods prices. One is that the total business inventory-sales ratio, which rose significantly over 2006 and into early 2007, has now returned to about the level that prevailed in late 2005. This pattern suggests that downward price pressures from excess inventories have subsided. Second, after slowing in 2006, the rate of increase of non-petroleum import prices increased in 2007.

Despite this recent firming, we continue to expect core inflation to gradually moderate over the forecast horizon [Exhibit B-4]. From a modeling standpoint, the main drivers of this moderation are the opening of an output gap combined with contained inflation expectations. Given the change in forecast for growth, with a larger expected increase in the unemployment rate, the case for this view has been strengthened. Considering individual components, with consumer spending expected to slow and the exchange value of the dollar expected to decline at a more moderate rate than was the case this past year, core goods prices are likely to begin declining again. In addition, core services prices are expected to slow in response to the slowing of nominal income growth, while historically high level of vacant homes continues to exert downward pressure on rents.

**Real activity.** There remains a wide range of views about the rate of growth of real GDP in the final quarter of 2007. Nonetheless, it does appear that the economy was quickly losing forward momentum at the end of 2007 as credit conditions tightened and consumer and business confidence plunged. With a continued rapid decline in housing construction, a contraction in the supply of credit to households and businesses, and a generalized increase in uncertainty, we now expect essentially no growth of real GDP during the first half of 2008, with the unemployment rate approaching 5 ½% by mid-year. In the second half of 2008, we expect growth to rebound to an above potential pace in response to the aggressive easing of monetary and fiscal policy. Despite this strong rebound, growth of real GDP for all of 2008 is now projected to be 1.8% (Q4/Q4), down from 2.3% in the December Blackbook [Exhibits B-1, B-2, and B-3].

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Growth is likely to remain somewhat above potential in 2009 as monetary policy remains accommodative, financial market functioning returns to normal, and consumer and business confidence is restored. Given the lower path for the FFR in this forecast, combined with the housing-specific features of the proposed stimulus package, we anticipate that residential investment will actually contribute positively to growth in 2009 following three years of steep contraction.

# Special Topic

## The Impact of Short-term Fiscal Stimulus

Charles Steindel Redacted

*Tax rebates of the size currently proposed may boost consumption spending about \$25-50 billion in the quarter they are received.*

News reports indicate that a short-term fiscal stimulus package is increasingly likely to be implemented into law. The reports suggest that such a package could amount to roughly 1% of GDP, or about \$150 billion, and probably consist of a combination of increased government spending as well as temporary business tax reductions and personal tax cuts.

A fiscal stimulus of this size has the potential to affect the near-term real outlook. In this special topic, we examine the possible impact of each element of the proposed fiscal stimulus on aggregate demand as well as the uncertainty about the impacts.

### *Increased Spending*

Increased government spending on goods and services (whether greater outlays or increased grants to support state and local government spending) would appear at first glance to raise aggregate demand by a similar amount. Therefore, fiscal stimulus through this mechanism would appear to be significant. However, a couple of factors probably reduce

its impact.

First, if households and firms adjust their consumption-saving behavior to account for the implied higher future taxes resulting from the current higher expenditures, the impact of higher spending is offset by such adjustments (such offsets are also applicable to the other elements of fiscal stimulus). Theoretically, the offset could be complete so that the higher spending has no impact on aggregate demand. Empirically, the offset appears incomplete, and spending increases appear to have a fairly substantial impact on aggregate demand.

The second factor is the more practical problem of implementation. There are substantial set-up costs with a spending package; as a practical matter, it is difficult to quickly ramp-up federal spending and to design and implement expanded grant programs. It thus appears to be difficult to implement such programs (unless there is some standby program) in the time frame for which a fiscal stimulus typically would be helpful.

### *Business Tax Reductions*

Temporary business tax incentives may include elements such as a short-term investment tax credit or an acceleration of depreciation allowances for capital put into service before a selected date. Such incentives effectively amount to a temporary reduction in



the cost to business of purchasing capital. Therefore, these incentives are intended to bring forward capital spending already planned for the near future.

The temporary nature of the incentive, in principle, strengthens its impact on aggregate demand. However, despite numerous incentives of this type put in place since the Kennedy Administration, the empirical evidence indicates that they have only modest impact at best on aggregate capital spending. One reason why it appears difficult to find a major impact of temporary business tax incentives is that the standard models do not explain much of the cyclical changes in capital spending; in particular, empirical estimates indicate that the cost of capital (through which business tax incentives work) have only a modest impact on aggregate capital spending.

#### *Personal Tax Reductions*

Based on news reports, the major portion of the stimulus package probably will be a personal tax reduction in the form of one-time rebate to taxpayers (as was the case in 1975 and 2001). The amounts under discussion seem to be substantial: \$800 to individuals, or \$1600 to joint filers (for taxpayers whose 2007 liability were less than these figures the rebate, under the typical scheme, would be reduced to that lower figure), which would result in payments to households of about \$100 billion.

Economists have long recognized that the spending

spending impact of such “temporary” tax changes would be smaller than “permanent” tax changes, given that spending decisions to a significant extent are made on the basis of expected household “lifetime” resources. An \$800 or \$1600 rebate would make only a small difference to lifetime resources, and hence would have little effect on spending.

However, it appears that a significant number of households, most notably because of limited access to credit markets, are unable to make spending decisions on the basis of lifetime resources, and hence determine their spending based largely on current income. These households could spend a large fraction of a rebate. It should be recognized, though, that many such households may have little or no federal income tax liability to be rebated, suggesting that other means might be considered to determine the groups eligible for such payments (e.g. payroll tax liability).

Early studies of the 1975 rebate suggested that as little as 25% (or even less) of the rebate entered the spending stream in the quarter it was made. A recent study of the 2001 rebate found a somewhat higher impact effect, but it still was under 50%, although it found that liquidity-constrained households increased spending more than others.

Although the point estimates of the short-term spending effect of tax rebates are considerably under those for “permanent” tax changes (which typically are about 75%), a rebate still cou

could have a substantial macroeconomic effect. For example, if \$100 billion in rebates are distributed in June 2008, the point estimates suggest an increase in consumer spending in Q3 of \$25-50 billion, or \$100-200 billion at an annual rate, which is about 0.7-1.4% of GDP (though, there probably would be offsets in the form of inventory drawdowns and increased imports).

### *Conclusion*

If the goal of a stimulus package is to increase aggregate demand quickly, personal tax cuts may be an effective if not efficient (measured as demand generated per dollar of stimulus) method, especially if there were mechanisms to steer the cuts to credit-constrained households. Increases in government spending, in principle, could inject more of the stimulus into aggregate demand, if the obstacles to a quick ramp-up of outlays could be overcome. The effects of temporary business tax incentives appear to be quite problematic.

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1. Proposals might be made for a temporary reduction in the overall corporate tax rate. It is hard to see that such a proposal could have a marked near-term stimulative effect. Profitable corporations could spend the boost to cash flow from the cut at any time, while those losing money would not receive any benefit.

2. Franco Modigliani and Charles Steindel, "Is a Tax Rebate an Effective Tool for Stabilization Policy?" *Brookings Papers on Economic Activity*, 1977:1; Alan Blinder, "Temporary Income Taxes and Consumer Spending," *Journal of Political Economy*, February, 1981.

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3. David S. Johnson, Jonathan Parker, and Nicolas Souleles, "Household Expenditure and the Income Tax Rebates of 2001," *American Economic Review*, December 2006. The 2001 payment differed from the 1975 rebate in that it was technically an early realization of the 2001H1 cut in full year tax liabilities enacted in the middle of that year. Thus, there would have been some reason for the recipient of the payment to regard it as a permanent change in taxes.

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### 3.2 Alternative Scenarios and Risks

The most significant changes we made to our risk analysis were to increase dramatically the weight on the *Credit Crunch* scenario and to decrease the weights on the *High Global Demand* and *Effects of Overheating* scenarios. These changes make the *Credit Crunch* scenario almost as likely as the central scenario, a feature we discuss further below. In addition to these changes, we again increased the scale of the downside shocks in the scenarios that produce deviations below our central scenario.

We increased the probability of the *Credit Crunch* scenario to reflect the fact that many of the economic releases (e.g., December employment report, business surveys, November new home sales) indicated that the U.S. economy is now close to recession and that a likely cause of this weakness is a decline in the credit available to firms and households. Further, many financial market indicators, such as equity prices and credit spreads, suggest a higher risk of recession [Exhibit C-1]. Consequently, the signs of an adverse feedback loop between the real economy and financial market conditions have become more numerous during the inter-meeting period.

One factor contributing to the greater likelihood of a credit crunch is the unwinding of banks' balance sheets. Subprime-related losses have led to an involuntary increase in the U.S. banking sector's balance sheet leverage. To reduce leverage, banks can issue new equity or reduce the size of their balance sheets. Banks have been able to offset some of the losses that have occurred already by raising new equity, primarily from foreign investors (including sovereign wealth funds). However, the decline in world equity markets over this period, in part due to the increased risk of a U.S. recession, makes further capital injections costly. Therefore, the future margin of adjustment is likely to be more aggressive reductions in the size of total bank assets. Two developments suggest this is already occurring: (1) recent 10K and 10Q filings report balance sheet contractions at some major financial institutions; and (2) the most recent senior loan officer survey shows further tightening of credit standards. Because the U.S. banking system has a large exposure to mortgage risk, their balance sheet management is a potential source of

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amplification and propagation of the shock from the U.S. housing sector to the rest of the economy, as further contractions in their balance sheets, resulting from more mortgage losses, induces tighter credit conditions that lower spending by households and firms.

In response to the recent change in monetary policy strategy, which seems intended to alleviate this risk, and the changes in our central scenario projection, we have changed the dynamics of the *Credit Crunch* scenario relative to that in the December Blackbook. We now assume that the *Credit Crunch* has significantly higher chance of having started already or starting sometime in 2008H1; however, instead of lasting 4-5 quarters on average, it now lasts only 3 quarters on average. This drop in duration is intended to capture the presumed effectiveness of policy in halting the credit crunch dynamics.

A mechanism for policy effectiveness in such a circumstance is that reductions in short-term interest rates can offset banks' desire to contract their balance sheets for at least two reasons. First, lower short-term rates have a direct impact on intermediaries' borrowing costs. Second, lower short-term rates have a direct effect on the valuation of assets and liabilities. Because bank assets have a higher rate of return than their liabilities, the value of their assets increases more than the value of their liabilities in response to short-term rate cuts, thus boosting intermediaries' equity value and relaxing their capital constraints. This dynamic is apparent in the aftermath of the 75 bps inter-meeting rate cut, when equity prices of financial firms increased.

Overall, the change in our alternative scenario probabilities discussed in the opening sentence, combined with changes in our central scenario projection, greatly increase the probability of a recession relative to the December Blackbook. These changes also make it likely that if a recession does occur, it will be more severe than the 1990-91 and 2001 recessions.

We reduced the probability of the *High Global Demand* scenario only very recently in response to the apparent weakening of global growth as indicated by the drop in global equity values that occurred in January. In late December, we had actually raised the

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weight on this scenario, as oil and commodity prices surged; however, oil prices are now about 10% below their highs, and there is growing evidence that global growth will be sensitive to a U.S. slowdown.

In the *Effects of Overheating* scenario, the source of the shock to the outlook is a retrenchment in consumer spending that occurs before other indicators weaken. November retail sales and service consumption were robust, and the December decline in retail sales was not large, suggesting U.S. consumption is *not* slowing more quickly than other indicators. The decreased weight on the *Effects of Overheating* scenario mainly reflects this fact.

The combined effect of these changes to the weights on the alternative scenarios is to lower slightly the probability of remaining in the central scenario over the forecast horizon [Exhibit C-1], although they raise the probability of a quick return to the central scenario. Together with the increase in the scale of negative shocks, the lower probability of remaining in the central scenario raises the overall uncertainty around our inflation and output projections, particularly in 2008 [Exhibit C-3]. These changes are evident in the shifts in the 5th and 95th percentiles from the previous to the current Blackbook. The increased scale of downside risks and the changes in the alternative scenario probabilities have substantially increased the downside risks to output. Combined with our lower central forecast, this has led to an increase in the probability of a more severe downturn, as indicated by the 5th percentile of the real GDP growth distribution reaching -3% in mid-2008; in October, the minimum of the 5th percentile was only -0.8%, while it was -2% in December.

We now judge that on balance there are downside risks to the inflation projection compared to the roughly balanced risks in December Blackbook. By the end of the forecast horizon, we see the inflation risks as returning to balance, but the output risks remaining skewed to the downside. This partly reflects the persistence of the *Productivity Slump* scenario as well as the effects of a potential new scenario. For this Blackbook, the forecast distributions take account of a small risk that the Fed loses some of its inflation

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credibility. This scenario is not shown explicitly in the Section C Exhibits, but if evidence accumulates in favor of inflation expectations becoming unmoored, we will increase the weight on this *Loss of Credibility* scenario, most likely at the expense of the *Effects of Overheating* scenario.

The effects of the changes in our risk assessment and central scenario forecasts can also be seen in the probability of core PCE inflation below 2% and the probability of a continuing expansion [Exhibit C-3]. In particular, the probability of two consecutive negative quarters of growth in 2008 has increased considerably and is now very close to 50%. Most of this change in the “recession” probabilities is attributable to the increased weight on the *Credit Crunch* scenario. In contrast, the change in the probability of inflation below 2% is smaller and is mainly driven by the upward revision of our central scenario projection for 2007Q4 and 2008H1 core PCE inflation.

Our assessment of the risks to the outlook and their relative importance is similar to the risk assessment given by the primary dealer economists in the Desk’s Primary Dealer survey. For real GDP growth, dealer economists marked down their forecasts for 2008 by a magnitude similar to the reduction in our central forecast. The average of their forecasts thus remains below ours, although the difference is not large in terms of our forecast distribution. They see greater uncertainty around their GDP forecasts than in the previous inter-meeting period, and generally see the risks to the downside. They also have a sizable near-term probability of a recession: the median probability of the economy being in a recession in six months is 49% (it was 35% in December). In contrast, and matching our assessment, there were only small changes in the core PCE inflation forecasts and in the uncertainty around those forecasts.

## 4. Forecast Comparison

### 4.1 Greenbook Comparison

There are considerable differences between the Greenbook and our forecasts, with respect to real activity. For 2008H1, the Greenbook projects real GDP growth to be around 1%,

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while we expect GDP to be essentially flat. This reflects a more substantial downward revision of our forecast over the last month relative to the revisions of the Greenbook projections. Beyond the coming six months, the Greenbook projects a relatively moderate and delayed rebound, with real GDP growth above the Greenbook's estimate of the potential growth rate only by the middle of 2009. In contrast, our forecast has a stronger rebound in which real GDP growth exceeds our estimate of the potential growth rate in 2008H2. The net result is that the Greenbook projection of GDP growth for 2008 is slightly lower than ours (1.5% versus 1.8%). The Greenbook forecasts 2.2% GDP growth in 2009, 1.0 percentage point lower than our forecast. There are only minor differences between the Greenbook and our forecasts on core PCE inflation. Both were revised upward for 2008H1. The Greenbook projects core PCE inflation of 2.3% in 2008H1, which is 0.3 percentage points higher than our forecast. Core PCE inflation in the Greenbook forecast is then expected to settle down at 1.8% by the end of 2009. This is above our forecast, which has core PCE inflation returning to 1.7% by the middle of 2009.

**Conditioning assumptions.** The Greenbook forecast is based on the assumption that the FFR will be reduced by another 50 bps to 3.0% at the January FOMC and then held constant at that level through 2010. Through mid-2009, this path is above the policy assumption that underlies our forecast (we assume the FFR is 2.5% by the end of 2008Q2), but it is below our assumed path by end-2009, as we assume that the FOMC, with an economic recovery more firmly established, will begin to renormalize policy in 2009H2. The Greenbook path is above market expectations through 2010.

The Board staff still expects the labor force participation rate to decline to 65.5% by 2009, while we continue to predict that it will remain at 66.0%. An important change in the medium-run Greenbook projections is an upward revision of potential output growth from 2.1% to 2.3% for 2009, reflecting an upward revision to their structural productivity growth estimate and a technical adjustment in the translation of nonfarm business output to overall GDP. This is still below our unchanged potential growth rate of 2.7% and

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continues to reflect the differences in assumptions about medium-run labor force growth between the Board staff and us.

The Board staff projects slower foreign real GDP growth in 2008 than we do. We anticipate foreign growth to slow in 2008 from 3.1% last year to 2.5% (2.8% in December), while the Board staff's growth forecast is 2.3% (2.6% in December) using our weights. The differences with the Greenbook are again limited to our respective outlooks for Japan and the NAFTA (North American Free Trade Agreement) countries. We have a higher estimate of Japan's potential growth rate and assume a stronger rebound in residential investment after a regulation-induced contraction of construction in the second half of 2007. The Board staff's lower U.S. growth projection helps explain the differences in the outlooks for the NAFTA countries. Both sets of forecasts project 2.9% growth in 2009.

Finally, both the Greenbook and our forecasts incorporate the anticipated effect of a fiscal stimulus package, the bulk of which is in the form of tax rebates in 2008H2. The assumed size of this package is \$125 billion in the Greenbook and \$150 billion in our forecast.

**Inflation.** Relative to the December Greenbook, the Board staff expects core PCE inflation to be higher in the short run. This reflects some momentum from the higher-than-anticipated inflation data for 2007Q4. These inflationary pressures are expected to be mitigated by below-potential growth in the 2008H1, leaving the forecast little changed beyond 2008H1. As a result, the Board increased its forecast for core PCE inflation for 2007 (Q4/Q4) as well as for 2008 (Q4/Q4) from 2.0% to 2.1%. The forecast for 2009 (Q4/Q4) is unchanged at 1.9%. Relative to the Greenbook, we expect core inflation to moderate more substantially, and thus we expect it to be 1.8% for 2008 (Q4/Q4) and 1.6% for 2009 (Q4/Q4).

The Board staff revised their estimate of total PCE inflation upward for 2007 (Q4/Q4) and 2008 (Q4/Q4). This revision mainly reflects continued pass through of energy and food price increases that contributed to the unexpectedly high inflation in 2007Q4. We



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also increased our estimate of short-term total PCE inflation, and our forecast is in line with that of the Greenbook.

**Real activity.** The Board staff projects a marked slowdown in real GDP growth to 0.5% (annual rate) in 2007Q4 and 0.6% in 2008Q1. Going forward, they project real GDP growth to be 1.5% in 2008 (Q4/Q4) and 2.2% in 2009 (Q4/Q4). Compared to the December Greenbook, the Board staff has slightly reduced its forecast for growth in 2008H1 and slightly increased it for 2008H2. This is different from our forecast: we project a more substantial slowdown, with real GDP growth at -0.8% and 1.0% (annual rate) in the first two quarters of 2008. After that, our forecast incorporates a faster recovery than the Greenbook forecast, in part because we assume a bigger fiscal and monetary stimulus. At 3.6% in 2008Q3 and 3.5% 2008Q4, we expect real GDP growth to be well above potential. As a result, our forecast for real GDP growth in 2008 (Q4/Q4) is 0.3 percentage points higher than that of the Board staff. Our forecast of real GDP in 2009 (Q4/Q4) is 1.0 percentage point higher than that of the Board staff (3.2% versus 2.2%, respectively), because we assume a higher potential growth rate as well as a more robust recovery.

The Board staff's estimates of the unemployment rate for both 2008 and 2009 were revised upward by 0.2 percentage points to 5.1% and 5.2% respectively. We anticipate a more pronounced but less prolonged effect of the slowdown on the unemployment rate: our forecast is 5.3% in 2008 and 5.0% in 2009.

Our projection of the 2007Q4 GDP growth contribution from net exports differs from that of the Board staff by less than 0.2 percentage points. For 2008 as a whole, we both expect a similar growth contribution from net exports. However, there are some important differences. With respect to composition, both exports and imports are lower in the Board staff's forecast than in ours. The discrepancies arise from two sources: the Board staff has a more subdued outlook for global demand growth and expects a sharper depreciation in the real-exchange rate. There are also significant differences in the net export contribution at the quarterly frequency for 2008: those arise mainly from

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discrepancies in the timing of oil imports. Finally, the Board staff expects net exports to make a positive growth contribution in 2009, while they constitute a small drag in our forecast due to a faster rebound of domestic demand in 2009.

**Uncertainty around forecasts.** The degree of uncertainty around the Greenbook forecasts for output increased slightly, while that around the inflation forecasts decreased a bit. The degree of uncertainty around our forecast for output also increased, while the uncertainty around our inflation was almost unchanged.

The 70% probability intervals around the forecasts for 2007, 2008, and 2009 are shown in Table 1, with the December value in parentheses. For core PCE inflation, the width of the FRBNY interval is slightly bigger than the Board's in 2008. In 2009, the FRBNY forecast has less uncertainty; the width of the FRBNY interval is 1.4 percentage points, whereas the Board's is 1.7 percentage points. In part, this discrepancy reflects the greater persistence in the inflation processes underlying the Greenbook forecast.

For output, the width of the FRBNY probability intervals increased slightly in 2008 and 2009 from 3.4 percentage points to 3.6 percentage points, primarily reflecting further increases in downside risks. The width of the Board's intervals remained unchanged for 2008 and increased by 0.1 percentage point for 2009. The FRBNY intervals are now more than 0.6 percentage points wider than the Board's for both 2008 and 2009.

To gauge the importance of the differences between our outlook and the Greenbook forecasts, we calculate the percentile of the Greenbook forecasts for inflation and output in our forecast distributions. The results are shown in Table 2, with December values in parentheses. The gap between the inflation forecasts has narrowed since December for 2007 for which most data are now available. For 2008 through 2010, there are small and presumably insignificant changes in the gap. The Board's core PCE inflation forecast, which exhibits more persistence than ours, tends to be around the 60<sup>th</sup> percentile of our inflation forecast distribution.

In regard to real GDP growth, the 2008 Greenbook forecast, which is 0.2 percentage points lower than our forecast, is at the 60<sup>th</sup> percentile of our distribution. This pattern implies that our own central forecast is at an even higher percentile, which reflects the substantial downside risks to output growth that can also be seen from the 70% probability interval around the FRBNY forecast for 2008 in Table 1. Because the Board predicts a more prolonged slowdown than we do, their forecast for 2009 is in the lower half our forecast distribution at the 40<sup>th</sup> percentile. The downside risk for potential output growth in our forecast, reflected in the *Credit Crunch* and *Productivity Slump* scenarios, means that the Board's long-run GDP growth forecast of around 2.2% is at the 60<sup>th</sup> percentile of our forecast distribution. It was at the median (i.e. 50<sup>th</sup> percentile) in December. This revision is due to both the Board increasing its estimate of potential output growth by 0.1 percentage point and us increasing the downside risk to potential output growth.

**Table 1: Comparison of 70% Intervals around FRBNY and Board Forecasts**

	Core PCE Inflation		Real GDP Growth	
	FRBNY	Board	FRBNY	Board
2007	2.0-2.2 (1.7-2.1)	N/A (1.7-2.2)	2.3-3.3 (1.8-3.1)	N/A (1.9-2.8)
2008	1.0-2.5 (1.0-2.4)	1.5-2.7 (1.3-2.7)	-0.8-2.8 (0.0-3.4)	0.0-3.0 (-0.2-2.8)
2009	1.0-2.4 (1.0-2.4)	1.1-2.8 (1.0-2.9)	0.8-4.4 (0.6-4.0)	0.7-3.6 (0.7-3.4)

**Table 2: Percentile of Greenbook Forecast in FRBNY Forecast Distribution**

	Core PCE Inflation	Real GDP Growth
2007	44 (70)	21 (40)
2008	66 (64)	60 (39)
2009	61 (58)	40 (44)
2010	61 (60)	60 (50)

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**Alternative Greenbook forecasting scenarios.** The first alternative scenario, *Recession*, assumes a decline in household and business spending equal to the average of the last six recessions. This is not a particularly severe recessionary scenario. The decreased demand leads to a slowdown in 2008Q1 that is similar to the one in our central forecast. It is, however, slightly more prolonged than in our forecast. Moreover, the Board imputes that this scenario would entail a policy response that is much more accommodating than the one we anticipate; with the FFR being 0.8% in 2009. Under this scenario, output growth will recover in 2009H1, and unemployment will peak at 6.1% in 2009. The weak demand will subdue inflationary pressures, and core PCE inflation will be about 0.3 percentage points lower than in the baseline projections.

The second alternative scenario, *No fiscal stimulus*, drops the assumed \$125 billion fiscal stimulus package. This mainly would lead to a reduction in real GDP growth and an increase in the unemployment rate in 2008Q2 relative to the baseline.

The third alternative scenario, *Persistent weakness*, assumes a less optimistic path for asset and housing markets than in the baseline projection. In particular, it assumes that corporate bond spreads remain elevated into 2009, equity prices only increase by 5% from 2008H2 to 2009H2 (13% under the baseline), and there is a 20% cumulative decline in house prices by late 2009 (6% under the baseline). Under this scenario, mainly because of the wealth effect on consumption from the asset-price declines, GDP only grows at 1.25% in both 2008 and 2009, and the unemployment rate peaks at 5.6% in 2009.

Moreover, the historical Taylor rule used by the Board staff for these scenarios implies that the FFR would be 1.9% in 2009 and 1.7% in 2010. The results for this scenario are based on the Board's assumption of a much bigger wealth effect on consumption than is incorporated in our forecast.

The fifth alternative scenario, *Faster recovery*, assumes a quick recovery in both the financial markets, leading to lower interest rate spreads, and in business and consumer sentiment. The first leads to lower interest rate spreads by as much as 25 bps by the end of 2008, and the second implies stronger GDP growth in the second half of 2008 and

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2009 by 0.4 and 0.7 percentage points, respectively. This implies less need for monetary policy stimulus, reflected in a higher FFR starting in the second half of 2008 but even more in 2009 and 2010 (20, 80 and 90 bps above baseline, respectively).

The sixth scenario, *Worker insecurity*, explores the consequences of a weak economy on wage growth moderation, which leads to lower price inflation. The resulting shift (relative to the baseline scenario) in income composition, away from wage compensation towards capital income, puts some downward pressure on spending and GDP growth. Lower inflation and lower GDP growth would allow monetary policy to lower gradually the FFR, starting in the first half of 2008 and reaching a lower level of 2.5% in 2009. The stronger monetary stimulus leads to higher GDP growth in the long run, while inflation remains subdued.

The seventh scenario, *Unanchored inflation expectations*, is the reverse of the previous one. In this scenario inflation expectations are higher by as much as 0.5 percentage points by the middle of 2008, leading to higher actual inflation, above the baseline from the second half of 2008 onwards by roughly 0.3 percentage points. Monetary policy responds to these pressures by tightening policy, especially from 2009 onwards (the FFR is higher by roughly 50 bps). Higher interest rates lead to slightly lower GDP growth in the long run (from 2010 onwards).

The eighth and last scenario, *Market-based federal funds rate*, considers the implications of monetary policy setting a path for the FFR equal to the path implied by current futures market. This path implies more significant interest rate cuts than in the baseline scenario, with the FFR lower by 50 bps by the end of the first half of 2008 and 100 bps lower by the end of the second half of 2008, after which it gradually increases. The looser monetary policy boosts GDP growth to 1.7% in 2008 and 2.8% in 2009. Core PCE inflation in this scenario is 0.3 to 0.4 percentage points higher than in the baseline scenario.

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## 4.2 Comparison with Private Forecasters<sup>1</sup>

Relative to the December Blackbook, we have increased our projection for real GDP growth in the last quarter of 2007 but lowered substantially our forecast for the first quarter of 2008. We have increased our forecast for inflation, especially in the short term, following recent data releases in core and headline PCE and CPI.

In general, our real GDP growth forecasts are not aligned with the private forecasts [Exhibit B-8]. Relative to the private forecasts, our projections are higher for 2007 and lower for 2008 (for both Q4 and Q4/Q4). For inflation our projections and those of private forecasters are more aligned. The main discrepancies reflecting the timing of the forecasts (release dates are given in footnote 1); because our forecast was done after the private forecasts, we were able to incorporate more recent information.

**Real GDP Growth.** For 2007Q4, our real GDP growth forecast has been revised upwards to 2.2% (annual rate), from 0.8% in the December Blackbook. This is above the latest projection of the Macro Advisers (1.3%), PSI (1.1%), Blue Chip (1.3%) and median SPF (1.5%). Like the Macro Advisers we increased substantially our forecast, while all others reduced their numbers. The main driving force of the upward revision in 2007Q4 growth is stronger than expected residential investment, which also explains discrepancies to private forecasts.

Our 2008Q1 forecast for real GDP growth is -0.8% (annual rate), down from the 1.6% growth forecasted in the December Blackbook. This is substantially lower than the distribution of forecasts and the only one that places the growth rate in the negative region. The PSI model projects GDP growth of 0.6% and the Median SPF is 2.2%, while both the Blue Chip and the Macro Advisers both expect 1.3%. The downward revision in residential investment for 2008Q1 is the main driving force for the change in our forecast for GDP growth in 2008Q1.

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<sup>1</sup> Release dates of the private forecasts discussed in this section are in parentheses: Blue Chip consensus (1/10), SPF (11/13), and Macro Advisers (1/17).

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In line with our forecast of a robust fourth quarter, our projected growth rate for 2007 is 2.9% (Q4/Q4), located at the high end of the spectrum of forecasts. Both the Blue Chip and Macro Advisers expect 2.6% which is roughly in line with our assessment, while the median SPF forecasts lower 2007 growth (2.1%). The main reason for the discrepancy is the much stronger upward revision in our 2007Q4 forecast for real GDP growth.

Our 2008 (Q4/Q4) real GDP growth projection was also revised down to 1.8% from 2.3%, which is in line with the Blue Chip forecast (2.0%, down from 2.4%). These are lower than the 2008 growth expected by the median SPF (2.5%) and the Macro Advisers (2.6%). The discrepancy is consistent with our more negative assessment of growth in the first quarter of 2008.

**Core PCE Inflation.** Our forecast for 2007Q4 core PCE inflation is now 2.7% (annual rate), up from a more moderate 2.0% in the December Blackbook. This is above the median SPF forecast from November (1.9%), which was consistent with our December Blackbook forecast.

For 2008Q1, we forecast core PCE inflation at 2.1%, while the median SPF projection is 1.9%. This represents a slight increase relative to the December Blackbook (1.8%).

Overall, our 2007 (Q4/Q4) projection is 2.1% while the median SPF forecast is 1.9%. This is consistent with our upward revision in the fourth quarter. For 2008 (Q4/Q4), we expect core PCE inflation to moderate to 1.8%, in line with the median SPF projection (1.9%).

**CPI Inflation.** We forecast overall CPI inflation at 4.2% for 2007Q4 (annual rate), which is in line with the most recent projections from Macro Advisers and Blue Chip (4.2% and 4.0%, respectively). The median SPF is lower (3.0%), more in line with the December distribution of projections.

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For 2008Q1, we forecast CPI inflation to moderate to 3.5% (annual rate), which is at the top end of the forecast of projections, together with the Macro Advisers (3.4%). Both the Blue Chip and the median SPF expect lower first quarter inflation (3.1% and 2.9%, respectively).

Our 2007 (Q4/Q4) projection for CPI inflation is 4.0%, equal to the Macro Advisers and in line with the Blue Chip forecast (3.9%), but stronger than the projected by the median SPF (3.6%). The discrepancy is explained by the timing of the SPF (December). For 2008 (Q4/Q4) our forecast for CPI inflation is 2.6%, in line with the overall distribution of projections (2.4% of the Blue Chip and 2.5% of the Macro Advisers and median SPF).

**Core CPI Inflation.** For 2007Q4 we revised our forecast to 2.5% (annual rate), up from 2.1% in the December Blackbook. This is at the top end of the distribution of projections, with the median SPF at 2.2% and the Macro Advisers expected 2.4%. For 2008Q1 we have a similar pattern, with our projection for core CPI at 2.6% (annual rate), while the Macro Advisers expect 2.5% and the median SPF 2.2%.

For 2007 (Q4/Q4), we forecast core CPI inflation at 2.3%, equal to the Macro Advisers and only slightly above the median SPF (2.2%). Our projection for core CPI inflation in 2008 (Q4/Q4) is a more moderate 2.1%, located at the lower end of the distribution of projections (the median SPF is 2.2% and the Macro Advisers expect 2.3%).

## 5. Robustness of Policy Recommendation

### 5.1 Sensitivity to Alternative Scenarios and Policy Rules

In this Blackbook, we have made a number of adjustments to our policy rules. First, we have again adjusted our neutral rate range to capture the further tightening of financial conditions over the inter-meeting period. For the current and next two quarters, we assume the neutral rate is between 3.0% and 3.75% (it was 3.5-4.0% in December). We then assume it evolves slowly over the remainder of the forecast horizon to our pre-crisis range of 3.75-4.75%, as credit and financial market functioning returns to normal. The



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estimate of the neutral rate over the near term now includes the low point of the neutral rate range of 3-5.5% we established in 2004. We made this change to reflect the large fall in Treasury rates in the inter-meeting period: the 4-5 year forward nominal off-the-run rate fell more than 50 bps to around 3.8% since the last FOMC meeting.

Second, because we assume the mandate-consistent range for inflation is 1.5-2%, we moved the inflation target in our policy rules from 1.5% to 1.75%. This change also lines up with the assumptions used in our UIG and smoothed inflation models. These changes affect the *Baseline* rule and the two variants – *Dove* and *Opportunistic Disinflation* – but do not affect the *Outcome-based* rule, because it does not have an explicit neutral rate.

A third set of changes concerns the gradualism in our policy rules as well as the Board-staff-estimated *Outcome-based* policy rule. These rules are stated in terms of quarterly averages of the FFR, and take 20% of the current quarter interest rate prescription, based on inflation and output, and 80% of the value of the previous quarterly average to produce its prescription for the FFR. To remove some of the sluggishness induced by this prescription, we used the end-of-quarter value of 4.25% for 2007Q4 rather than the average value of 4.54%. However, we do not give the rules the information about the 75 bps inter-meeting cut. In addition, we introduced into all the rules a preemptive move to 1% if the interest rate prescription of the standard Taylor rule (which does not have an interest rate smoothing term) falls below 1%. For example, if inflation was at target and the neutral rate was 3.25%, the output gap would have to be 4.5% to induce this trigger: assuming the economy started at potential, a four-quarter growth rate of -2.8% would lead to such a gap.

As a consequence of our changed risk assessment, the temporarily lower neutral rate, and the switch to a full risk-management policy (i.e., a policy to forestall costly lower probability events; in this case, financial market turmoil and a credit crunch leading to a severe downturn), our policy recommendation has changed from the December Blackbook. Our recommended path is well below the policy prescription of the *Baseline* rule under the central scenario and four of the five alternative scenarios (the exception is

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the *Credit Crunch* scenario) in the medium-term [Exhibit D-1]. Under three of the alternative scenarios and our central scenario, the *Baseline* rule prescribes a FFR target of 3.5% by the end of 2008 (it is higher under the *High Global Demand* scenario), compared to our recommendation of 2.5%. Our recommendation is now close to the prescription of the *Baseline* rule under the *Credit Crunch* scenario, indicating the extent of the risk management under our recommendation. It is now 200 bps below the prescription under the *High Global Demand* scenario.

The real FFR paths using the *Baseline* rule differ more significantly across the five alternative scenarios, reflecting the differences in the inflation outcomes associated with the different scenarios and the probability of triggering the pre-emptive move to a 1% FFR [Exhibit D-1]. Although inflation is low under the *Credit Crunch* scenario, real interest rates decline the most under this scenario, because the large downside risks to output and inflation under it lead to even larger declines in nominal rates. However, even under this scenario the *Baseline* rule does not produce a projection of negative real interest rates.

The FFR distribution using the *Baseline* rule indicates a substantial probability of sharp drops in the FFR (as indicated by the probability of a FFR at 1.00% in 2008Q2) as a consequence of the increased weight on the *Credit Crunch* scenario, the drop in the central scenario GDP growth projection, and the lower neutral rate [Exhibit D-5]. The near-term probability of such sharp drops is now higher than it was in December.

We consider the same alternative policy rules that we have considered in recent Blackbooks: the *Dove* rule, the *Opportunistic Disinflation* rule, and the *Outcome-based* rule. The *Outcome-based* rule, combined with our downside risk to output growth and our relatively benign inflation outlook, comes closest to matching our policy recommendation in the near term in expected value. Under the *Credit Crunch* scenario, this rule would prescribe reducing the FFR to 2% quickly and maintaining it near that level for much of the forecast horizon [Exhibits D-2 and D-3]. As in past Blackbooks, this rule implies considerable uncertainty about the FFR going forward [Exhibit D-5].

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The prescription of the *Opportunistic Disinflation* rule, which keeps the FFR above 3.00% over the next two years under the central scenario and all of the alternative scenarios except the *Credit Crunch* scenario, is well above our policy recommendation over the forecast horizon [Exhibit D-3]. Following this rule rather than the risk-management approach would better preserve Fed credibility if, ex post, it appeared that either the *Productivity Slump* or the *Effects of Overheating* scenarios explained recent developments well or if evidence mounts in favor of the *High Global Demand* scenario; that is, if our high-inflation alternatives scenarios appeared to be true. However, the robustness of the prescription of this rule to the downside risk in our forecast depends on the assumption that there is a well-understood risk-management strategy of moving to 1% directly to forestall financial market turmoil from spilling over into the real economy [Exhibit D-5]. The inter-meeting move by the FOMC, although sizable by historical standards, is not nearly as abrupt as moving to 1% directly and thus strongly suggests that this is **not** the type of risk-management strategy the FOMC will follow.

The *Dove* rule is designed to be very sensitive to drops in output below potential. Thus, with the soft near-term real growth forecast and the large downside risk to real activity, it prescribes cuts in the FFR in 2008 from 4.25% under all of our scenarios. However, it is only under the *Credit Crunch* scenario that these cuts match our policy recommendation for 2008H1. After this the rule prescribes rates as low as 2% in expected value [Exhibits D-2 and D-3]. As can be seen in Exhibit D-5, it places the most probability on low FFR of all our rules.

The special topic, *Is Policy Loose According to the Historical Greenspan Rule?*, assesses the robustness of our policy recommendation using the DSGE-VAR model centered on our central scenario and *Credit Crunch* scenarios for 2008Q1. The results indicate that, once the current level of the FFR is taken as given, market expectations of the future FFR path as well as our policy recommendation are consistent with the historical behavior of the FOMC over the past twenty years. The results of this analysis thus provide independent support for the interpretation of our policy recommendation as a risk-management approach to a possible credit crunch.

# Special Topic

## Is Policy Loose According to the Historical Greenspan Rule?

Marco Del Negro <sup>Redacted</sup> with assistance from Audrey Stern <sup>Redacted</sup>

*According to the Greenspan rule estimated using our DSGE-VAR model, a FFR of 3% at the end of 2008Q1 would be appropriate under a credit-crunch scenario but not under our central scenario.*

In this special topic, we use the DSGE-VAR model to address the following question: based on a monetary policy rule estimated using the last 20 years of data, under which scenarios would a FFR of 3% by the end of 2008Q1 be justified? In other words, do macroeconomic conditions, as summarized by projected real GDP growth and core PCE inflation, under either the central or the credit-crunch scenario justify further cuts under the historical rule? The answer is no under the central scenario, but it is yes under the credit-crunch scenario.

To address this question we estimate the DSGE-VAR model using data from the past 20 years. One of the model equations is a monetary policy rule that summarizes the FFR response to macroeconomic conditions. Because most of the sample period encompasses the Greenspan tenure as FOMC chairman, the coefficients of this estimated rule reflect policy under Greenspan. We can then use this rule to decompose the FFR path into two components: the endogenous policy

response to real activity and inflation and deviations from the rule, which could occur because policy responds to other information (e.g., financial markets) or responds differently from the “typical” response (e.g., risk management).

There is much uncertainty about the macroeconomic conditions in 2007Q4 and 2008Q1. In Figure 1, we assume that real GDP growth and core PCE inflation projected for 2007Q4 and 2008Q1 under our central scenario are realized. Specifically, we assume real GDP growth in 2008Q1 to be slightly negative, and core PCE inflation to be about 2% (annual rate). We also assume that the FFR will be 3% by the end of 2008Q1, roughly this Blackbook’s policy assumption. From 2008Q2 onward to the end of 2010, we use the DSGE-VAR model to compute projections for all three variables. This information is summarized by the black lines in Figure 1.

The green line in the FFR chart displays the counterfactual FFR path, assuming that policy follows the estimated policy rule starting in 2007Q1. Three conclusions emerge from comparing the green and black lines in the chart: 1) under the estimated rule the Fed should have started cutting the FFR sooner than it did; 2) macro conditions under the central scenario justify a FFR of 3.75% by the end of 2008Q1; 3) if, however, we take as given a FFR cut to 3%, the projected path for the FFR reaches 2% by mid-2009, which is

roughly in line with financial markets expectations. The latter conclusion suggests that current market expectations are consistent with historical patterns of FOMC response, given the signals from the January 22, 2008 statement. Note that this kind of analysis is only possible in models like this one where the policy rule and the dynamic responses of output and inflation are analyzed jointly.

Figure 2 repeats the exercise using the real GDP growth and core PCE inflation projections for 2007Q4 and 2008Q1 under the credit-crunch scenario. Specifically, we assume real GDP growth in 2008Q1 to be about -2.5% (annual rate) and core inflation to be 1.5% (annual rate). The projections of the model will differ from those in Figure 1 because of the differing initial conditions. Importantly, core inflation projections under the credit-crunch scenario are more benign, as they always fall within the mandate-consistent range of 1.5-2%. Consequently, the FFR path is lower than it was in Figure 1. Next, we perform the FFR path decomposition. We find that under the credit-crunch scenario the green path for the FFR is close to 3% in 2008Q1, which indicates that macro conditions under a credit-crunch scenario can justify such a policy choice.

Figure 1

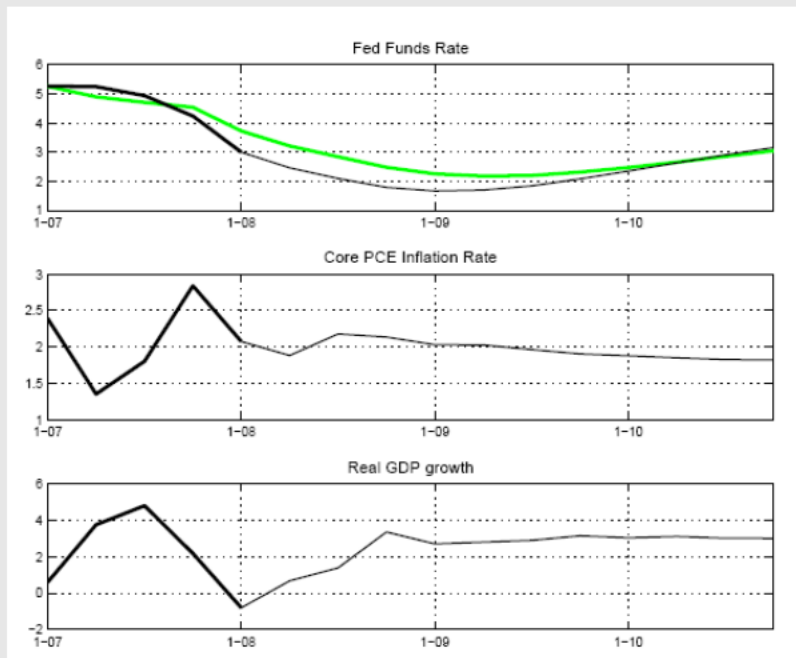
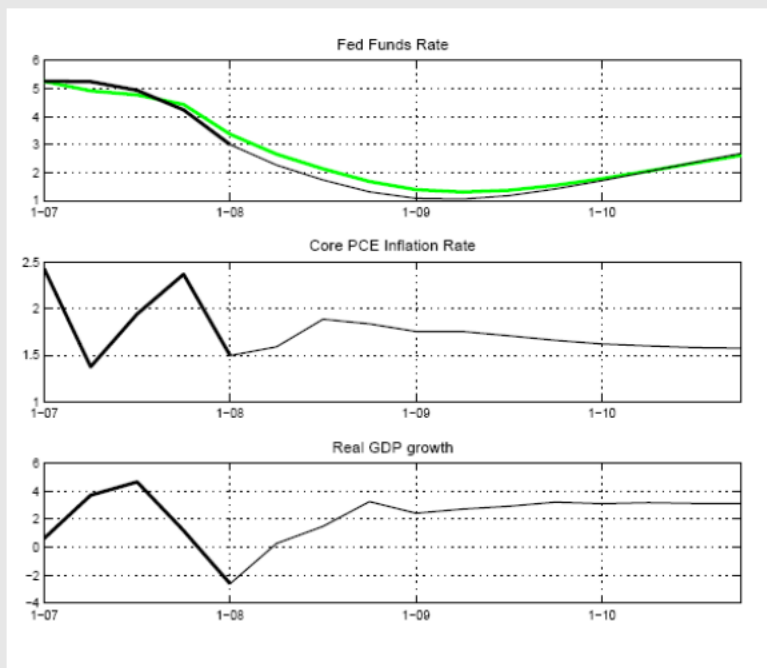


Figure 2



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## 5.2 Comparison to Market Expectations

The FFR path priced into financial markets has moved down markedly since the December Blackbook. The market's short-term uncertainty around that path has increased sharply following the large January 22 inter-meeting cut. The expected FFR for late 2008/early 2009 is just below 2.0%, compared with an expectation of around 3.0% before the December FOMC meeting. As has been the case in the past few Blackbooks, the market path is about 50 bps below our policy recommendation in late 2008/early 2009. This gap widens, because, under our recommendation, the policy rate is renormalized back to 4.25% by the end of 2010. We do not view this latter gap as significant, given the high uncertainty and the difficulties in assessing term premia in long Eurodollar futures. Also similar to the last few Blackbooks, the average forecasts from the Dealer Survey for the FFR over the next year is similar to our policy recommendation.

The market-implied path is also below the paths of our *Baseline* rule under both the central scenario and the mean of our forecast distribution [Exhibits D-1 and D-2]. This is the case even though both of these paths have shifted downward substantially because of changes to our real growth outlook, risk assessment, and a lower neutral rate assumption.

The path prescribed by the *Opportunistic Disinflation* rule under the expected value of the forecast distribution remains well above the market path. In contrast, the path prescribed by the *Dove* rule, while it does not fall as quickly as the market path initially, gives a similar FFR value to the market for the beginning of 2009. Our *Average* rule, which weights the *Baseline* rule and the two variants to match the market path as closely as possible, places 0% of the weight on the *Opportunistic Disinflation* rule, 10% of the weight on the *Baseline* rule, and 90% of the weight on the *Dove* rule [Exhibit D-4]. The weights on the alternative rules are unchanged from the December Blackbook. Even with these weights, the *Average* rule is still unable to closely match the market path.

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A recurring explanation we have given in previous Blackbooks for the divergence between the market path and the prescriptions of our *Baseline* rule and the two variants, *Opportunistic Disinflation* and *Dove*, is that markets appear to believe the FOMC has become more sensitive to low-probability events that may lead output to fall well below potential, as it happened in previous periods of financial turmoil (e.g. 1987 and 1998). This market belief has been vindicated by the recent 75 bps inter-meeting cut. The alternative, but not mutually exclusive recurring interpretation, was that the market placed a higher weight on the *Credit Crunch* scenario than we did; this was supported by the fact that our *Baseline* rule under the *Credit Crunch* scenario has tracked the market path for 2008 for some time. However, these common shifts in our path as we switched our risk assessment and forecast and the implied market path suggest the market was placing more weight on a risk-management approach than assessing a markedly different outlook from ours.

The market path remains consistent with the short-run prescription of the *Outcome-based* rule – the Board’s rule that sets the FFR based on a statistical description of the FOMC’s behavior from 1988-2006 – evaluated under the expected value of our forecast distribution (i.e. under our risk assessment). In practice this *Outcome-based* rule has an acceleration term following rate cuts that captures some of the previous risk-management behavior of the FOMC. However, it is still the case that if the FOMC was following something close to the *Outcome-based* rule, markets should be pricing in significantly more volatility in the FFR.

The implied volatility term structure around the market-implied path has tilted up in the short run and moved down at medium horizons partly because of the influence of low projected rates. It is comparable to the uncertainty around the *Dove* rule but still lower than the *Outcome-based* rule [Exhibit D-5]. Furthermore, the implied distributions of our rules capture most of the negative skewness priced into markets due to the option for pre-emption described in the sensitivity section (section 5.1). Similarly the Dealer Survey also indicates that over the next 12 months there is a significant chance that the FFR will fall below 2%, with one dealer forecasting a 1% FFR from mid-year on.



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Overall, our analysis suggests that the market is appropriately pricing in a risk-management strategy by the FOMC in 2008 through the middle of 2009. One measure of the success of this strategy would be that from mid-2009 on, the market was placing positive probability on a renormalization of FFR. Measures of implied volatility from options markets suggest this is the case. In addition, the Dealer survey also shows a greater probability of the FFR above 3% 18-months ahead versus 12-months ahead.

## 6. Key Upcoming Issues

In this Blackbook, we have recommended that at the upcoming January meeting the FOMC reduce the FFR target by 50 bps to 3.00% and signal that further reductions are likely in the near future. In our view this reduction is a logical continuation of the more aggressive easing embodied in the January 22<sup>nd</sup> inter-meeting 75 bps reduction in the FFR and the downward tilt signaled in the accompanying statement. Compared to the assumed FFR path in the December Blackbook, our current recommended path has an additional 125 bps reduction in the FFR target over the near term. Even with this anticipated more accommodative policy stance, the economic and financial market developments have led us to lower our real GDP forecast for 2008H1. We expect the weakness in 2008H1 to be partially offset by a quick rebound in 2008H2.

Even though we have lowered our policy path, it is still somewhat above the expected path priced into futures markets over the entire forecast horizon. We now anticipate the FFR target to bottom out at 2.5% by the middle of 2008 at the latest and remain there through mid-2009, and then to revert to 3.5% by end-2009 as the FOMC begins to renormalize policy. In contrast, the markets expect the FFR to go down to about 2.25% by the end of 2008 and to return only gradually to higher levels. The decline in the market path over the inter-meeting period reinforces our assessment from the December Blackbook that the market-implied path appears to be predicated on market participants placing either a very high probability on the economy evolving along a path similar to the *Credit Crunch* scenario or the FOMC displaying responsiveness to the output gap similar to that of the *Outcome-based* rule (which is greater than that in our *Baseline* rule). In

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spite of the inter-meeting 75 bps reduction in the FFR target, market participants thus appear to consider an adverse feedback loop from financial and credit market conditions to the real economy as more likely than our forecast distribution analysis suggests.

Under the continued uncertainty about the economic outlook and the associated policy response, FOMC communication issues are of utmost importance. In recent months the FOMC has communicated that it would act aggressively in the face of weak data on the real side; in particular, the inter-meeting rate cut and the signaled downward tilt can be interpreted as an initial step in the committee acting on this strategy. Our policy recommendation would be the natural next step. In addition to the 50bps rate cut we propose, we believe the FOMC statement should communicate the following three important points: (1) our readiness to act on evidence of additional softness in real activity; (2) our continued close attention to inflation expectations and intention to act on them if they rise too much; and (3) our readiness to return relatively quickly to a neutral stance once weakness dissipates.

For evidence on softness in real activity, we continue to track labor market developments, consumer spending, and business fixed investment. In particular, our concern is that continued turbulence in financial and credit markets will negatively impact consumer and business confidence, and suppress spending through tighter credit conditions and the wealth effect. The lower spending would translate into a reduction in hiring and capital spending by the business sector as well as decrease consumer spending further and negatively impact financial markets. Because the events of the inter-meeting period suggest a greater chance of such a vicious circle, we have increased probability of the *Credit Crunch* alternative scenario, which itself differs from the December Blackbook by featuring a more severe feedback loop. These developments in real activity are important for policy for two reasons. First, they should be taken into account for the decision when to act on the downward tilt signal that we propose to communicate and that is incorporated in our proposed policy path. Second, if these conditions deteriorate significantly relative to our current forecast, we should be willing to reduce the FFR below the 2.5% we currently anticipate.

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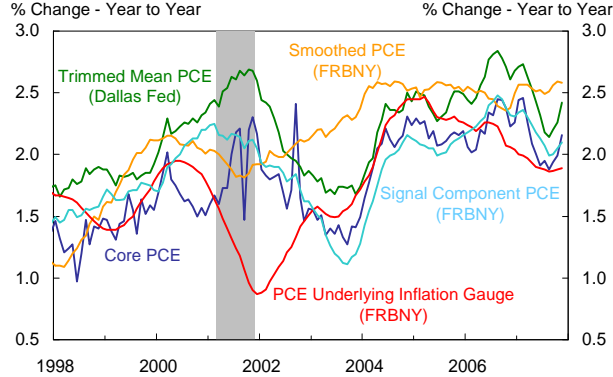
After the inter-meeting rate cut, inflation expectations have increased slightly. It is not quite clear whether this reflects the repricing of risk due to financial instability or whether is a sign of potential unmooring of inflation expectations. We expect a better read on this evidence in the near future if financial markets stabilize. Because of the importance of inflation expectations in inflation dynamics and in the cost of maintaining inflation near the mandate-consistent range, it is important to communicate readiness to reverse the downward tilt in policy if there are signs that the recent up-tick in inflation expectations may be persistent.

In addition to the willingness to change the tilt of policy, it is important to communicate the intent of a relatively quick reversal (compared to the 2004-06 policy path) to a neutral stance once financial markets return to more normal functioning and the soft patch in real activity is over. In this way, we express our continued commitment to price stability, which should enable long-run inflation expectations to remain well-contained.

# A. Significant Developments

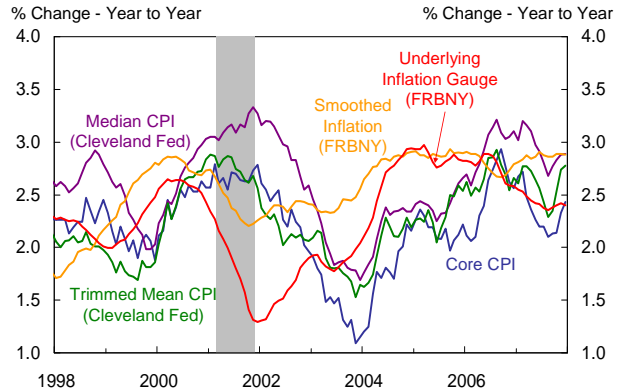
## Exhibit A-1: Measures of Trend Inflation

### Alternative Measures of PCE Inflation



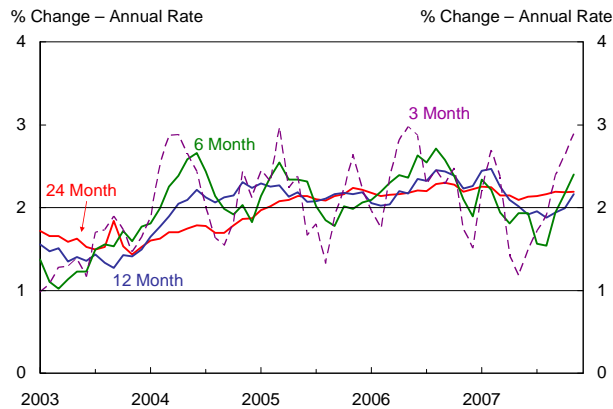
Source: Bureau of Economic Analysis, Cleveland Fed, MMS Function (FRBNY), and Swiss National Bank

### Alternative Measures of CPI Inflation



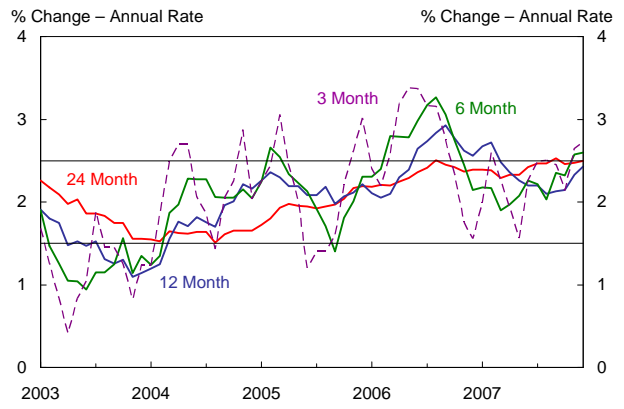
Source: Bureau of Labor Statistics, Cleveland Fed, MMS Function (FRBNY), and Swiss National Bank

### Core PCE over Various Horizons



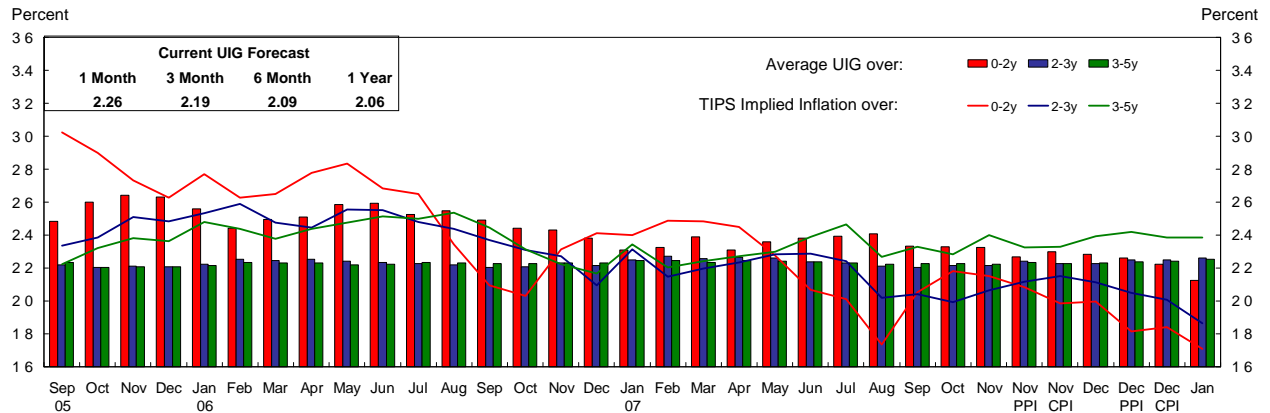
Source: Bureau of Economic Analysis

### Core CPI over Various Horizons



Source: Bureau of Labor Statistics

## Exhibit A-2: Underlying Inflation Gauge (UIG)

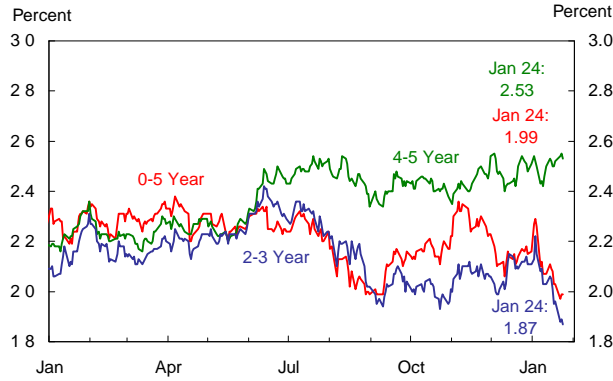


Source: MMS Function (FRBNY), Federal Reserve Board, and Swiss National Bank

# A. Significant Developments

## Exhibit A-3: Implied Inflation Compensation

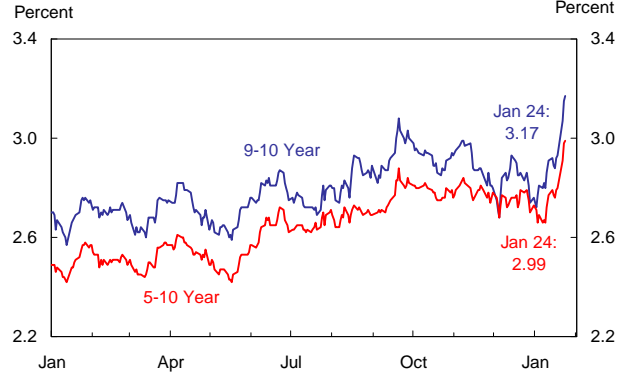
TIPS Implied Inflation Compensation: 0-5, 2-3, 4-5 Year Horizons



Source: Federal Reserve Board

Note: Carry-adjusted

TIPS Implied Inflation Compensation: 5-10, 9-10 Year Horizons

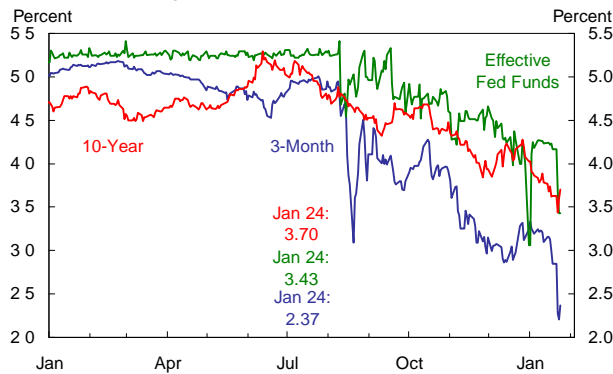


Source: Federal Reserve Board

Note: Carry-adjusted

## Exhibit A-4: Treasury Yields

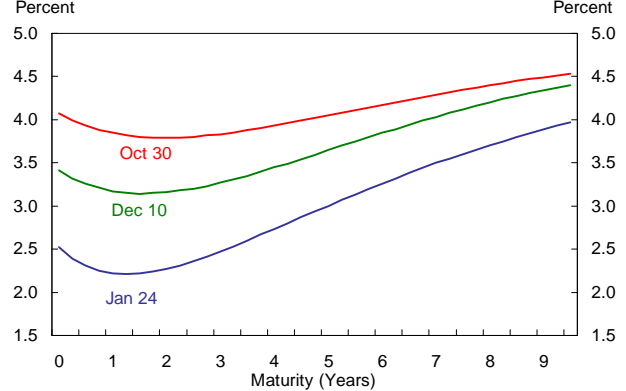
Short- and Long-Term Rates



Source: Bloomberg

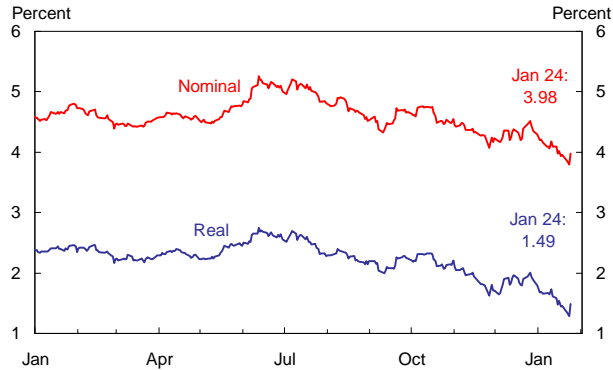
Note: Yields of on-the-run securities

Yield Curves



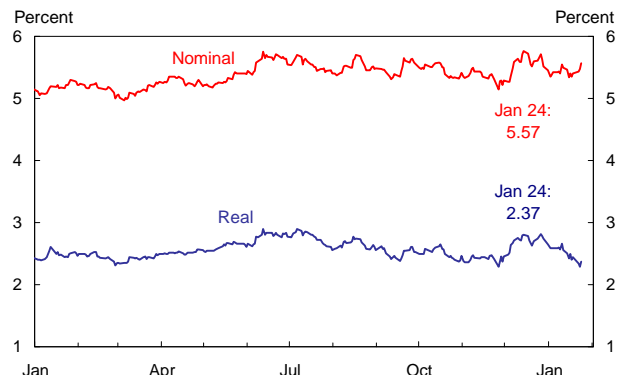
Source: Federal Reserve Board

4-5 Year Forward Rates



Source: Federal Reserve Board

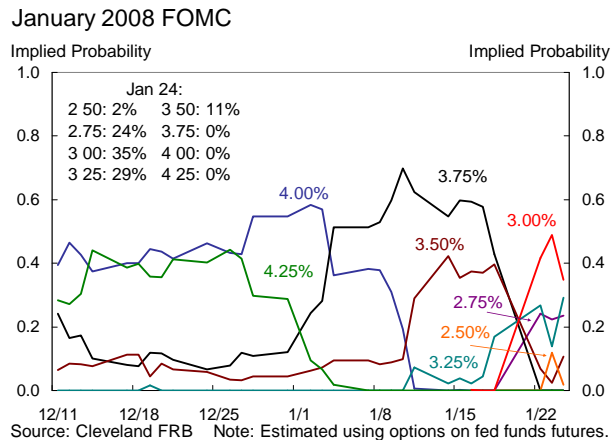
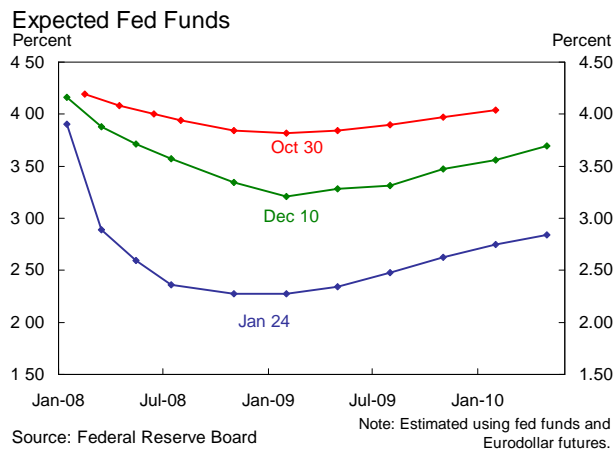
9-10 Year Forward Rates



Source: Federal Reserve Board

# A. Significant Developments

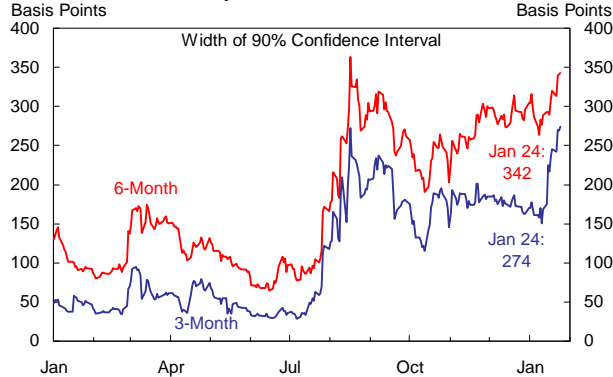
**Exhibit A-5:  
Policy Expectations**



# A. Significant Developments

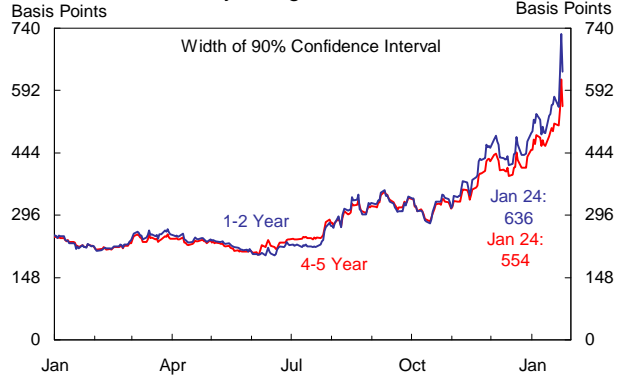
## Exhibit A-6: Policy Uncertainty

**Interest Rate Volatility: Short-Term**



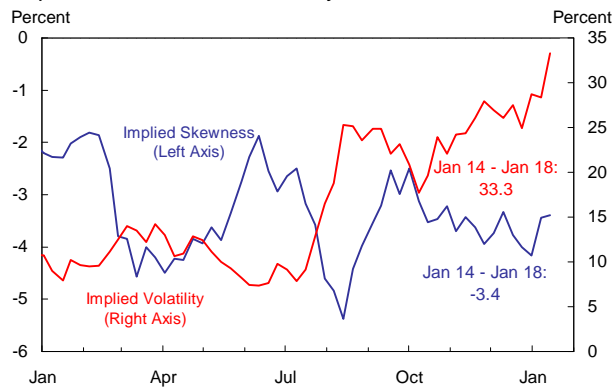
Source: Datastream and FRBNY calculations  
Note: Implied volatilities estimated from Eurodollar futures options.

**Interest Rate Volatility: Long-Term**



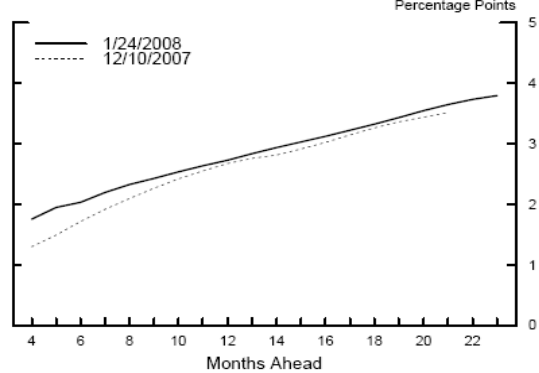
Source: FRBNY calculations  
Note: Implied volatilities estimated from swaptions.

**Implied Skewness and Volatility**



Source: CME and FRBNY calculations  
Note: Weekly averages based on 3-9 month implied volatilities from Eurodollar futures options.

**Eurodollar Implied Volatility Term Structure\***

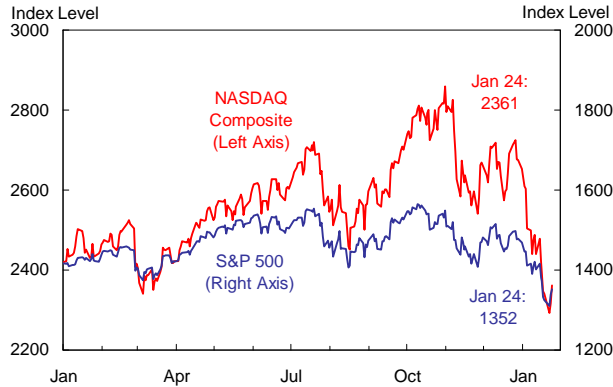


\*Width of a 90 percent confidence interval computed from the term structures for the expected federal funds rate and implied volatility.

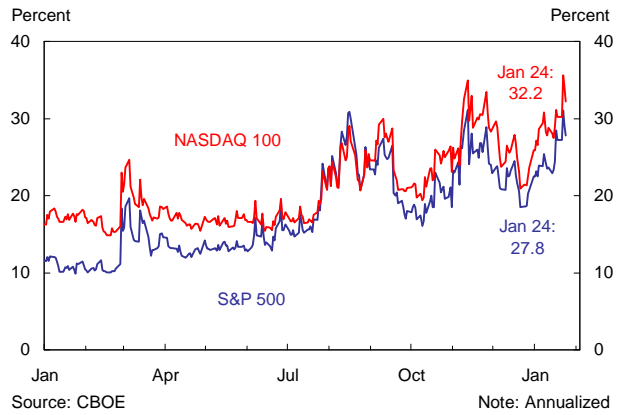
# A. Significant Developments

## Exhibit A-7: Equity Markets and Corporate Credit Risk

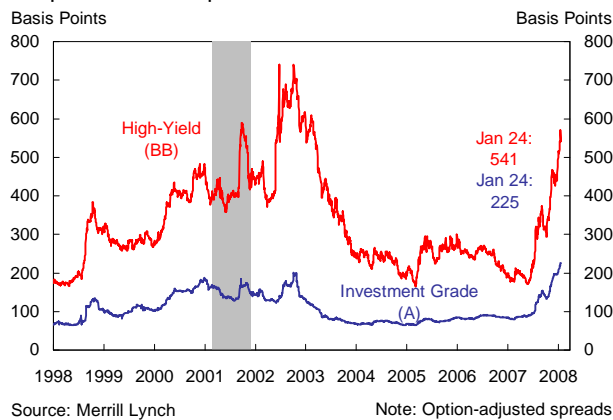
Performance



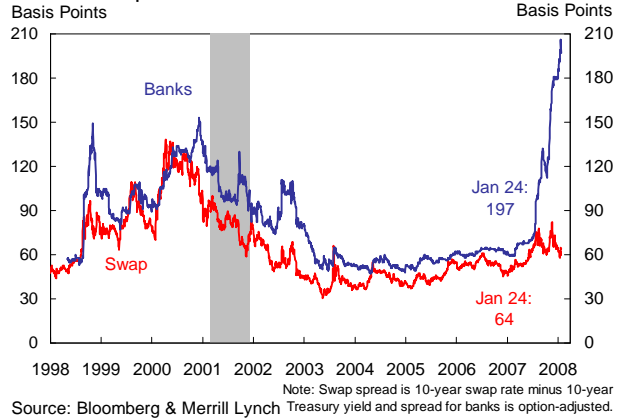
Implied Volatility: 1-Month



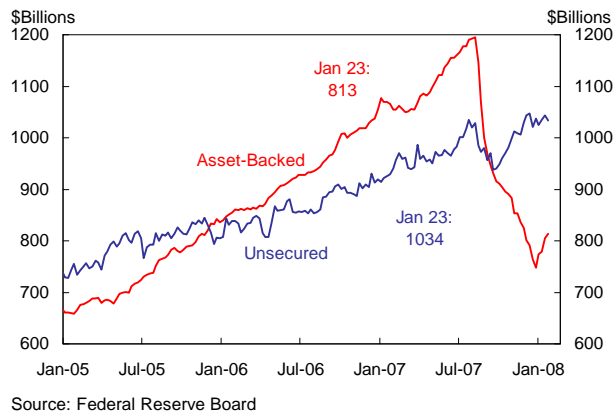
Corporate Credit Spreads



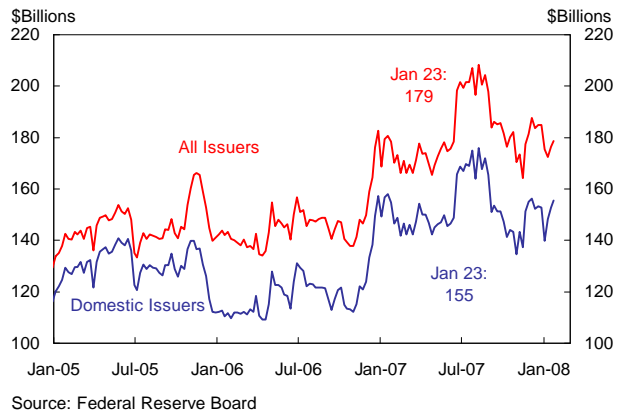
AA Credit Spreads



Commercial Paper Outstanding



Commercial Paper Outstanding, Nonfinancial Firms

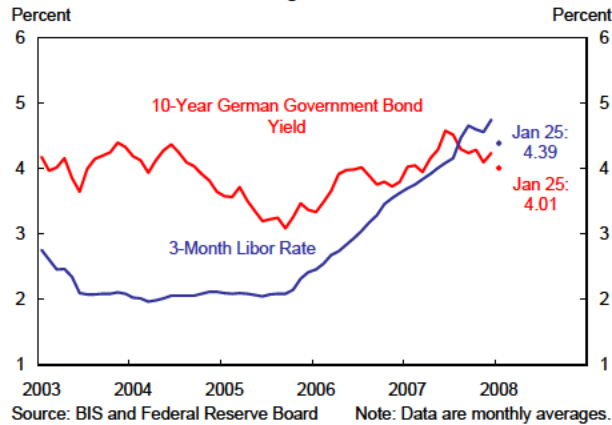




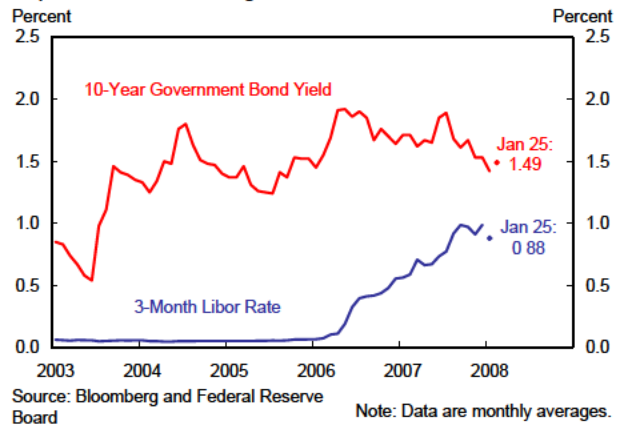
## A. Significant Developments

### Exhibit A-8: Global Interest Rates and Equity Markets

**Euro Area Short- and Long-Term Interest Rates**

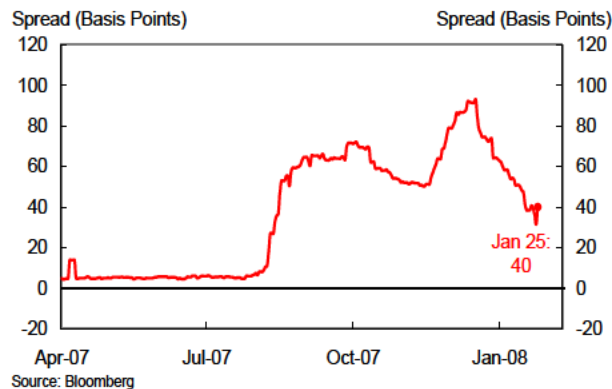


**Japan Short- and Long-Term Interest Rates**



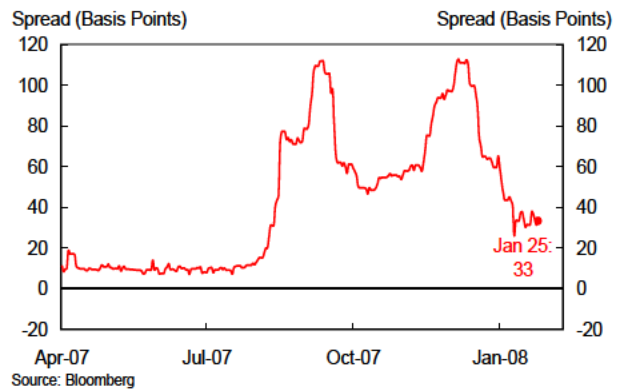
**Euro Area**

LIBOR Rate - OIS Swap Rate (3-month)

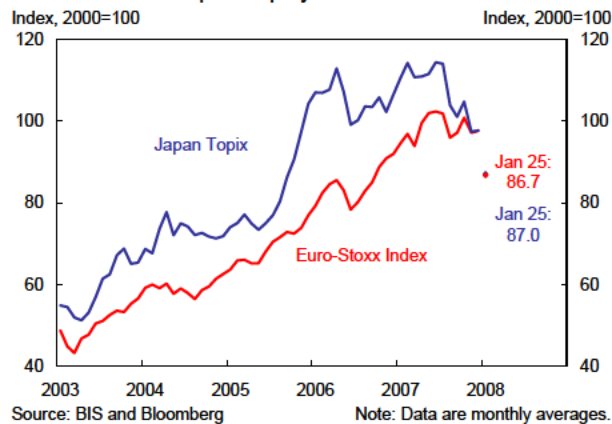


**United Kingdom**

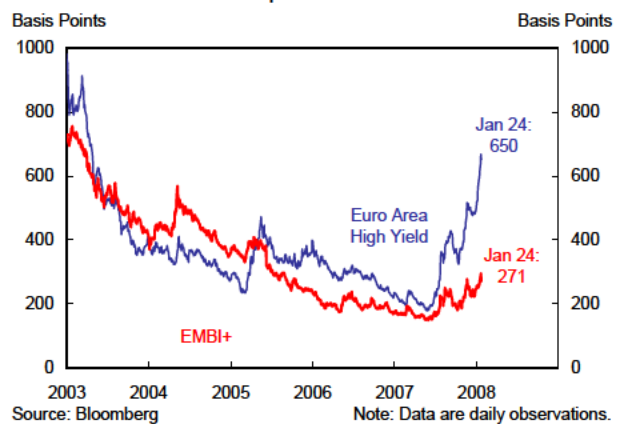
LIBOR Rate - OIS Swap Rate (3-month)



**Euro Area and Japan Equity Indices**



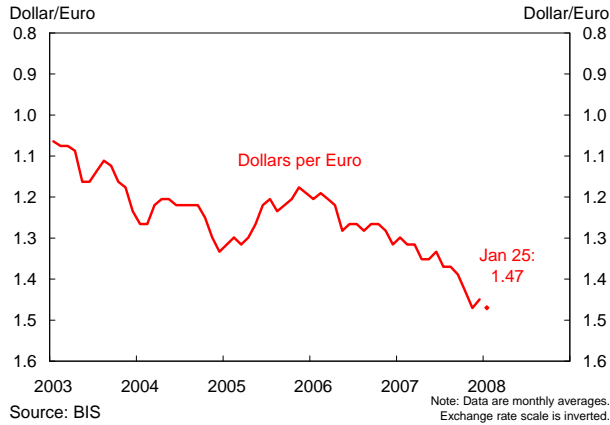
**EMBI+ and Euro Area Spreads**



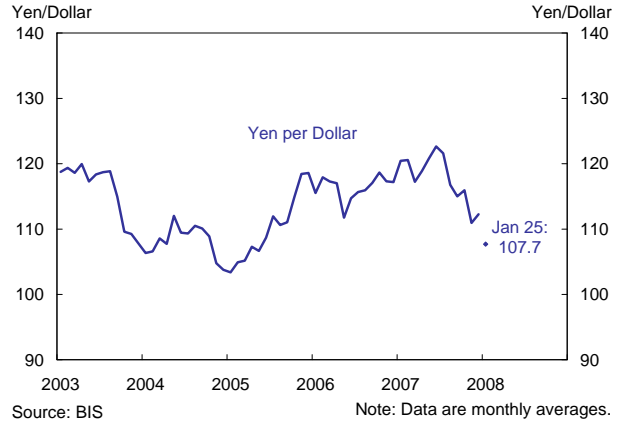
# A. Significant Developments

**Exhibit A-9:  
Exchange Rates**

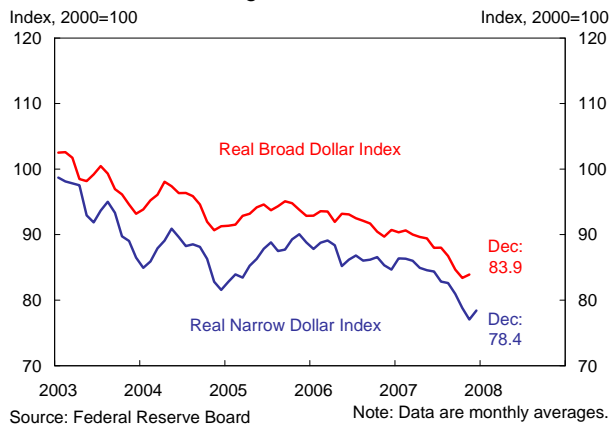
**Dollar-Euro Exchange Rate**



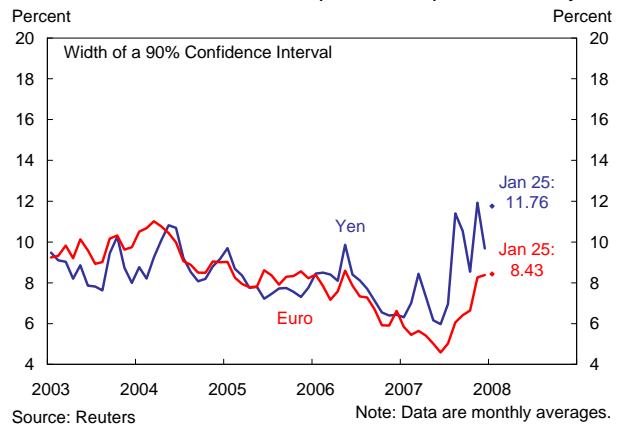
**Yen-Dollar Exchange Rate**



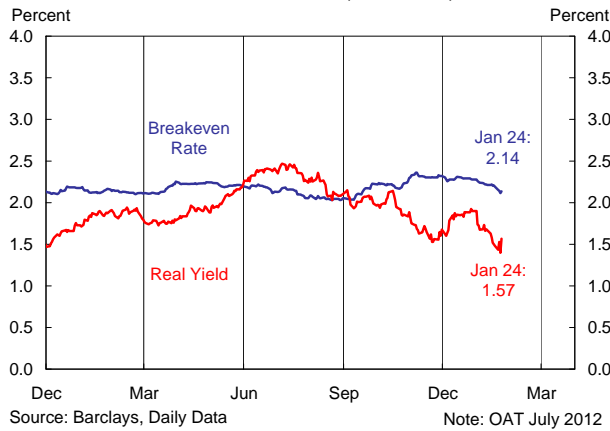
**Real Effective Exchange Rates**



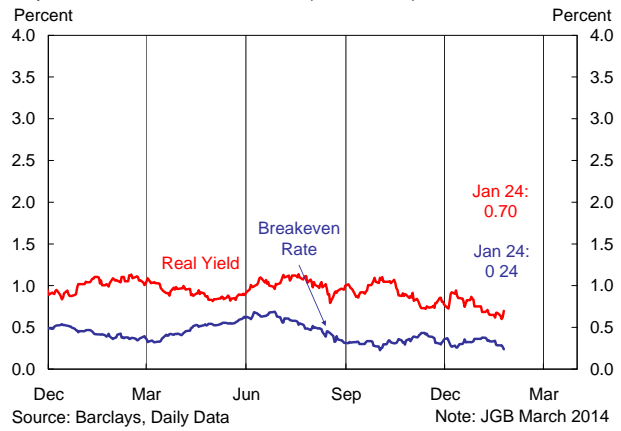
**Euro and Yen One-Month Implied FX Option Volatility**



**Euro Area Inflation-Linked Bonds (Past Year)**



**Japan Inflation-Linked Bonds (Past Year)**

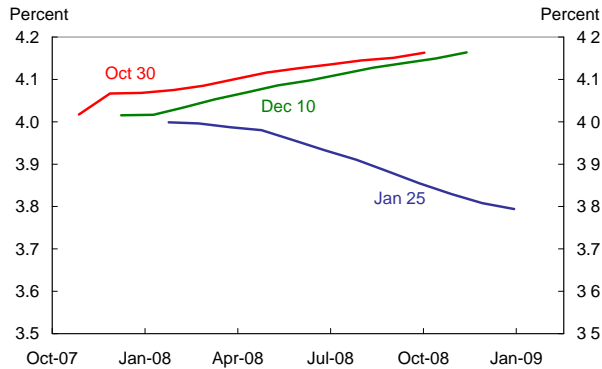


# A. Significant Developments

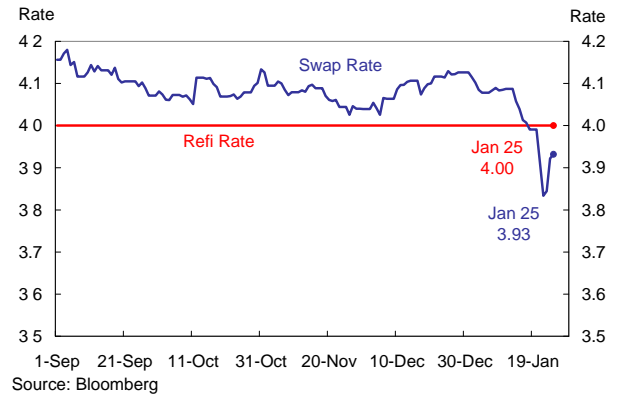
## Exhibit A-10: Euro Area and Japan Swap Curves

### Euro Area Swap Rates

Expected Average Overnight Rate Months Ahead

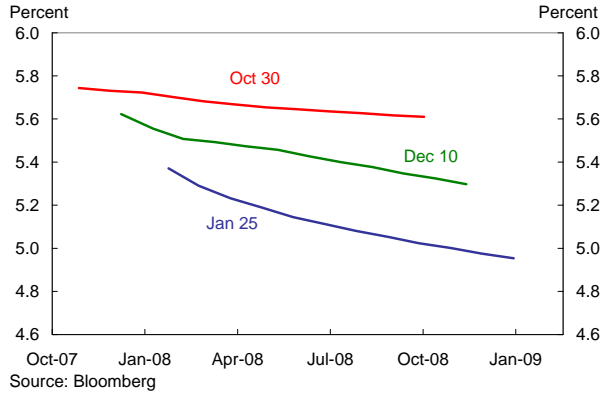


### Euro Area: Expected Average Overnight Rate Over the Next Six Months (Swap Rate)

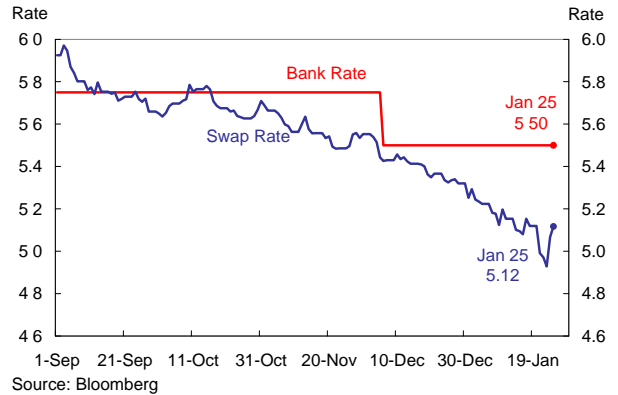


### UK Swap Curve

Expected Average Overnight Rate Months Ahead

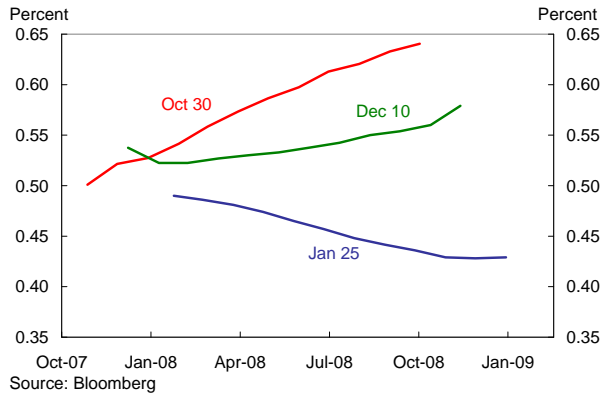


### UK: Expected Average Overnight Rate Over the Next Six Months (Swap Rate)

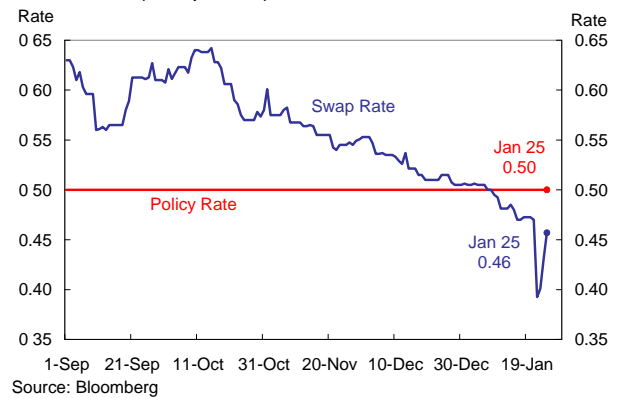


### Japan Swap Curve

Expected Average Overnight Rate Months Ahead



### Japan: Expected Average Overnight Rate Over the Next Six Months (Swap Rate)

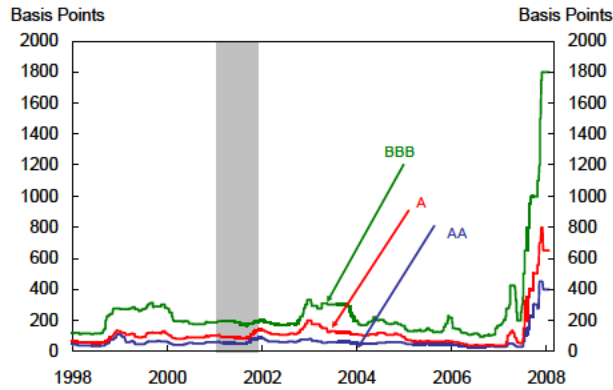


Note: Shading represents NBER recessions.

# A. Significant Developments

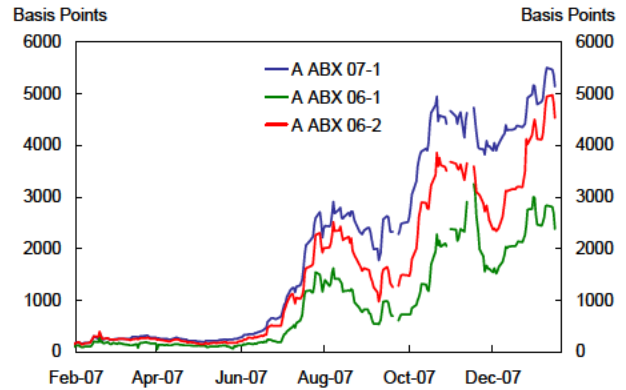
## Exhibit A-11: Financial Market Indicators of Subprime Spillovers

Spreads on Subprime MBS Tranches



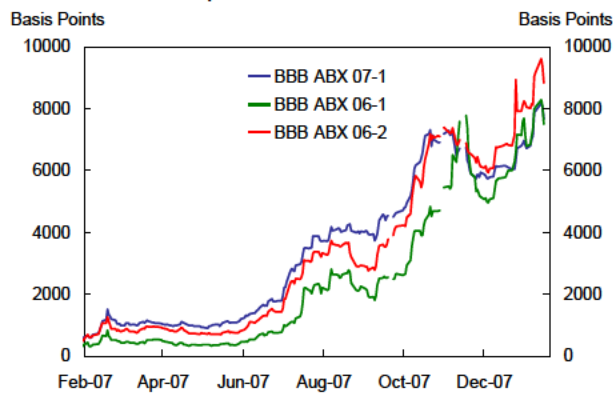
Source: JPMorgan and FRBNY (Markets Group)

A-Rated ABX Spreads



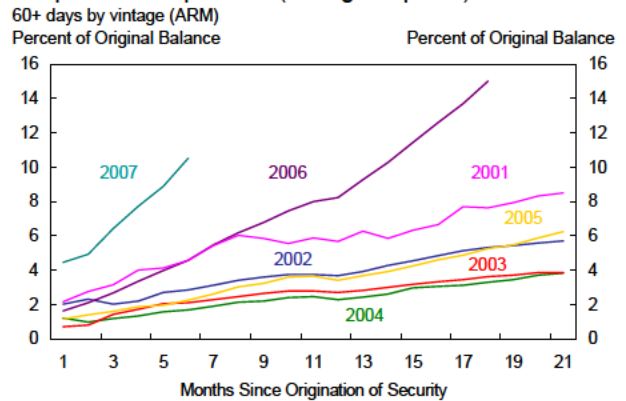
Source: JPMorgan and FRBNY (Markets Group)

BBB-Rated ABX Spreads



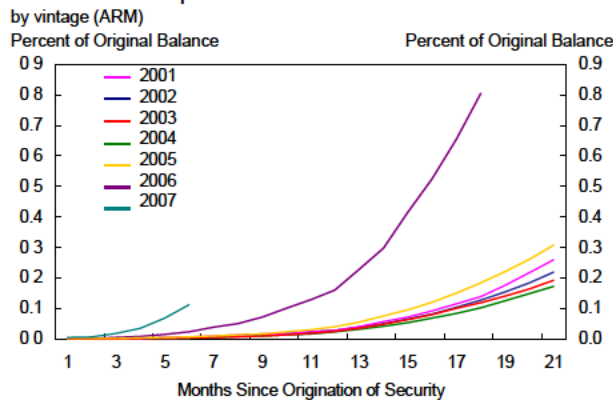
Source: JPMorgan and FRBNY (Markets Group)

Subprime Delinquencies (through Sept '07)



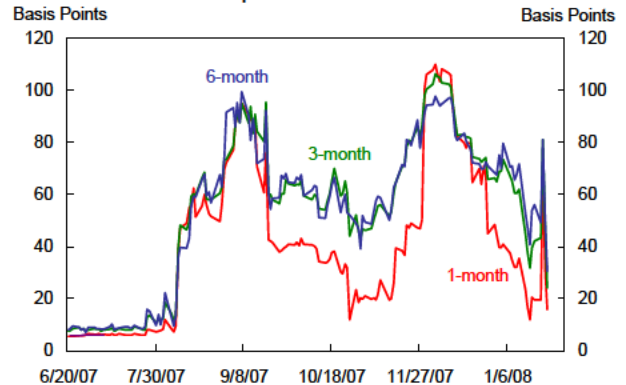
Source: Moody's and FRBNY (Bank Supervision)

Cumulative Subprime Losses



Source: Moody's and FRBNY (Bank Supervision)

USD LIBOR-to-OIS Spread



## B. FRBNY Forecast Details

### Exhibit B-1: Quarterly and Annual Projections of Key Variables

	Core PCE Inflation			Real GDP Growth			Unemployment Rate*			Fed Funds Rate**		
	Oct	Dec	Jan	Oct	Dec	Jan	Oct	Dec	Jan	Oct	Dec	Jan
<b>2007</b>												
Q1	2.4	2.4	2.4	0.6	0.6	0.6	4.5	4.5	4.5	5.3	5.3	5.3
Q2	1.4	1.4	1.4	3.8	3.8	3.8	4.5	4.5	4.5	5.3	5.3	5.3
Q3	1.5	1.8	2.0	3.3	4.9	4.9	4.6	4.6	4.7	4.8	4.8	4.8
Q4	1.8	2.0	2.7	2.0	0.8	2.2	4.7	4.7	4.8	4.8	4.3	4.3
<b>2008</b>												
Q1	1.8	1.8	2.1	2.0	1.6	-0.8	4.7	4.9	5.3	4.8	4.0	2.8
Q2	1.7	1.7	1.9	2.8	2.5	0.9	4.7	5.0	5.4	4.8	3.8	2.5
Q3	1.7	1.7	1.7	2.8	2.3	4.8	4.7	5.0	5.4	4.5	3.8	2.5
Q4	1.7	1.7	1.7	3.0	2.8	2.5	4.6	5.0	5.3	4.3	3.8	2.5
<b>2009</b>												
Q1	1.7	1.7	1.7	2.8	2.8	3.6	4.6	4.9	5.2	4.3	4.0	2.5
Q2	1.7	1.7	1.7	2.7	3.0	3.2	4.6	4.9	5.2	4.3	4.3	2.5
Q3	1.6	1.6	1.6	2.8	2.8	3.0	4.6	4.9	5.1	4.3	4.3	3.0
Q4	1.6	1.6	1.6	2.6	2.6	2.8	4.6	4.9	5.0	4.3	4.3	3.5
<b>Q4/Q4</b>												
2006	2.3	2.3	2.3	2.6	2.6	2.6	-0.5	-0.5	-0.5	1.0	1.0	1.0
2007	1.8	1.9	2.1	2.4	2.5	2.9	0.2	0.2	0.4	-0.5	-1.0	-1.0
2008	1.7	1.7	1.8	2.6	2.3	1.8	-0.1	0.3	0.5	-0.5	-0.5	-1.8
2009	1.6	1.6	1.6	2.7	2.8	3.2	0.0	-0.1	-0.3	0.0	0.5	1.0

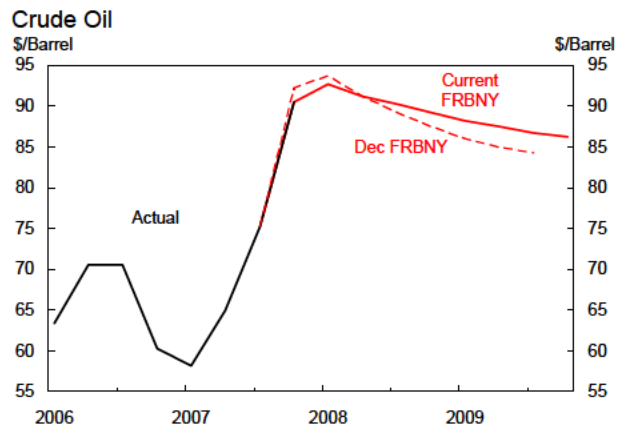
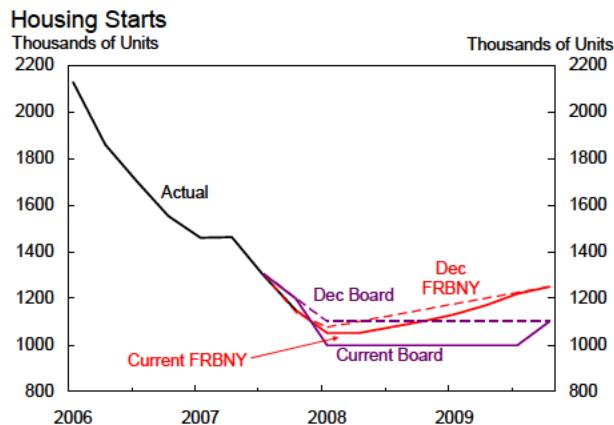
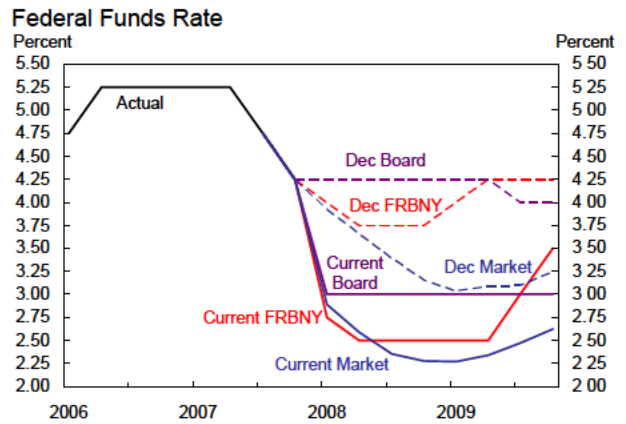
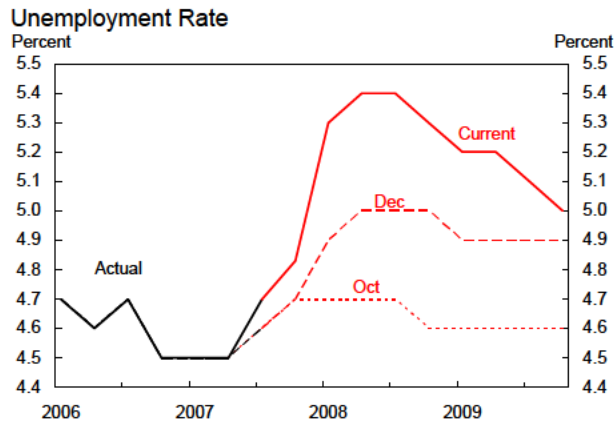
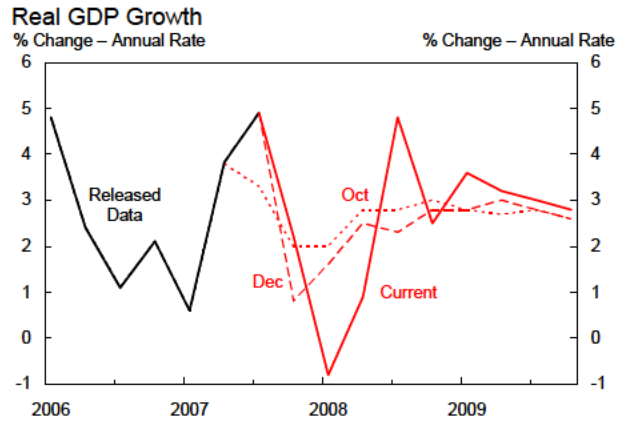
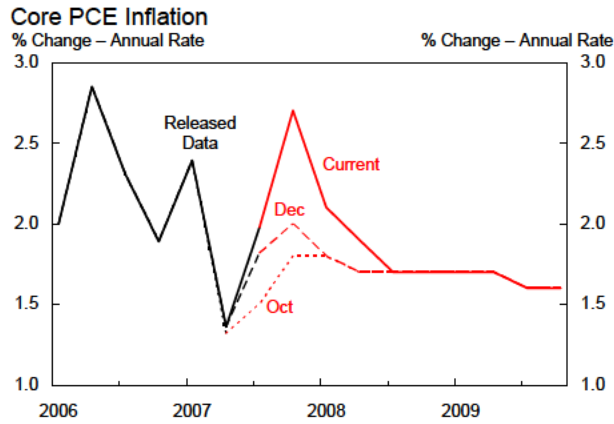
Note: Columns reflect the forecast dates. Numbers in gray are from previous Blackbooks, and numbers in italics are released data.

\*Quarterly values are the average rate for the quarter. Yearly values are the difference between Q4 of the previous year and Q4 of the listed year.

\*\*Quarterly values are the end-of-quarter value. Yearly values are the difference between the end-of-year value in the previous year and the end-of-year value in the listed year.

## B. FRBNY Forecast Details

### Exhibit B-2: Evolution of Projected Quarterly Paths of Key Indicators and Forecast Assumptions



Source: MMS and IR Functions (FRBNY) and Federal Reserve Board

## B. FRBNY Forecast Details

### Exhibit B-3: Near-Term Projections

	Quarterly Growth Rates (AR)		Quarterly Growth Contributions (AR)	
	2007Q4	2008Q1	2007Q4	2008Q1
<b>OUTPUT</b>				
Real GDP	2.2 (0.8)	-0.8 (1.6)	2.2 (0.8)	-0.8 (1.6)
<b>Final Sales to Domestic Purchasers</b>	2.7 (0.9)	-0.5 (1.3)	2.8 (1.0)	-0.5 (1.4)
<b>Consumption</b>	2.5 (1.5)	1.3 (2.3)	1.7 (1.1)	0.9 (1.6)
<b>BFI: Equipment and Software</b>	2.0 (4.0)	-5.0 (4.0)	0.1 (0.3)	-0.4 (0.3)
<b>BFI: Nonresidential Structures</b>	16.0 (5.0)	10.0 (5.0)	0.5 (0.2)	0.3 (0.2)
<b>Residential Investment</b>	-18.0 (-28.0)	-40.0 (-29.1)	-0.9 (-1.4)	-2.0 (-1.4)
<b>Government: Federal</b>	12.0 (8.0)	5.0 (5.0)	0.8 (0.6)	0.4 (0.4)
<b>Government: State and Local</b>	3.4 (2.5)	2.5 (2.3)	0.4 (0.3)	0.3 (0.3)
<b>Inventory Investment</b>	-- --	-- --	-1.0 (-0.6)	-0.1 (0.1)
<b>Net Exports</b>	-- --	-- --	0.4 (0.4)	-0.2 (0.2)
<b>INFLATION</b>				
Total PCE Deflator	3.8 (3.5)	2.9 (1.9)		
Core PCE Deflator	2.7 (2.0)	2.1 (1.8)		
<b>PRODUCTIVITY AND LABOR COSTS*</b>				
Output per Hour	3.3 (0.0)	0.0 (1.2)		
Compensation per Hour	5.2 (7.0)	3.8 (4.0)		
Unit Labor Costs	2.0 (7.0)	3.8 (2.8)		

Note: Numbers in parentheses are from the previous Blackbook.

\*Nonfarm business sector.

## B. FRBNY Forecast Details

### Exhibit B-4: Real GDP and Inflation Projections

	Q4/Q4 Growth Rates			Q4/Q4 Growth Contributions		
	2007	2008	2009	2007	2008	2009
<b>OUTPUT</b>						
<b>Real GDP</b>	2.9 (2.5)	1.8 (2.3)	3.2 (2.8)	2.9 (2.5)	1.8 (2.3)	3.2 (2.8)
<b>Final Sales to Domestic Purchasers</b>	2.2 (1.8)	1.6 (1.8)	2.7 (2.5)	2.4 (1.9)	1.7 (1.9)	2.9 (2.6)
<b>Consumption</b>	2.6 (2.3)	2.6 (2.4)	2.6 (2.6)	1.8 (1.6)	1.8 (1.7)	1.9 (1.9)
<b>BFI: Equipment and Software</b>	3.3 (4.0)	-0.2 (3.5)	3.5 (3.0)	0.2 (0.3)	0.0 (0.3)	0.2 (0.2)
<b>BFI: Nonresidential Structures</b>	16.0 (12.6)	5.5 (3.7)	3.0 (3.0)	0.5 (0.4)	0.2 (0.1)	0.1 (0.1)
<b>Residential Investment</b>	-16.7 (-19.2)	-18.5 (-14.8)	8.1 (3.0)	-0.9 (-1.0)	-0.8 (-0.6)	0.3 (0.1)
<b>Government: Federal</b>	4.5 (3.5)	2.0 (2.0)	1.5 (1.5)	0.3 (0.2)	0.1 (0.1)	0.1 (0.1)
<b>Government: State and Local</b>	2.8 (2.6)	2.1 (2.1)	1.9 (1.9)	0.3 (0.3)	0.3 (0.3)	0.2 (0.2)
<b>Inventory Investment</b>	-- --	-- --	-- --	-0.1 (-0.0)	-0.1 (0.1)	0.4 (0.1)
<b>Net Exports</b>	-- --	-- --	-- --	0.6 (0.6)	0.3 (0.3)	-0.1 (0.0)
<b>INFLATION</b>						
<b>Total PCE Deflator</b>	3.3 (3.2)	2.2 (1.9)	1.7 (1.7)			
<b>Core PCE Deflator</b>	2.1 (1.9)	1.8 (1.7)	1.6 (1.6)			
<b>Total CPI Inflation</b>	4.0 (3.9)	2.6 (2.5)	2.1 (1.9)			
<b>Core CPI Inflation</b>	2.3 (2.2)	2.1 (2.0)	1.9 (1.9)			
<b>GDP Deflator</b>	2.1 (2.0)	2.3 (2.2)	2.0 (2.0)			

Note: Numbers in parentheses are from the previous Blackbook.



## B. FRBNY Forecast Details

### Exhibit B-5: Projections of Other Key Economic Variables

	Q4/Q4 Growth Rates		
	2007	2008	2009
<b>INTEREST RATE ASSUMPTIONS</b>			
Federal Funds Rate (End-of-Year)	4.25 (4.25)	2.50 (3.75)	3.50 (4.25)
10-Year Treasury Yield (Avg. Q4 Level)	4.3 (4.3)	3.6 (4.1)	3.6 (4.1)
<b>PRODUCTIVITY AND LABOR COSTS*</b>			
Output	3.2 (2.8)	2.1 (2.6)	3.5 (3.1)
Hours	0.1 (0.6)	1.0 (1.0)	1.7 (1.3)
Output per Hour	3.1 (2.3)	1.2 (1.6)	1.8 (1.8)
Compensation per Hour	4.1 (4.5)	4.0 (4.7)	4.2 (4.7)
Unit Labor Costs	1.0 (2.2)	2.8 (3.2)	2.4 (2.9)
<b>LABOR MARKET</b>			
Unemployment Rate (Avg. Q4 Level)	4.8 (4.7)	5.3 (5.0)	5.0 (4.9)
Participation Rate (Avg. Q4 Level)	66.0 (66.1)	66.0 (66.1)	66.0 (66.1)
Avg. Monthly Nonfarm Payroll Growth (Thous.)	124 (131)	105 (115)	188 (143)
<b>INCOME</b>			
Personal Income	6.0 (5.7)	4.9 (5.3)	5.5 (5.3)
Real Disposable Personal Income	2.3 (2.1)	2.7 (3.3)	3.9 (3.7)
Corporate Profits Before Taxes	3.2 (5.2)	-0.6 (1.4)	0.0 (1.3)

Note: Numbers in parentheses are from the previous Blackbook.

\*Nonfarm business sector.

## B. FRBNY Forecast Details

### Exhibit B-6: FRBNY and Greenbook Forecast Comparison

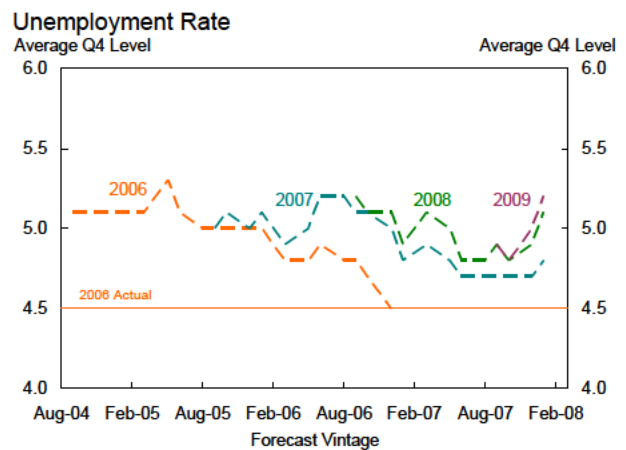
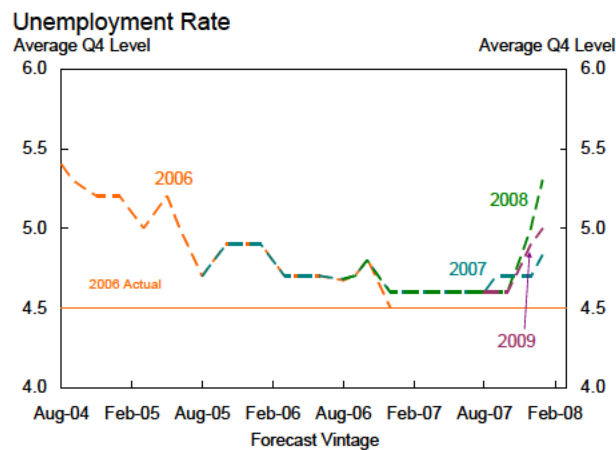
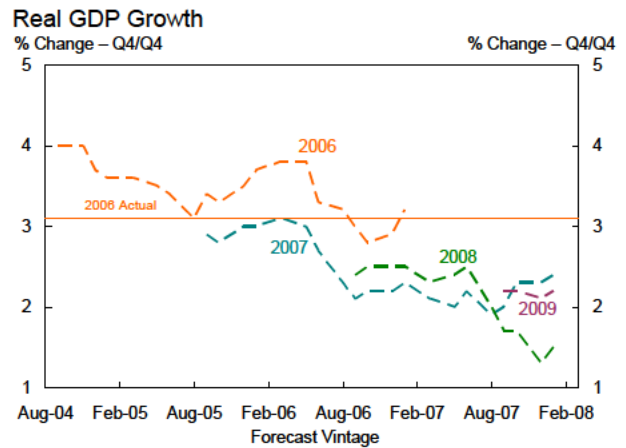
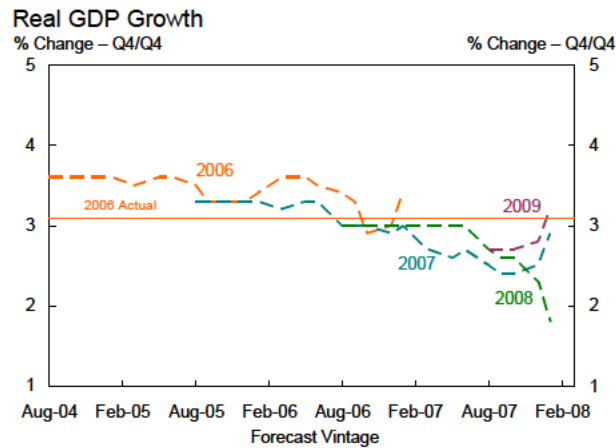
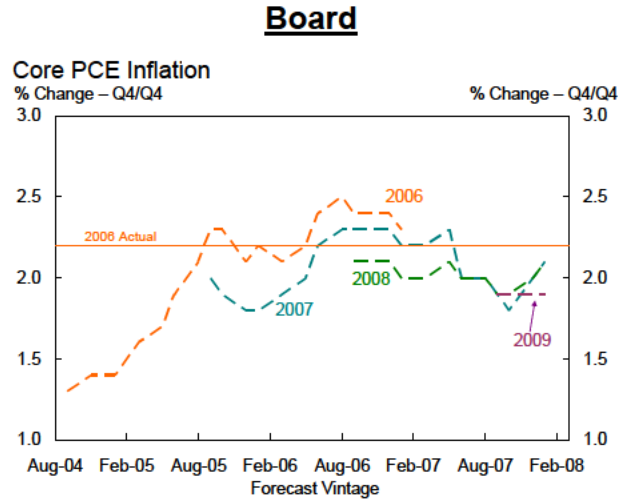
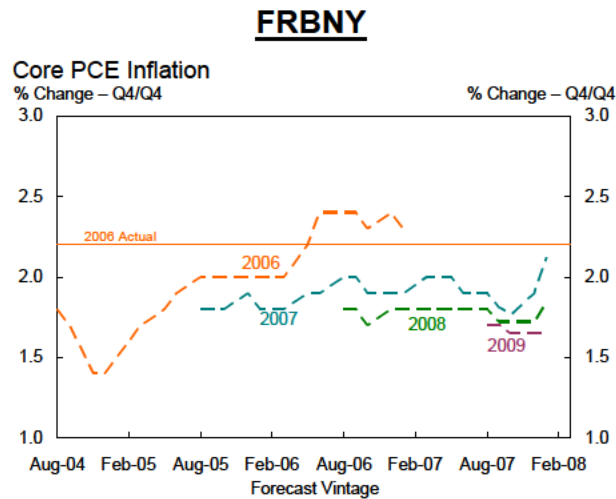
	FRBNY			Board		
	2007	2008	2009	2007	2008	2009
<b>OUTPUT</b>						
Real GDP	2.9 (2.5)	1.8 (2.3)	3.2 (2.8)	2.4 (2.3)	1.5 (1.3)	2.2 (2.1)
<b>GDP Growth Contributions</b>						
Final Sales to Domestic Purchasers	2.4 (1.9)	1.7 (1.9)	2.9 (2.6)	2.6 (1.7)	1.7 (0.8)	1.7 (2.0)
Consumption	1.8 (1.6)	1.8 (1.7)	1.9 (1.9)	1.8 (1.6)	1.6 (1.0)	1.0 (1.6)
BFI	0.8 (0.7)	0.2 (0.4)	0.4 (0.3)	0.8 (0.7)	0.1 (0.1)	0.3 (0.3)
Residential Investment	-0.9 (-1.0)	-0.8 (-0.6)	0.3 (0.1)	-1.1 (-1.1)	-0.8 (-0.6)	0.0 (-0.1)
Government	0.7 (0.6)	0.4 (0.4)	0.4 (0.4)	0.5 (0.5)	0.3 (0.3)	0.2 (0.2)
Inventory Investment	-0.1 (-0.0)	-0.1 (0.1)	0.4 (0.1)	-0.2 (0.0)	-0.1 (0.0)	0.5 (0.0)
Net Exports	0.6 (0.6)	0.3 (0.3)	-0.1 (0.0)	0.6 (0.6)	0.5 (0.5)	0.3 (0.1)
<b>INFLATION</b>						
Total PCE Deflator	3.3 (3.2)	2.2 (1.9)	1.7 (1.7)	3.4 (3.2)	2.2 (2.0)	1.7 (1.7)
Core PCE Deflator	2.1 (1.9)	1.8 (1.7)	1.6 (1.6)	2.1 (2.0)	2.1 (2.0)	1.9 (1.9)
<b>INTEREST RATE ASSUMPTION</b>						
Fed Funds Rate (End-of-Year)	4.25 (4.25)	2.50 (3.75)	3.50 (4.25)	4.25 (4.25)	3.00 (4.25)	3.00 (4.00)
<b>PRODUCTIVITY AND LABOR COSTS*</b>						
Output per Hour	3.1 (2.3)	1.2 (1.6)	1.8 (1.8)	2.7 (2.3)	1.6 (1.3)	1.9 (1.9)
Compensation per Hour	4.1 (4.5)	4.0 (4.7)	4.2 (4.7)	3.9 (3.7)	4.4 (4.5)	4.1 (4.2)
Unit Labor Costs	1.0 (2.2)	2.8 (3.2)	2.4 (2.9)	1.2 (1.3)	2.8 (3.1)	2.2 (2.3)
<b>LABOR MARKET</b>						
Unemployment Rate (Avg. Q4 Level)	4.8 (4.7)	5.3 (5.0)	5.0 (4.9)	4.8 (4.7)	5.1 (4.9)	5.2 (5.0)
Participation Rate (Avg. Q4 Level)	66.0 (66.1)	66.0 (66.1)	66.0 (66.1)	66.0 (65.9)	65.7 (65.7)	65.5 (65.5)
Avg. Monthly Nonfarm Payroll Growth (Thous.)	124 (131)	105 (115)	188 (143)	125 (133)	33 (50)	75 (75)
<b>HOUSING</b>						
Housing Starts (Avg. Q4 Level, Thous.)	1151 (1140)	1100 (1150)	1250 (1250)	1200 (1200)	1000 (1100)	1100 (1100)

Note: All values are Q4/Q4 percent change, unless indicated otherwise. Numbers in parentheses are from the previous Blackbook or Greenbook.

\*Nonfarm business sector

## B. FRBNY Forecast Details

### Exhibit B-7: Evolution of FRBNY and Board Forecasts since Mid-2004



Note: Forecast vintage is the date the forecast was produced.

## B. FRBNY Forecast Details

### Exhibit B-8: Alternative GDP and Inflation Forecasts

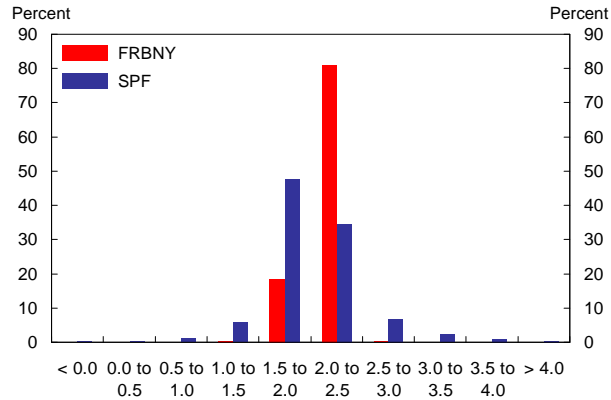
<b>Real GDP Growth</b>					
	<b>Release Date</b>	<b>2007Q4</b>	<b>2008Q1</b>	<b>2007 Q4/Q4</b>	<b>2008 Q4/Q4</b>
<b>FRBNY</b>	1/25//2008	2.2 (0.8)	-0.8 (1.6)	2.9 (2.5)	1.8 (2.3)
<b>PSI Model</b>	1/23/2008	1.1 (2.2)	0.6 (1.9)	-- --	-- --
<b>Blue Chip</b>	1/10/2008	1.3 (1.7)	1.3 (1.9)	2.6 (2.5)	2.0 (2.4)
<b>Median SPF</b>	11/13/2007	1.5 (2.7)	2.2 (2.7)	2.1 (1.9)	2.5 (2.8)
<b>Macro Advisers</b>	1/24/2008	1.2 (0.0)	1.3 (1.8)	2.6 (2.4)	2.6 (2.7)
<b>Core PCE Inflation</b>					
	<b>Release Date</b>	<b>2007Q4</b>	<b>2008Q1</b>	<b>2007 Q4/Q4</b>	<b>2008 Q4/Q4</b>
<b>FRBNY</b>	1/25//2008	2.7 (2.0)	2.1 (1.8)	2.1 (1.9)	1.8 (1.7)
<b>Median SPF</b>	11/13/2007	1.9 (1.9)	1.9 (2.0)	1.9 (1.9)	1.9 (2.0)
<b>CPI Inflation</b>					
	<b>Release Date</b>	<b>2007Q4</b>	<b>2008Q1</b>	<b>2007 Q4/Q4</b>	<b>2008 Q4/Q4</b>
<b>FRBNY</b>	1/25//2008	4.2 (4.0)	3.5 (3.4)	4.0 (3.9)	2.6 (2.5)
<b>Blue Chip</b>	1/10/2008	4.0 (2.8)	3.1 (2.7)	3.9 (3.6)	2.4 (2.3)
<b>Median SPF</b>	11/13/2007	3.0 (2.0)	2.9 (2.3)	3.6 (3.6)	2.5 (2.2)
<b>Macro Advisers</b>	1/24/2008	4.2 (3.7)	3.4 (2.4)	4.0 (3.8)	2.5 (2.2)
<b>Core CPI Inflation</b>					
	<b>Release Date</b>	<b>2007Q4</b>	<b>2008Q1</b>	<b>2007 Q4/Q4</b>	<b>2008 Q4/Q4</b>
<b>FRBNY</b>	1/25//2008	2.5 (2.1)	2.6 (2.3)	2.3 (2.2)	2.1 (2.0)
<b>Median SPF</b>	11/13/2007	2.2 (2.2)	2.2 (2.2)	2.2 (2.2)	2.2 (2.2)
<b>Macro Advisers</b>	1/24/2008	2.4 (2.2)	2.5 (2.3)	2.3 (2.2)	2.3 (2.3)

Note: Numbers in parentheses are from August release for SPF and December release for all other forecasts. All values are quarterly percent changes at an annual rate.

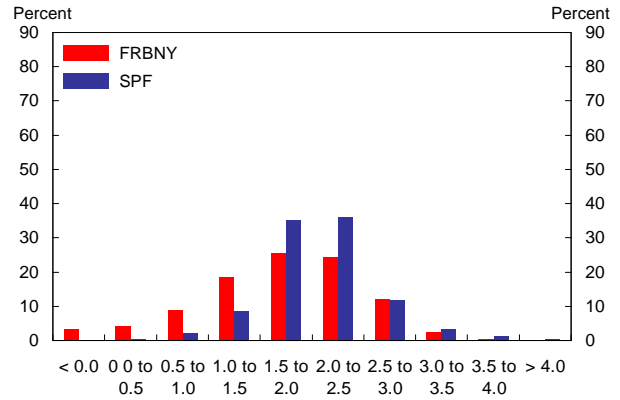
## B. FRBNY Forecast Details

### Exhibit B-9: FRBNY, SPF, and Board Forecast Comparison

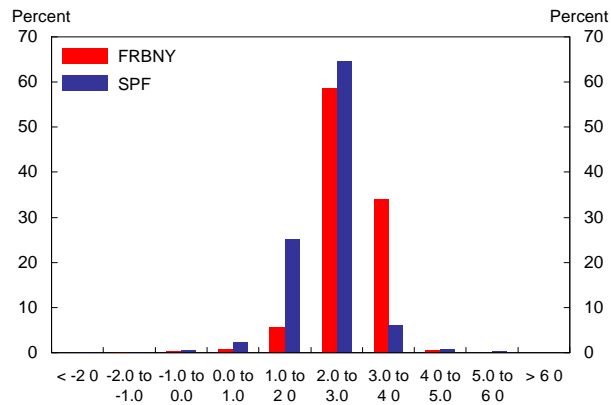
2007Q4/Q4 Core PCE Inflation Probabilities



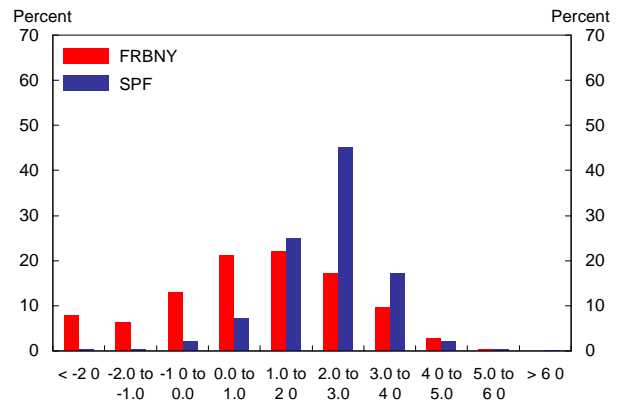
2008Q4/Q4 Core PCE Inflation Probabilities



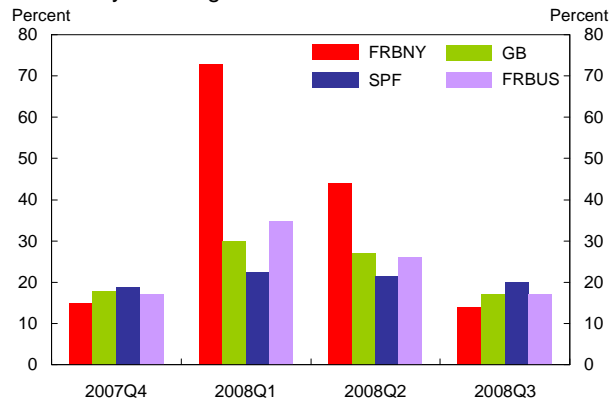
2007/2006 Real GDP Growth Probabilities



2008/2007 Real GDP Growth Probabilities



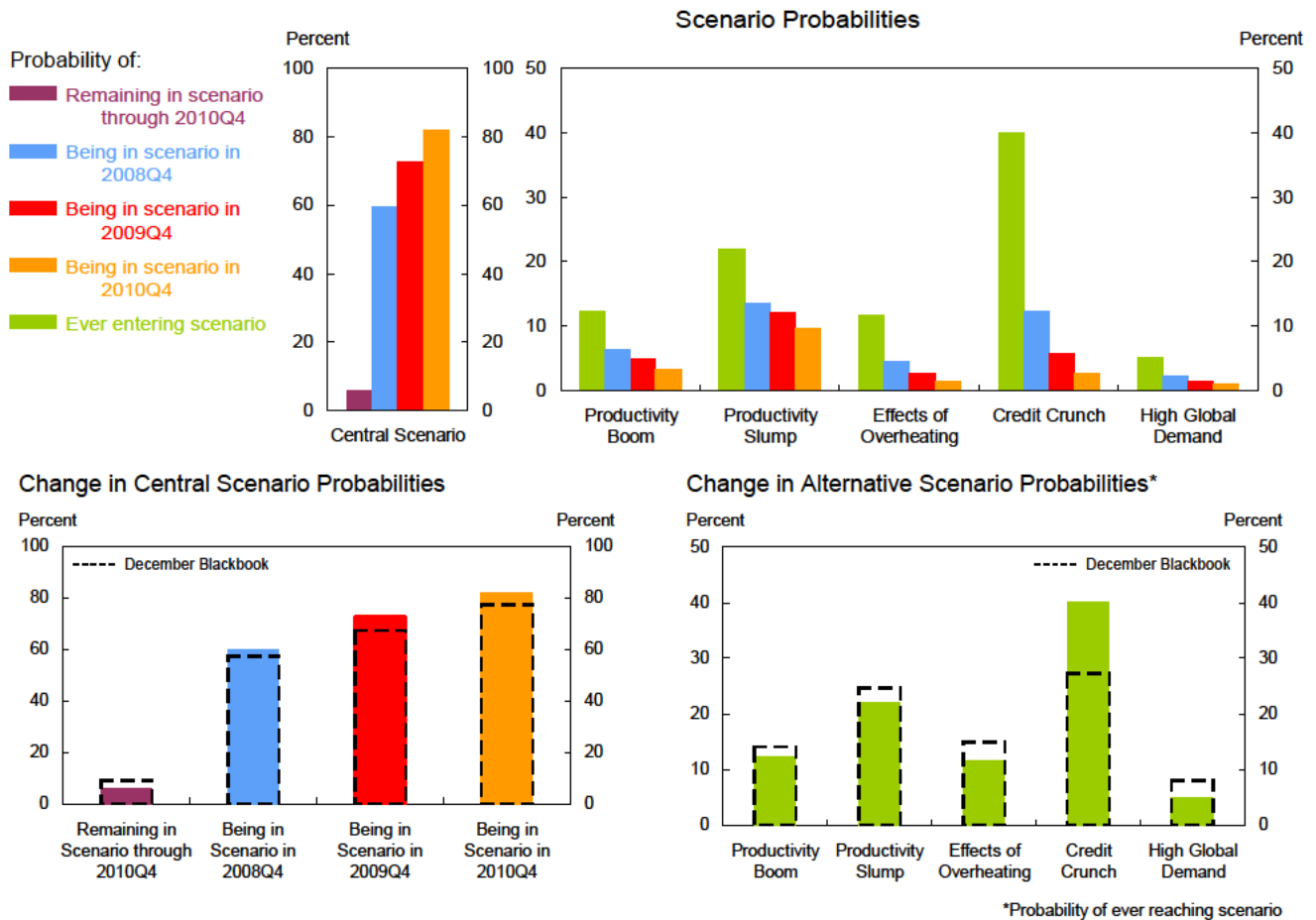
Probability of a Negative-Growth Quarter



Source: MMS Function (FRBNY), FRB Philadelphia Survey of Professional Forecasters, and Federal Reserve Board  
 Note: SPF forecast was released November 13, 2007. Board forecasts are from the January Greenbook.

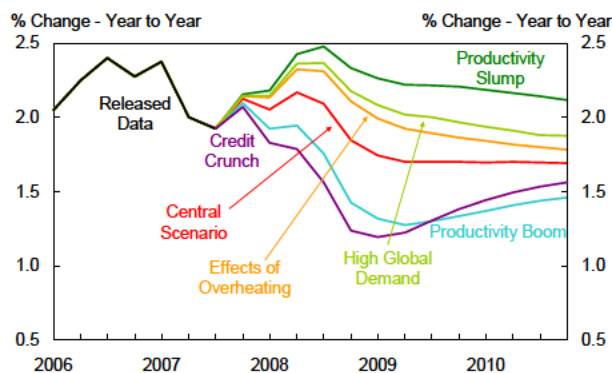
## C. FRBNY Forecast Distributions

**Exhibit C-1:  
Risks**

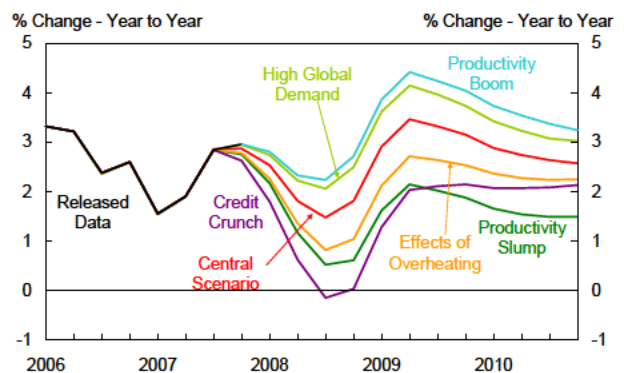


**Exhibit C-2: Projections  
under Alternative Scenarios**

**Core PCE Inflation under Alternative Scenarios**



**Real GDP Growth under Alternative Scenarios**

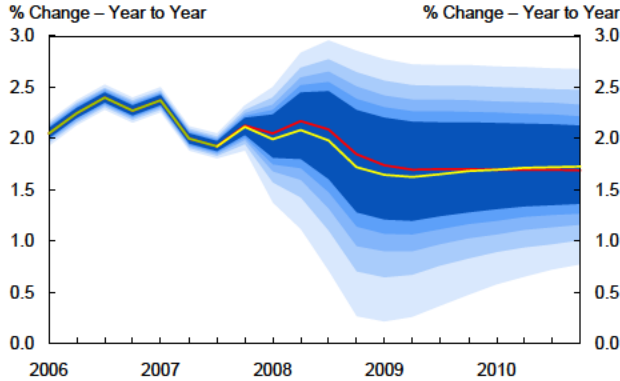


Source: MMS Function (FRBNY)

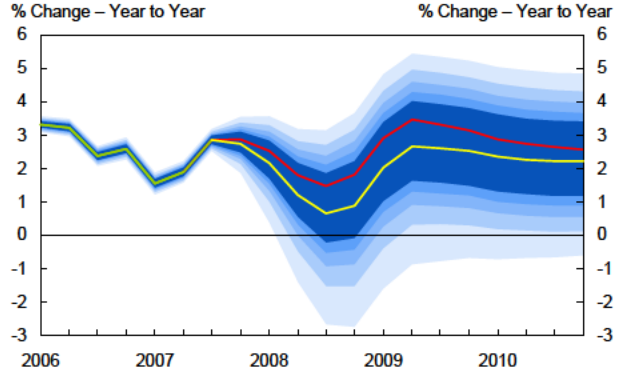
## C. FRBNY Forecast Distributions

### Exhibit C-3: Inflation and Output Forecast Distributions

**Core PCE Inflation Forecast Distribution**

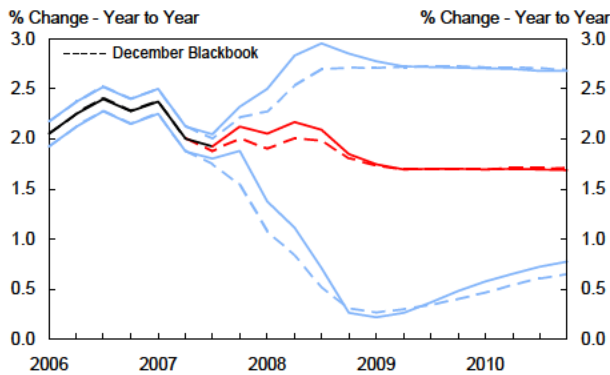


**Real GDP Growth Forecast Distribution**

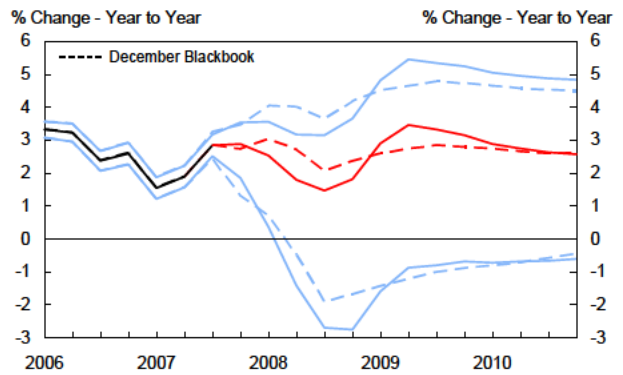


The yellow line is the expected value of the forecast distribution, the red line is the central scenario projection, and the green line is released data. The shading represents the 50, 60, 70, 80, and 90 percent chance that the four-quarter change will be within the respective range.

**Change in Core PCE Inflation Forecast Distribution**

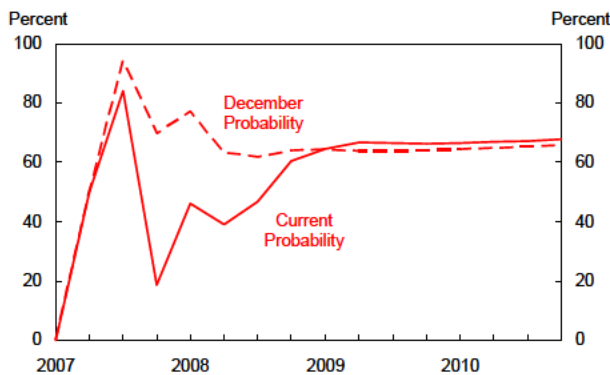


**Change in Real GDP Growth Forecast Distribution**

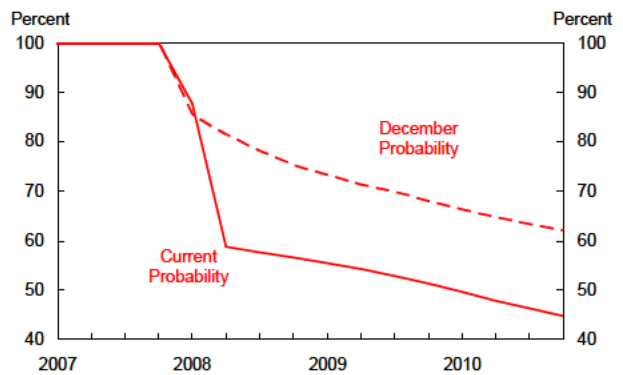


The blue lines are the 90% chance the four-quarter change will be within the lines, the red line is the central scenario projection, and the black line is released data. Dashed lines represent forecasts from previous Blackbook.

**Probability of Four-Quarter Core PCE Inflation below 2%**



**Probability of Continuing Expansion\***



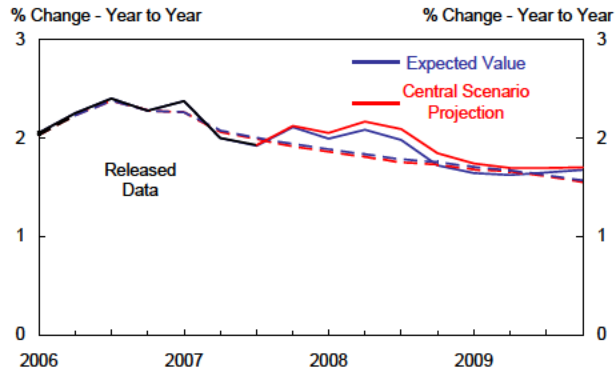
\*No two consecutive quarters of negative growth

Source: MMS Function (FRBNY)

## C. FRBNY Forecast Distributions

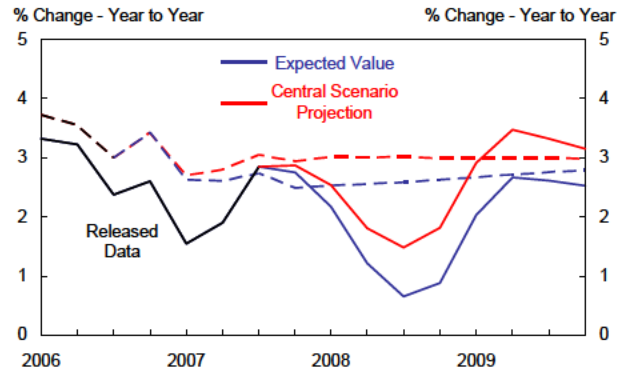
### Exhibit C-4: Evolution and Performance of Inflation and Output Forecast Distributions

One-Year Comparison of Core PCE Inflation Forecast

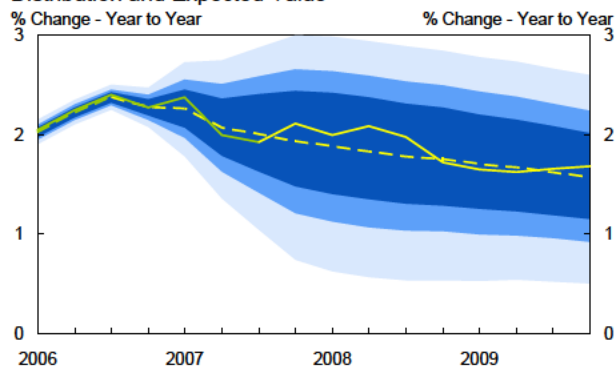


The solid lines are the **current** central scenario projection (red) and expected value of the forecast distribution, while the dotted lines are the same from the **January 2007** forecast.

One-Year Comparison of Real GDP Growth Forecast

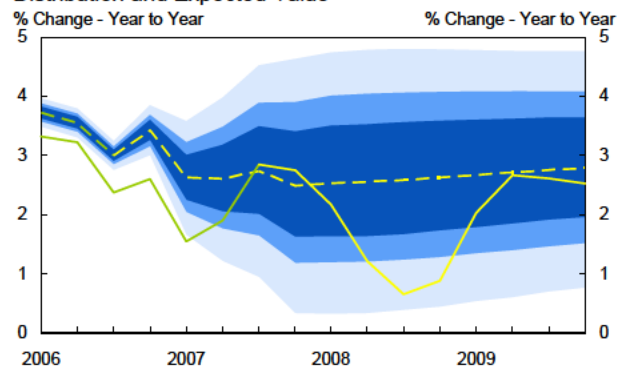


One-Year Comparison of Core PCE Inflation Forecast Distribution and Expected Value



The solid yellow line is the **current** expected value of the forecast distribution, while the dashed yellow line is the **January 2007** expected value. The shading represents the 50, 75 and 90 percent probability intervals from the **January 2007** forecast. The green lines are released data.

One-Year Comparison of Real GDP Growth Forecast Distribution and Expected Value



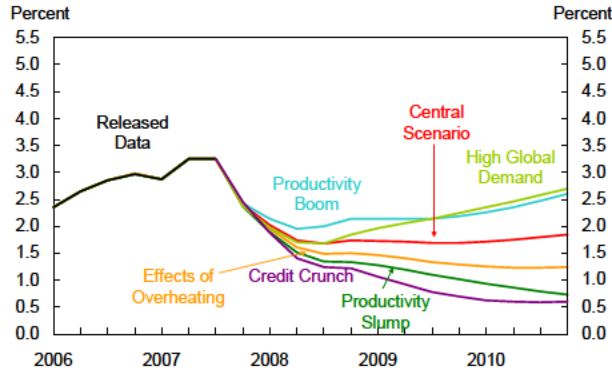
Source: MMS Function (FRBNY)



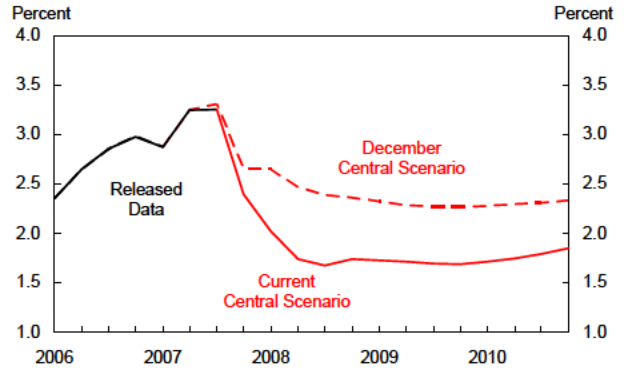
## D. FRBNY Fed Funds Rate Projections

**Exhibit D-1: *Baseline*  
Policy Rule Analysis**

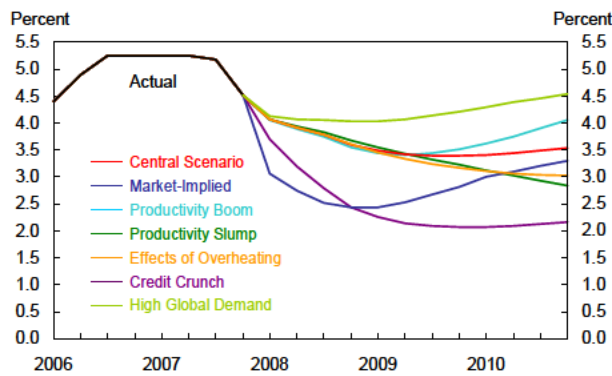
**Real FFR under Alternative Scenarios**



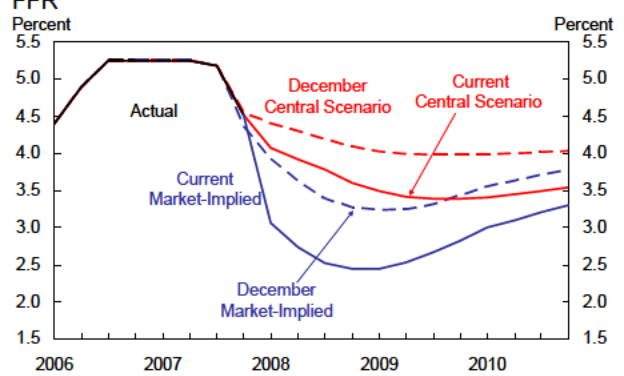
**Change in Central Scenario Real FFR**



**Nominal FFR under Alternative Scenarios**

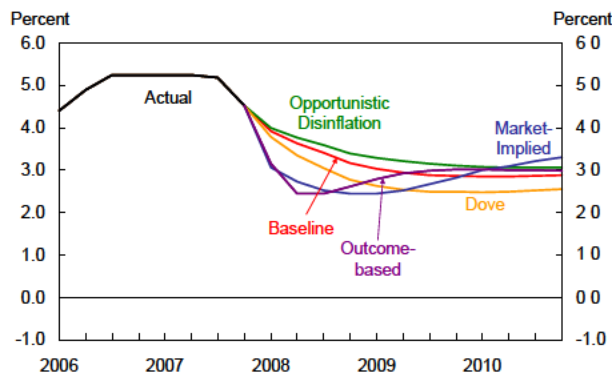


**Change in Central Scenario and Market-Implied Nominal FFR**



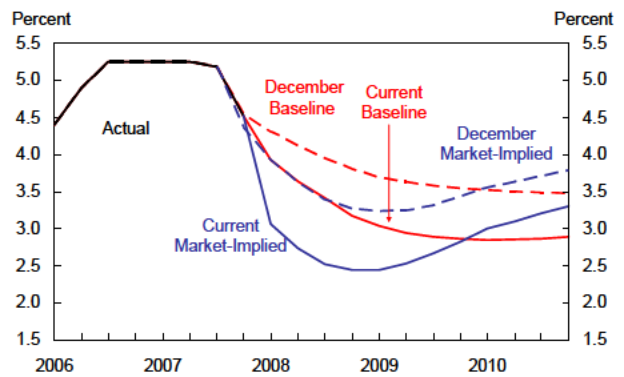
**Exhibit D-2: Alternative Policy Rules under  
Expected Value of Forecast Distribution**

**Nominal FFR using Alternative Policy Rules\***



\*Evaluated using yellow line from C-3

**Change in *Baseline*\* and Market-Implied Nominal FFR**



\*Evaluated using yellow line from C-3

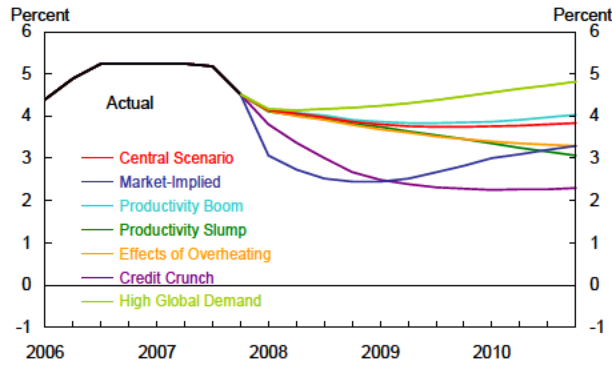
Source: MMS Function (FRBNY)

## D. FRBNY Fed Funds Rate Projections

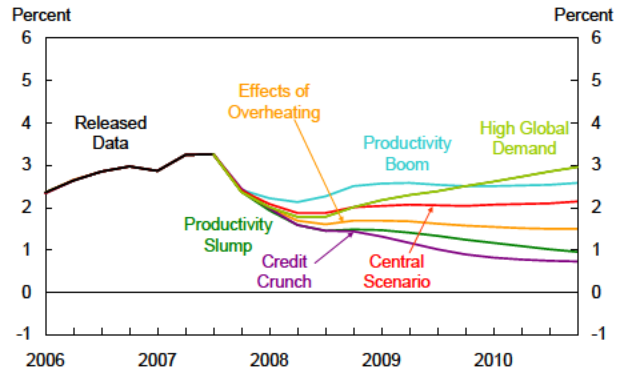
### Exhibit D-3: Alternative Policy Rule Analysis

#### Policy Rule: *Opportunistic Disinflation*

Nominal FFR under Alternative Scenarios

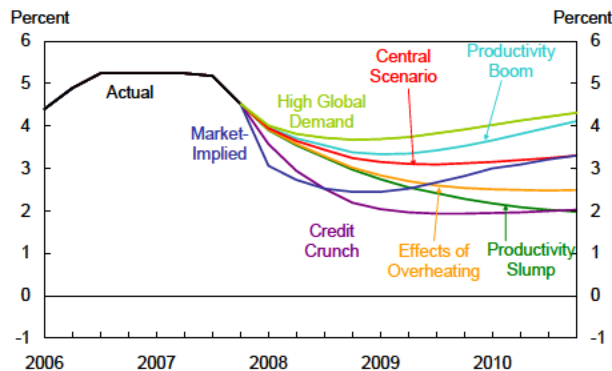


Real FFR under Alternative Scenarios

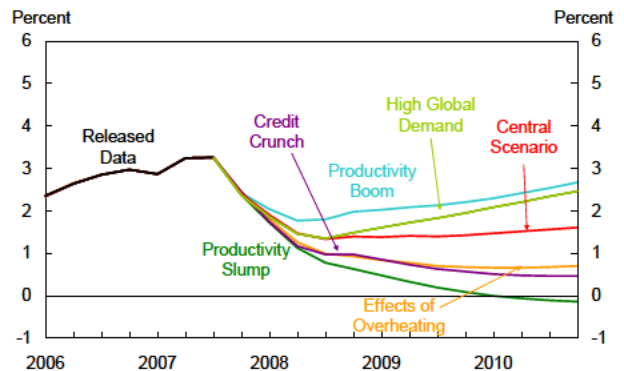


#### Policy Rule: *Dove*

Nominal FFR under Alternative Scenarios

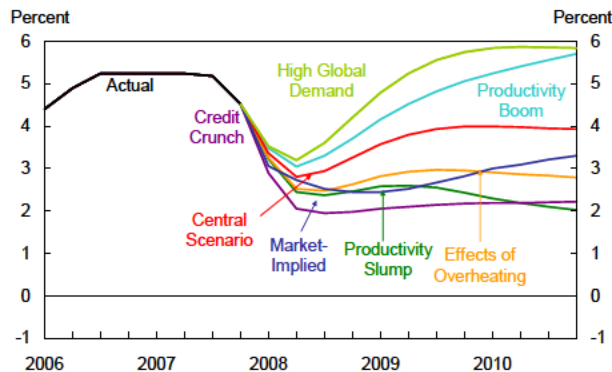


Real FFR under Alternative Scenarios

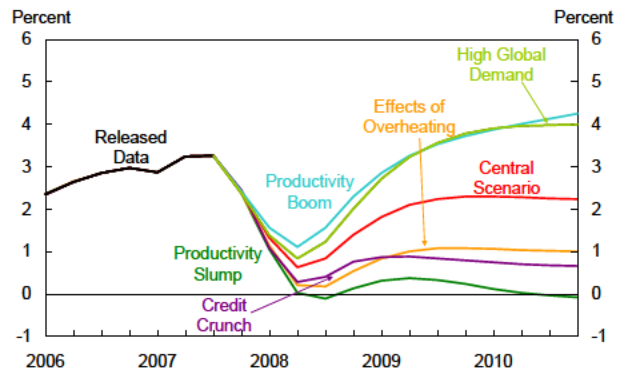


#### Policy Rule: *Outcome-based*

Nominal FFR under Alternative Scenarios



Real FFR under Alternative Scenarios



Source: MMS Function (FRBNY)

## D. FRBNY Fed Funds Rate Projections

**Exhibit D-4: Comparison between Market and Policy Rule FFR Expectations: 2008Q4**

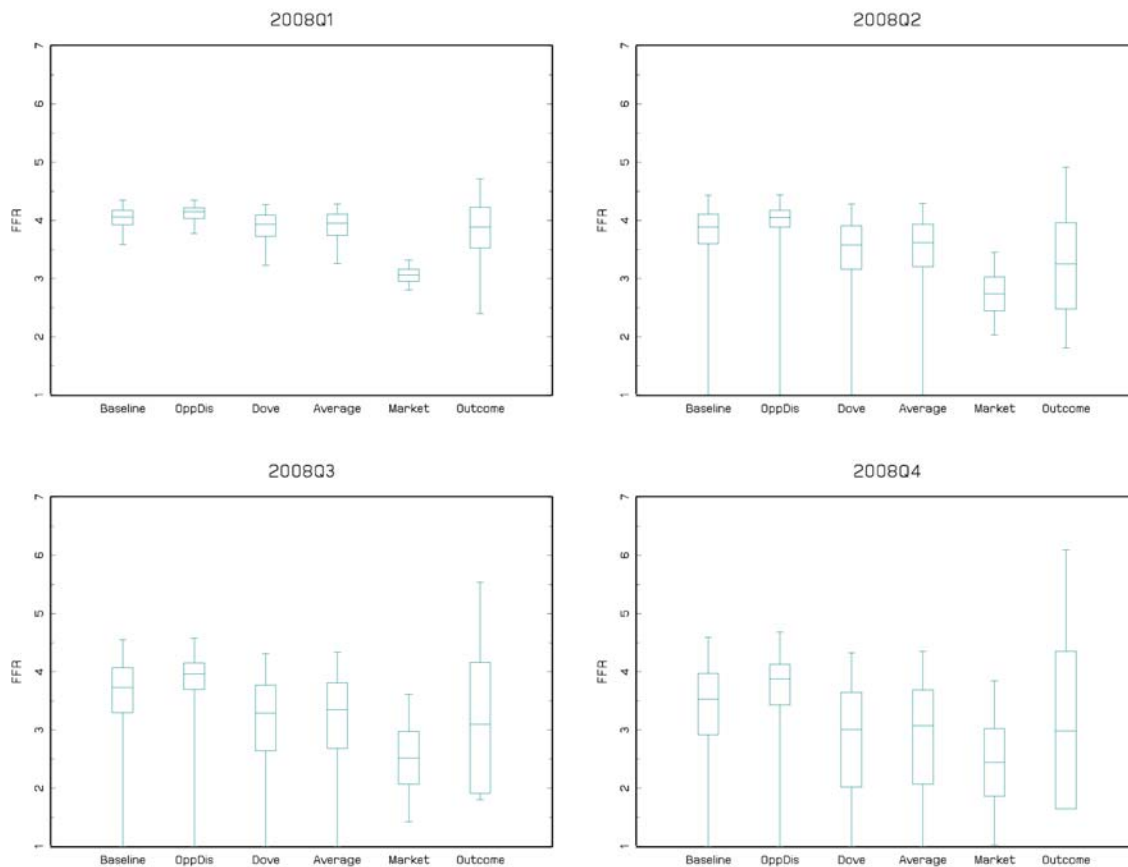
	Percentile of Rule Expectation in Market Distribution	Percentile of Market Expectation in Rule Distribution
<i>Baseline</i>	80 (76)	20 (13)
<i>Opportunistic Disinflation</i>	87 (90)	20 (4)
<i>Dove</i>	65 (70)	32 (28)
<i>Outcome-based</i>	83 (86)	40 (34)
<i>Average</i>	67 (71)	31 (27)

“Average” Weights:

Rule	Current	Dec. Blackbook
<i>Baseline</i>	0.10	0.10
<i>Opportunistic Disinflation</i>	0.00	0.00
<i>Dove</i>	0.90	0.90

Note: Numbers in parentheses are from the previous Blackbook.

**Exhibit D-5: FFR Distributions**



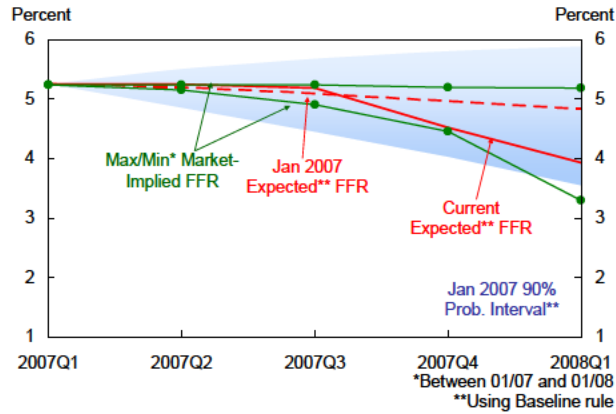
Note: The box represents the 50% probability interval, the line in the box the median, and the tails the 90% probability interval.

Source: MMS Function (FRBNY)

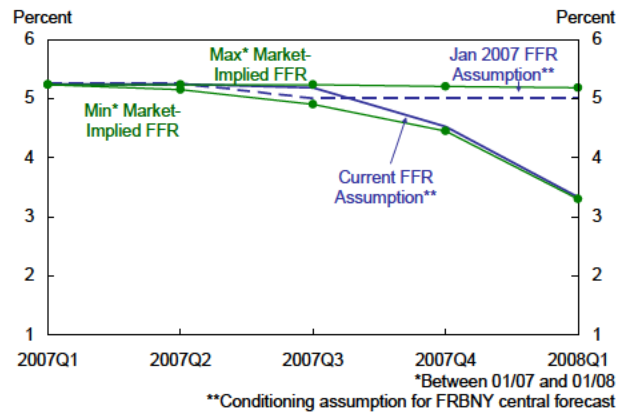
## D. FRBNY Fed Funds Rate Projections

### Exhibit D-6: Evolution of FFR Expectations and Assumption

**FFR Forecast Distribution and Market-Implied FFR**



**FFR Conditioning Assumption and Market-Implied FFR**



Source: MMS Function (FRBNY)

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## Alternative Scenario Descriptions

In this abbreviated version of the Exhibit C documentation, we include brief descriptions of the alternative scenarios used in this Blackbook. Full documentation, including a description of the methodology, is included in the Appendix.

Our first two alternative scenarios consider the impact of above- and below-trend productivity growth, respectively. 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 to 2004, High II). The NIPA revisions in July 2006 and 2007 prompted us to reduce our estimate of potential output growth; thus our current central projection for medium- and long-term productivity growth is somewhat lower than that of the pre-1973 epoch.

### **Alternative 1:** *Productivity Boom*

The recent decline in productivity growth might prove to be a temporary, cyclical one. In this case, it is possible we will return to the strong productivity growth of the High II epoch, with some mixture of IT-driven production and applications leading the way. Support for this view comes from Moore's law on the doubling of computing power every 18<sup>th</sup> months. As such, we could see persistent productivity growth above our assumed trend, implying a higher potential growth rate and thus expected real growth that is higher than our current estimate. Strong productivity growth would also limit labor cost pressures and thereby help to subdue inflation.

### **Alternative 2:** *Productivity Slump*

It is possible that the upswing in productivity that began in the mid-1990s has ended as the IT-driven surge has run its course. This would mean a period of productivity growth below the trend in our central forecast. Furthermore, the increase in the level and volatility of energy and commodity prices could continue and cause lower productivity growth, as occurred in the 1970s. Below-trend growth would not only imply a lower estimate of potential growth, but would also push inflation above the level projected in our central forecast.

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We also consider three additional scenarios, two related to the impact of past monetary policy and possible misperceptions of its past and current stances, and one related to the impact of developments in the global economy.

**Alternative 3: *Effects of Overheating***

Motivated principally by concerns over the prospect of deflation, the FOMC adopted a deliberately accommodative policy stance in the aftermath of the global slowdown of 2000-2003. It is possible the FOMC markedly underestimated the equilibrium real interest rate (i.e. overestimated the degree of slack in the real resources) during this period. In this case, their accommodative policy would have stimulated aggregate demand growth in excess of potential and, ultimately, triggered inflation. The above-potential output growth in 2004-mid-2006 and the persistent above-target inflation are consistent with such a scenario, as is the abrupt slowdown in real output growth that began in mid-2006. If this overheating episode occurred, it has likely passed already; however, there is a risk its effects will linger in the form of slightly above-forecast inflation and slightly below-forecast output growth.

Developments in the global economy during this period may have contributed to the economic conditions that motivated the initial policy and may also have made it more difficult for the FOMC to identify the overheating in real time. For example, one likely factor contributing to the deflation scare in the early part of this decade was the downward pressure on global goods prices triggered largely by growth in emerging economies' labor forces. Another critical factor may have been the exchange rate policies that a number of emerging market central banks adopted over this period. These policies, which were aimed at strengthening the dollar relative to their domestic currency, may have put significant downward pressure on long-term interest rates both in the U.S. and around the world, and in doing so, may have made it more difficult to correctly assess the equilibrium real interest rate during this period.

---

**Alternative 4: *Credit Crunch***

The financial turmoil that started in the summer of 2007 put a significant strain on the availability of credit. New issuances of commercial paper (CP) – in particular, asset-backed commercial paper (ABCP) – dropped sharply, and spreads between ABCP and AA-rated CP rose notably. Spreads on other credit products, including corporate bonds and CDS, also rose significantly. In addition, mortgage rates moved up, while credit standards began to tighten, making mortgages more difficult to attain. This combination of factors suggests the neutral rate is lower than before the financial turmoil began (we now estimate it to be between 3.5 and 4.0 in the near-term). The current FFR, which appears high relative to neutral, combined with the apparent lack of available credit creates a risk that output growth will slow significantly below the level projected in the central forecast; this would likely be accompanied by inflation below the level in the central forecast.

**Alternative 5: *High Global Demand***

Recent global growth, most notably in China and other emerging markets, has been robust; at the same time, low unemployment rates and relatively high capacity utilization rates in advanced economies outside the U.S. indicate there is little slack in the global economy. If these developments continue, there is a risk that high demand for U.S. exports will raise output growth above the level in the central forecast. At the same time, the strength in global demand could cause it to outpace supply, further pushing up commodity prices (and especially energy prices) and beginning to push up the price of imported manufactured goods. These increases would likely cause above-forecast inflation in the U.S.

The implications for inflation and output of the various scenarios can be summarized as follows:

1. *Productivity Boom*: inflation below central forecast, output above central forecast.
2. *Productivity Slump*: inflation above central forecast, output below central forecast.

3. *Effects of Overheating*: inflation above central forecast, output slightly below central forecast.
4. *Credit Crunch*: inflation below central forecast, output significantly below central forecast.
5. *High Global Demand*: inflation above central forecast, output above central forecast.



## Policy Rule Descriptions

In this abbreviated version of the Exhibit D documentation, we include a description of policy rules used in this Blackbook. Full documentation, including the methodology description, is included in the Appendix.

In both our *Baseline* and alternative policy rule specifications, the policy rate responds to deviations of inflation from target and of output from potential, while incorporating some degree of inertia. For each of the FFR paths and each of the policy rules, we determine these deviations using the corresponding inflation and output paths.

*Policy Rule – Baseline Specification:*

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

$\rho = 0.8$  (interest rate smoothing parameter)

$\dot{i}^* = 3.75$  in short - term, moving to 4.25 (neutral FFR)

$\pi^* = 1.5$  (core PCE inflation target)

$\varphi_\pi = 1.5$  (weight on inflation deviations)

$\varphi_x = 0.5$  (weight on output gap)

$\pi_t$  : core PCE, 4 - quarter average

$x_t$  : output gap, using 2.7% potential growth rate

$\dot{i}_{t-1}$  : interest rate in previous quarter<sup>2</sup>

Because we know that, if the FFR target moves at the next meeting, its move will usually be in increments of 25 basis points, we round the first forecasted FFR value from the *Baseline* and alternative policy rule prescriptions.<sup>3</sup> This serves to both capture some of the discreteness in FFR movements and to smooth the FFR paths from the current to the

<sup>2</sup> For 2008Q1, we used a value of 4.25 instead of the interest rate in 2007Q4.

<sup>3</sup> For this Blackbook, we did not use this rounding rule. Instead, for each rule, we used the first forecasted FFR value exactly as given by the rule.

upcoming quarter. We currently perform this exercise according to the following table, where  $r^*$  is the actual output from the policy rule:

Policy Rule Prescription	Average FFR in 2007Q4
$r^* < 3.00$	$r^*$
$3.00 < r^* < 4.00$	4.50
$4.00 < r^* < 5.25$	4.54
$5.25 < r^* < 6.00$	4.75
$r^* > 6.00$	$r^*$

We then feed these modified values into the policy rules to calculate the remaining FFR values.

The two variants of the *Baseline* rule that we use this cycle are the *Opportunistic Disinflation* and *Dove* rules. The *Opportunistic Disinflation* rule reacts more strongly than the *Baseline* rule to deviations of inflation from target when inflation is above the upper bound of the implicit target range (taken to be 2%) and falling. In such circumstances, it tends to raise the policy rate higher, then lower it more slowly than the *Baseline* rule. Specifically, in each quarter over the forecast horizon, if the four-quarter average of core PCE inflation in the prior quarter is above 2% and higher than the current quarter value, we substitute the prior quarter's core PCE inflation value for the current quarter's value in the *Baseline* policy rule specification (i.e. set  $\pi_t = \pi_{t-1}$ ). In all other cases we follow the *Baseline* rule prescription. Thus, if the four-quarter average of inflation in the last quarter is below the value for the current quarter or simply below 2%, the *Opportunistic Disinflation* rule offers the same prescription as the *Baseline* rule.

The *Dove* rule reacts more strongly than the *Baseline* rule to a negative output gap. When the output gap is negative, the *Dove* rule increases the weight on deviations of output from potential ( $\varphi_x = 1$  instead of 0.5). When the output gap is positive, however, the *Dove* rule offers the same prescription as the *Baseline* rule ( $\varphi_x = 0.5$ , as usual).

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In addition to the *Baseline* rule and the two variants, we also consider the FFR paths generated by the Board staff's *Outcome-based* rule. The most significant difference between the three FRBNY rules and the *Outcome-based* rule is that the FRBNY rules offer a prescription for future behavior based on policymaker preferences and views of the economy, whereas the *Outcome-based* rule is a statistical description of the average of past FOMC behavior. Specifically, the *Outcome-based* rule calculates an FFR for a given quarter as a function of the FFR in the previous two quarters, the current quarter's four-quarter core PCE inflation, and the output gap for the current and previous quarters using parameters estimated from real-time historical data (1988-2006)<sup>4</sup>.

We also want to compare the policy paths and distributions calculated using these rules with the market-implied path and distribution. In these charts, we use the standard path of market policy expectations derived from fed funds and Eurodollar futures contracts that is pictured in Exhibit A-5. For Exhibit D-6, we construct a distribution for the market-implied path by assuming it has a normal distribution centered at the standard, market-implied path, with a standard deviation derived from options markets (pictured in Exhibit A-6).

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<sup>4</sup> *Outcome-based* rule:  $i_t = 1.20*i_{t-1} - 0.39*i_{t-2} + 0.19*(1.17 + 1.73*\pi_t + 3.66*x_t - 2.72*x_{t-1})$