

FRBNY BLACKBOOK

January 2009

FRBNY Blackbook

RESEARCH AND STATISTICS GROUP

FOMC Background Material

January 2009

CONFIDENTIAL(FR) Class II FOMC

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1. Policy Recommendation and Rationale

Our policy recommendation is to keep the federal funds target unchanged at between 0 to 0.25%. The options to consider are further expansion of the balance sheet and communication strategies to affect expectations about future interest rates and inflation.

We recommend that the policy statement be enhanced by tying any move from the low target interest rate to the stabilization in the financial system, reflation in prices, and recovery in output and employment. Our specific recommendation is that instead of stating that the committee anticipates interest rates to stay low for “some time”, the statement would read that the “committee will keep the interest rate low at least until conditions in financial markets improve significantly, output and employment show clear signs of a sustained recovery and any risk of further declines in inflation have abated.” We further recommend that the committee explore the possibility of enhancing this statement with explicit numerical guideposts. Finally, we recommend that the committee backs this communication up with further expansion of its balance sheet, for example, through a further expansion of TALF.

We forecast that inflation will moderate substantially in 2009, with the significant likelihood of a few deflationary readings. This probability has increased since the last FOMC, despite aggressive monetary actions and the prospects of a large fiscal stimulus package. The outlook now has four consecutive quarters of negative growth and unemployment peaking at 9.4 in 2010. Assuming the recession started in December 2007, as suggested by the NBER dating committee, this implies a six quarter recession, the longest since WWII. While the central scenario is bleaker since the last FOMC meeting, the risk assessment around the forecast has not changed dramatically. We still see the Global Credit Crunch scenario as the most likely one by far, with a probability of 40%.

Recent data have been almost uniformly negative. Industrial production is falling at about a record pace and unemployment claims are at historical high. Various confidence measures are at record lows. Meanwhile, inflation expectations are still a bit below our comfort level. We are concerned about the specter of contractionary forces in prices and

output playing off each other, with falling prices raising the real rate of interest and suppressing demand, while ever lower demand puts additional downward pressure on prices. The zero interest rate bound makes it challenging to break these dynamics.

The data from financial markets have been mixed. Credit market conditions have generally improved slightly, short-term inflation compensation increased somewhat, but equity markets remain extremely volatile.

The FOMC needs to set clear short-term goals about the evolution of prices and output as part of its communication strategy. The commitment to keep the FFR unconditionally low, by itself, is not enough. In order for the communication to be effective, the FOMC needs to signal that it will not raise its target rate until there is a substantial recovery in prices and in output. This would be best done by clearly stating a short term goal for the price level.

The Committee has several policies in its arsenal that could back up communications of this kind. These include the various credit policies that the Federal Reserve is already implementing. The various credit facilities are designed to bring down spreads and improve the functioning of particular markets. They also serve a second objective. By expanding its balance sheet the Federal Reserve is increasing aggregate credit and thus working to bolster inflation and output. Thus while the expansion of Federal Reserve's balance sheet helps facilitate micro market functioning it can also enhance the credibility of the Federal Reserve's commitment to its price level goals. Explaining this second role should be part of the communication strategy aimed at influencing inflation and output expectations.

Finally, explicitly describing how expansionary fiscal policy will not trigger a FFR increases and implicitly monetizing the budget deficit to some extent by keeping the fund rates low through open market operations, is one additional action the Federal Reserve can take.

2. Significant Developments

2.1 Economic Developments

Slowing global growth and weak domestic conditions lead to further deterioration in the economic outlook over the inter-meeting period. Measures of inflation point to falling prices and an increased risk of deflation going forward.

Inflation. The total PCE index fell a record 1.1% in November while core PCE was unchanged. The 12-month change in core PCE slipped below 2.0% for the first time since March 2004, falling from 2.0% to 1.9% in November.

December CPI data had the total index falling 0.7%, while the core index was unchanged for the second month in a row. The total energy component fell 8.3% and food prices declined 0.1% after sharp increases throughout 2008. Over year-ago levels, the total index fell 0.1% and the core index increased by only 1.7%, down from 2.0% in November. The 2008Q4 change in the total index was -2.4% (annual rate), the largest quarterly decline in the history of the series.

Survey measures of inflation expectations declined again in December while preliminary January readings show some signs of moderate increases. The Reuters/Michigan median near-term (1-year) inflation expectations in December fell from 2.9% in November to 1.7% in December, the lowest anticipated inflation rate in over five years. Inflation expectations edged down to 2.6% at the longer end. Reading inflation expectations from financial data continues to be challenging. Inflation expectations derived from TIPS or swaps have come up somewhat at the short end but still indicate expectations of deflation.

Real activity. The economy showed signs of deterioration over the inter-meeting period with indicators suggesting that there was a very sharp contraction of GDP in 2008Q4.

Real PCE fell 0.6% in November on the heels of similar declines in the previous four months. Despite some surprising gains in spending on furniture, appliances and clothing, the outlook is for consumption to drop by around 4% in 2008Q4 and to remain weak through the beginning of 2009.

Housing market activity continues to deteriorate. Sales of new single-family homes fell for the fourth month in a row in November to a meager 407,000 units (annual rate). Existing home sales behaved similarly, falling 8.6% in November. Total housing starts plunged 15.5% in December following a 15.1% decline in November. The November reading of only 550,000 units (annual rate) is the lowest level of housing starts on record. Home prices are falling at a rapid pace with the FHFA (formerly OFHEO) purchase-only home price index down a record 1.8% in November.

Industrial production fell 2% in December and capacity utilization was at its lowest level since February 1983.

Labor market. Labor market conditions worsened over the inter-meeting period. Payroll employment dropped 524,000 in December bringing total job losses to 1.5 million over Q4. Every major private sector saw cuts in employment with the exception of education and health.

Aggregate weekly hours declined by 1.2% which is a very steep fall by historical standards. This is the largest drop since the weather-induced fall in January 1996. Excluding that event, this was the largest decline in aggregate hours worked since October 1982. Average hourly earnings are resilient in the face of rapidly deteriorating labor market conditions, suggesting that higher-skilled and more experienced workers are being retained. This is also consistent with sustained growth of productivity.

In the household survey, the unemployment rate rose 0.4 percentage point to 7.2% in December. The labor force participation rate edged down from 65.8% to 65.7% in December and fell by 30 basis points in 2008 as a whole, with declines concentrated in

young and prime-age male workers. Even more dramatic was the sharp drop in the employment-population ratio which fell from 61.4% to 61.0%. This is the lowest ratio since 1987.

The average duration of unemployment increased by almost a week to 19.7 weeks in December, indicating increased difficulty in finding jobs and weak job creation in the economy.

Trade. The trade deficit plummeted to \$40.4 billion in November, down from \$56.7 billion in October. Both imports and exports declined significantly, consistent with the worldwide slump in trade. In volume terms, exports fell by 3.3% while non-oil imports were down 6.8%.

The oil bill of \$23.6 billion in November was much lower than the October bill of \$37.2 billion (down 36.5%), largely due to a fall in oil prices from \$92 to \$67 per barrel in October.

Foreign economies. Economic indicators from all major regions have been strikingly weak over the inter-meeting period. Industrial production collapsed in the euro area, the U.K. and Japan in November, while confidence measures in these countries were down in December. Chinese GDP was flat in Q4 while Korean output fell 21% (saar). Global trade declined dramatically in November and December.

2.2 Financial Markets

U.S. Markets. The expected path of policy declined moderately over the inter-meeting period while Treasury coupon yields rose moderately. Credit market conditions generally improved and short-term inflation compensation increased, but equity markets declined.

The expected path of policy over the next two years shifted down as much as 30 basis points since the last FOMC meeting. Policy expectations were abruptly revised with the

December FOMC decision and announcement and also fell with weaker-than-expected data.

Nominal Treasury yields fell immediately following the December FOMC meeting, but rebounded in January as supply concerns increased.

Real yields declined, particularly at shorter-term horizons. Over the inter-meeting period, 5-year real yields declined 113 basis points causing 0-5 year inflation compensation to widen by 124 basis points. While some of the widening may be due to reduced downside risks to growth and a general improvement in market conditions, much of it is attributed to improved liquidity conditions in the TIPS market, causing liquidity premia to diminish.

Equity markets declined modestly over the inter-meeting period. Equity markets generally rose over the first-half of the inter-meeting period, with some of the performance attributed to strong monetary and fiscal policy announcements. Weaker-than-expected economic data and increased financial sector concerns subsequently contributed to equity market declines.

Credit market conditions generally improved since the December FOMC meeting with single-A corporate spreads narrowing 120 basis points to 518 basis points, and BB-rated corporate spreads narrowing 312 basis points to 1147 basis points. Money market spreads narrowed as well, with the 3-month LIBOR/OIS spread, for example, at 94 basis points on January 23 compared to 154 basis points on December 16.

Foreign Markets. Funding conditions in the industrialized world showed some tentative signs of improvement over the inter-meeting period with the 3-month euro and sterling LIBOR-OIS spreads decreasing by around 16 and 29 basis points, respectively. Nonetheless, the levels of these LIBOR-OIS spreads remain elevated.

In Europe, major players like Barclays, Deutsche Bank and Royal Bank of Scotland (RBS) announced significant profit warnings and job cuts due to severe market

conditions. In Japan, the largest three banks announced plans to raise an estimated \$20 billion of capital.

A number of European governments were forced to launch new bank support packages in an attempt to restart lending. In Ireland, the Anglo Irish Bank was nationalized. Also, the French government authorized on January 21 another 10.5 billion euro capital injection into its top 6 banks, with similar measures announced in Denmark. The U.K. package announced on January 20, however, was the most elaborate and consisted of:

- a facility for banks to take up government insurance against their expected bad debts (including AAA asset-backed securities);
- extending broad access to discount window facility to one year;
- allowing the Bank of England to directly purchase high-quality securities such as corporate bonds and commercial paper up to GBP50 billion (\$70 billion).

The U.K. government also increased its stake in RBS to 70 percent.

Since the last FOMC meeting there have also been some hesitant signs of stabilization of financial conditions in the emerging world. Emerging market bond spreads narrowed moderately over the period and the issuance of external sovereign debt has become slightly easier since the start of 2009. However, the pricing of debt remains on the high side due to elevated risk aversion amongst investors and issuance of corporate debt remains constrained.

These mild improvements followed significant liquidity support measures and policy easing across emerging markets. In China, the central bank continued to lower its reserve requirements for banks. The total decrease in these requirements since September 2008 is estimated to be equal to a total liquidity injection of about \$188 billion. The Indian government announced a wide range of administrative measures to provide liquidity support for non-bank financials and encouraging lending in general.

Equity indices in Europe and Japan fell over the inter-meeting period due to negative growth prospects and, in Europe, continued concerns about the health of the financial

sector. As a consequence of the latter, European financials continue to be hit hard with Barclays equity price down around 50 percent, Deutsche Bank down around 35 percent and BNP Paribas falling 40%. Emerging markets equities declined on the gloomy global economic outlook.

Energy prices were relatively stable over the inter-meeting period, despite a decision by OPEC to curb its oil production and political turmoil in the wake of the Israeli-Palestinian armed conflict in Gaza. As in previous periods, concerns about the depth of the global recession and its impact on global energy demand have been the most important determinants of energy price movements.

Long-term interest rates decreased in the euro area and Japan, around 15 basis points, and were broadly unchanged in the U.K. These declines were mainly driven by the decrease in energy prices as well as the impact of the recessions in these respective economies. In emerging Asia, long term interest rates continued to decline.

The U.S. dollar appreciated against the euro and was broadly unchanged *vis-à-vis* the yen. In trade-weighted terms, the dollar was up 5 percent. This reflects the increasingly dour outlook for growth abroad and consequently a higher possibility of further policy rate declines, especially in Europe. The continued strength of the yen reflects a lack of appetite for carry trades by investors as risk aversion levels remain elevated. The dollar was stable against the Chinese yuan, with forward rates suggesting a depreciation of the yuan against the dollar based on a worsening outlook for the Chinese economy, especially its exports, and the current strength of the dollar.

2.3 Global Economic Policy

Consumer price inflation in Europe and Japan is on a downward trajectory and data make it clear that these economies are in a recession, with the prospect of a further deepening of this downturn in 2009. In response to these developments, a number of major central banks across Europe and Asia continued to slash policy rates:

- A policy rate cut of 20 basis points by the Policy Board of the Bank of Japan announced on December 19, 2008. In addition, the Bank of Japan stepped up its liquidity support operations and increased its purchases of government bonds.
- A cut of 50 basis points by the Bank of England on January 8, which brings its policy rate to 1.5 percent – the lowest level ever.
- The ECB cut its policy rate with 50 basis points to 2 percent on January 15.

Confidence indicators suggest further deterioration in Europe and Japan, raising the probability of additional policy moves. In Japan, this would be in the form of quantitative easing, whereas in Europe policy rates still have room to come down. Policy rates are expected to fall close to zero in the U.K. and to 1% in the euro area in the first half of 2009.

Elsewhere, monetary policies continued to become more accommodative. The People's Bank of China cut its main policy rates on December 22, 2008 by 27 basis points. Additionally, it announced further reductions in reserve requirements for banks, a new, high, money growth target for 2009 and targeted efforts to lower mortgage rates. Other central banks, in particular in India, Saudi Arabia and Turkey, lowered their respective policy rates, often by 100 basis points or more.

3. Evolution of Outlook and Risks

3.1 Central Forecast

Conditioning assumptions. The outlook for the economy has darkened considerably since the December FOMC, prompting a further marking down of the forecast for GDP. In our central projection, the US economy remains in recession through mid-2009. At the trough, the level of real GDP is about 2% below the 2007Q4 peak, somewhat less than the most severe recessions in the post-war period. By the second half of 2009 recovery begins to take hold, aided by the preemptive path of monetary policy, various initiatives to foster financial market stability, and aggressive fiscal stimulus measures. Growth returns to just above its potential rate by 2010, implying only a modest narrowing of the

output gap over the forecast horizon. At the trough, the unemployment rate is expected to be around 8.75%, a full four percentage points above the level at the peak. This is large relative to the decline in GDP due to continued moderate growth of productivity and a rather muted decline in the labor participation rate. Moreover, the unemployment rate is expected to continue rising over the first year of recovery, likely reaching 9.25%, as the participation rate and average weekly hours move upward again. Thereafter, the unemployment rate moves down, but only gradually. Although we judge this modal forecast to be the most likely near-term outcome, the risk that this recession will be more severe than any in the post-WWII period is high.

In addition to the weaker growth prospects for the US, the foreign growth outlook has also been downgraded since December, particularly for 2009. We now project that foreign GDP (on a GDP-weighted basis) contracted by 0.8% in 2008 (Q4/Q4) and will be essentially unchanged in 2009 before recovering in 2010. The developed economies are expected to follow a growth path similar to our own. In contrast, emerging economies are expected to continue to grow but will experience a period of below potential growth.

With weaker growth of the global economy, the path of oil prices assumed in the modal forecast has been lowered once again. We expect the price of West Texas Intermediate grade oil to average \$45 per barrel in 2009Q1, \$5 lower than in December. Consistent with futures quotes, we expect a modest rise in oil prices from current levels through the end of 2010, with the 2009Q4 average price at \$59 per barrel and the 2010Q4 average price at \$66. Our assumed path for oil prices is modestly higher than that of the Greenbook.

With lower oil and other commodity prices, a larger output gap, and a somewhat higher exchange value of the dollar, the path of both total and core inflation in the current modal forecast is somewhat lower than in December. In particular, aggressive pricing in response to weak final demand will keep downward pressure on prices over the first half of 2009, when we expect the core PCE deflator to rise just 0.5% (annual rate). We expect core inflation to then firm somewhat as recovery begins to take hold, but still anticipate

core inflation of just 0.9% for 2009 (Q4/Q4). In this environment, and particularly given the downside risks to growth, the risk of deflation is quite high.

Given the downgrading of growth prospects and the lower path of core inflation, we have further extended the date at which a renormalization of monetary policy begins. Thus, rather than rising to 1% by the end of 2010 we now assume that the FFR will remain in the 0 to 0.25% range over the entire forecast horizon.[Exhibit B-2].

As is our usual practice, our assumptions for equity prices, the real exchange value of the dollar, and home prices are similar to those of the Greenbook. Equity prices are assumed to increase 12% in both 2009 and 2010, driven primarily by a narrowing of risk spreads. This assumption is unchanged from the December Greenbook, although the starting point is lower. The real exchange value of the dollar is assumed to increase modestly in the near-term but then gradually decline by about 4% by the end of 2010. The projected path of home prices is essentially unchanged. The Board anticipates a further 15% to 16% decline of the Loan Performance home price index by the end of 2010, for a total peak to trough decline of about 32%. This corresponds to our assumption of about a 20% peak to trough decline of the Federal Housing Finance Administration (FHFA, formerly the OFHEO) purchase-only home price index.

Relative to the last Greenbook, the Board staff has increased the total size of the fiscal stimulus package assumed in their forecast from \$500 billion over two years to \$800 billion over two years. In addition, the composition of the package has shifted away from tax cuts toward increases in outlays. The broad outlines of the assumed fiscal measures are as follows:

- A permanent reduction of income taxes of \$180 billion over the first two years;
- \$400 billion of grants to the states, with \$200 billion targeted toward infrastructure investments and \$200 billion for general purposes;
- Extension of unemployment benefits and increases in food stamps which combined increase federal transfers to household by \$90 billion over 2009 and 2010;

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- Temporary business tax cuts of \$120 billion over two years, including bonus depreciation, increased limits on expensing, and a 5-year NOL carry-back;
 - A \$50 billion federal program to buy down mortgage interest rates for qualifying homes purchased in 2009 by 1 percentage point;
 - \$10 billion of additional federal outlays.

In addition, the Board staff assumes that \$50 billion of TARP funds will be used for mortgage loan modifications for homeowners at risk of default and \$50 billion for reducing mortgage interest rates for qualifying home buyers.

Conceptually, we have introduced a fiscal stimulus of comparable magnitude into our forecast. However, we judge that the effect of this package on the modal forecast will be more muted than is assumed in the Greenbook, at least over the near-term. First, the tax bill currently being considered by the Ways and Means Committee does not include a permanent reduction of personal income taxes. What is included is a refundable credit of 6.2% of earned income, up to a maximum of \$500 for an individual and \$1000 for couples, most of which will not be received by tax payers until the first half of 2010. We have concluded that this is likely to have a considerably lower multiplier than a permanent tax cut. Second, we judge the business tax cuts as having limited effect given the very low capacity utilization rates implied by our modal forecast. Finally, the stimulus from the transfers to states is likely to be drawn out over time.

We maintain our estimate of potential GDP growth at 2.7%, composed of 1.2% trend hours growth (although we assume this growth will begin to decline in 2009-2010) and 1.5% trend productivity growth (on a GDP basis, which is equivalent to 1.8% on a nonfarm business sector basis). As always, there is substantial uncertainty around our estimate of potential GDP growth. The Board staff has retained their estimate of potential at 2.2% in 2009 and 2010.

We expect the lower degree of inflation persistence evident since the early 1990s to continue. This assumption is in contrast to the greater degree of inflation persistence

assumed in recent Board staff forecasts. In our central scenario, inflation expectations decline as overall inflation slows. This return of inflation expectations to the mandate-consistent range plays an important role in the gradual moderation of inflation toward the midpoint of the FOMC's objective for core PCE inflation of 1.5% to 2.0%.

Inflation. In our central scenario, total inflation is at first negative as the effects of recent sharp declines in energy and other commodity prices pass through to prices paid by consumers. Core inflation is very low in the first half of 2009 reflecting the quite abrupt decline in final demand. In particular, prices of non-food, non-energy goods decline relatively steeply as businesses aggressively cut prices to reduce excess inventories. Thereafter, both total and core inflation gradually return to the mandate consistent range as final demand firms within the context of anchored inflation expectations.

Real activity. Within this central projection, consumer spending remains relatively sluggish through 2009 as households respond to the decline in their net worth by boosting saving out of current cash flow. The correction in housing production is expected to be largely completed by mid-2009. At that point the large drag that residential investment has exerted on growth for the past three years will subside. Thereafter, housing is likely to be a modest plus for growth, but the surge of residential investment experienced in the early stages of past recoveries is not anticipated due to the continued high levels of homes entering the market through the foreclosure process.

Business investment in new structures and new equipment and software is expected to decline sharply in 2009 as capacity utilization rates decline and vacancy rates rise. In addition, during the first half of 2009 we expect businesses to aggressively pare inventories to compensate for sluggish demand. With the sharp downgrading of foreign growth prospects, exports are expected to decline through mid-2009 with significant growth not returning until 2010. Nonetheless, in the near-term net exports remains a plus for growth in an accounting sense as imports also decline due to the weakness of domestic demand. During the second half of 2009 the net export contribution gradually declines and then turns negative in 2010 as the recovery of domestic demand induces an

increase in the rate of growth of imports. Underlying this projected path of private final demand is the expectation that financial market functioning returns to more normal conditions and that consumer and business confidence is gradually restored. This, of course, is a key risk of the forecast. A related risk is that, even if financial markets and asset prices behave as assumed, the decline of household net worth embedded in this central projection induces a steeper-than-expected increase in the personal saving rate, keeping consumer spending weaker for longer.

3.2 Alternative Scenarios and Risks

The risk assessment has not changed dramatically since the last Blackbook. This may seem counterintuitive in light of both the renewed stress in the banking sector that has emerged in recent weeks and the worse-than-expected slowdown in the global economy. However, one has to recall that the risk assessment is relative to the *Central Scenario* forecast, and the latter has worsened since the last FOMC. Moreover, we expect that the fiscal stimulus package proposed by the new administration, together with the actions taken by the Federal Reserve, will succeed in limiting the downside risk to the US economy. Finally, the FRBNY risk assessment in December had already anticipated, via the *Global Deflation* scenario, much of the current downside risk.

Exhibit C-1 shows that the *Global Credit Crunch* scenario is still the most likely one by far, with an associated probability above 40%. The *Global Deflation* scenario is not very likely, as the associated probability of entering the scenario is less than 5%. Exhibit C-2 displays the core PCE inflation and growth paths associated with the various scenarios. These paths have changed since the last Blackbook as a result of lower core PCE inflation and output forecasts in the *Central* scenario. For instance, the core PCE forecast in the *Global Credit Crunch* scenario currently entails two quarters of deflation, unlike in the previous Blackbook, and a four quarter contraction in output of almost 5% in 2009Q2 (versus 4% in the previous Blackbook). The *Global Deflation* scenario currently foresees a 4-quarter decline in core PCE lasting though 2010Q1, while in the previous Blackbook such decline was over by the end of 2009.

These changes result in a modest downward shift in the forecast distribution for both inflation and output [Exhibit C-3]. The 5th and 95th quintiles of the core PCE inflation forecast distribution for 2009Q2 have decreased 50 basis points from -1% to below -1.5%, and from 2.5% to 2%, respectively. The “Depth of Deflation” chart shows that the probability of low inflation/deflation (defined as average annual inflation lower than 1.5% in the 2009-2011 period) has increased from 11% to 15%. The expected decline in the level of output conditional on being in a low inflation/deflation environment is currently 12%. The 5th and 95th quintiles of the GDP forecast distribution have declined only slightly. The “Depth of Recession” chart shows that the likelihood of a “severe” recession, defined as a four-quarter drop in output larger than 3%, is now at 70%.

4. Forecast Comparison

4.1 Greenbook Comparison

The path for the FFR is the same for the Greenbook and the Blackbook, with both projecting the FFR to stay at 0.25% at least until the end of 2010.

Conditioning Assumptions. The potential growth assumptions in the Blackbook and the Greenbook are unchanged (2.7% versus 2.2%, respectively). The difference between these two rates comes mainly from assumptions regarding labor force participation and structural productivity. Specifically, the Greenbook assumes that the labor force participation rate will decline to 65.3% in 2010, while we assume a rate of 66.1%.

The main difference between the Greenbook and the Blackbook is the size, timing, and the effects of the fiscal stimulus package. The Greenbook now incorporates into its projections a fiscal stimulus package amounting to \$800 billion over two years, compared to \$500 billion in December. As a result, the personal savings rate in the Greenbook is substantially higher than in the Blackbook (5.2% and 1.2%, respectively, in 2009).

International. The FRBNY forecast for the net export contribution to 2008 GDP growth (Q4/Q4) is 1.2 percentage points, slightly higher than the Board's forecast of 1.1 percentage points. This small difference arises from the Board's much higher forecast for oil import in 2008Q4. The FRBNY forecast for the net export contribution to 2009 GDP growth is 0.6 percent points, whereas the Board's forecast is -0.1. This difference is largely due to the FRBNY factoring in a slower recovery in import growth, due to a less optimistic assumed path for U.S. domestic demand.

Inflation. The inflation forecast in the Greenbook for 2009 is very similar to the Blackbook, as both predict a decline of around 1.0% in core PCE inflation. However, for 2010 our projection is considerably higher than the Greenbook projection (1.6% and 0.8%, respectively). The two forecasts for total PCE inflation have similar differences.

Real activity. Both the Greenbook and the Blackbook expect a significant drop in projected output for 2008Q4, with the Greenbook projecting that GDP contracted 4.9% and the Blackbook projecting 4.6%. The downturn going forward is more severe in the Blackbook, with GDP down 1.3% in 2009. The Greenbook has GDP falling -0.8%. Correspondingly, the Greenbook expects a lower unemployment rate than the Blackbook this year (8.4% versus 9.2%, respectively). The Greenbook assumes an average monthly decline of 192,000 in payroll employment and the Blackbook assumes a 280,000 average. The main cause of difference between the forecast is that the Board staff projects a bigger and faster impact from the stimulus plan.

Uncertainty around forecasts. The Blackbook has more inflation uncertainty in the forecast, particularly in 2009. The Blackbook assigns more probability to lower inflation this year than the Greenbook, with the bottom of the forecast probability interval at -0.7% versus 0.5% in the Greenbook. For growth, the Blackbook incorporate significantly more downside risk than the Greenbook. The lower end of the 70% forecast interval is -5.3% for 2009 and -0.3% for 2010 in the Blackbook, while the corresponding numbers are -2.2% and 1.2% in the Greenbook. The upper ends of the 70% forecast intervals for the GDP growth are similar in the Blackbook and the Greenbook.

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 difference between the core PCE forecasts of the Greenbook and the Blackbook is more pronounced than it was in December. As in December, the largest gap is between the forecasts for core PCE inflation in 2010. The discrepancy between the outlooks for growth has widened for 2009 and 2010. The Greenbook forecast for growth in 2009 lies at the 68th percentile of our forecast distribution, reflecting the relatively optimistic projection of the Greenbook for the GDP growth.

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

	Core PCE Inflation		Real GDP Growth	
	<i>FRBNY</i>	<i>Board</i>	<i>FRBNY</i>	<i>Board</i>
2008	1.4-2.0 (1.4-2.2)	1.7-2.0 (1.8-2.3)	-1.9-0.2 (-2.2-0.4)	-0.6 - -0.3 (-0.8-0.1)
2009	-0.7-1.7 (-0.2-1.9)	0.5-1.5 (0.6-1.7)	-5.3-0.5 (-4.1-1.4)	-2.2-0.7 (-2.4-0.6)
2010	0.5-2.4 (0.7-2.3)	-0.1-1.6 (-0.2-1.7)	-0.3-4.5 (-0.1-4.4)	1.2-4.0 (1.1-3.8)
2011	0.1-2.9 (1.1-2.4)	n/a (n/a)	2.2-6.5 (1.2-5.3)	n/a (n/a)

Table 2: Percentile of Greenbook Forecast in FRBNY Forecast Distribution

	Core PCE Inflation	Real GDP Growth
2008	72 (61)	57 (60)
2009	63 (57)	68 (52)
2010	22 (18)	55 (51)
2011	9 (7)	57 (82)

Alternative Greenbook forecasting scenarios. The Greenbook considers several alternative scenarios. The scenarios vary substantially in the way that they incorporate the effects of financial turmoil and the potential effects of monetary policy and fiscal stimulus.

The first scenario, *More Financial Stress*, increases the consequences from financial turbulence and considers the case of a more severe global contraction in 2009. In this scenario, the cost of borrowing and risk premium stay at high levels through 2010 and come down more slowly than in the baseline projection. In addition, home prices decline 10% more than the baseline projection. The financial turmoil is intensified by a 1% further decline in global growth which reduces oil prices to \$10 per barrel below the baseline scenario. This scenario is the most pessimistic one in terms of GDP growth and the unemployment rate in the medium term. Growth is only 0.6% in 2010 (as opposed to 2.6% in the baseline) and the unemployment rate is 9.3% (as opposed to 8.1% in the baseline). As a result of too much slack persisting through 2013, the core PCE inflation drops below zero in 2011 and 2012 and the FFR stays at its lower bound through 2013.

The second scenario, *More Cautious Spending*, studies the possibility of a sharper decline on consumer and business spending. In particular, this scenario assumes that the personal savings rate moves up to 6.5% in 2010 (as opposed to 5% in the baseline) and real business fixed investment expands 12% less than the baseline model. In this scenario, GDP contracts more severely than the baseline, drops by 6.1% in 2009H1, and expands by only 0.2% in 2009H2. Correspondingly, the unemployment rate peaks at a higher level than the baseline (9.2% versus 8.4%).

The third scenario, *Faster Recovery*, is the most optimistic alternative scenario in the Greenbook. In this scenario, the monetary and fiscal stimulus work more quickly than the baseline projection to jump-start the economy. This scenario features a V-shaped recession pattern, different than the last two recessions which were U-shaped. GDP grows by 5.6% in the second half of 2009 as opposed to 2.0% in the baseline. The unemployment rate peaks at 8.2% in 2009 and drops to 4.5% in 2011. Core PCE inflation

stays above 1% throughout the forecast horizon. This is the only scenario where the FFR is above 0.25% in 2010.

The fourth scenario, *Large-scale Asset Purchases*, examines the potential effects of an expansion of various liquidity and credit easing programs. Specifically, the Federal Reserve purchases an additional \$500 billion in agency debt and MBS as well as an additional \$500 billion in long-term treasury securities. As a result of these large-scale asset purchases, the interest on 30-year mortgages declines by 125 basis points and the yield on 10-year Treasury securities declines by 75 basis points. As a result of these declines, investment, consumption, and net exports pick up and GDP grows 0.6-0.7% higher than the baseline model. In addition, the FFR moves up from the zero bound a year earlier than the baseline scenario.

The fifth scenario, *Deflation*, considers the possibility of negative inflation. In this case, core PCE inflation declines to 0.1% in 2010 and falls below zero in 2011. Since the FFR is at its lower bound, the decline in inflation expectations causes the real interest rate to increase. GDP growth is 0.3% lower and the unemployment rate is 0.1% higher than the baseline in 2011.

The sixth scenario, *Anchored Inflation Expectations*, incorporates moored long-run inflation expectations. In this scenario, inflation expectations remain around 2%, preventing a decline in actual inflation. As a result, the economy recovers, inflation moderates and the FFR starts increasing in 2012. Activity is very similar to the baseline case since there is only a somewhat lower real interest rate.

4.2 Comparison with Private Forecasters¹

The last release of the Survey of Professional Forecasters occurred in mid-November and thus their forecasts do not incorporate information from the latest releases. As a result,

¹ Release dates of the private forecasts discussed in this section are in parentheses: Blue Chip consensus (12/10), SPF (11/17), Macro Advisers (12/08), and the PSI Model (12/12).

we focus on the comparison of the FRBNY forecasts with the PSI model, Blue Chip and Macro Advisers forecasts. To summarize, the FRBNY forecast predicts a more severe contraction in real GDP in 2009 than Macro Advisers and Blue Chip. In terms of inflation, the FRBNY predicts a lower inflation rate compared to other forecasts in the short-run (2009Q1) while the differences are modest in the medium-term (2009 Q4/Q4).

Real GDP Growth. The FRBNY forecast for real GDP growth for 2008Q4 is -4.6%. The PSI model, Blue Chip, and Macro Advisers forecasts for GDP growth are more pessimistic than the FRBNY for 2008Q4 with projections of -5.1%, -5.2% and -5.6%, respectively. However, the FRBNY forecast predicts a more severe contraction in real GDP in 2009 (-4.8% for 2009 Q1 and -1.3% for 2009 Q4/Q4). The Macro Advisers forecast real GDP growth of -4.2% in 2009Q1 and an overall increase of 0.4% for 2009Q4/Q4, while the Blue Chip forecasts a less severe decline in 2009Q1 (-3.3%) but overall negative growth in 2009 Q4/Q4 (-0.2%).

Core PCE Inflation. We have revised down our projection for core PCE inflation for 2008Q4 from 1.0% to 0.5%; meanwhile, the Macro Advisers projection is essentially unchanged at 1.0%. Both the Macro Advisor projections and the FRBNY projections for core PCE inflation were revised down significantly for 2008Q4 and 2009Q1. For 2009Q1, Macro Advisers reduced their forecast from 1.5% to 1.0% while our projection changed from 0.7% to 0.2%. Even though the FRBNY projection for core PCE is lower than Macro Advisers for 2009Q1 (0.2% and 1.0%, respectively), in the medium-run this discrepancy disappears as the FRBNY projection for 2009 Q4/Q4 is 0.9% and Macro Advisers' is 0.8%.

CPI Inflation. CPI inflation forecasts were revised down substantially across all forecast horizons; however, there are discrepancies in these forecasts. For 2008Q4, our forecast for headline CPI is substantially different from those of the Blue Chip and Macro Advisers for 2008Q4 and 2009. While we expect CPI inflation to be -5.5% in 2008Q4, the Blue Chip consensus forecast is -8.0% and Macro Advisers is forecasting -8.6%. For 2009Q1, both Macro Advisers and the Blue Chip are expecting a lower level of CPI

inflation than the FRBNY forecast (-3.2% and -2.1%, respectively, versus -1.3%). Our projection for 2009 Q4/Q4 is similar to the Blue Chip consensus (0.9% versus 0.7%) while the Macro Advisers projection is much lower at 0.1%.

Core CPI Inflation. In terms of core CPI inflation, the Macro Advisers projections are higher than ours for 2008Q4 and 2009Q1. In particular, Macro Advisers projects core PCE inflation to be 0.7% in 2008Q4 and 1.3% for 2009Q1 while we expect it to be 0.4% for both 2008Q4 and 2009Q1. For 2009 Q4/Q4, both the Macro Advisers and FRBNY projections have been lowered even though we still have a higher forecast for core CPI inflation: our core CPI inflation forecast is 1.2%, which is 0.3% higher than the Macro Advisers projection.

5. Robustness of Policy Recommendation

5.1 Sensitivity to Alternative Scenarios and Policy Rules

Our current policy recommendation is to keep the target federal funds rate in the 0-0.25% range through 2010. This recommendation is consistent with *all* of our policy rules under *all* scenarios, with one exception. Given that these policy rules are quite different from each other, and that the scenarios encompass a broad range of deviations from the *Central Scenario* forecast, this convergence in FFR prescriptions speaks to the gravity of the outlook. The only case where the FFR prescription is notably different from the policy recommendation occurs when the *Loss of Credibility* scenario is combined with the *Baseline* rule: in this case the prescription is to raise the FFR to 0.75% and then gradually increase it to 2.5% by the end of 2011 [Exhibit D-1].

Exhibit D-1 also shows the real FFR rates implied by the *Baseline* rule under the various scenarios. Importantly, this real FFR is computed ignoring the zero bound. The exhibit therefore shows the “neutral” real rate under the different scenarios: this rate ranges from -2% to -6%. Given that the nominal FFR is obviously constrained at zero, these figures can be interpreted as indicating the desired level of expected inflation under each scenario. For instance, under the *Global Deflation* scenario, the policy maker would

ideally generate an expected inflation rate of about 6% in order to bring the real rate to the desired level.

The prescription from the alternative policy rules, namely the *Asymmetric Price Targeting*, *Dove*, and *Outcome-based* rules are broadly similar to those from the *Baseline* rule. The main differences is that these alternative rules tend to be either more reactive to output (i.e. the *Dove* and *Outcome-based* rules) or more averse to disinflation (i.e. the *Asymmetric Price Targeting* rule), and therefore imply a lower desired real rate, *ceteris paribus*. For the *Outcome-based* rule, we show the nominal FFR ignoring the zero bound. This rule therefore has the nominal FFR reaching -6% under the *Central Scenario* and -14% under the *Global Disinflation* scenario by 2010.

We also use the DSGE-VAR to assess the current stance of monetary policy. When we run the counterfactual forecasts eliminating past policy shocks, we find that the DSGE-VAR predicts a FFR near zero in 2009Q1. Because of the gradualism implicit in the estimated policy rule, the counterfactual FFR in 2008Q4 is 1.5%.

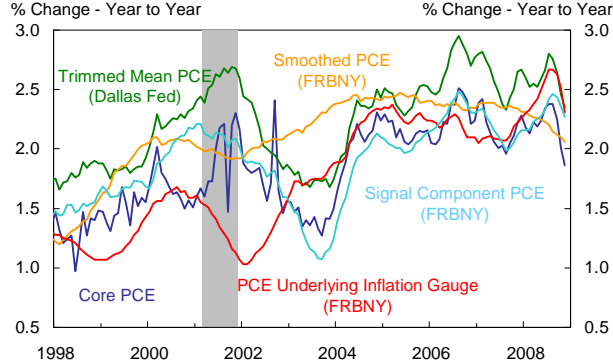
5.2 Comparison to Market Expectations

In the short run, our policy recommendation is very similar to the path currently priced into markets and to the forecast of the primary dealers. The expected market-implied FFR implies a very gradual renormalization starting in the second half of 2009, while primary dealers expect the FOMC to start raising rates only half way through 2010. Our recommendation is to begin raising rates only in 2011.

A. Significant Developments

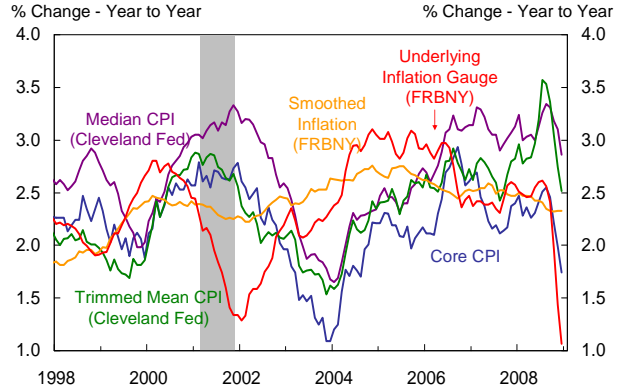
Exhibit A-1: Measures of Trend Inflation

Alternative Measures of PCE Inflation



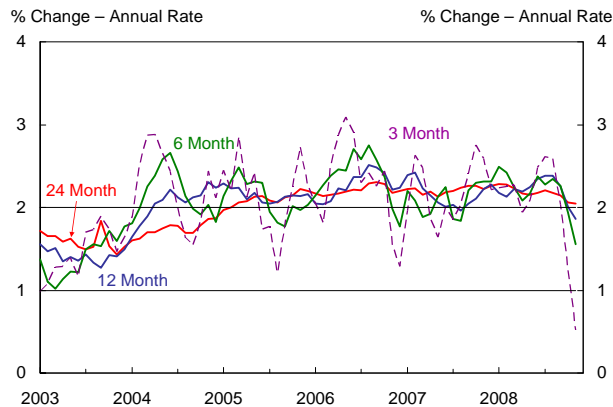
Source: Bureau of Economic Analysis, Cleveland Fed, MMS Function (FRBNY), and Swiss National Bank

Alternative Measures of CPI Inflation



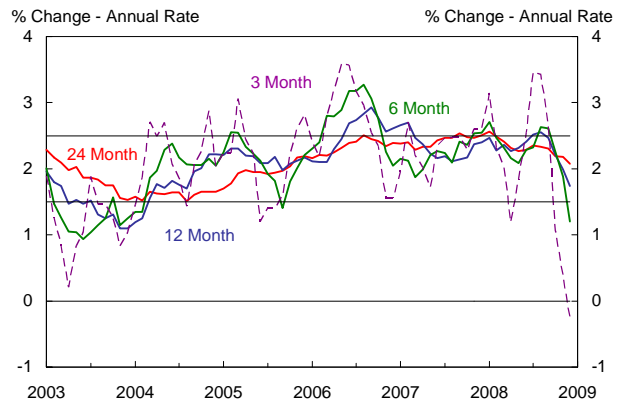
Source: Bureau of Labor Statistics, Cleveland Fed, MMS Function (FRBNY), and Swiss National Bank

Core PCE over Various Horizons



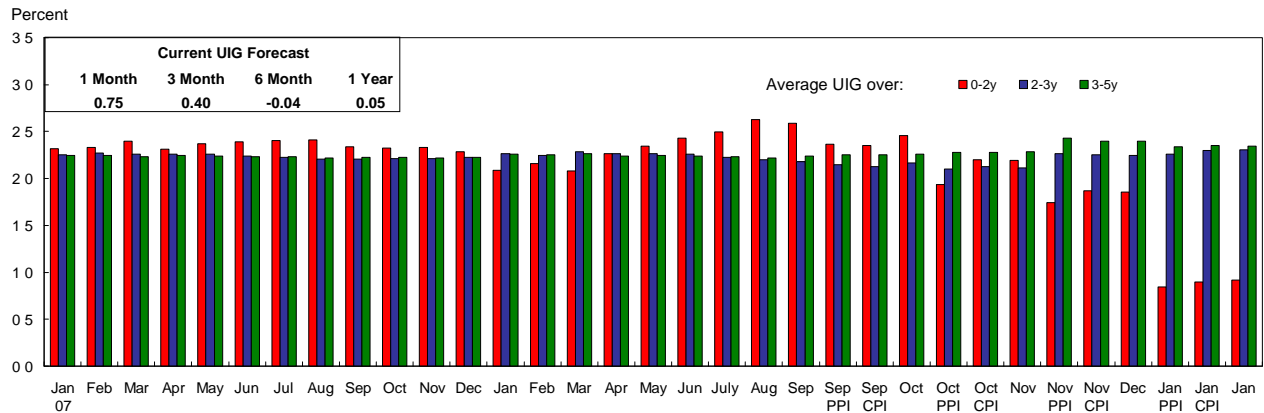
Source: Bureau of Economic Analysis

Core CPI Inflation over Various Horizons



Source: Bureau of Labor Statistics

Exhibit A-2: Underlying Inflation Gauge (UIG)

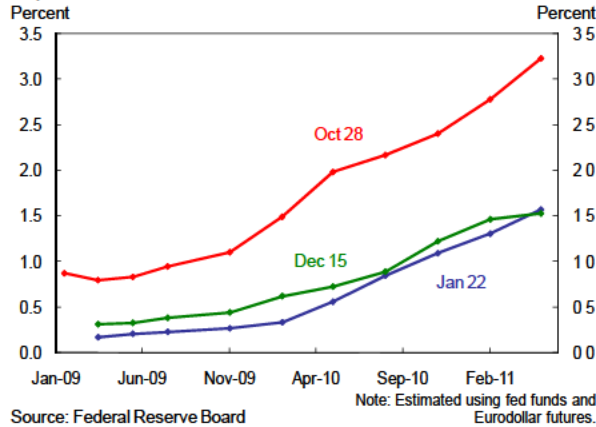


Source: MMS Function (FRBNY), Federal Reserve Board, and Swiss National Bank

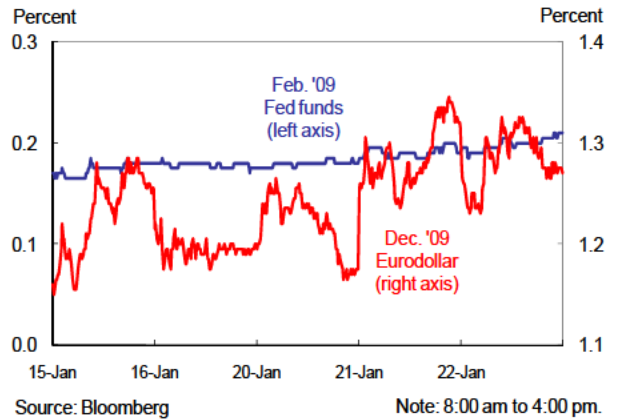
A. Significant Developments

**Exhibit A-3:
Policy Expectations and Uncertainty**

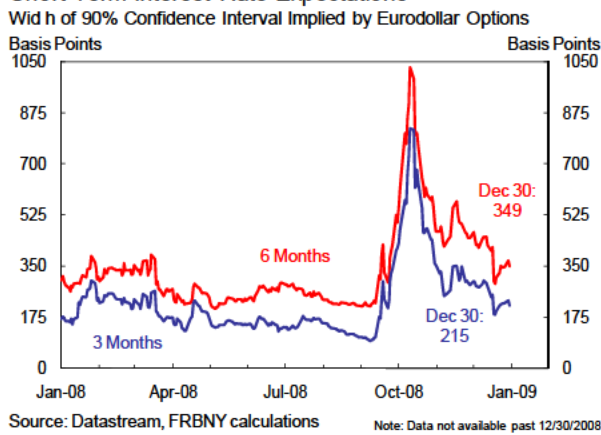
Expected Fed Funds



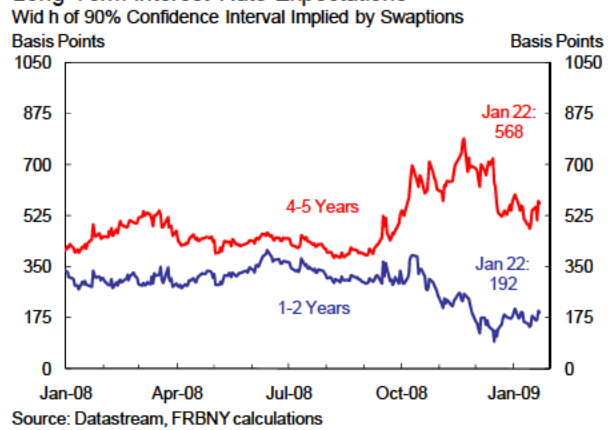
Implied Fed Funds and Eurodollar Rates (Intraday)



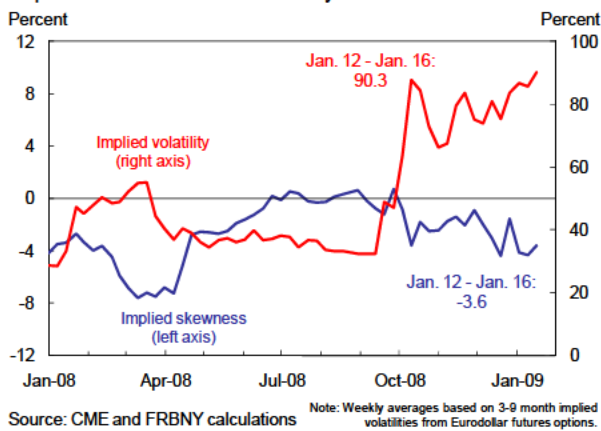
Short-Term Interest Rate Expectations



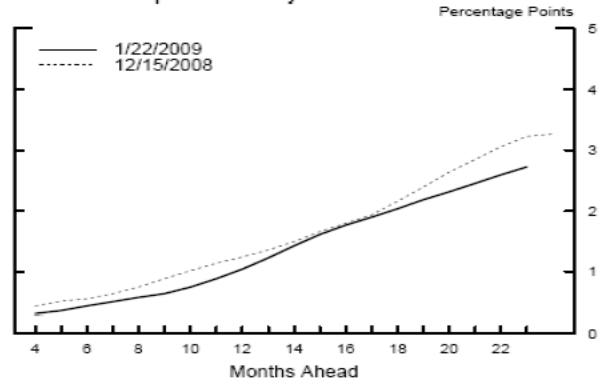
Long-Term Interest Rate Expectations



Implied Skewness and Volatility



Eurodollar Implied Volatility Term Structure*

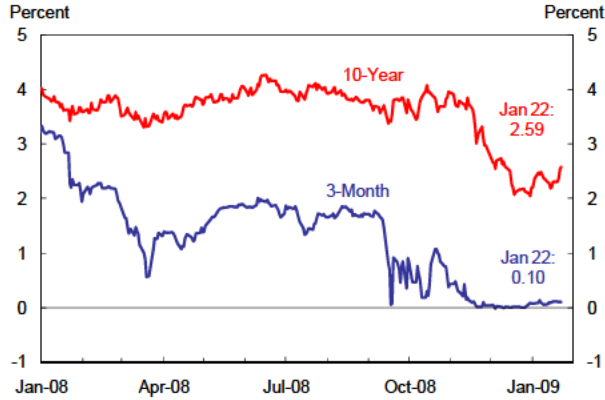


*Width of a 90 percent confidence interval computed from the term structures for the expected federal funds rate and implied volatility.

A. Significant Developments

**Exhibit A-4:
Treasury Yields**

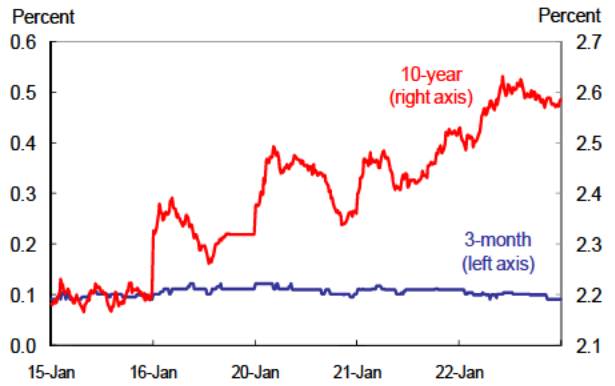
Short- and Long-Term Rates



Source: Bloomberg

Note: Yields of on-the-run securities

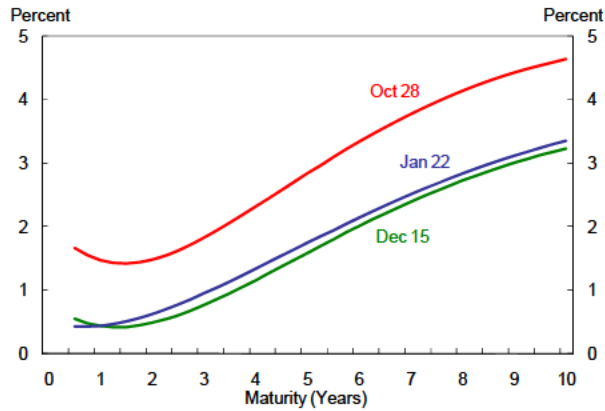
Short- and Long-Term Rates (Intraday)



Source: Bloomberg

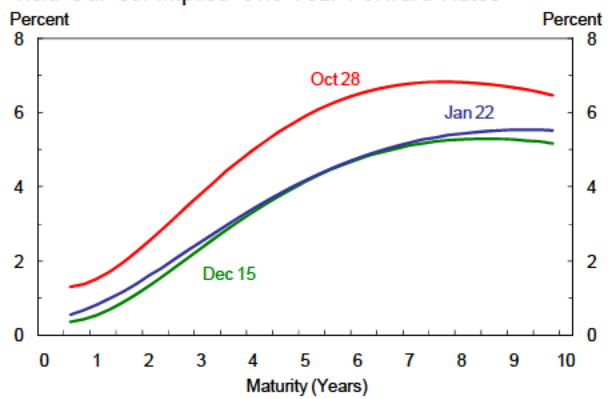
Note: On-the-run securities, 8:00 am to 4:00 pm.

Yield Curves



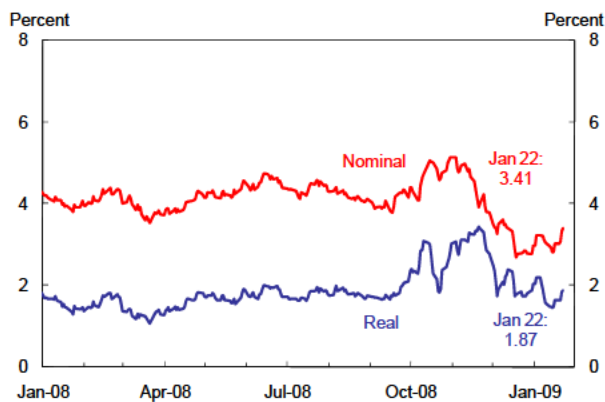
Source: Federal Reserve Board

Yield Curves: Implied One-Year Forward Rates



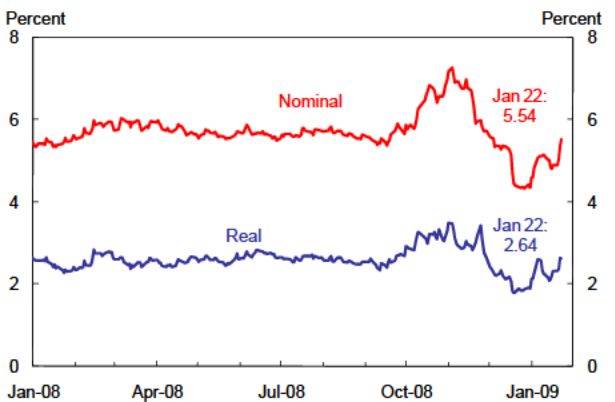
Source: Federal Reserve Board

4-5 Year Forward Rates



Source: Federal Reserve Board

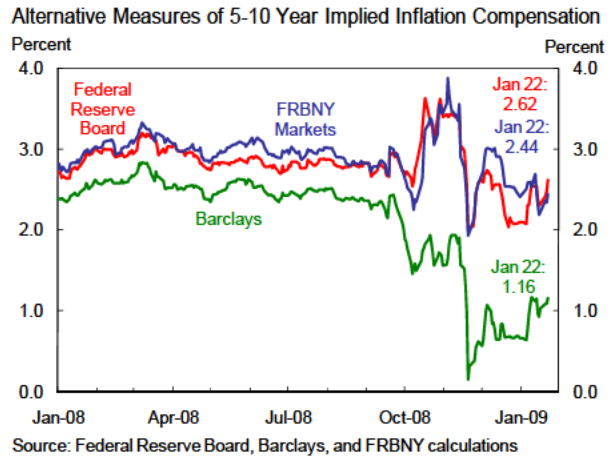
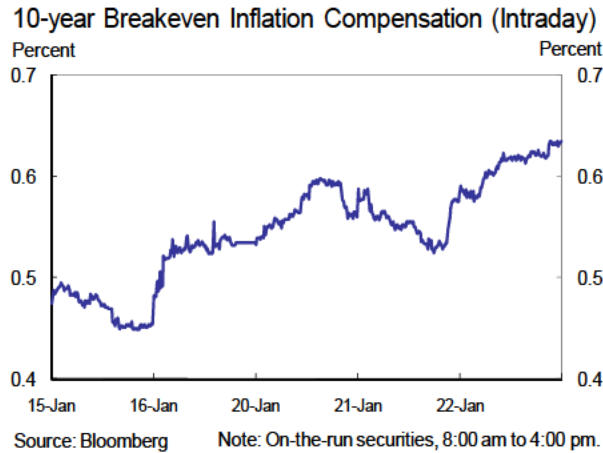
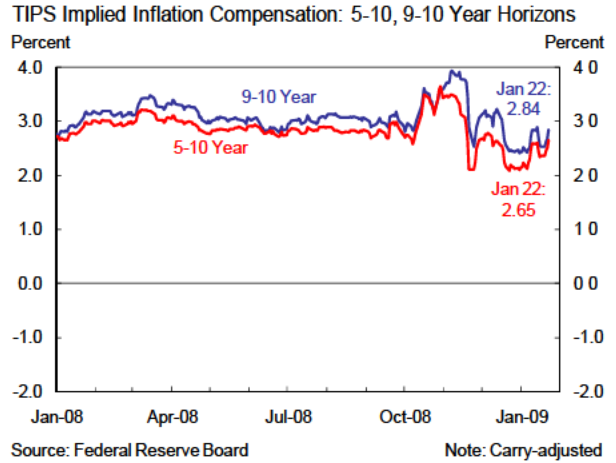
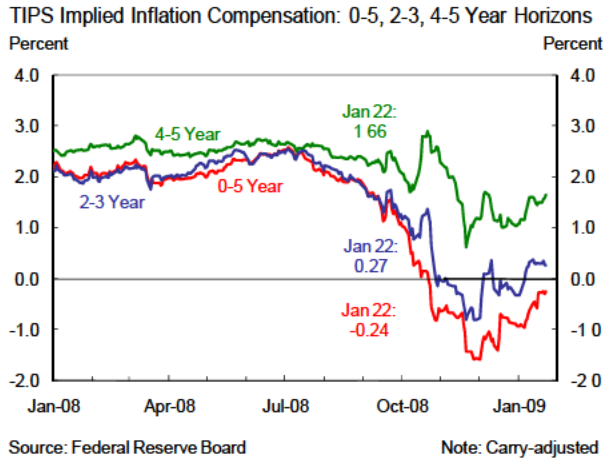
9-10 Year Forward Rates



Source: Federal Reserve Board

A. Significant Developments

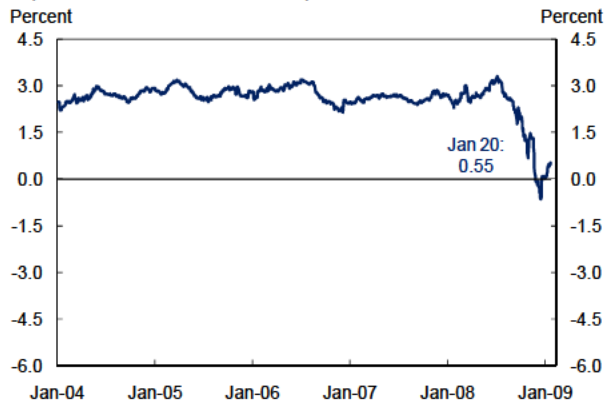
Exhibit A-5: Implied Inflation Compensation



A. Significant Developments

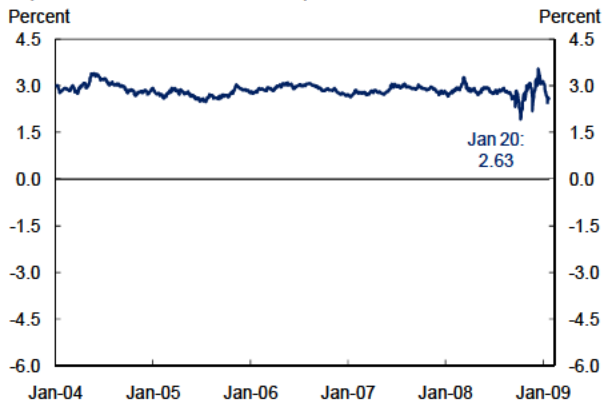
**Exhibit A-6:
Implied Inflation from Inflation Swaps**

Implied Inflation from Inflation Swaps: 0-5 Year Horizon



Source: Barclays

Implied Inflation from Inflation Swaps: 5-10 Year Horizon



Source: Barclays

Implied Inflation from Inflation Swaps: 0-1, 1-2, 2-3 Year Horizons

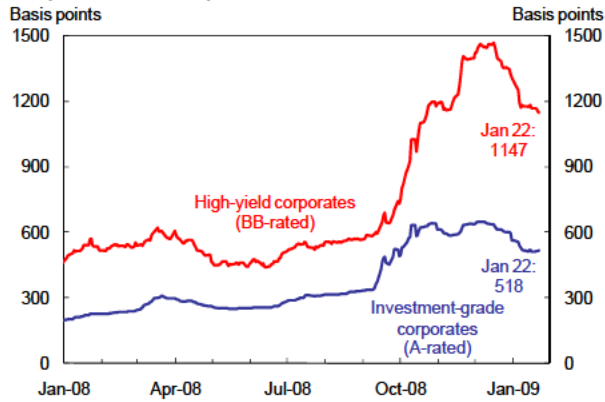


Source: Barclays

A. Significant Developments

**Exhibit A-7:
Credit Conditions**

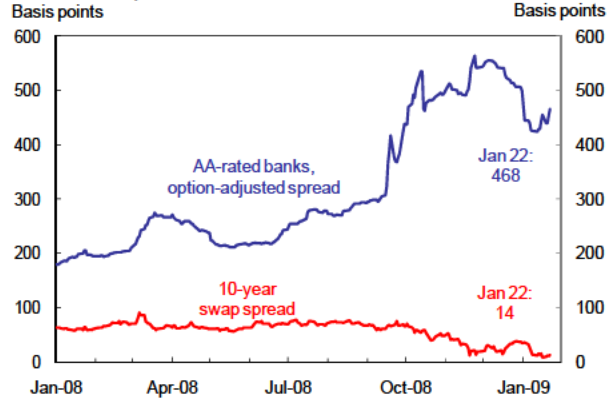
Corporate Credit Spreads



Source: Merrill Lynch

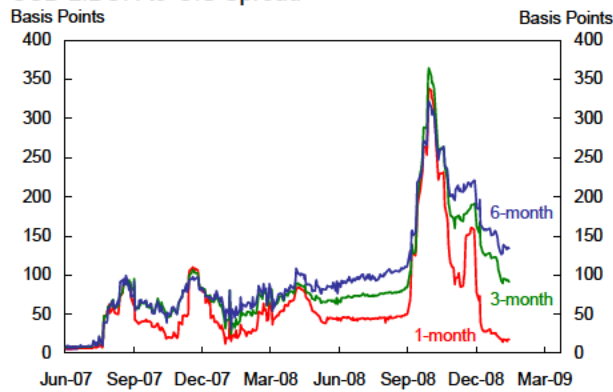
Note: Option-adjusted spreads.

AA Credit Spreads



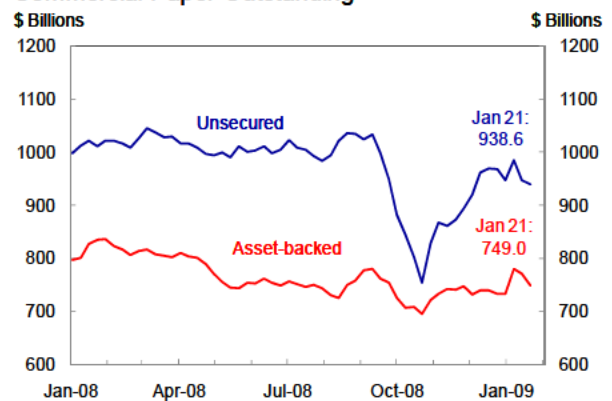
Source: Bloomberg and Merrill Lynch

USD LIBOR-to-OIS Spread



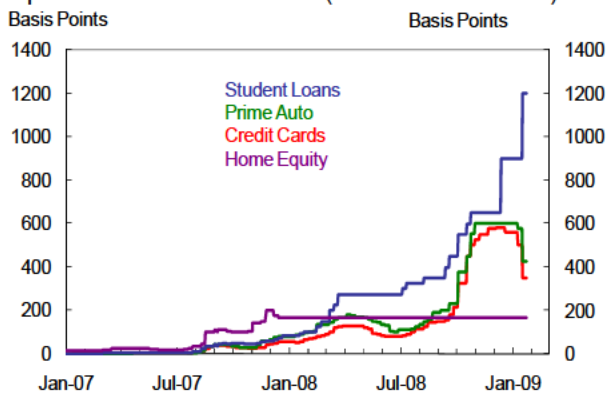
Source: Bloomberg

Commercial Paper Outstanding



Source: Federal Reserve Board

Spreads on Consumer ABS (AAA-rated tranches)

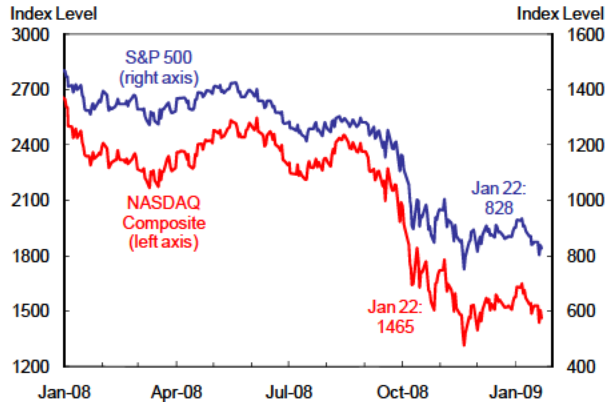


Source: JPMorgan

A. Significant Developments

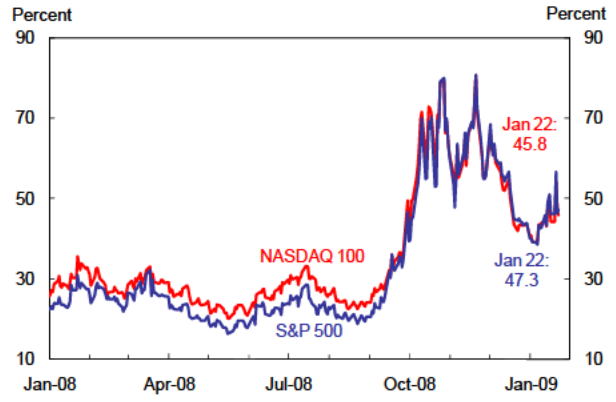
**Exhibit A-8:
Equity Markets**

Equity Index Levels



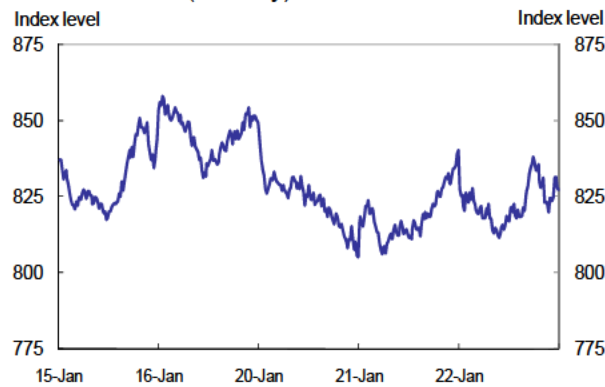
Source: Datastream

Equity Index Implied Volatility: 1-Month



Source: Datastream

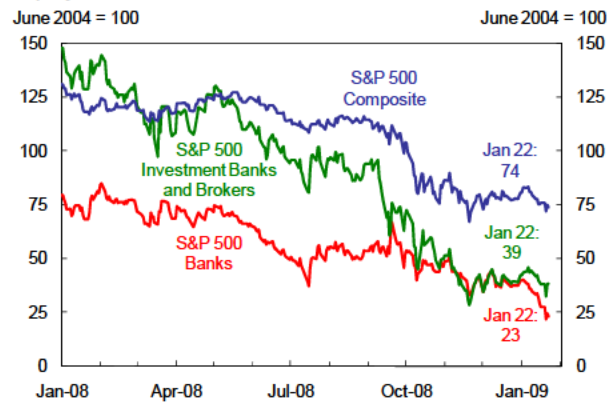
S&P 500 Index (Intraday)



Source: Bloomberg

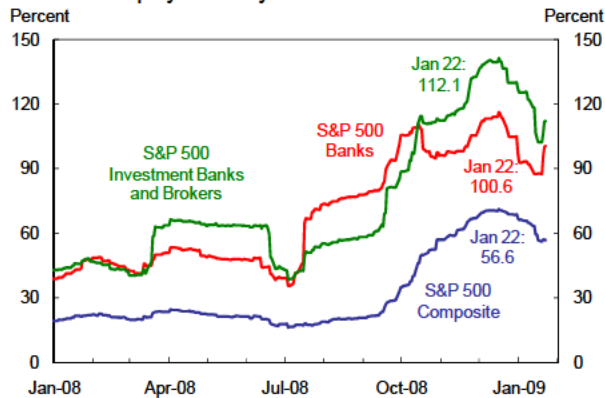
Note: 9:30 am to 4:00 pm.

Equity Performance



Source: Datastream

Historical Equity Volatility



Source: Datastream

Note: Annualized 3-month std. dev. of daily returns.

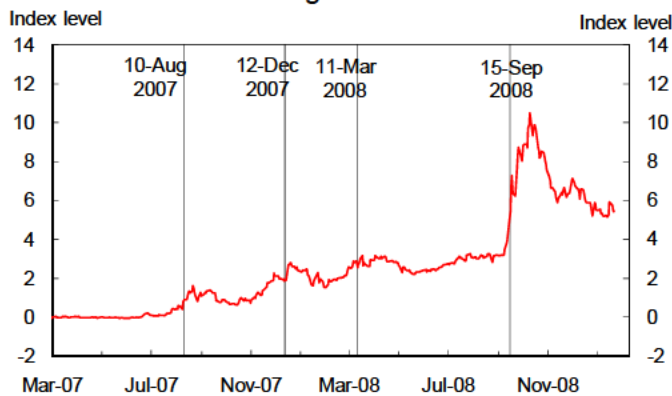
A. Significant Developments

Exhibit A-9: Interbank Funding Stress Index

	Current level (Jan 22)	Change since last FOMC (Dec 15)	Change since Oct FOMC (Oct 28)	1-year low	1-year high
Interbank funding stress index					
Overall index	5.45	-1.07	-2.85	1.51	10.49
Banking sector credit risk*	9.95	0.03	1.77	2.57	11.31
Fed lending facilities use	4.16	-1.34	-3.85	0.87	8.80
Cost of funds in the interbank market	2.25	-1.92	-6.46	0.96	12.75

*Data is not available for the JP Morgan Banking and Financial Services CDS Indexes from 12/4/2008 – 1/22/2009.

Overall interbank funding stress index



Source: New York Fed calculations

Banking sector credit risk



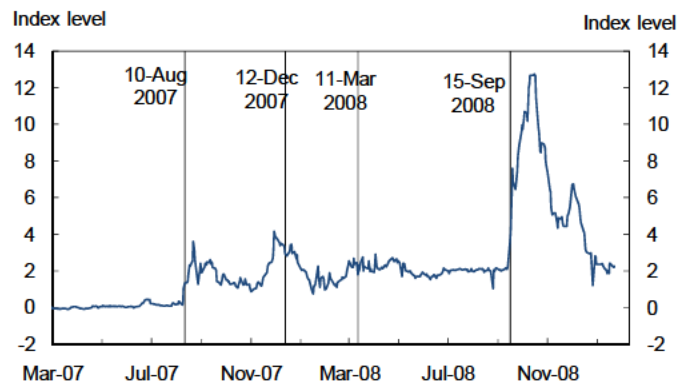
Source: New York Fed calculations

Fed lending facilities use



Source: New York Fed calculations

Cost of funds in the interbank market

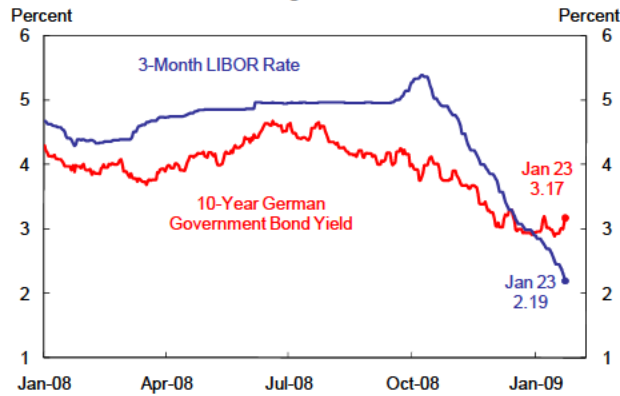


Source: New York Fed calculations

A. Significant Developments

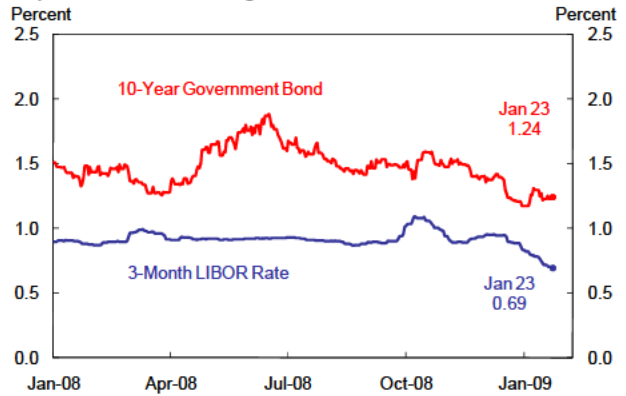
**Exhibit A-10:
Global Interest Rates and Equity Markets**

Euro Area Short- and Long-Term Interest Rates



Source: Bloomberg

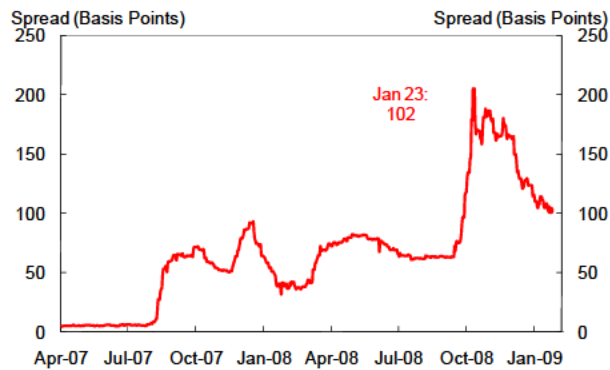
Japan Short- and Long-Term Interest Rates



Source: Bloomberg

Euro Area

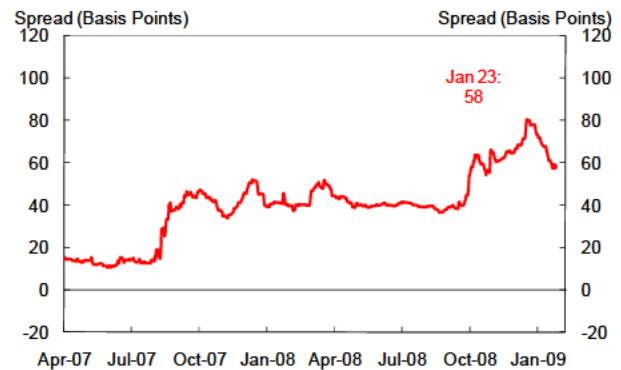
LIBOR Rate - OIS Swap Rate (3-month)



Source: Bloomberg

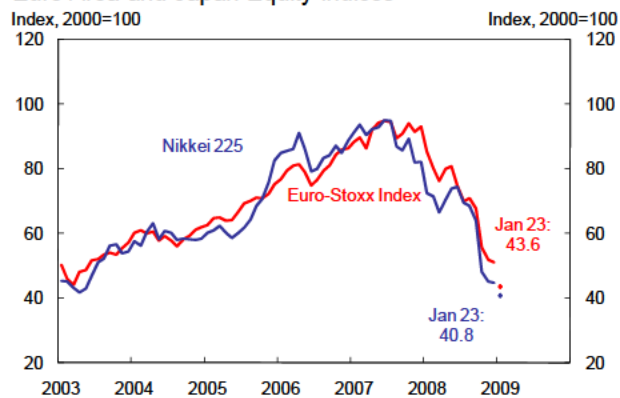
Japan

LIBOR Rate - OIS Swap Rate (3-month)



Source: Bloomberg

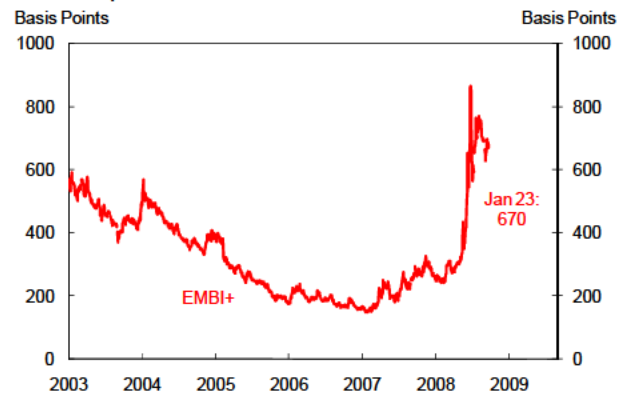
Euro Area and Japan Equity Indices



Source: BIS and Bloomberg

Note: Data are monthly averages.

EMBI+ Spread



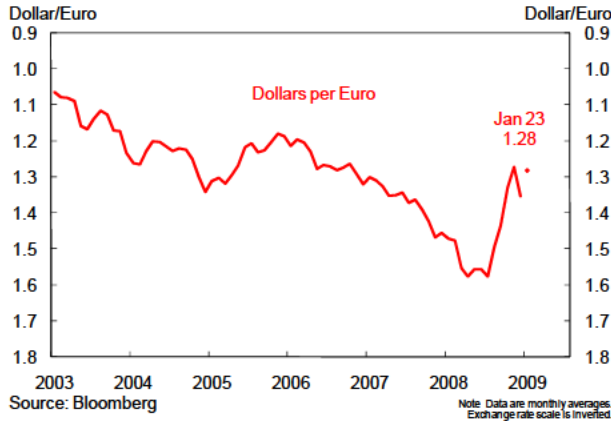
Source: Bloomberg

Note: Data are daily observations.

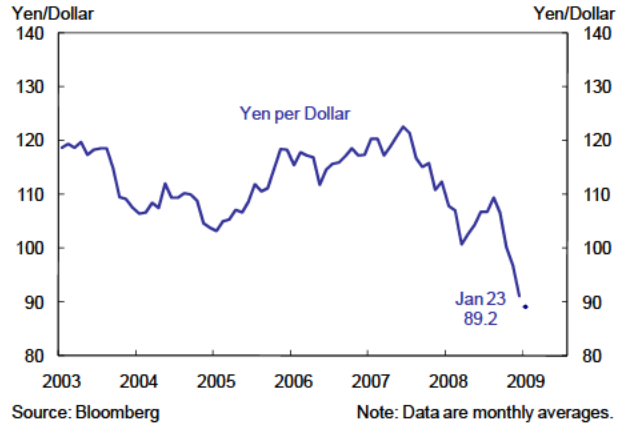
A. Significant Developments

Exhibit A-11:
Exchange Rates

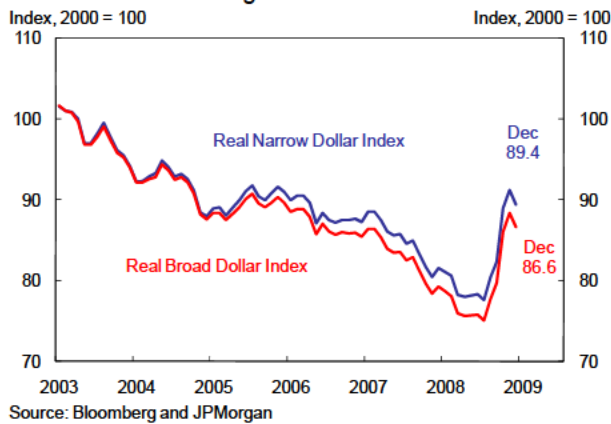
Dollar-Euro Exchange Rate



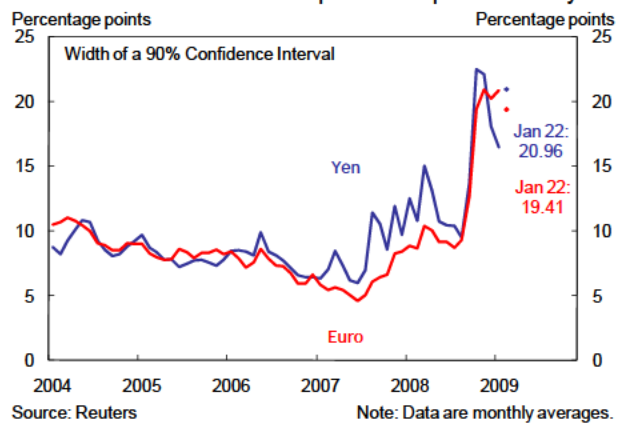
Yen-Dollar Exchange Rate



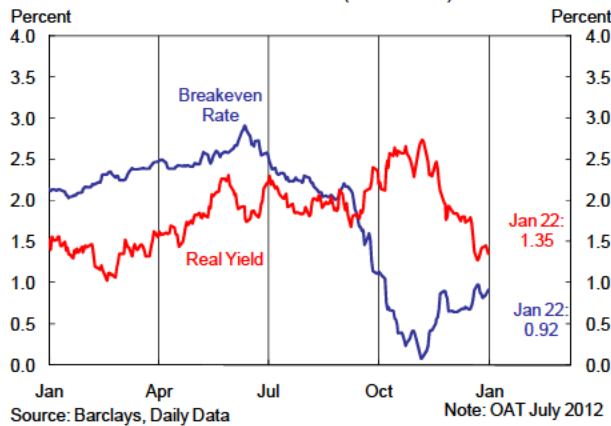
Real Effective Exchange Rates



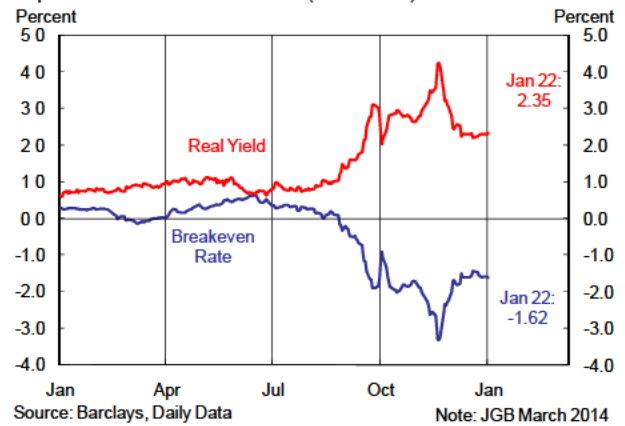
Euro and Yen One-Month Implied FX Option Volatility



Euro Area Inflation-Linked Bonds (Past Year)



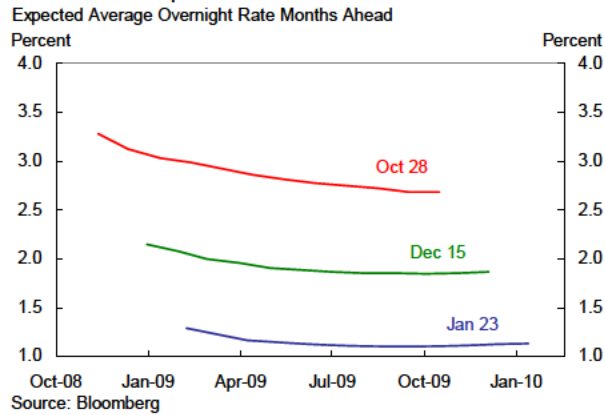
Japan Inflation-Linked Bonds (Past Year)



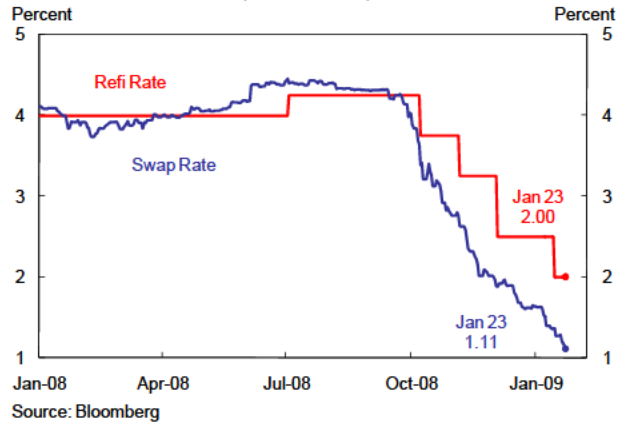
A. Significant Developments

**Exhibit A-12:
Euro Area and Japan Swap Curves**

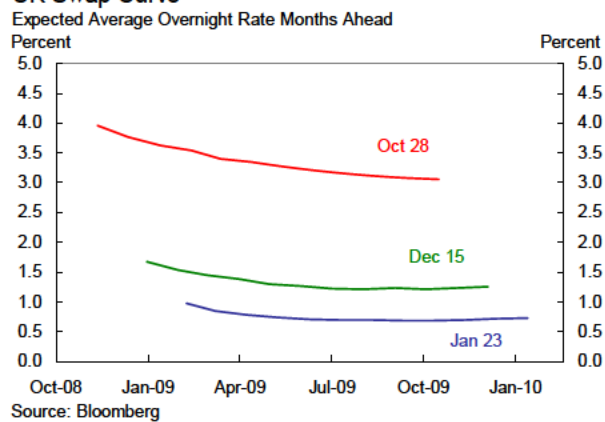
Euro Area Swap Curve



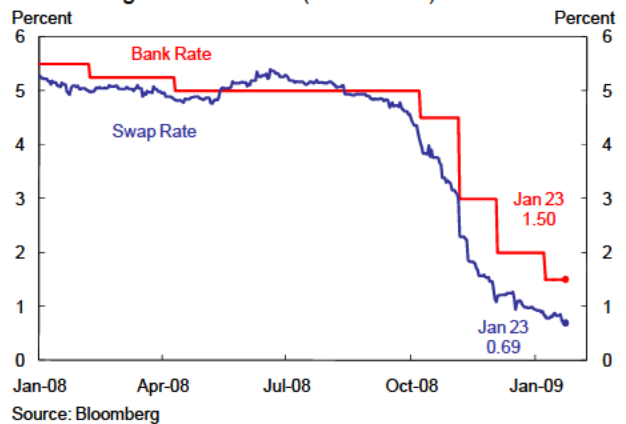
Euro Area: OIS Rate (Six Months)



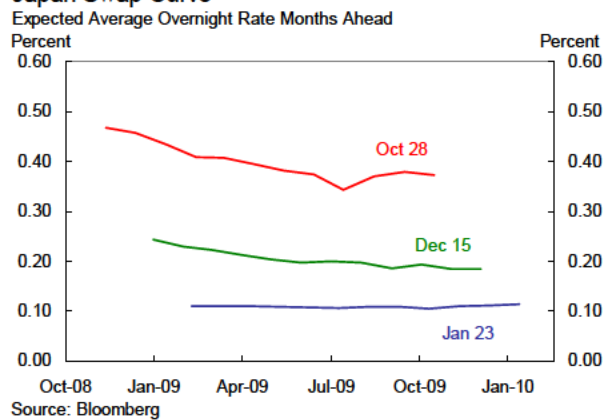
UK Swap Curve



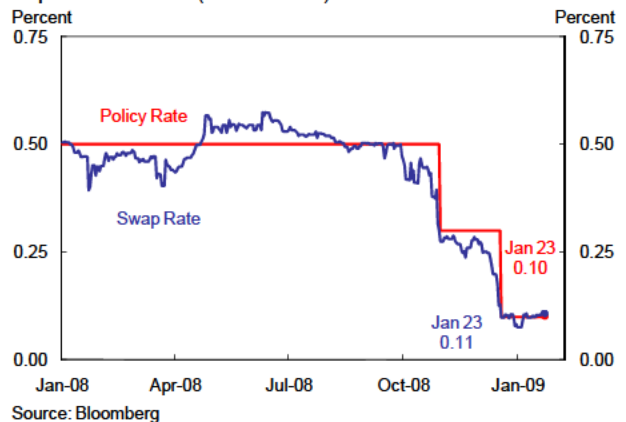
United Kingdom: OIS Rate (Six Months)



Japan Swap Curve



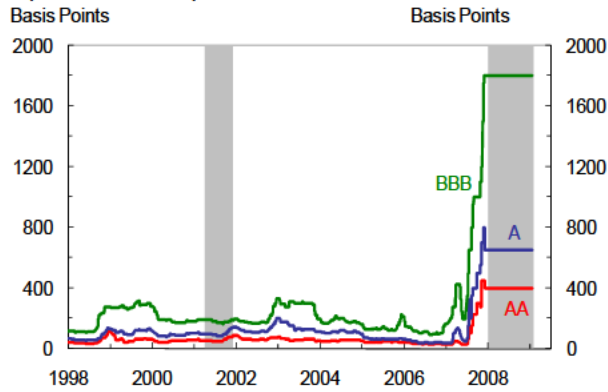
Japan: OIS Rate (Six Months)



A. Significant Developments

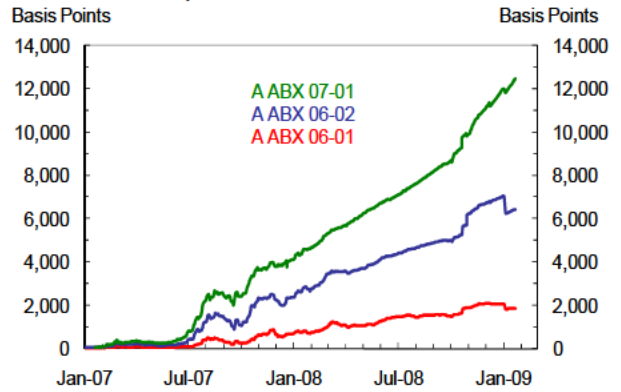
Exhibit A-13:
Subprime Spillovers

Spreads on Subprime MBS Tranches



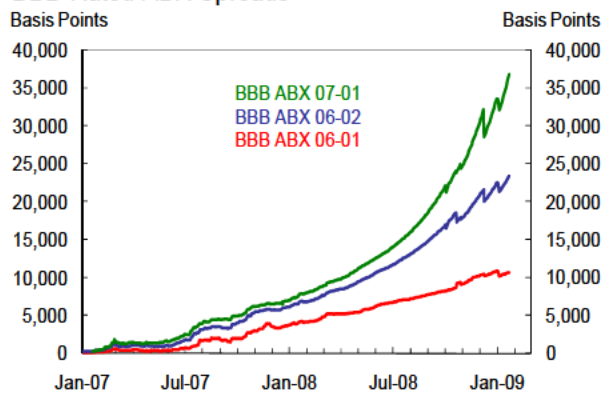
Source: JPMorgan

A-Rated ABX Spreads



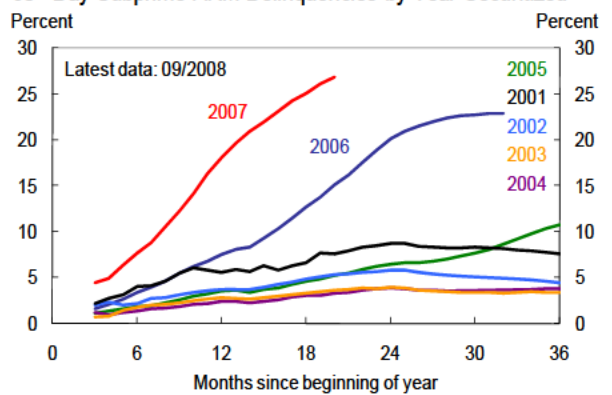
Source: JPMorgan

BBB-Rated ABX Spreads



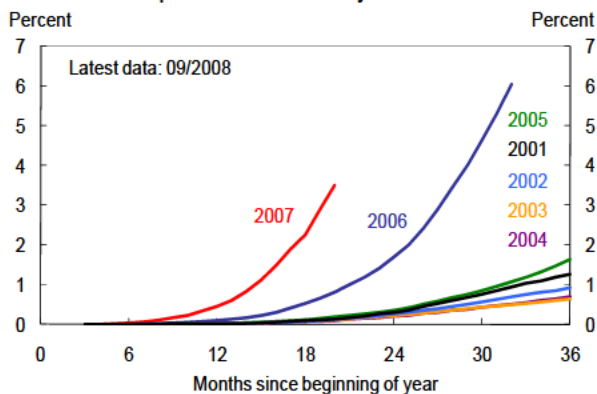
Source: JPMorgan

60+ Day Subprime ARM Delinquencies by Year Securitized



Note: Percent of original balance.

Cumulative Subprime ARM Losses by Year Securitized



Source: Moody's Investors Service Note: Percent of original balance.

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
2008												
Q1	2.2	2.2	2.2	0.9	0.9	0.9	4.9	4.9	4.9	2.3	2.3	2.3
Q2	2.1	2.1	2.1	2.8	2.8	2.8	5.3	5.3	5.4	2.0	2.0	2.0
Q3	3.0	2.6	2.4	-0.3	-0.5	-0.5	6.0	6.0	6.1	2.0	2.0	2.0
Q4	1.9	1.0	0.5	-2.8	-4.0	-4.5	6.6	6.7	6.9	1.0	0.3	0-0.25
2009												
Q1	1.8	0.7	0.2	-1.5	-3.2	-5.1	7.2	7.1	7.5	1.0	0.3	0-0.25
Q2	1.7	1.0	0.8	2.2	-0.9	-2.0	7.6	7.8	8.1	1.0	0.3	0-0.25
Q3	1.6	1.4	1.2	1.5	1.2	0.5	7.9	8.3	8.7	1.0	0.3	0-0.25
Q4	1.5	1.5	1.4	1.8	2.0	1.3	8.0	9.0	9.2	1.3	0.3	0-0.25
2010												
Q1	1.5	1.5	1.5	2.3	2.3	2.1	7.9	9.0	9.3	1.5	0.3	0-0.25
Q2	1.5	1.5	1.6	3.1	2.8	2.9	7.8	9.1	9.3	2.0	0.5	0-0.25
Q3	1.5	1.8	1.7	3.3	3.3	3.4	7.7	9.1	9.2	2.5	0.8	0-0.25
Q4	1.5	1.8	1.8	3.2	3.5	3.8	7.5	9.1	9.2	3.0	1.0	0-0.25
Q4/Q4												
2007	2.2	2.2	2.2	2.3	2.3	2.3	0.4	0.4	0.4	-1.0	-1.0	-1.0
2008	2.3	2.0	1.8	0.1	-0.2	-0.4	1.8	1.9	2.1	-3.3	-4.0	-4.0
2009	1.6	1.1	0.9	1.0	-0.3	-1.3	1.4	2.3	2.3	0.3	0.0	0.0
2010	1.5	1.6	1.6	3.0	3.0	3.0	-0.5	0.1	0.0	1.8	0.8	0.0

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

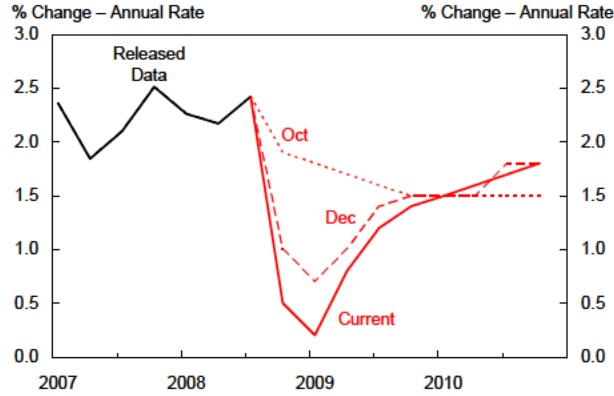
*Quarterly values are the average rate for the quarter. Yearly values are the difference between Q4 of the previous year and Q4 of the listed year.

**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.

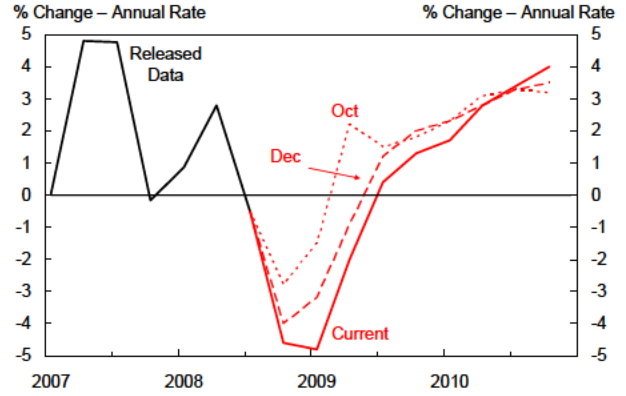
B. FRBNY Forecast Details

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

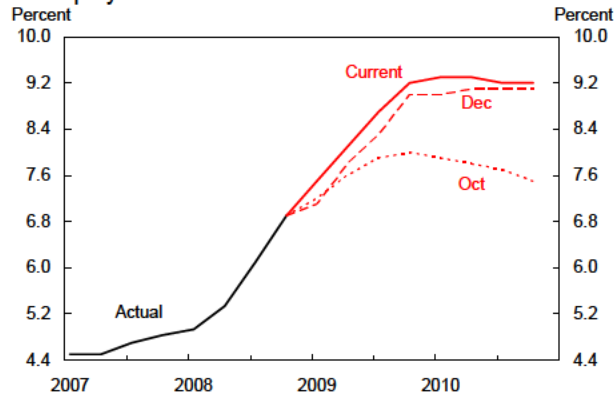
Core PCE Inflation



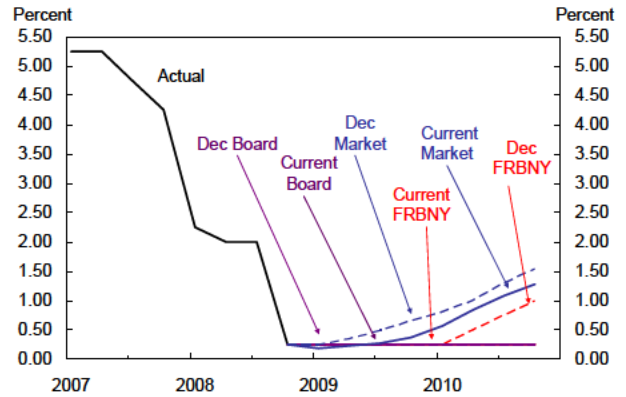
Real GDP Growth



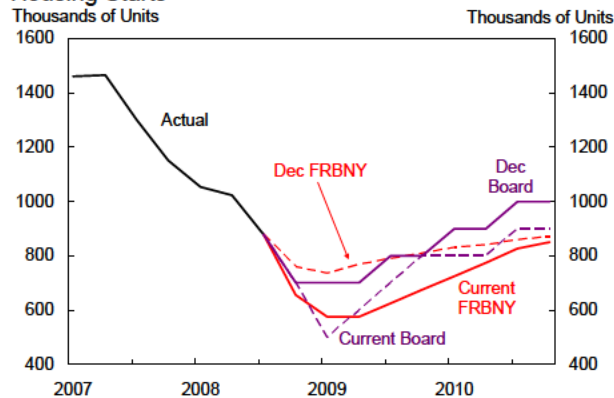
Unemployment Rate



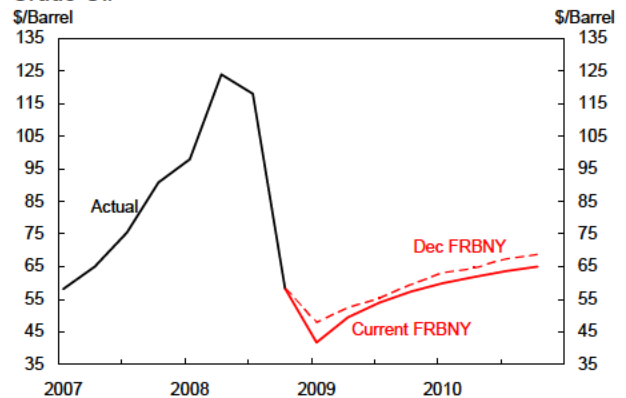
Federal Funds Rate



Housing Starts



Crude Oil



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)	
	2008Q4	2009Q1	2008Q4	2009Q1
OUTPUT				
Real GDP	-4.5 (-4.0)	-5.1 (-3.2)	-4.5 (-4.0)	-5.1 (-3.2)
Final Sales to Domestic Purchasers	-3.9 (-3.0)	-4.2 (-2.9)	-4.1 (-3.1)	-4.4 (-3.0)
Consumption	-4.2 (-3.1)	-1.0 (-0.8)	-2.9 (-2.1)	-0.7 (-0.5)
BFI: Equipment and Software	-17.5 (-5.0)	-25.0 (-15.0)	-1.3 (-0.4)	-1.8 (-1.1)
BFI: Nonresidential Structures	5.0 (0.0)	-8.0 (-8.0)	0.2 (0.0)	-0.3 (-0.3)
Residential Investment	-20.0 (-18.0)	-42.5 (-33.0)	-0.7 (-0.6)	-1.6 (-1.2)
Government: Federal	11.0 (1.0)	1.0 (1.5)	0.8 (0.1)	0.1 (0.1)
Government: State and Local	-1.3 (-0.5)	0.0 (0.0)	-0.2 (-0.1)	0.0 (0.0)
Inventory Investment	-- --	-- --	-0.6 (-1.1)	-1.6 (-1.1)
Net Exports	-- --	-- --	0.2 (0.2)	0.8 (0.9)
INFLATION				
Total PCE Deflator	-5.6 (-4.4)	-0.7 (-0.5)		
Core PCE Deflator	0.5 (1.0)	0.2 (0.7)		
PRODUCTIVITY AND LABOR COSTS*				
Output per Hour	2.4 (0.8)	0.0 (0.5)		
Compensation per Hour	2.6 (2.6)	3.0 (3.0)		
Unit Labor Costs	0.2 (1.8)	3.0 (2.5)		

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		
	2008	2009	2010	2008	2009	2010
OUTPUT						
Real GDP	-0.4 (-0.2)	-1.3 (-0.3)	3.0 (3.0)	-0.4 (-0.2)	-1.3 (-0.3)	3.0 (3.0)
Final Sales to Domestic Purchasers	-1.2 (-1.0)	-2.0 (-1.0)	2.8 (2.9)	-1.3 (-1.0)	-2.1 (-1.0)	2.9 (3.0)
Consumption	-1.5 (-1.2)	0.3 (0.4)	2.7 (2.3)	-1.1 (-0.8)	0.2 (0.3)	1.9 (1.6)
BFI: Equipment and Software	-7.9 (-4.1)	-17.7 (-11.3)	2.3 (7.1)	-0.6 (-0.3)	-1.2 (-0.8)	0.1 (0.4)
BFI: Nonresidential Structures	10.3 (8.2)	-10.3 (-8.8)	2.6 (6.5)	0.4 (0.3)	-0.4 (-0.4)	0.1 (0.2)
Residential Investment	-18.7 (-18.6)	-28.3 (-14.1)	8.7 (5.0)	-0.7 (-0.7)	-0.9 (-0.4)	0.2 (0.1)
Government: Federal	9.3 (6.7)	1.4 (1.5)	1.5 (1.5)	0.7 (0.5)	0.1 (0.1)	0.1 (0.1)
Government: State and Local	0.6 (0.6)	0.9 (1.2)	3.2 (3.7)	0.1 (0.1)	0.1 (0.2)	0.4 (0.5)
Inventory Investment	-- --	-- --	-- --	-0.4 (-0.5)	0.1 (0.2)	0.2 (0.2)
Net Exports	-- --	-- --	-- --	1.2 (1.2)	0.6 (0.5)	0.0 (-0.2)
INFLATION						
Total PCE Deflator	1.7 (2.1)	0.8 (0.8)	1.7 (1.8)			
Core PCE Deflator	1.8 (2.0)	0.9 (1.1)	1.6 (1.6)			
Total CPI Inflation	2.5 (2.6)	0.9 (0.8)	2.0 (2.1)			
Core CPI Inflation	2.0 (2.0)	1.2 (1.5)	1.9 (2.0)			
GDP Deflator	2.6 (2.9)	0.7 (0.9)	1.6 (1.7)			

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		
	2008	2009	2010
INTEREST RATE ASSUMPTIONS			
Federal Funds Rate (End-of-Year)	0-0.25 (0.25)	0-0.25 (0.25)	0-0.25 (1.00)
10-Year Treasury Yield (Avg. Q4 Level)	3.3 (3.3)	2.6 (2.6)	3.0 (3.00)
PRODUCTIVITY AND LABOR COSTS*			
Output	-1.2 (-1.0)	-2.3 (-0.8)	3.5 (3.4)
Hours	-3.6 (-3.0)	-3.0 (-1.8)	2.0 (1.7)
Output per Hour	2.5 (2.1)	0.7 (0.9)	1.5 (1.6)
Compensation per Hour	2.9 (2.9)	2.6 (2.6)	1.7 (1.7)
Unit Labor Costs	0.4 (0.8)	1.9 (1.7)	0.2 (0.0)
LABOR MARKET			
Unemployment Rate (Avg. Q4 Level)	6.9 (6.7)	9.2 (9.0)	9.2 (9.1)
Participation Rate (Avg. Q4 Level)	65.8 (65.9)	65.4 (65.9)	65.5 (66.1)
Avg. Monthly Nonfarm Payroll Growth (Thous.)	-166 (-145)	-280 (-194)	111 (112)
INCOME			
Personal Income	2.5 (2.7)	-1.7 (-0.1)	4.2 (4.5)
Real Disposable Personal Income	1.3 (1.1)	-1.9 (-0.8)	3.7 (2.9)
Corporate Profits Before Taxes	-7.7 (-8.5)	-4.9 (-1.7)	3.2 (4.5)

Note: Numbers in parentheses are from the previous Blackbook.

*Nonfarm business sector.

B. FRBNY Forecast Details

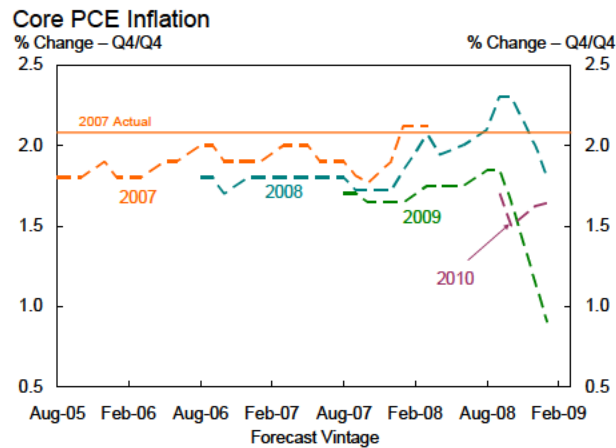
Exhibit B-6: FRBNY and Greenbook Forecast Comparison

	FRBNY			Board		
	2008	2009	2010	2008	2009	2010
OUTPUT						
Real GDP	-0.4 (-0.2)	-1.3 (-0.3)	3.0 (3.0)	-0.5 (-0.4)	-0.8 (-0.9)	2.6 (2.4)
GDP Growth Contributions						
Final Sales to Domestic Purchasers	-1.3 (-1.0)	-2.1 (-1.0)	2.9 (3.0)	-1.4 (-1.6)	-1.3 (-1.3)	3.1 (2.7)
Consumption	-1.1 (-0.8)	0.2 (0.3)	1.9 (1.6)	-1.0 (-1.1)	0.4 (0.5)	2.0 (1.9)
BFI	-0.2 (0.0)	-1.6 (-1.1)	0.2 (0.7)	-0.3 (-0.3)	-1.8 (-1.8)	0.3 (0.4)
Residential Investment	-0.7 (-0.7)	-0.9 (-0.4)	0.2 (0.1)	-0.8 (-0.8)	-0.4 (-0.3)	0.3 (0.2)
Government	0.7 (0.6)	0.2 (0.3)	0.6 (0.6)	0.7 (0.6)	0.5 (0.3)	0.5 (0.2)
Inventory Investment	-0.4 (-0.5)	0.1 (0.2)	0.2 (0.2)	-0.3 (-0.1)	0.6 (0.4)	0.0 (0.0)
Net Exports	1.2 (1.2)	0.6 (0.5)	0.0 (-0.2)	1.1 (1.2)	-0.1 (0.0)	-0.5 (-0.4)
INFLATION						
Total PCE Deflator	1.7 (2.1)	0.8 (0.8)	1.7 (1.8)	1.7 (1.9)	0.6 (0.7)	1.1 (1.0)
Core PCE Deflator	1.8 (2.0)	0.9 (1.1)	1.6 (1.6)	1.9 (2.0)	1.0 (1.1)	0.8 (0.8)
INTREST RATE ASSUMPTION						
Fed Funds Rate (End-of-Year)	0-0.25 (0.25)	0-0.25 (0.25)	0-0.25 (1.00)	0-0.25 (0.50)	0-0.25 (0.25)	0-0.25 (0.25)
PRODUCTIVITY AND LABOR COSTS*						
Output per Hour	2.5 (2.1)	0.7 (0.9)	1.5 (1.6)	2.4 (2.0)	1.1 (0.8)	2.0 (2.4)
Compensation per Hour	2.9 (2.9)	2.6 (2.6)	1.7 (1.7)	3.4 (3.2)	2.1 (2.4)	1.5 (1.6)
Unit Labor Costs	0.4 (0.8)	1.9 (1.7)	0.2 (0.0)	1.0 (1.2)	1.0 (1.6)	-0.5 (-0.8)
LABOR MARKET						
Unemployment Rate (Avg. Q4 Level)	6.9 (6.7)	9.2 (9.0)	9.2 (9.1)	6.9 (6.7)	8.4 (8.1)	8.1 (8.2)
Participation Rate (Avg. Q4 Level)	65.8 (65.9)	65.4 (65.9)	65.5 (66.1)	65.9 (65.9)	65.5 (65.5)	65.3 (65.3)
Avg. Monthly Nonfarm Payroll Growth (Thous.)	-166 (-145)	-280 (-194)	111 (112)	-167 (-158)	-192 (-175)	117 (42)
HOUSING						
Housing Starts (Avg. Q4 Level, Thous.)	656 (760)	675 (810)	850 (870)	700 (700)	800 (800)	900 (1000)

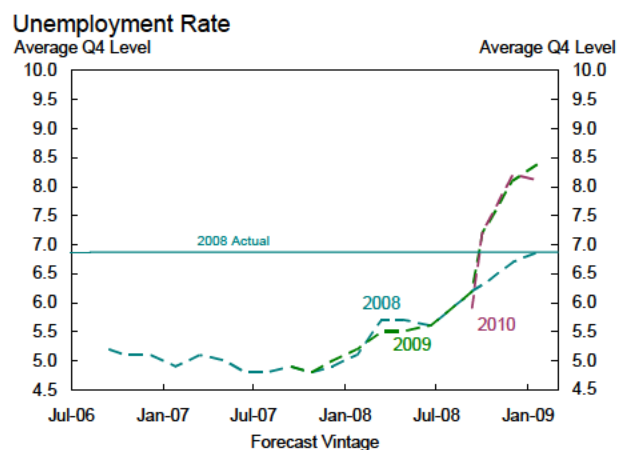
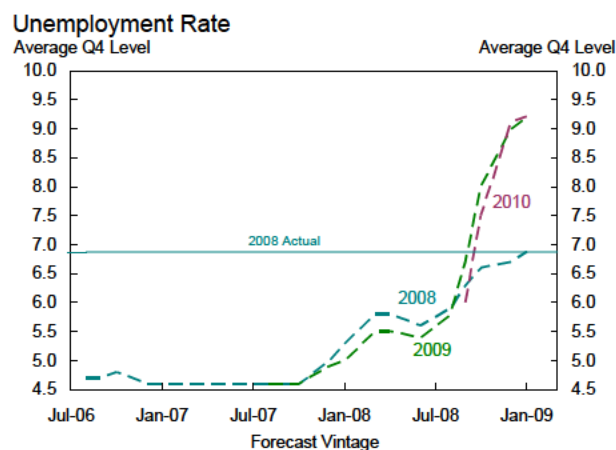
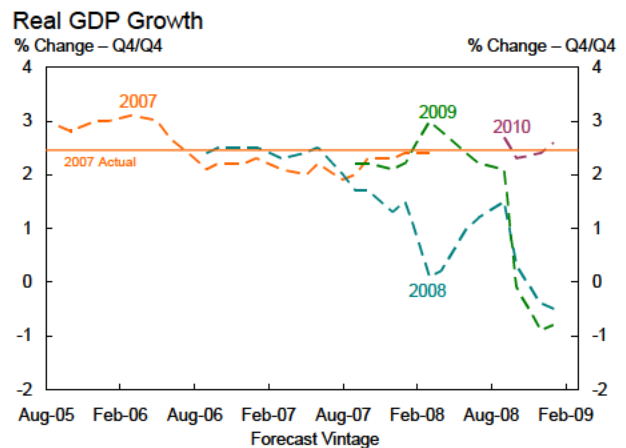
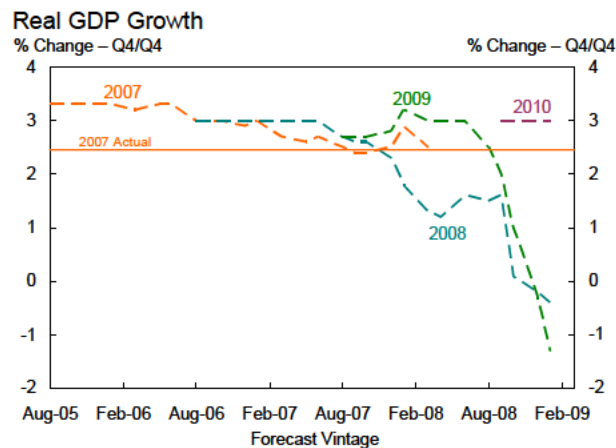
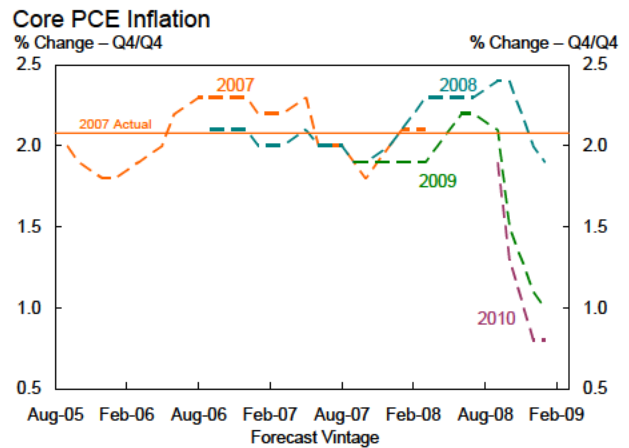
B. FRBNY Forecast Details

Exhibit B-7: Evolution of FRBNY and Board Forecasts since Mid-2005

FRBNY



Board



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

B. FRBNY Forecast Details

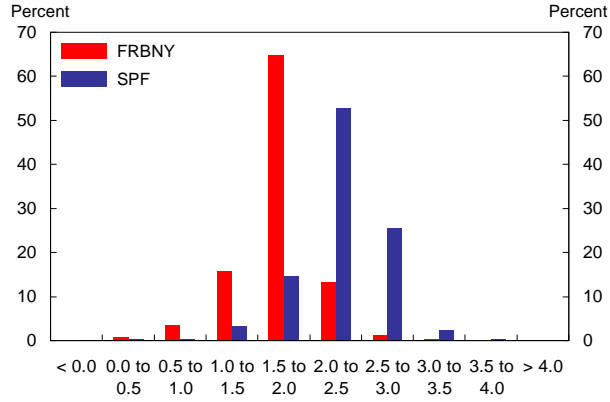
Exhibit B-8: Alternative GDP and Inflation Forecasts

		Real GDP Growth			
	Release Date	2008Q4	2009Q1	2008 Q4/Q4	2009 Q4/Q4
FRBNY	1/22/2009	-4.5 (-4.0)	-5.1 (-3.2)	-0.4 (-0.2)	-1.3 (-0.3)
PSI Model	1/22/2009	-5.1 (-3.9)	-3.7 (-2.5)	-- --	-- --
Blue Chip	1/10/2009	-5.2 (-4.1)	-3.3 (-2.4)	-0.5 (-0.3)	-0.2 (0.1)
Median SPF	11/17/2008	-2.9 (0.7)	-1.1 (1.6)	1.4 (1.7)	-0.2 (1.5)
Macro Advisers	1/22/2009	-5.6 (-6.3)	-4.2 (-4.2)	-0.7 (-0.7)	0.4 (0.1)
		Core PCE Inflation			
	Release Date	2008Q4	2009Q1	2008 Q4/Q4	2009 Q4/Q4
FRBNY	1/22/2009	0.5 (1.0)	0.2 (0.7)	1.8 (2.0)	0.9 (1.1)
Median SPF	11/17/2008	2.0 (2.1)	1.6 (2.1)	2.3 (2.2)	1.7 (2.0)
Macro Advisers	1/7/2009	1.0 (1.1)	1.0 (1.5)	1.9 (2.0)	0.8 (0.9)
		CPI Inflation			
	Release Date	2008Q4	2009Q1	2008 Q4/Q4	2009 Q4/Q4
FRBNY	1/22/2009	-5.5 (-5.1)	-1.3 (-2.2)	2.5 (2.6)	0.9 (0.8)
Blue Chip	1/10/2009	-8.0 (-5.7)	-2.1 (-0.3)	1.9 (2.5)	0.7 (1.3)
Median SPF	11/17/2008	-2.6 (2.5)	0.8 (2.6)	3.4 (4.3)	1.7 (2.4)
Macro Advisers	1/7/2009	-8.6 (-7.2)	-3.2 (-1.7)	1.7 (2.1)	0.1 (0.2)
		Core CPI Inflation			
	Release Date	2008Q4	2009Q1	2008 Q4/Q4	2009 Q4/Q4
FRBNY	1/22/2009	0.4 (0.4)	0.4 (0.8)	2.0 (2.0)	1.2 (1.5)
Median SPF	11/17/2008	2.1 (2.3)	2.0 (2.3)	2.4 (2.3)	2.0 (2.2)
Macro Advisers	1/7/2009	0.7 (0.7)	1.3 (1.8)	2.1 (2.1)	0.9 (1.2)

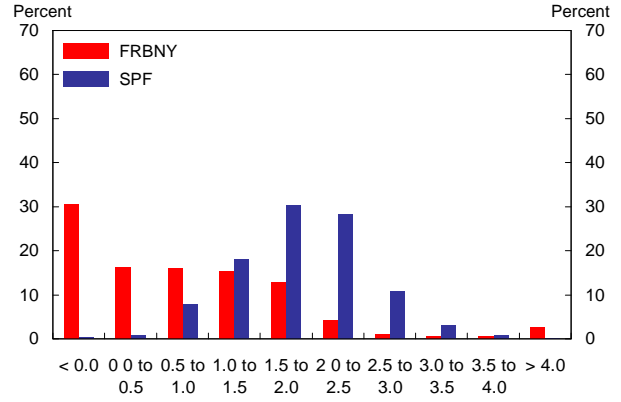
B. FRBNY Forecast Details

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

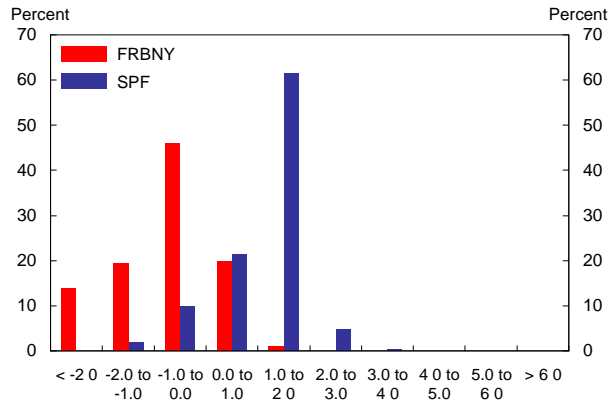
2008Q4/Q4 Core PCE Inflation Probabilities



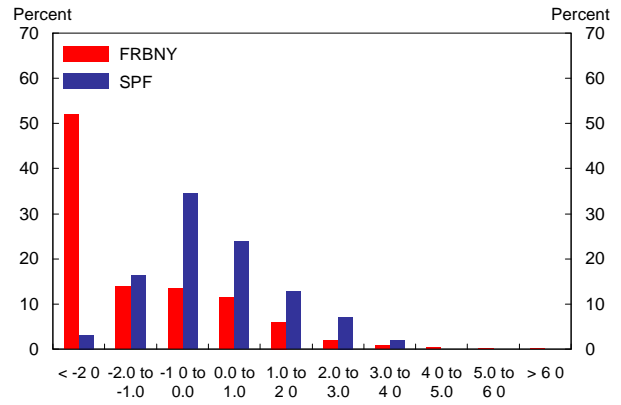
2009Q4/Q4 Core PCE Inflation Probabilities



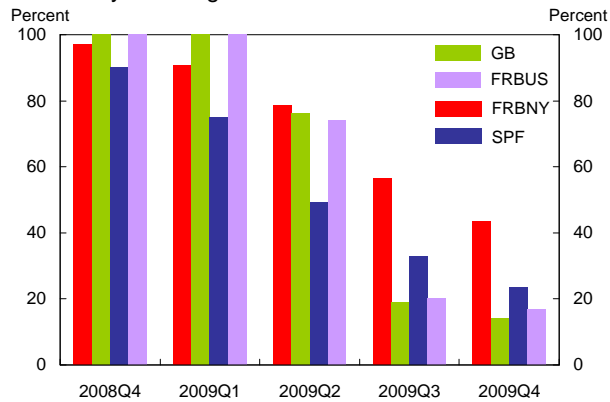
2008/2007 Real GDP Growth Probabilities



2009/2008 Real GDP Growth Probabilities

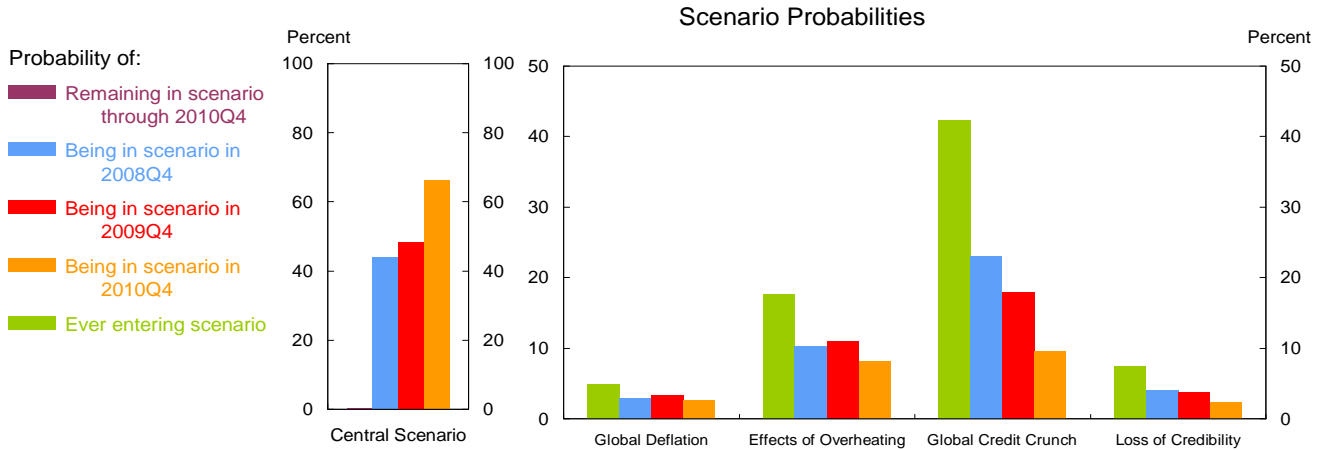


Probability of a Negative-Growth Quarter

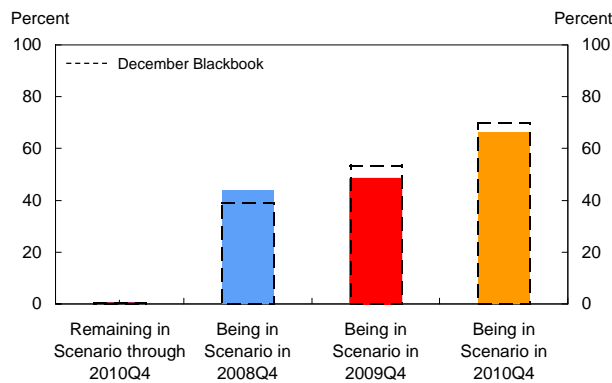


C. FRBNY Forecast Distributions

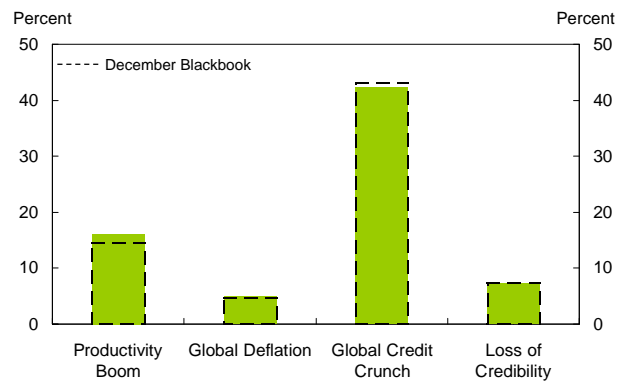
Exhibit C-1: Risks



Change in Central Scenario Probabilities



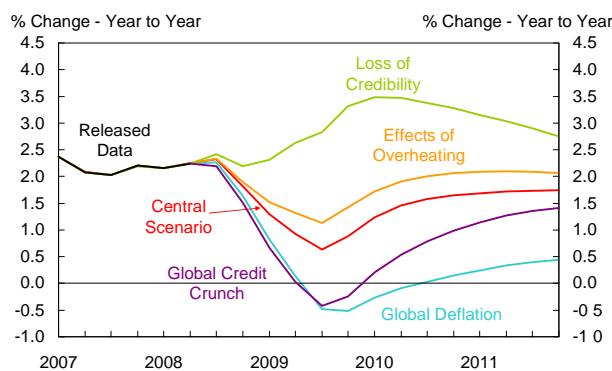
Change in Alternative Scenario Probabilities*



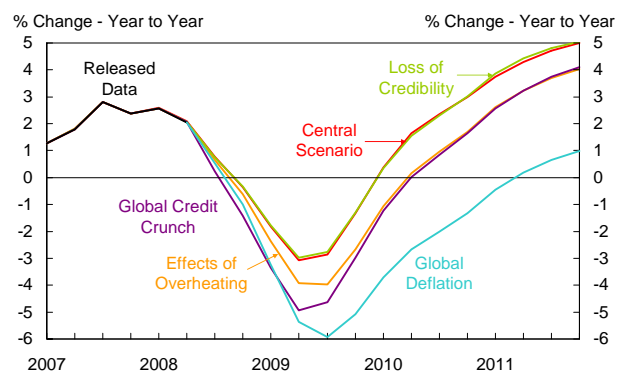
*Probability of ever reaching scenario

Exhibit C-2: Projections under Alternative Scenarios

Core PCE Inflation under Alternative Scenarios



Real GDP Growth under Alternative Scenarios

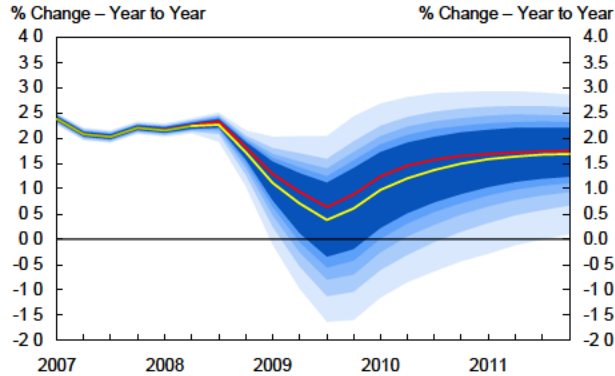


Source: MMS Function (FRBNY)

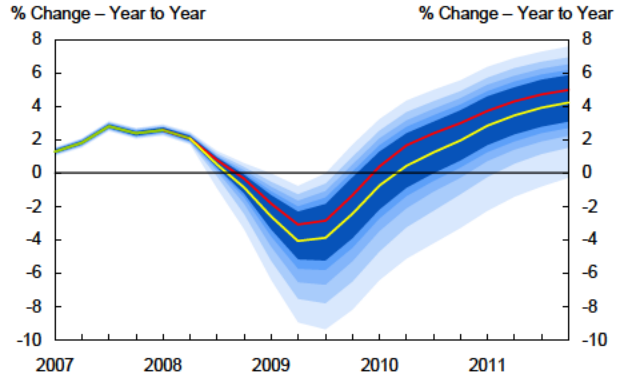
C. FRBNY Forecast Distributions

Exhibit C-3: Inflation and Output Forecast Distributions

Core PCE Inflation Forecast Distribution

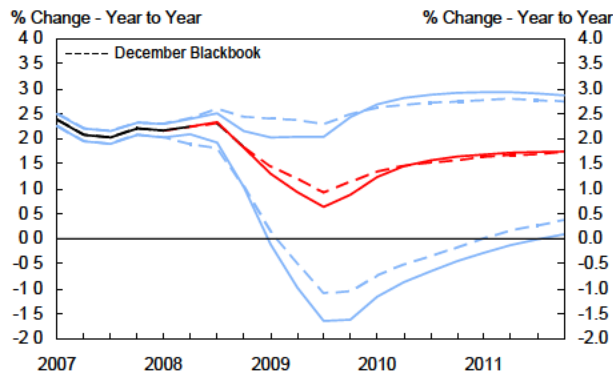


Real GDP Growth Forecast Distribution

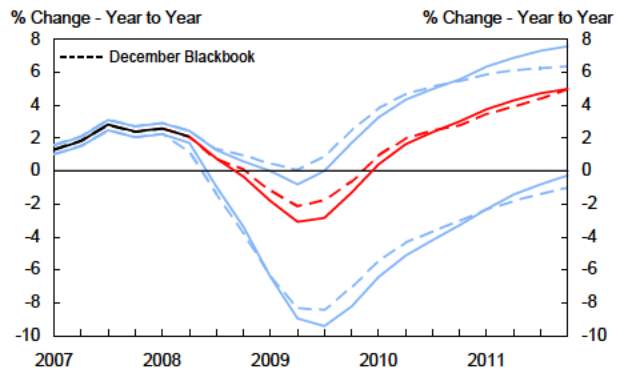


The yellow line is the expected value of the forecast distribution, the red line is the central scenario projection, and the green line is released data. The shading represents the 50, 60, 70, 80, and 90 percent chance that the four-quarter change will be within the respective range.

Change in Core PCE Inflation Forecast Distribution

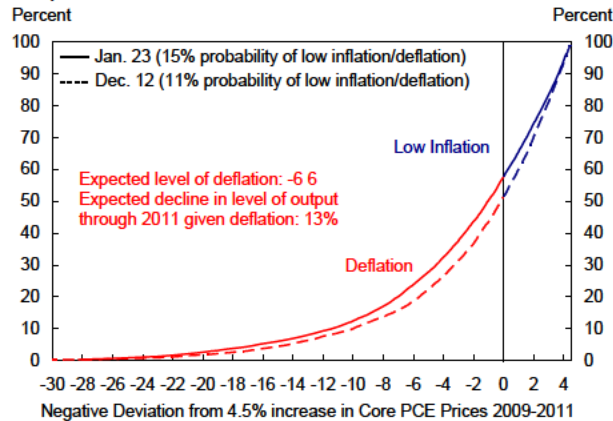


Change in Real GDP Growth Forecast Distribution

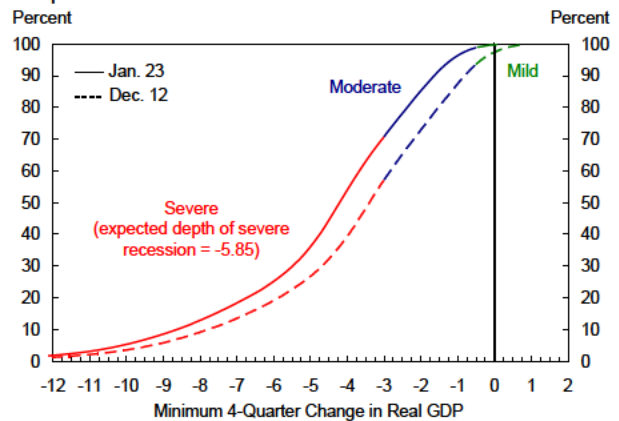


The blue lines are the 90% chance the four-quarter change will be within the lines, the red line is the central scenario projection, and the black line is released data. Dashed lines represent forecasts from previous Blackbook.

Depth of Deflation



Depth of Recession

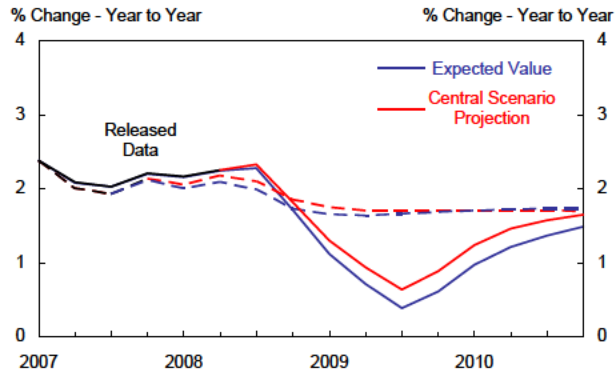


Source: MMS Function (FRBNY)

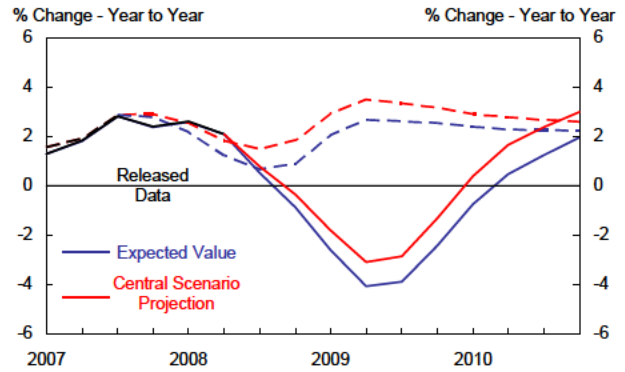
C. FRBNY Forecast Distributions

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

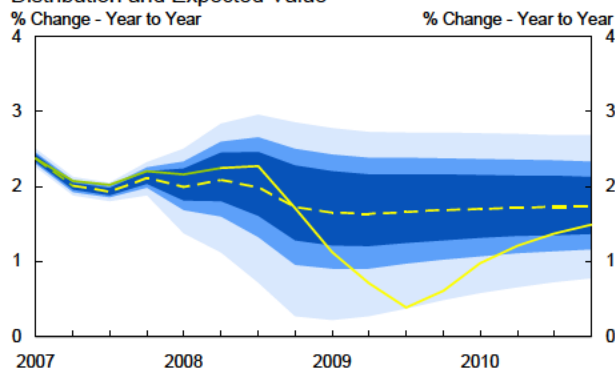
One-Year Comparison of Core PCE Inflation Forecast



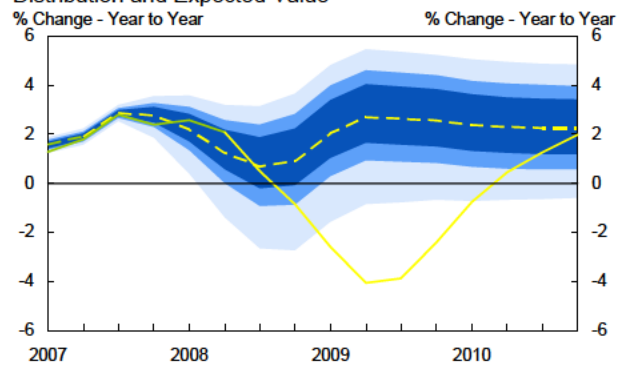
One-Year Comparison of Real GDP Growth Forecast



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



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



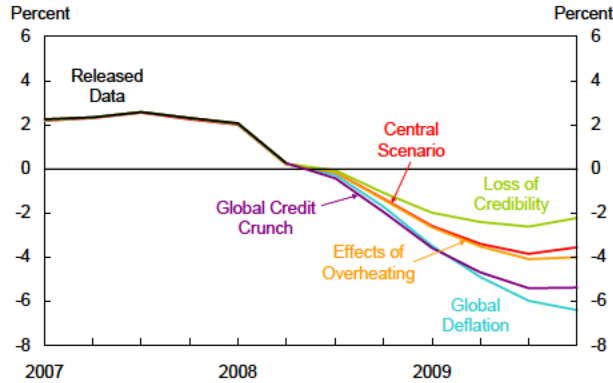
The solid yellow line is the **current** expected value of the forecast distribution, while the dashed yellow line is the **January 2008** expected value. The shading represents the 50, 70 and 90 percent probability intervals from the **January 2008** forecast. The green lines are released data.

Source: MMS Function (FRBNY)

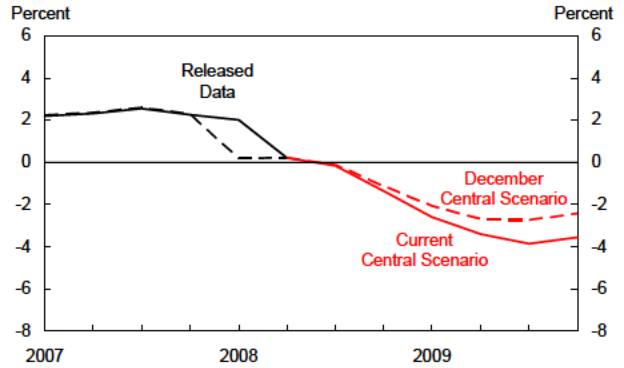
D. FRBNY Fed Funds Rate Projections

Exhibit D-1: *Baseline* Policy Rule Analysis

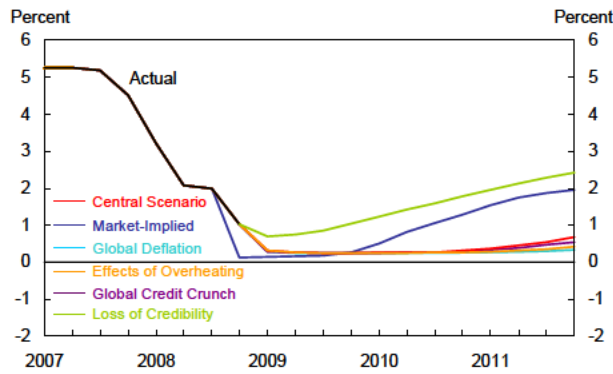
Real FFR under Alternative Scenarios



Change in Central Scenario Real FFR



Nominal FFR under Alternative Scenarios



Change in Central Scenario and Market-Implied Nominal FFR

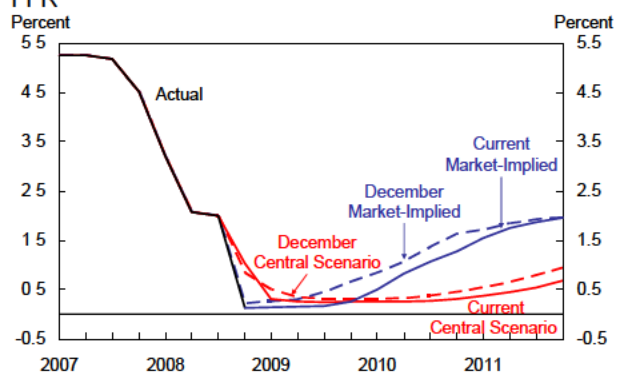
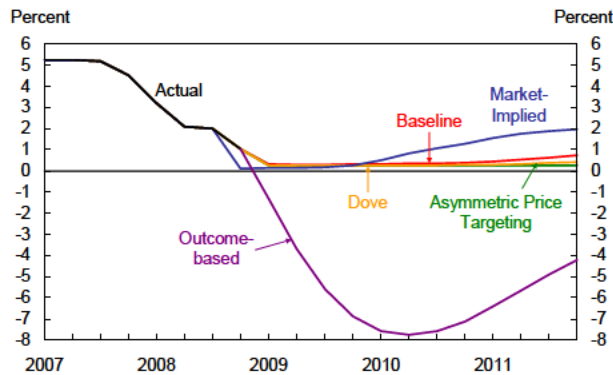


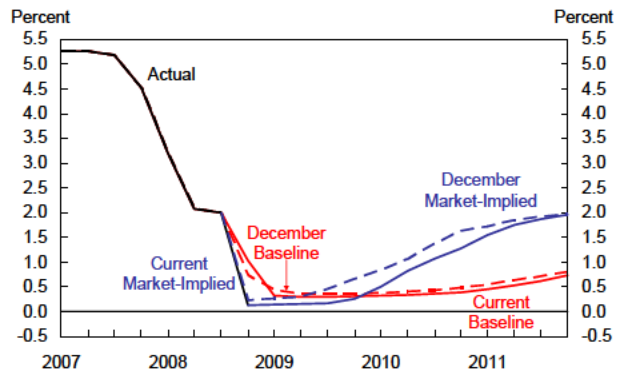
Exhibit D-2: Alternative Policy Rules under Expected Value of Forecast Distribution

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

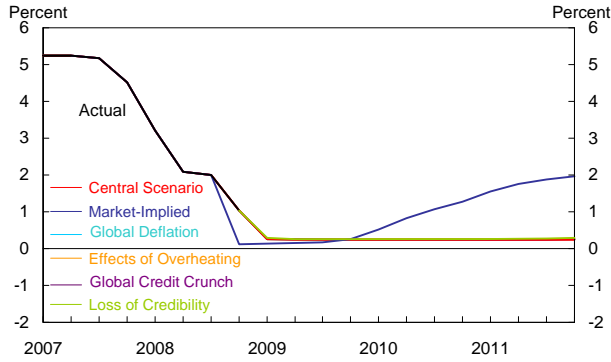
Source: MMS Function (FRBNY)

D. FRBNY Fed Funds Rate Projections

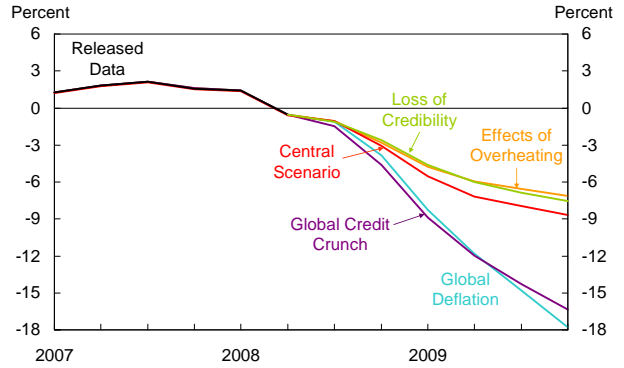
Exhibit D-3: Alternative Policy Rule Analysis

Policy Rule: *Asymmetric Price Targeting*

Nominal FFR under Alternative Scenarios

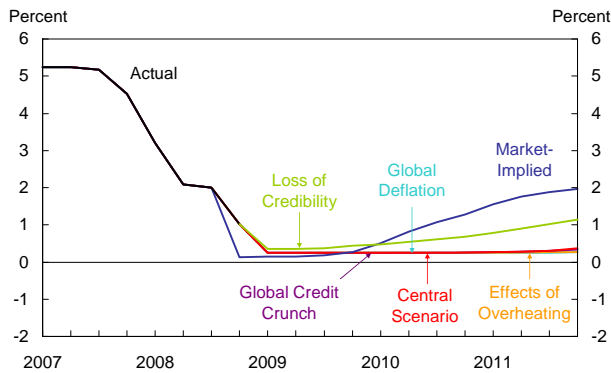


Real FFR under Alternative Scenarios

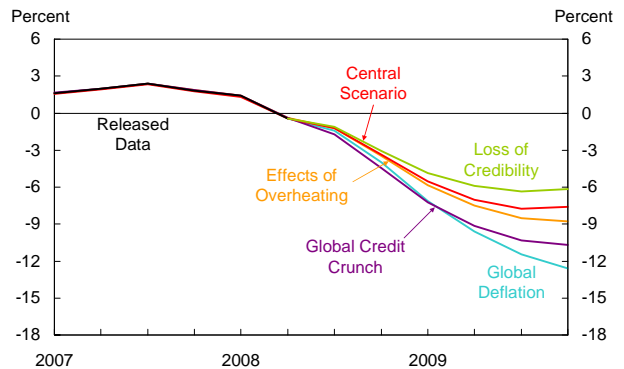


Policy Rule: *Dove*

Nominal FFR under Alternative Scenarios

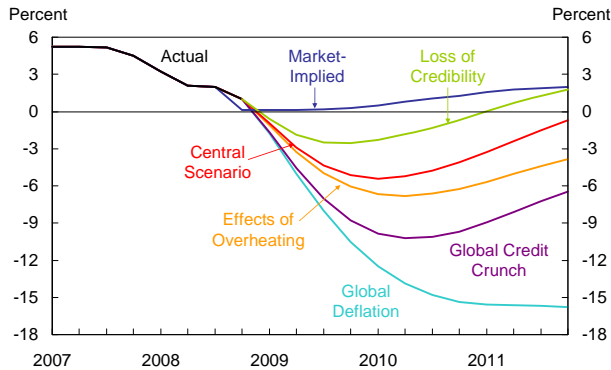


Real FFR under Alternative Scenarios

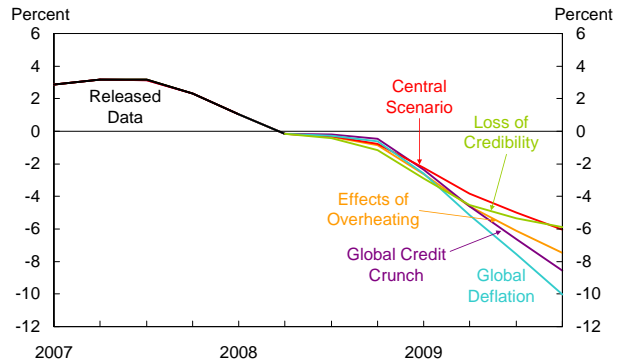


Policy Rule: *Outcome-based*

Nominal FFR under Alternative Scenarios



Real FFR under Alternative Scenarios



Source: MMS Function (FRBNY)

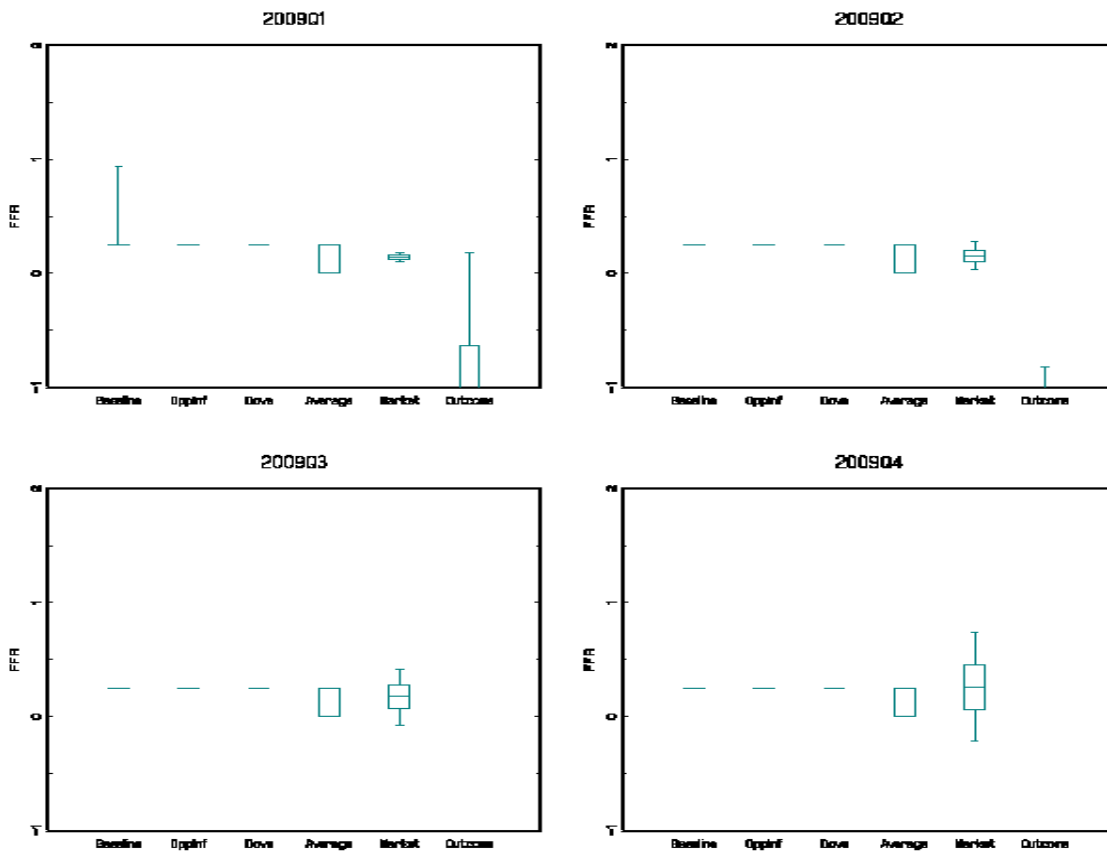
D. FRBNY Fed Funds Rate Projections

Exhibit D-4: Comparison between Market and Policy Rule FFR Expectations: 2009Q1

“Average” Weights:

Rule	Current	December Blackbook
<i>Baseline</i>	0.32	0.32
<i>Opportunistic Disinflation</i>	0.02	0.02
<i>Dove</i>	0.66	0.66

Exhibit D-5: FFR Distributions



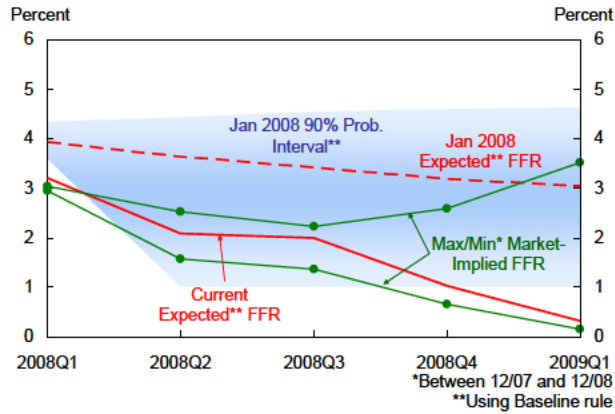
Note: The box represents the 50% probability interval, the line in the box the median, and the tails the 90% probability interval.

Source: MMS Function (FRBNY)

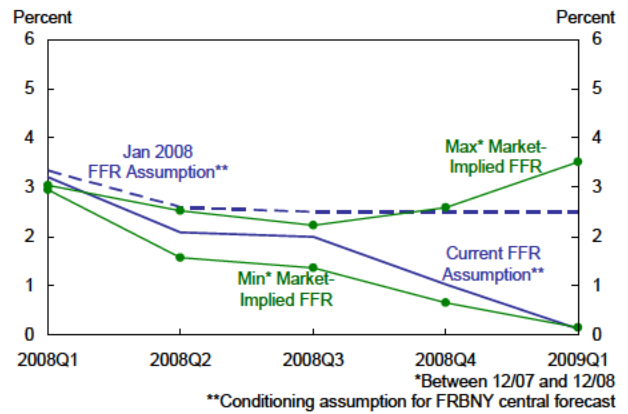
D. FRBNY Fed Funds Rate Projections

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)

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*

After a lull from 2004 through early 2007, productivity growth since has been robust and above our current estimate of trend productivity growth. Our projections for 2008Q2 productivity indicate that this pattern should continue. These patterns raise the possibility that the lull in productivity growth in mid-decade was a cyclical development and that medium- and long-term productivity growth will be closer to that 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 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 (as well as a possible development of a larger output gap in 2008). Strong productivity growth would also limit labor cost pressures and thereby help to subdue inflation.

Alternative 2: *Productivity Slump*

The recent surge in productivity growth may reflect a new cyclical pattern whereby firms protective of their profit margins reduce labor input in anticipation of slower profit growth. Furthermore, it is possible that the longer-term upswing in productivity that

began in the mid-1990s has ended as the IT-driven surge has run its course. If so, there could be an extended period of productivity growth below the trend in our central forecast. In addition, the increase in the level and volatility of energy and commodity prices could continue and lead to 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.

We also consider four additional scenarios. Three are related to the impact of monetary policy on the economy and financial markets as well as possible FOMC misperceptions of its past and current policy stances. The other is 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 from 2004 through 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 in the U.S.; 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 and the associated dollar reserve accumulation, which were aimed at maintaining the dollar strong 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: *Global Credit Crunch*

The financial turmoil that started in the summer of 2007 has continued to put a significant strain on the availability of credit. In the U.S., financial conditions have tightened significantly and financial market stress has reached record high levels in recent months. 30-year fixed rate mortgage rates remain near their one-year high. In addition, global data for 2003Q3 have been largely negative. The intensification of the financial crisis together with global slowing of economic growth has led to significant wealth losses and increased volatility in equity markets. Policy-makers worldwide have enacted measures to address the freezing of interbank markets and implemented a coordinated cut in policy rates. This combination of factors suggests the neutral rate is lower than before the financial turmoil began (we estimate it to be between 3.00% and 3.75% over the near-term). Even though the current FFR is below our lower estimate of the neutral rate, tighter credit conditions and continued stresses in global financial markets, along with increased risk of a further deterioration in global economic conditions, create 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: *Loss of Credibility*

One interpretation of recent higher inflation, higher financial market inflation compensation, higher commodity prices, and dollar depreciation is that inflation expectations have risen despite the FOMC continuing to state its price stability mandate, raising concern that the FOMC has started to lose its credibility on inflation. Although some FOMC communications have placed more emphasis on the upside inflation risks, the FOMC also has communicated continued concern about growth risks, thus providing

signals that the FFR may remain low that have further fueled such concerns. It is possible that these statements and actions of the FOMC may lead to further increases in inflation and inflation expectations, such that firms and households begin to see the FOMC as not credible in regard to inflation. Such developments are likely to cause further rises in inflation and inflation expectations above forecast.

Alternative 6: *Global Deflation*

Recent price level indicators point to slowing or decreasing inflation in many regions of the world. Domestic measures of implied inflation have fallen sharply, suggesting that inflation expectations are also declining. These signals, coupled with falling global output as a result of financial market turmoil, suggest that there is an increased risk of global deflation going forward. This possibility is further exacerbated as central banks around the world cut interests rates and target rates approach their lower bounds. The *Global Deflation* scenario reflects the possibility that the U.S. and the rest of the world may get mired in a liquidity trap for a prolonged period of time. These factors would result in both inflation and output growth far below the levels projected in the central forecast. Although the onset of this slowdown would be later compared to other scenarios, global factors would cause these conditions to be more persistent.

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 slightly above central forecast, output slightly below central forecast.
4. *Global Credit Crunch*: inflation below central forecast, output significantly below central forecast.
5. *Loss of Credibility*: inflation far above central forecast, output slightly below central forecast.
6. *Global Deflation*: inflation far below central forecast, output far below 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:

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

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

$i^* = 2.00 - 3.00$ in short - term, moving to 4.25 (neutral FFR)

$\pi^* = 1.75$ (core PCE inflation target)

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

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

π_t : core PCE, 4 - quarter average

x_t : output gap, using 2.7% potential growth rate, moving to 2.6%

i_{t-1} : interest rate in previous quarter

The two variants of the *Baseline* rule that we use are the *Asymmetric Price Targeting* and *Dove* rules. The *Asymmetric Price Targeting* rule is designed to combat deflation by instituting price-level targeting. This rule reacts more slowly than the *Baseline* rule to initial increases in inflation, maintaining a lower policy rate for a longer period of time.² In each quarter over the forecast horizon, the rule reacts to the cumulative gap between a 1.5% price level path and the actual path on the downside; the rule is asymmetric because

² All of the policy rules are subject to an effective lower bound of 0.25%.

price-level targeting is only implemented on the downside. When the cumulative gap in inflation is greater than 1.5% per year, the policy rule reverts to targeting the gap between four-quarter changes in inflation and the inflation objective, just as in 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).

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 the previous quarter using parameters estimated from real-time historical data (1988-2006)³.

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 Exhibits D-4 and D-5, 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).

³ *Outcome-based* rule: $i_t = 1.20*i_{t-1} - 0.39*i_{t-2} + 0.19*(1.17 + 1.73*\pi_t + 3.66*x_t - 2.72*x_{t-1})$