

FRBNY BLACKBOOK

RESEARCH AND STATISTICS GROUP

FOMC Background Material

June 2013

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FRBNY BLACKBOOK

June 2013

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1. Policy Recommendation and Rationale

The economic and financial market developments since the April Blackbook do not support any significant change in our policy recommendation. We recommend maintaining the state-contingent forward guidance regarding the federal funds rate without changes in the thresholds for unemployment and inflation, and continuing the asset purchases at the current pace until we are confident that the outlook for the labor market has improved substantially. In addition, we recommend providing more guidance about the future path of the balance sheet.

Overall, the recent domestic and foreign data releases have been soft, as the economy continues to face headwinds, in particular from the fiscal side. We view the risks for real activity and inflation as roughly balanced at near- and medium-term horizons. Although the housing market has kept its positive momentum and consumer spending growth appears to have been maintained, other releases have been less encouraging. Even though payroll employment growth in April and May was above consensus forecasts, the pace has slowed notably from that of 2012Q4 and 2013Q1, and other measures of labor market health do not indicate much improvement. Indicators of manufacturing production also continued to be weak. On net, the data since the last Blackbook have led us to mark down our estimate of real GDP growth for 2013Q2 from 2.0% to 1.5% (annual rate), resulting in a slightly lower forecast for the rest of the year. At the same time, inflation has continued to moderate---with the total PCE deflator reaching 0.7% on a year-over-year basis in April---and is expected to remain well below the FOMC's longer-run objective for the rest of the year.

In our view, these developments are clearly inconsistent with reducing the pace of asset purchases in the second half of the year, especially if this slowing were to lead to a material reduction in the program's expected ultimate size. As we do not see an efficacy or cost rationale for doing so, slowing the purchases without convincing evidence of a significant improvement in the labor market outlook may endanger the credibility of the ongoing commitment to a highly accommodative policy stance, and in particular, erode

the market's reliance on the forward guidance on interest rates. Such a loss of credibility could result in a tightening of financial conditions that would be difficult to counteract in the absence of effective signaling devices on the future course of policy at the zero lower bound.

The Committee should revise the "exit strategy principles" formulated in June 2011 because the Fed's balance sheet is now much larger and has a different composition than at that time, and those guidelines are inconsistent with the current outcome-based policy framework. Recent speculation about the possibility of a dialing down of the asset purchases have arguably contributed to an undesirable rise in long-term yields and a tightening in financial conditions. We thus recommend that the FOMC provide clear guidance about the principles determining the size and composition of the balance sheet from now through end of the normalization process. We recommend that the FOMC communicate as appropriate the following guidelines:

1. It reaffirms its determination to continue the purchase program as long as economic activity and employment are projected to remain below their potential levels over a two-year horizon, provided that inflation and inflation expectations remain contained;
2. It intends to reduce the rate of purchases as the outlook for economic activity and employment improves sufficiently beyond that of September 2012;
3. It does not anticipate selling assets in the near term, but it may let the size of the balance sheet decrease gradually over time by ceasing reinvestments, once economic activity is judged to be at or above its long-run sustainable level, or inflation is expected to run above 2%.

Even without a substantial improvement in the outlook, however, the Committee may judge it appropriate to scale back the asset purchase program if its perceived costs rise above its benefits. In such a contingency, the Committee should be prepared to deploy alternative strategies to maintain an accommodative stance. One option would be to reinforce the forward guidance on the interest rate by announcing a lower threshold for the unemployment rate. However, as we have argued in previous recommendations, we

believe that a more effective option would be to change the framework for forward rate guidance to an explicit commitment to nominal GDP targeting. In particular, a threshold expressed in terms of the gap that has accumulated over the past few years between nominal GDP and its desired path could represent a unified criterion for determining the lift-off date, while providing some continuity with current communication. Moreover, this criterion would ensure greater continuity between the lift-off phase and the subsequent period of policy re-normalization. In fact, making the pace of normalization contingent on the evolution of the nominal GDP gap would result in a highly accommodative stance of policy—over and above that implied by historical policy—for a considerable time after the economic recovery strengthens, as indicated in the current FOMC statement. For example, the FOMC could indicate that it will keep the target range for the federal funds rate between 0 and $\frac{1}{4}$ percent until the nominal GDP gap, which has emerged since the last time unemployment was 6.5% (October 2008), has been closed or is forecasted to close within a certain horizon. Another tool, which we have also discussed previously, is to reduce the interest rate on reserves, perhaps to near the current level of the effective federal funds rate.

Finally, with the purpose of gaining flexibility in its management of its policy instruments, we recommend that the FOMC evaluates tools that would assure more control of the federal funds rate in an environment with a large amount of reserves. An advantage of greater control of the interest rate is that it would disentangle the size of the balance sheet from considerations regarding the ability to tighten policy at the appropriate time, as well as reduce the probability of having to sell assets and realize capital losses. Confidence in these tools would therefore mitigate some of the costs of further balance sheet expansion and make it less likely that cost, rather than macroeconomic considerations, might be the driver of a change in the pace of asset purchases in the near future.

2. Evolution of Outlook and Risks

2.1 Central Forecast

Intermeeting developments. Based on the second estimate, real GDP grew at a 2.4% annual rate in the first quarter of 2013. Available data suggest that growth slowed in the second quarter--our current estimate of Q2 growth of real GDP is 1 1/2%, although some forecasts are as low as 1 1/4%. Given what we know at this writing, growth of real GDP over the first half of 2013 will be about 2% (annual rate), in line with our January projection but about 1/2 percentage point below what we were expecting in April.

Relative to expectations at the beginning of the year, the strength of consumer spending over the first half of the year has been an upside surprise. Real personal consumption expenditures (PCE) rose at a 3.4% annual rate in the first quarter, the fastest in two years. As has been the case for some time, the first quarter growth of real PCE was led by spending on durable goods, particularly motor vehicles. Motor vehicle sales averaged 15.3 million units (annual rate) in 2013Q1, the highest since 2007Q4. Consumer spending was also boosted by the unseasonably cold weather, which led to a sharp increase in spending on utilities. But excluding utilities, real PCE increased at a respectable 2.8% annual rate.

Available data for the second quarter suggest that the rate of growth of real PCE is likely to slow from the first quarter pace but still remain somewhat stronger than previously expected. Sales of lightweight motor vehicles slipped to 14.9 million (annual rate) in April, but then rebounded to 15.3 million in May. Household spending on utilities is likely to decline in the second quarter as weather patterns have returned to normal. Our current estimate is that real PCE will increase at a 2.2% annual rate in the second quarter, although this estimate is unusually tentative due to the recent annual revision of the retail sales data which has not yet been incorporated into the BEA's monthly estimates of real PCE.

There are several potential explanations for the surprising strength of consumer spending,

and all of them are likely operating to some extent. First, gasoline prices fell nearly 15% over the six months ending in April. We estimate that this saved the household sector about \$75 billion (annual rate) or about three-fifths of the increase in payroll taxes. Second, household net worth soared in the first quarter as equity values and home prices rose and total liabilities continued to decline. Expressed as a percent of disposable income, household net worth has returned to the average of the past decade. Finally, while still not particularly high from a historical standpoint, in recent months measures of consumer confidence have moved to their highest levels of the recovery to date. Somewhat more upbeat assessments of labor market conditions have contributed to this improvement in confidence.

Also providing a boost to growth is the fact that the recovery of the housing sector has gained momentum. As of April, a three-month moving average of single-family housing starts was up 30% over year ago levels to 630,000 units (seasonally-adjusted annual rate). Over the same period, a three-month moving average of multi-family housing starts was up 32% to around 320,000 units, and a three-month moving average of total sales of new and existing single-family homes has increased 10 percent. As of April, the CoreLogic national home price index for detached single-family homes was up 12.6% over year ago levels, the largest 12 month increase of this price index since February of 2006. In terms of levels, this home price index has returned to where it was in mid-2004. We expect residential investment to provide a growth contribution of 0.4 percentage points in the second quarter, somewhat more than the average of the preceding three quarters.

In contrast, growth of business fixed investment was sluggish in the first quarter, rising at just a 2.2% annual rate. April data on construction, manufacturers' shipments, and imports and exports of capital goods suggest that it will remain sluggish in the second quarter. Government spending is expected to continue to contract in the second quarter, although at a somewhat slower rate than in the previous two quarters. After exerting a 0.2 percentage point drag on growth in the first quarter, both real exports and real imports of goods increased in April, suggesting that trade will be a modest plus for growth in the second quarter.

Looking at the economy from the supply side, the slowing of growth in the second quarter is most evident in manufacturing. The ISM manufacturing index fell to 49.0 in May, its lowest level since mid-2009. The new orders, production, and orders backlog subcomponents were all below 50. In contrast, the ISM non-manufacturing index moved up slightly in May, and at 53.7 is within the range that has prevailed over the past year. The recent data on employment provide a similar picture. The April-May average monthly increase in employment in the private service-providing sector of the economy was 176,000, up somewhat from the first quarter average of 169,000. In contrast, the April-May average change in employment in manufacturing was -9,000 versus an average monthly gain of 11,000 during the first quarter.

Both total and core inflation continued to slow over the intermeeting period, as did the rate of change of average hourly earnings. As of April, the 12-month change of the total PCE deflator had declined to 0.7%, quite a bit lower than what was experienced in mid-2010 and mid-2012. Much of this slowing of inflation reflects the decline of energy prices, which were down 4.2% from year ago levels. Available data suggest that the decline of energy prices halted in May while prices began to firm in June. However, core inflation has also declined notably, with the 12-month change of the core PCE deflator down to 1.1% in April. The nonmarket components of this index have certainly contributed to the slowing, but the 12-month change of the market-based core PCE deflator was also 1.1% as of April.

A decomposition of the slowing in core inflation reveals that it is primarily due to slowing in the rate of increase of prices of non-food, non-energy goods. This likely stems from the softening of global demand for goods and the appreciation of the dollar that has occurred since mid-2011, both of which have resulted in a marked slowing in the rate of increase of nonpetroleum import prices. In contrast, the rate of increase of non-energy or core services has been relatively stable at a level consistent with inflation expectations, which have also been relatively stable. This set of conditions did not hold back in 2010, when the rates of inflation for both core goods and core services, as well as

inflation expectations, slowed appreciably. However, it should be noted that in the April price data there were declines in prices for health care services, transportation services, and recreation services. While this could be just noise, it bears watching the months ahead.

Conditioning assumptions. Our estimate of potential GDP growth is around 2 ¼%, reflecting trend growth of productivity of 1 ¼% and trend growth of hours worked of 1%. Under these assumptions, the average monthly increase of payroll employment would be around 112,000 if the economy were growing at potential. The Board staff estimate of potential for 2013 has been raised to 2.0% from 1.9% in April. For 2014 the Board staff estimate of potential is unchanged at 2.1%.

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 modal forecast, inflation expectations remain well anchored. This assumption is central to our projection that PCE deflator inflation will gradually move up to the FOMC's objective of 2.0% by 2014. In contrast, the Tealbook forecast expects PCE deflator inflation to remain around 1 ½% in 2014.

In both the Tealbook and Blackbook, projections of global real GDP growth in 2013 are essentially unchanged at 2.5% (Q4/Q4) and 2.6% (Q4/Q4), respectively. Forecasts for global growth in 2014 are also essentially unchanged at 3.0% for both the Tealbook and the Blackbook.

In the Tealbook, the nominal exchange value of the dollar is projected to rise 1.8% in 2013, up from a 1.1% appreciation in April. The exchange value of the dollar is then expected to decline 1.2% in 2014 versus 1.7% in the April Tealbook. The net result is a modestly higher path of the dollar over the forecast horizon. The movements of the dollar in the Blackbook are the same as those in the Tealbook.

Spot prices of oil have moved somewhat higher over the intermeeting period.

Accordingly, we have raised our assumed path of oil prices over the remainder of 2013 by about \$1.50 per barrel, with the spot price of WTI at \$93.50 in 2013Q4. The Board's assumed price for 2013Q4 is \$94.00. Oil prices are projected to move gradually lower in 2014, reaching around \$90.00 per barrel by 2014Q4 in both forecasts.

We have maintained the same fiscal policy assumptions as in the April forecast, and those assumptions are the same as those of the Tealbook. Fiscal policy is exerting substantial drag on the economy in 2013 and will continue to do so in 2014. The Board staff assumption is that, including multiplier effects, fiscal policy at all levels of government will exert a drag on growth of real GDP of 1 ½ percentage points in 2013 and 1 ¼ percentage points in 2014.

We also routinely adopt the Tealbook assumptions regarding equity and home prices. Equity prices are now roughly three percent higher than they were expected to be at this point in time in the April Tealbook. The Board staff interprets this development as a pulling forward of the anticipated reduction of the equity premium. Going forward, equity prices are assumed to increase at an 8% annual rate, below the 9% growth rate assumed in April. Thus the level of equity prices is somewhat higher over the medium term but the level at the end of the forecast horizon is essentially unchanged. The recent rate of increase of the CoreLogic national home price index has continued to surprise to the upside. The Board now assumes that it will increase 13 percent for all of 2013, up from the 8% increased assumed in April. The increase of the index is expected to slow to 5% in 2014, up from the 4% assumed in April. On net, the path of home prices over the forecast horizon is considerably higher. The higher paths for equity and home prices in this forecast cycle play an important role in the significant upward adjustment of consumer spending in 2014 in the Board staff forecast. We have traditionally taken a less mechanical view of the workings of the wealth effect, based largely on research suggesting that consumers' reactions to short run changes in wealth tend to be more muted than the longer-run multipliers estimated in many models.

The Outlook. As mentioned above, real GDP is expected to increase at a 2 % annual rate

over the first half of 2013, about what we expected in the January Blackbook, but somewhat less than anticipated in April. Nonetheless, we see the fundamentals of the economy as actually being somewhat better than we would have guessed in January. Key measures of household leverage are the best they have been in well over a decade. Household net worth, expressed as a percent of disposable income, has returned to its average of the previous decade, reflecting rising equity and home prices and declining liabilities. Credit standards are beginning to ease somewhat, such that we are now experiencing a fairly typical cyclical recovery of consumer spending on durable goods. Light-weight motor vehicles sold at a seasonally-adjusted annual rate of 15.3 million in May, not far from the 16.1 million sales of 2007. Similarly, after five years in which housing production was well below what is consistent with underlying demographic trends, it now appears that we have worked off the excess supply of housing built up during the boom years of the last decade. Housing starts and sales are now on a clear upward trend, and a widely followed national home price index is up around 12 ½ percent over the twelve months ending in April. Indeed, anecdotal reports suggest that this higher than expected increase in home prices is due to a lack of homes for sale.

Unfortunately, the improvements in consumer spending on durables goods and housing are not yet showing through in the overall GDP growth rate due to the significant headwinds that we continue to face. First, while the worst of the contraction at the state and local level of government appears to be over, federal fiscal policy has become quite contractionary. Second, the Euro Area is experiencing a protracted recession, while growth in many of the largest emerging economies has slowed. This has resulted in a very sharp slowing of US exports, with an associated slowing in production and employment growth in the US manufacturing sector.

But the headwinds restraining growth will gradually subside over the next few quarters, setting the stage for a stronger pace of growth in 2014. The private sector of the economy will continue to heal, credit conditions will continue to ease, and fiscal drag will lessen. Growth prospects among our major trading partners are expected to improve. And this combination of events is likely to create an environment in which business investment

spending will gather strength. Thus, we anticipate growth moving up to around 3 ¼% in 2014, which will be associated with more rapid improvement in labor market conditions and the unemployment rate declining to around 6 ½% by the end of the year.

Inflation is projected to gradually firm over the forecast horizon. As mentioned above, energy prices essentially leveled off in May and began to rise again in June. In addition, we expect core goods inflation to begin moving back up towards the rate of inflation expectations, helped along by the anticipated firming of global demand and the assumed decline of the exchange value of the dollar. On a Q4/Q4 basis, the rate of increase of the PCE deflator is expected to rise to 2% in 2014 from 1.1% in 2013.

2.2 Alternative Scenarios and Risks

Our assessment of risks to the outlook has modestly changed since the last Blackbook, driven by a slight decrease in downside risk to real economic activity. As a result, risks to growth are now roughly balanced at near- and medium-term horizons. Risks to inflation have also slightly decreased, both on the upside and on the downside, and remain more or less balanced. As in April, however, the balance of risks for inflation is around a lower profile for the central scenario in the near and medium term.

These small changes in the overall risk profile reflect an increase in the likelihood of *Faster Growth*, which now accounts for roughly 35% of probability, compensated by a reduction in the likelihood of the *Fiscal Consolidation* (slightly less than 30% probability) and *Global Credit Crunch* (about 15% probability) scenarios [Exhibit C-1]. These adjustments mainly stem from the resilience of consumer spending to the sequestration and the continuous improvement in the housing sector. The positive surprises in payroll employment in the April and May labor market reports have also added to the probability that *Faster Growth* has become the most likely alternative scenario.

Finally, Exhibit C-3 also displays the baseline forecasts from the FRBNY-DSGE model (orange line). The DSGE forecast for both core PCE inflation and real GDP growth is

now below the mean and modal forecasts both in the near-term and in 2014-15.

3. Forecast Comparison

3.1 Comparison with Private Forecasters¹

Real GDP Growth. The FRBNY projection for real GDP growth falls within the range of private forecasts for both 2013Q2 and Q3. Like Macro Advisers and the Median SPF, we have revised down our forecast for the current quarter. Differently from these two private forecasters, however, we have added to GDP growth in the third quarter. On a year-over-year basis, the FRBNY growth projection for 2013 remains unchanged at 2.3%, consistent with all other private forecasters. Our estimate of 3.3% growth in 2014 (revised downward from 3.6%) is in line with Macro Advisers' forecast but higher than the Blue Chip's forecast.

Inflation. The FRBNY year-over-year forecast of core CPI inflation for 2013 was revised down from 1.8% in April to 1.7%, consistent with that of Macro Advisers and slightly below the Median SPF. Our projection for 2014 was increased by 0.2 percentage points to 2.4%---higher than the corresponding private forecasts. The FRBNY year-over-year projection for core PCE inflation in 2013 was revised down by 0.1 percentage points to 1.1%---in line with Macro Advisers' but below the Median SPF (1.5%). The FRBNY projection for core PCE inflation in 2014, on the other hand, remained unchanged at 1.8%, within the range of the private forecasts. The near-term FRBNY core PCE inflation projections for 2013Q1 and 2013Q2 are now 0.7% and 1.0%, respectively---down from 1.1% and 1.2% in April. Both numbers are at the lower end of the private forecasters range. Our projections for CPI inflation in 2013Q2 have been significantly revised downward, from 0.2% to -0.3%. This number is consistent with that of Macro Advisers (-0.4%) but well below Blue Chip (1.3%) and Median SPF (1.6%). Our forecast for 2013Q3 (1.9%) has not changed and remains at the bottom of the range from private forecasters [2.0%,2.7%]. On a year-over-year basis, our forecast of CPI inflation for 2013 was revised down 0.1 percentage points to 1.2%, in line with Macro Advisers' but lower

¹ The details of the forecast comparison are in Exhibit B-8. Quarterly numbers are SAAR.

than Blue Chip (1.5%) and Median SPF (1.7%). Conversely, our forecast for 2014 was revised up from 2.3% to 2.7%---well above the range of private forecasters [1.4%,2.2%].

3.2 FRBNY-DSGE Model Forecast

The FRBNY model forecasts are obtained using data released through 2013Q1, augmented for 2013Q2 with the FRBNY staff forecasts for real GDP growth, core PCE inflation, and growth in total hours, and with values of the federal funds rate and the spread between Baa corporate bonds and 10-year Treasury yields based on 2013Q2 observations. The expected future federal funds rates are constrained to equal market expectations, as measured by the OIS rates, through 2015Q2, using anticipated policy shocks. The standard deviations of these shocks are estimated using federal funds rate expectations since 2008Q4, the beginning of the zero bound period. The 2013Q2 staff projections and OIS rates are those available on June 13, 2013.

Output growth in 2013Q1 and 2013Q2 (as projected by the staff) was a bit weaker than projected in March, and hence the DSGE output forecasts for 2013 and 2014 are slightly lower than in the last Blackbook [Exhibit E-1]. The model continues to project a lackluster recovery in economic activity, with output growth in the neighborhood of 2 percent throughout the forecast horizon. Growth forecasts for 2013, 2014 and 2015 (Q4/Q4) are 1.9, 1.8 and 1.5 percent, respectively, compared to the rates of 2.3, 1.9 and 1.4 percent, respectively, we reported in March [Exhibit B-8]. Core PCE inflation in 2013Q1 (again, as projected by the staff) turned out in line with the March DSGE projections. Inflation forecasts are also a bit lower in the short run than those in March. Mean and modal core PCE inflation projections for 2013, 2014 and 2015 (Q4/Q4) are below the FOMC long-run goal of 2 percent throughout the forecast horizon. Specifically, these are 0.9, 1.2 and 1.5 percent, respectively, compared to 1.1, 1.3 and 1.5 percent, respectively, in March. The DSGE model forecasts for output growth are weaker than the FRBNY central forecast throughout the forecast horizon, with the exception of the very short run. The inflation forecasts imply a slower return to the FOMC long run goal than the FRBNY staff forecasts.

Unchanged from the March Blackbook, there is significant uncertainty around real GDP forecasts from the DSGE model, with 68 percent bands covering the interval 0.5 to 2.8 percent in 2013 (Q4/Q4), -1.5 to 4.2 percent in 2014 (Q4/Q4), and -1.8 to 4.4 percent in 2015 (Q4/Q4). The forecast distribution for inflation remained virtually unchanged relative to March, with the 68 percent probability bands within the 0.4 to 2.3 percent interval throughout 2015. Reflecting the differences in the modal forecasts, the DSGE forecast distribution is shifted downward relative to the FRBNY forecast distribution. Uncertainty around the real activity and inflation forecasts, as measured by the width of the 90% probability interval, is lower through 2013 than in the FRBNY forecast distribution, but becomes higher afterwards, especially for real activity.

The FRBNY forecast is driven by two main factors. On the one hand, the headwinds from the financial crisis, as captured by the effect of shocks to credit spreads and to the marginal efficiency of investment (MEI), result in low real activity, low real marginal costs, and consequently, low inflation. The economy experienced large spreads shocks during the Great Recession and a sequence of adverse MEI shocks afterwards. Given that these shocks have persistent effects on output growth and inflation, financial headwinds continue to negatively affect the forecasts for real activity and inflation through the end of the forecast horizon. On the other hand, accommodative monetary policy, particularly the forward guidance, has played an important role in counteracting these headwinds, which has lifted up output and inflation. However, the impact of past forward guidance on the *level* of output has begun to wane by now, according to the model. This implies that the effect of policy on *growth* forecasts is actually negative, particularly toward the end of the forecasting horizon. This largely explains why output growth is still below trend by the end of 2015.

The model views the federal funds rate at the zero lower bound as mostly driven by the endogenous response of policy to the weak economy. In fact, throughout 2013 the historical rule would imply a rate at about 25 basis points. However, by early 2015 the policy accommodation provided by the forward guidance becomes more noticeable, implying a federal funds rate path below the historical rule by about 75 basis points.

4. Robustness of Policy Recommendation

4.1 Sensitivity to Alternative Scenarios and Policy Rules

Our current policy recommendation implies a target range for the federal funds rate of 0 – 0.25% until mid-2015. This implies an earlier lift-off than the *Baseline* policy rule under our central scenario or under the fiscal consolidation scenario [Exhibit D-1]. In contrast, our recommendation implies a later lift-off than the *Baseline* policy rule under the faster recovery scenario. It is important to keep in mind, however, that standard Taylor-type rules do not necessarily provide good approximations of optimal policy when policy is constrained by the zero lower bound, as a commitment to maintain rates at a low level for longer than prescribed by standard rules may be necessary to provide the appropriate level of accommodation.

In Exhibit D-2, we report on the prescriptions from various policy rules using the expected value of the forecast distribution as an input. The path implied by the *Baseline* policy rule shows a liftoff in 2015Q1. The *Nutter* rule, which puts weight on inflation only, prescribes a policy rate slightly above 0.50% by 2013Q3. Exhibit D-2 also shows the implied nominal FFR under the *Outcome-based* rule, ignoring the zero bound constraint. Under the expected value of the forecast distribution, the unconstrained nominal FFR remains negative throughout the forecast horizon – reaching almost -6% by 2014Q4.

Exhibit D-3 displays the prescriptions from alternative policy rules under the various alternative scenarios. FFR paths under the *Asymmetric Price Targeting* rule continue to be at the lower bound (0.25%) throughout the forecast horizon. The *Nutter* rule prescribes a liftoff in 2013Q3 under most scenarios, except in the face of a global credit crunch. For the *Outcome-based* rule, which ignores the zero lower bound, the paths are at or below zero through the end of 2015 for all scenarios.

4.2 Comparison to Market Expectations

The expected FFR path derived from overnight index swaps (OIS) quotes moved up quite significantly relative to its path at the time of the April Blackbook Update. The market

path is now consistent with a liftoff in 2015Q1. The median of the modal forecasts from the Primary Dealers Survey suggests instead a later timing for the first increase in the FFR target, in 2015H2, which is unchanged from the April survey. The average probability distribution of the timing of the first increase in the FFR target only registered small changes over the intermeeting period. The mode of the distribution remained at 2015H2, with a probability slightly above 25%, while probabilities of about 25% and 17% were placed on 2015H1 and 2016H1, respectively. The probability of the first increase in 2014H2 just breached the 10% threshold. Other dates received a probability of less than 10%.

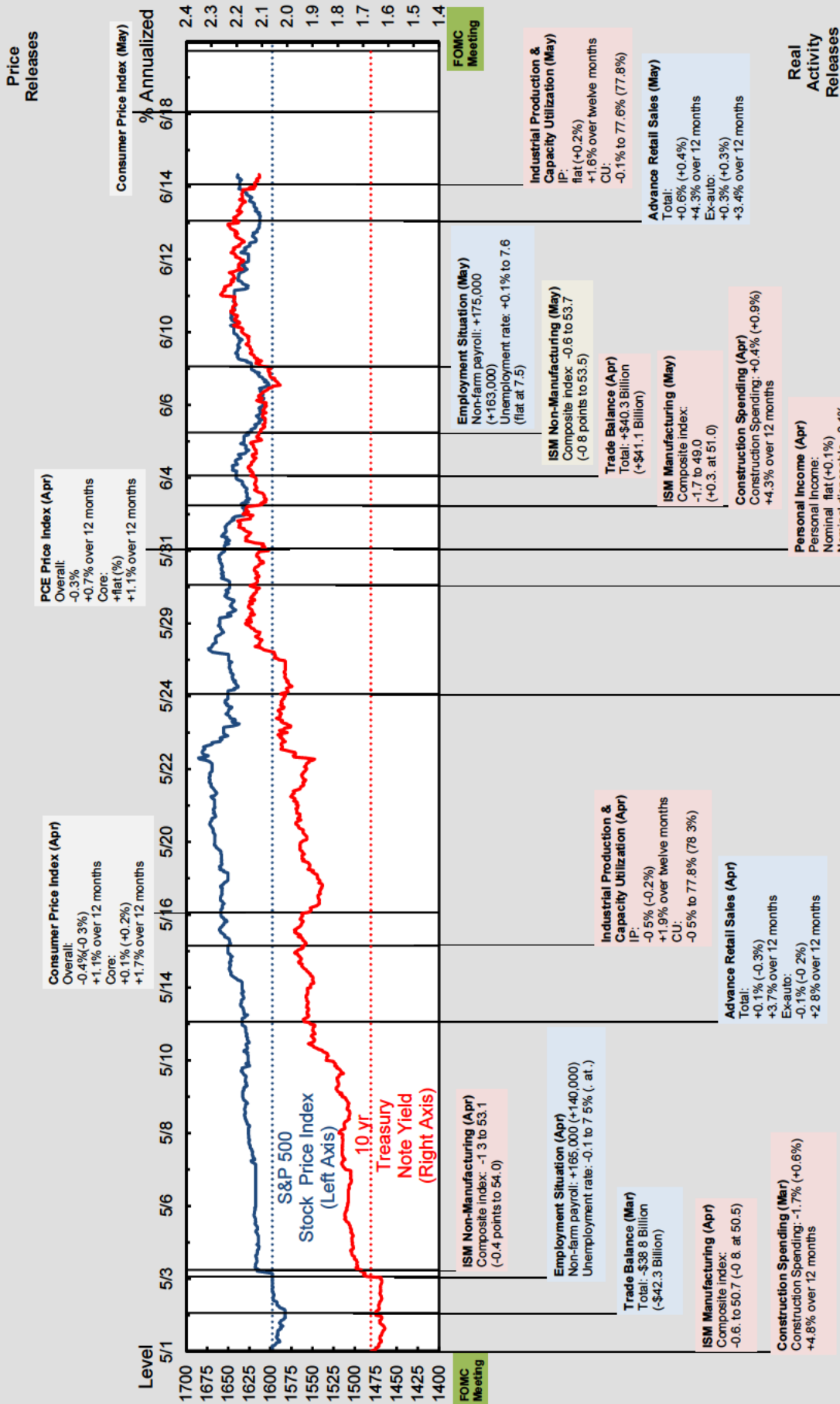
The median of the distribution of the date in which dealers expect asset purchases to end remained unchanged relative to the last FOMC meeting at 2014Q2. The probability attached to ending asset purchases before the December 2013 meeting is zero. All dealers, however, now expect a slowing of purchases over the life of the program. The first slowing is expected to be announced after either the October or December 2013 FOMC meeting---a notable shift forward relative to the April survey. The median dealer still expects an average \$20 billion purchase per month of both Treasury and mortgage-backed securities by 2014Q1, which is in contrast with the Tealbook assumption of an end to the Federal Reserve's balance sheet expansion in the second half of this year. The median expectation for the monthly pace of Treasury purchases is to decrease for the first time after the December 2013 FOMC meeting from \$45 billion to \$30 billion per month and to decrease further to \$25 billion a month after the January 2014 meeting. As for the monthly purchases of agency securities, the median expectation is for a termination of the program after the April 2014 FOMC meeting.

5. Significant Developments

5.1 Economic Developments

Foreign Data Releases. *Euro area:* Output fell 0.8 percent (saar) in Q1, putting it down 1.1 percent over the year. Investment spending was the major drag on growth as it continues the steady decline that started at the beginning of 2011. Consumption was flat,

Key Data Releases



Note
Blue shading: Data release encouraging/positive.
Red shading: Data release discouraging/negative.
Beige shading: Data release was neutral.
Gray shading: No attempt to sign the impact.
Numbers in parentheses are the median of the Bloomberg survey.

Source: Bloomberg
On-the-run securities, 8:00AM - 4:00PM.
S&P 500 Stock Price Index: 9:30AM - 4:00PM.

which is a relatively strong reading after six quarters of decline. Both imports and exports fell. Manufacturing was largely unchanged from October 2012 through March, but ticked up in April. The economic sentiment index has been unchanged this year through May. The composite PMI readings for May were somewhat improved, but the data still point to a contraction in Q2. Loans to nonfinancial firms were down 5 percent over the year in April. The unemployment rate reached another all-time high of 12.2 percent in April, with the number of unemployed up 9 percent over the year.

Japan: Robust 4.1 percent (saar) growth in Q1 was propelled by strong private consumption and export sales. Investment spending was again flat. The private consumption index edged up in April, extending its upward climb over the past two quarters. Export volumes increased in April, improving on the Q1 pace and indicating continuing recovery from steep declines in H2 2012. Industrial production improved in April; however, manufacturers were less sanguine in their projections for May and June. The core CPI index fell 0.4 percent over the year in April.

EM Asia: Chinese data suggest little or no pickup in activity in Q2 following the unexpected slowdown in Q1 growth. Industrial production, investment spending, and retail sales moved sideways in April and May, while manufacturing PMI readings declined slightly. Exports and imports slowed markedly in May, partly from correcting a misreporting that had inflated earlier readings, but also due to sluggishness in external and domestic demand. Credit growth remains rapid, but a recent moderation suggests that efforts to rein in “shadow” financing channels are taking effect. Production, exports, and manufacturing PMI readings suggest that activity in the rest of EM Asia was weak heading into Q2.

Latin America: Brazil’s output rose 2.2 percent (saar) in Q1. Consumption was soft as inflation hurt real incomes. Prices were up 6.5 percent over the year in May. Output in Mexico was up only 1.8 percent in Q1, held down by public spending restraint and a sluggish export-oriented manufacturing sector.

5.2 Financial Markets

Domestic Financial Markets.

Nominal Interest Rates: While short-term yields with maturities of two years or less were largely unchanged, the yields of Treasuries with maturities of ten years or more increased by about 35 basis points since the last meeting in April. The increase was accompanied by an increase in mortgage market rates. According to the New York Fed staff model, the change in longer-dated Treasuries can be almost fully attributed to an increase of the term-premium, with long-term expectations of future nominal short rates little changed. Option implied volatilities in Treasury and swap markets, as measured by the 3-month MOVE and SMOVE indices, have also increased for about 20 basis points since our last update. [Exhibit A-3: Treasury Yields]

Inflation Compensation: Along with the increase in nominal Treasuries, breakeven inflation at the 5-year and 10-year horizons has declined somewhat since April. With the overall level of breakeven inflation rates being close to their historical averages, inflation expectations remain well anchored. Consistent with the evidence for nominal Treasury yields, the staff models suggest that the slight decline in long-term breakeven inflation can primarily be attributed to a reduction of the inflation risk premium, which measures the compensation that investors demand for bearing inflation risk. The 5-10 year real forward rate currently stands at 0.81%, a significant increase since April, further above the zero level than the last update. [Exhibit A-4: Real Yields and Implied Inflation]

Expected Policy Path: The expected path of the federal funds rate, as inferred from market and survey data, has shifted significantly upwards since our last update in April. Expectations now seem to suggest a faster pace of tightening after the liftoff. Market quotes derived from Overnight Index Swaps (OIS) imply fed funds rate expectations of about 0.25% for August 2014, about 0.40% for February 2015 and about 1.00% for May 2016. Survey responses from the Blue Chip Financial Forecasts' June 2013 panel (survey period May 22-23) show that the majority (75%) of market participants expect the federal funds rate to achieve 0.21 by the third quarter of 2014, while 25% of market participants

expect the rate remain around 0.15 by the third quarter of 2014. [Exhibit A-5: Policy Expectations]

Equity Markets: The S&P500 index has continued to increase since April and now stands at 1623 points and thus above the previous historical high that it had marked in October 2007. Other broad equity indices have also continued to increase on balance over the past month. Equity valuations are likely supported by a somewhat brighter domestic economic outlook, higher earnings expectations and continued expectations for monetary accommodation. Implied equity volatility, as measured by the VIX, continues to be low by historical standards, with a current level of about 11. While the VIX has fluctuated somewhat since the last update of this document in April, it remained well below the intermittent peak of about 19 that it had reached on February 25, the day after the Italian parliamentary election. [Exhibit A-6: Equity]

Credit Spreads: Broad measures of corporate credit spreads moved sideways or increased slightly since the last update of this document in April. However, levels remain low compared to post-crisis averages. On balance, investment grade corporate bond spreads to comparable maturity Treasuries declined by some 30 basis points to their current level of 155 basis points, yet still above historical lows. High yield corporate bond spreads to comparable maturity Treasuries were largely unchanged over the past month and currently stand at 508 basis points. Primary and secondary mortgage market rates increased somewhat since April to 3.98 percent and 2.93 percent, respectively. However, the spread between the two rates was largely unchanged over the past month, and remains well below its peak right after the September 2012 FOMC. [Exhibit A-7: Credit]

Foreign Financial Markets. *Euro Area:* Changing perceptions about monetary policy outlooks in the United States and the euro area have been the main driver of euro area financial market developments over the intermeeting period. In case of the euro zone policy outlook, expectations for additional rate cuts decreased in the wake of improved euro area data releases from late May onwards. Consequently, euro area sovereign debt

yields rose significantly: German and French 2-year yields were up by about 15 and 40 basis points, respectively, and in the case of ten-year yield equivalents, about 40 and 50 basis points. In terms of peripheral sovereign debt, Spanish and Italian 2-year spreads to German equivalents widened by 25 and 40 basis points, respectively. The euro appreciated against most major currencies, including 2 percent against the U.S. dollar. Equities declined by 2 percent, with bank and peripheral indices underperforming the broader EuroStoxx index. Cyprus received its first tranche of aid in mid-May totaling €2 billion from European facilities and €1 billion from the IMF, following approval of the Memorandum of Understanding by euro area governments, the Eurogroup, and the IMF.

Japan: The less-accommodative-than-expected outcome from the June Bank of Japan meeting, disappointments regarding the lack of detail from Prime Minister Shinzo Abe's structural reform proposals, as well as some reassessment amongst market participants of the monetary policy outlooks abroad have had a major impact on Japanese asset price movements over the intermeeting period. As a consequence, benchmark 10-year JGB yields increased about 25 basis points since the last FOMC meeting, with the yield curve steepening dramatically since the announcement of the Quantitative and Qualitative Easing (QQE) program at the Bank's April policy meeting. The yen appreciated 3 percent relative to the U.S. dollar, and equity values fell by about 10 percent.

Emerging Asia: Shifting expectations about monetary policy in the U.S. and the euro area, weak economic data in India (in particular, a growing current account deficit), and mixed news on the Chinese economy resulted in EM Asian currencies that were, on average, weaker against the dollar. In particular, the Indian rupee lost ground, as it fell 7 percent against the dollar over the intermeeting period. The Chinese yuan, however, strengthened slightly in U.S. dollar terms. Bond yields in the region increased by about 50 basis points, led by higher Indonesian yields.

Latin America: Since the last FOMC meeting, Latin American currencies depreciated, on average, by about 5 percent against the dollar. The Brazilian real in particular weakened, by about 7 percent, leading the authorities to take several measures to support the

domestic currency. Latin American bond yields are up sharply over the period, by about 100 basis points, with particularly large increases in Brazil, Mexico, and Colombia.

5.3 Global Economic Policy

Euro Area: The ECB left its main refinancing rate unchanged at its June policy meeting, as expected, after cutting it from 0.75 to 0.50 percent in May. The June statement noted that there are downside risks to the Bank's expectations that the recovery will start in the second half of the year. President Draghi nonetheless reiterated that the ECB stood ready to act if needed. At the May meeting, the ECB also announced that it was starting consultations with European institutions with the intention to support lending to small- and medium-sized enterprises (SMEs). However, given the complexity of the issue, new measures are months away from being announced. The ECB remains concerned about the under-capitalized banking system and will start its Asset Quality Review program for banks in Q4 and conclude it in Q1 2014. The hope is that credible bank balance sheet information will facilitate recapitalization efforts.

Japan: At its April policy meeting, the Bank of Japan announced easing measures that will drastically ramp up asset purchases and increase the duration of assets held on its balance sheet, with an aim to achieve its 2 percent inflation target within the next two years. Subsequent meetings, the last one on June 11, have kept its policy stance unchanged. In response to increased volatility on Japanese government bond markets, the Bank amended its schedule for its June bond purchase operations to increase the frequency of purchases, lower the size of individual operations, and partition the maturity buckets of purchases.

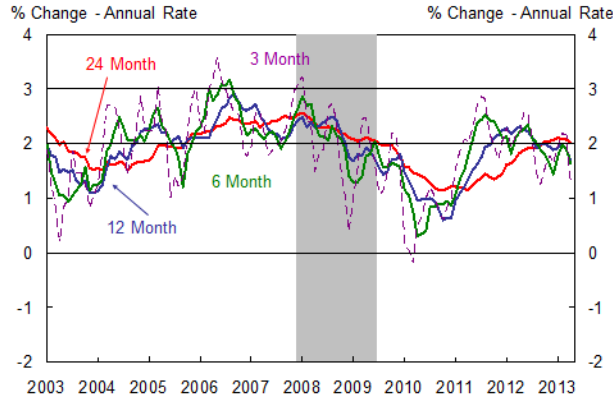
EM Asia: Central banks in India, Korea, and Thailand cut rates in recent months in the face of weak economic data. With the exception of India, however, EM Asian central banks are expected to either stay on hold or tighten slightly for the remainder of the year. Reserve accumulation by central banks outside China has up to now been minimal this year.

Latin America: Mexico's central bank kept its policy rate at 4.0 percent at its June meeting and is expected to remain on hold for the remainder of the year. The accompanying policy statement noted the impact of recent currency weakness on inflation, as well as the growing downside risks to its expectation of stronger growth in Q3 and Q4 of this year. In Brazil, the central bank increased its policy rate by a-larger-than-expected 50 basis points on May 29. An additional 75 basis points of hikes is expected by year-end. In addition, Brazilian authorities removed on June 4 a 6 percent tax on fixed income inflows in order to support the currency amid a widening current account deficit and the broader EM currency sell-off. The Brazilian central bank has also auctioned roughly \$6 billion in forward dollar liquidity since end-May in an effort to contain these currency pressures.

A. Significant Developments

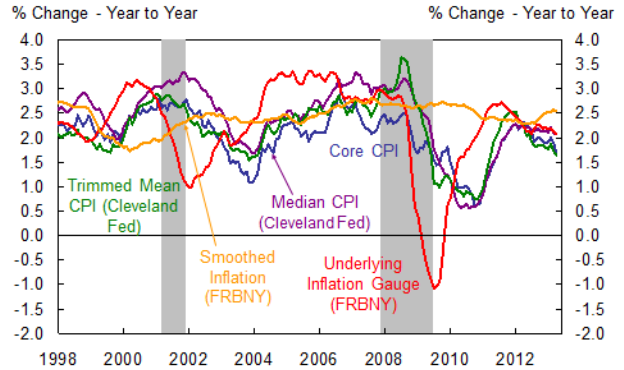
Exhibit A-1: Measures of Trend Inflation

Core CPI Inflation over Various Horizons



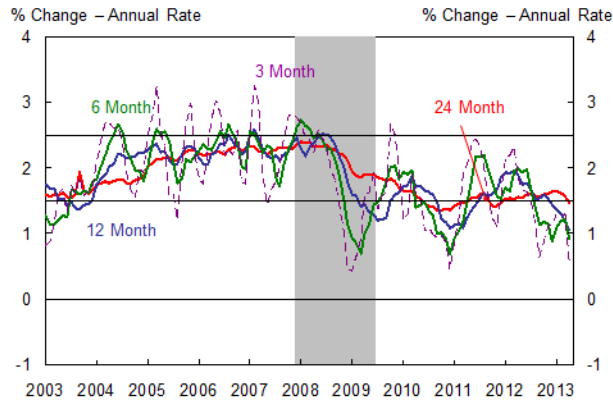
Source: Bureau of Labor Statistics

Alternative Measures of CPI Inflation



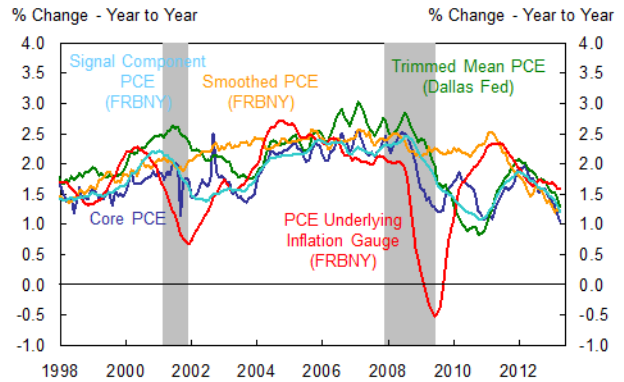
Source: Bureau of Labor Statistics, Cleveland Fed, MMS Function (FRBNY), and Swiss National Bank

Core PCE over Various Horizons



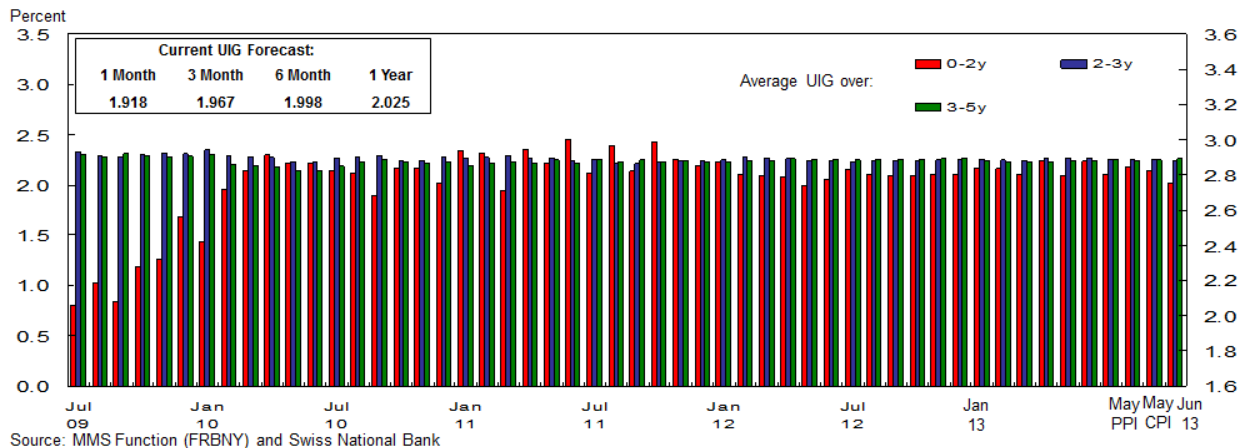
Source: Bureau of Economic Analysis

Alternative Measures of PCE Inflation



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

Exhibit A-2: Underlying Inflation Gauge (UIG)



Source: MMS Function (FRBNY) and Swiss National Bank

A. Significant Developments

Exhibit A-3:
Treasury Yields

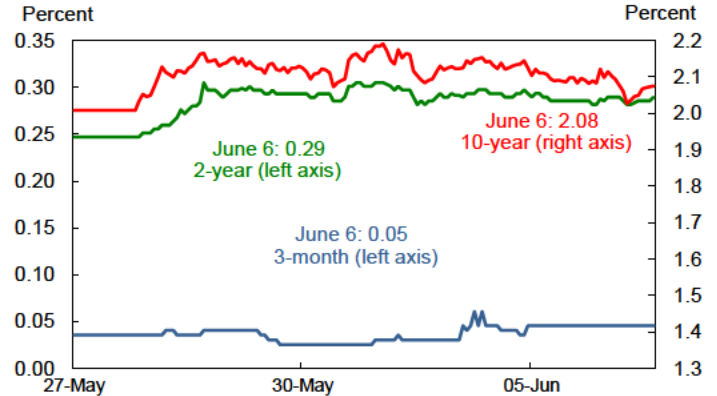
Short- and Long-Term Rates



Source: Bloomberg

Note: Yields of on-the-run securities.

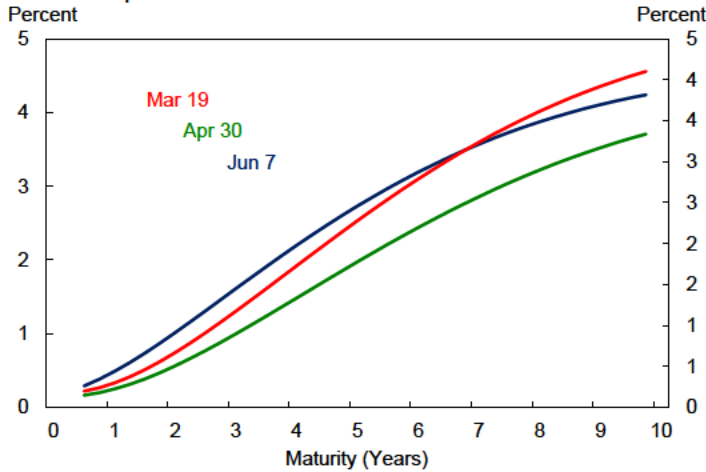
Short- and Long-Term Rates (Intraday)



Source: Bloomberg

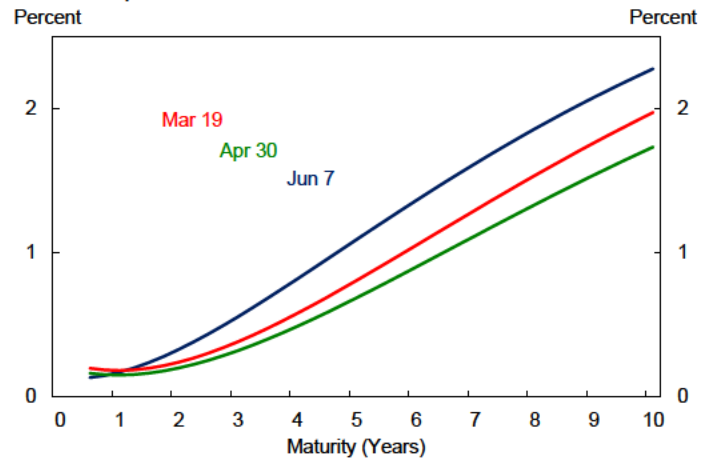
Note: On-the-run securities, 8:00 am to 4:00 pm.

Zero Coupon Yield Curves: One-Year Forward Rates



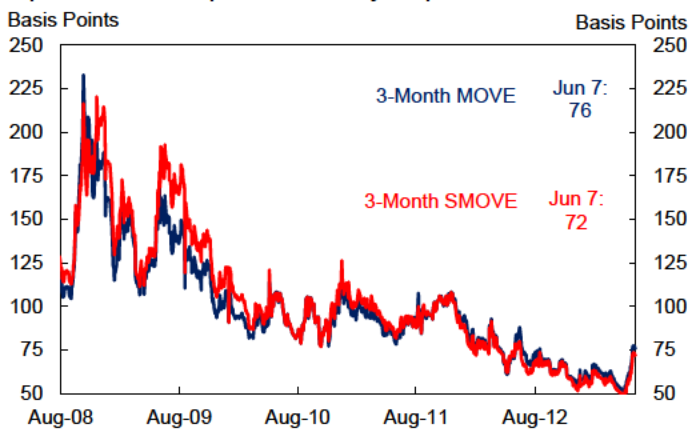
Source: Federal Reserve Board

Zero Coupon Yield Curves



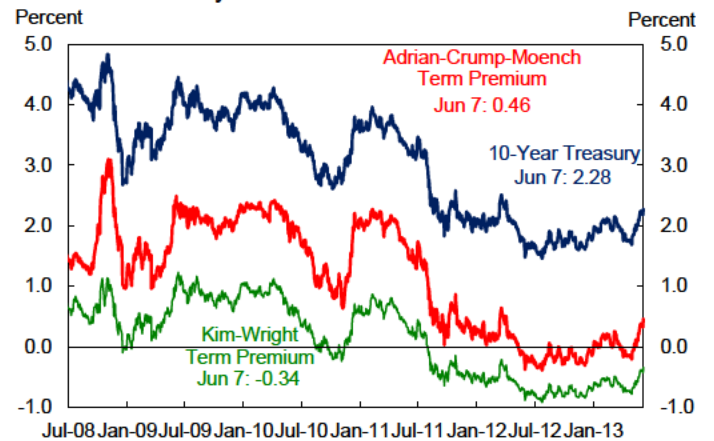
Source: Federal Reserve Board

Option and Swaption Volatility Expectations



Source: Federal Reserve Board, Barclays, and FRBNY staff

10-Year Treasury and Term Premia

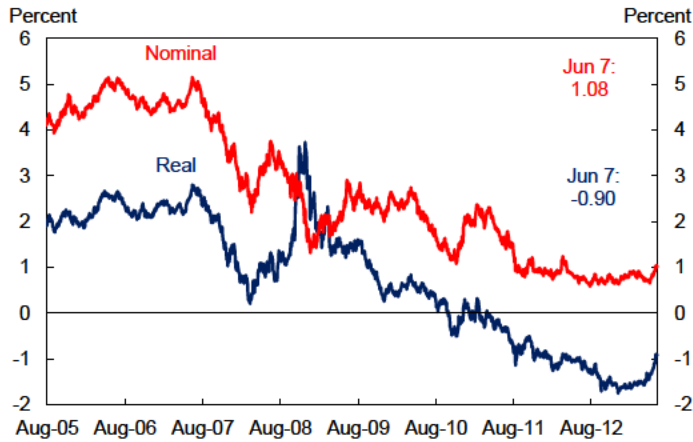


Source: FRBNY calculations, Federal Reserve Board

A. Significant Developments

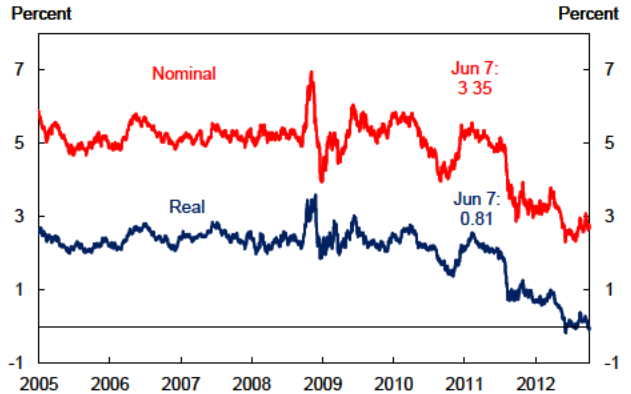
Exhibit A-4:
Real Yields and Implied Inflation

5 Year Spot Rate



Source: Federal Reserve Board

5-10 Year Forward Rates



Source: Federal Reserve Board

Note: Carry-adjusted

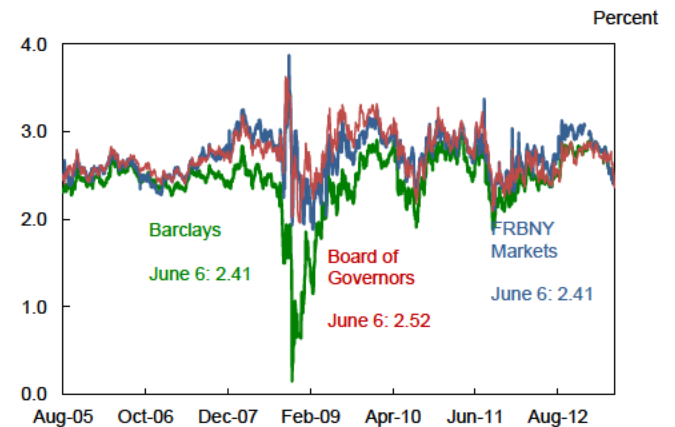
TIPS Implied Inflation: 4-5 and 5-10 Year Horizons



Source: Federal Reserve Board

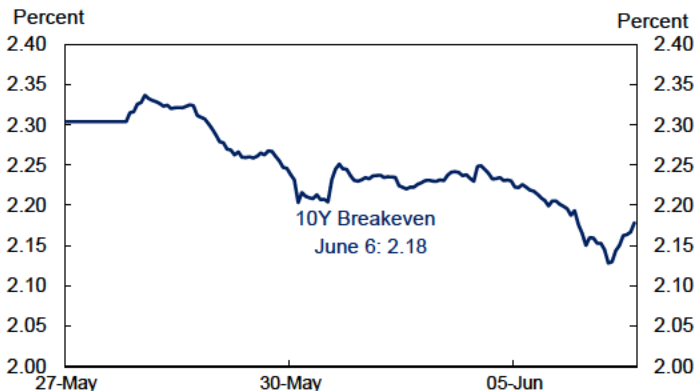
Note: Carry-adjusted

Alternative Measures of 5-10 Year Implied Inflation Compensation



Source: Federal Reserve Board, Barclays, and FRBNY calculations

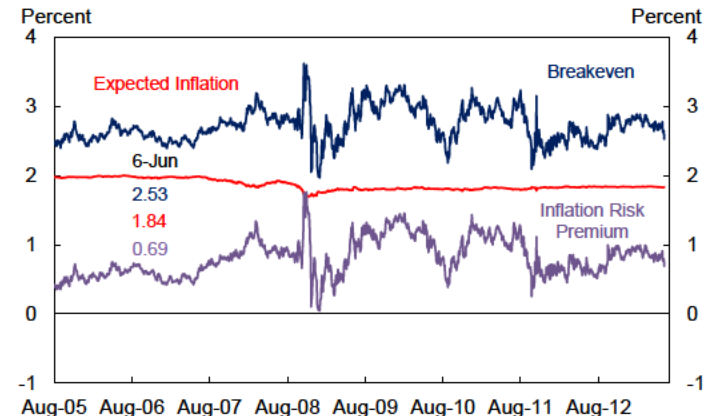
10-Year Breakeven Inflation Compensation (Intraday)



Source: Bloomberg

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

5-10 Year Forward Decomposition (2005-present)

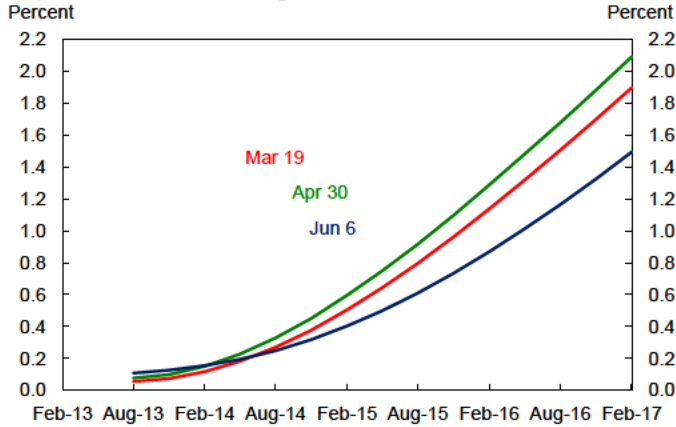


Source: FRBNY Calculations

A. Significant Developments

Exhibit A-5:
Policy Expectations

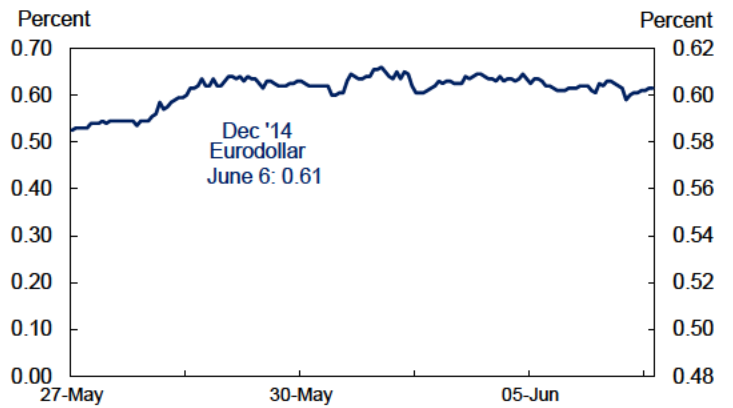
Expected Fed Funds Target Rate



Source: Federal Reserve Board

Note: Estimated using OIS quotes.

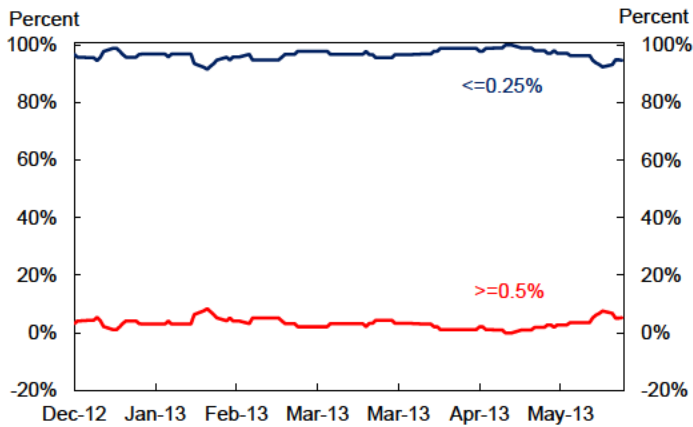
Implied Eurodollar Rates (Intraday)



Source: Bloomberg

Note: 8:00 am to 4:00 pm.

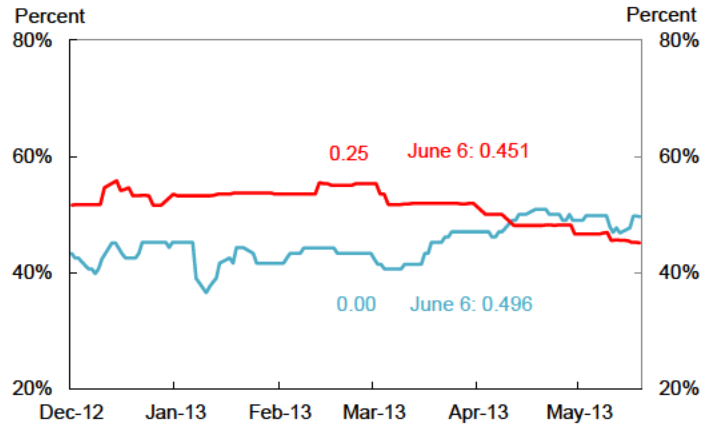
Fed Funds Probabilities December 2013



Source: Bloomberg

Note: Estimated from Fed Funds Futures

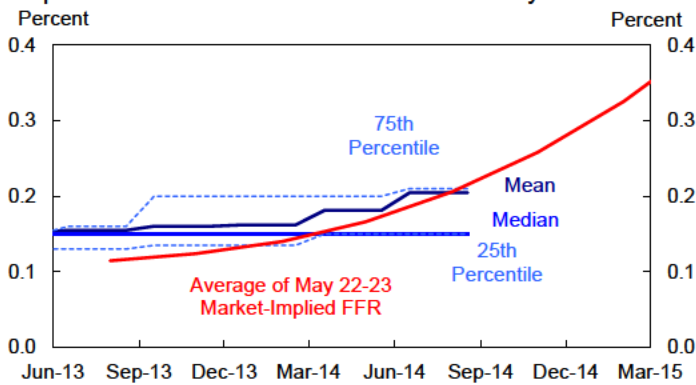
Fed Funds Probabilities December 2013



Source: Bloomberg

Note: Estimated from Fed Funds Futures

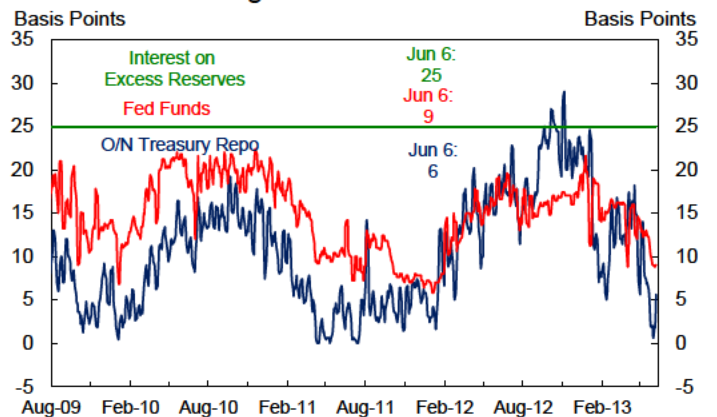
Expected Fed Funds from June 2013 Survey



Note: Implied FFR estimated from OIS quotes.

Source: The Blue Chip Financial Forecast conducted on May 22-23.

Short Term Funding Rates



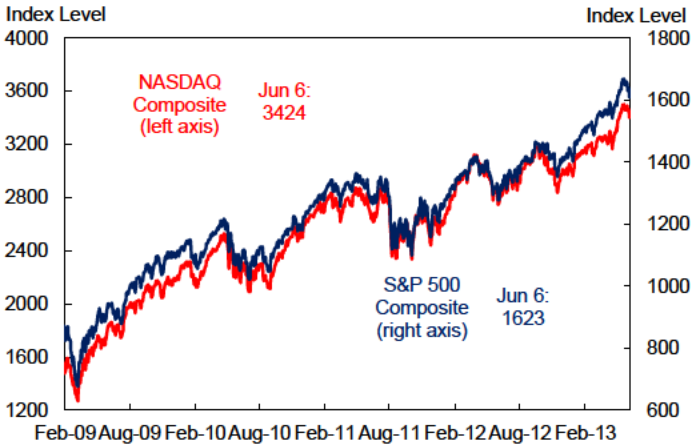
Source: Bloomberg, FRBNY calculations

Note: 1-week moving averages.

A. Significant Developments

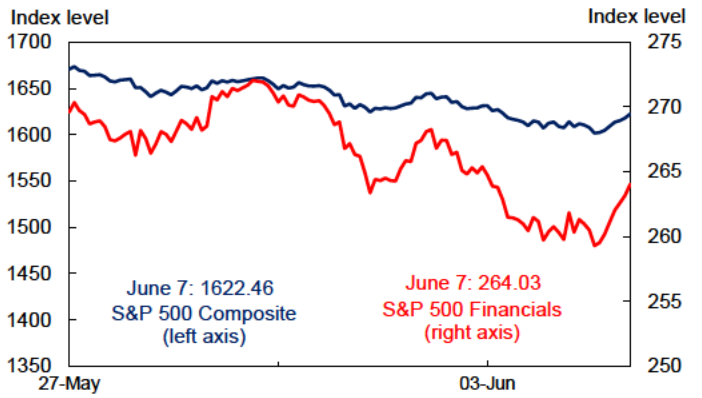
Exhibit A-6:
Equity

Equity Index Levels



Source: Bloomberg

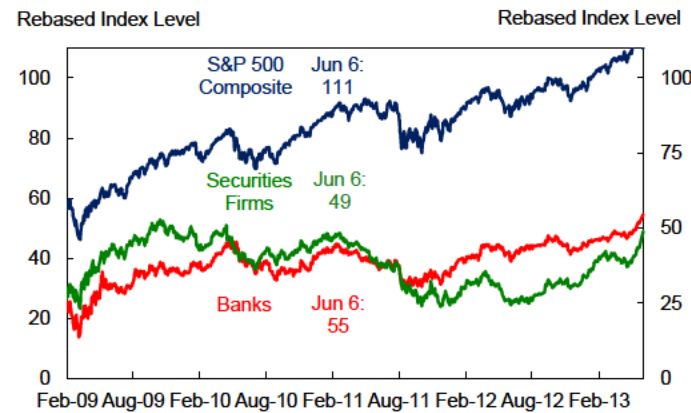
S&P 500 Indices (Intraday)



Source: Bloomberg

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

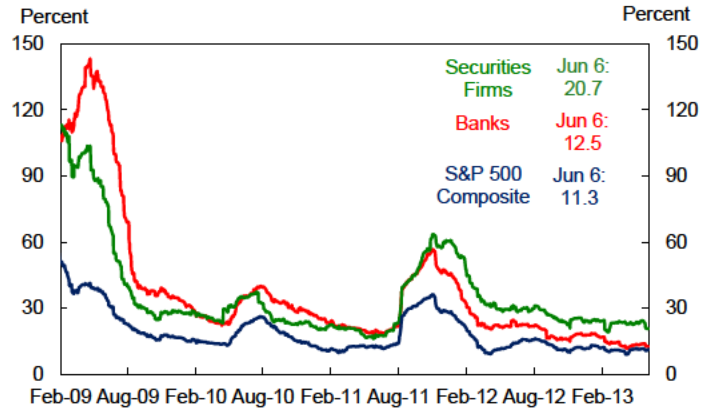
Equity Performance



Source: Bloomberg

Note: Rebased to equal 100 on August 1, 2007. Banks series is S&P 500 Banks index. Securities Firms series is S&P 500 Investment Banks and Brokerages index.

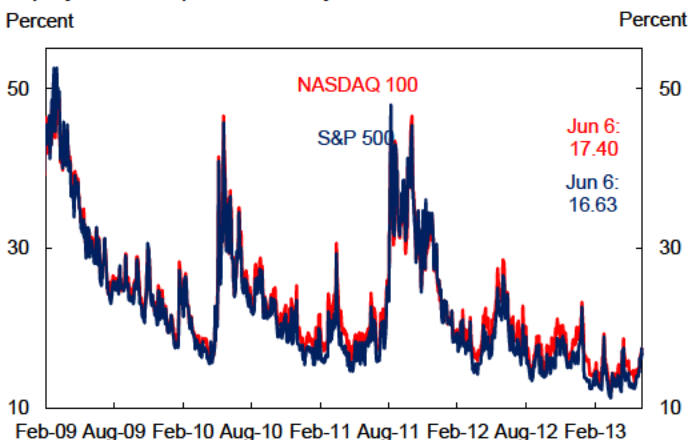
Historical Equity Volatility



Source: Bloomberg

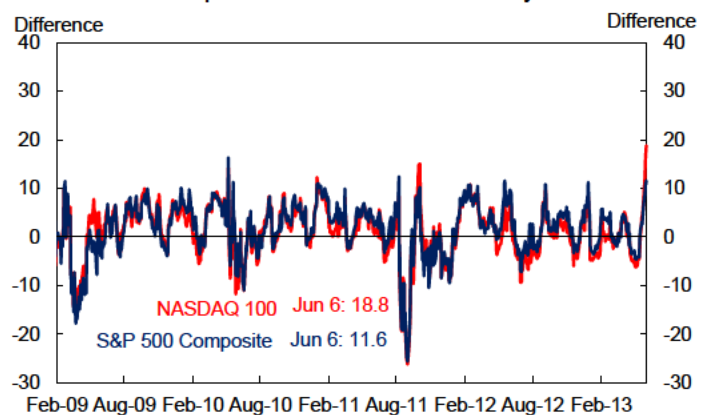
Note: Annualized rolling 3-month standard deviation of daily returns. Banks series is S&P 500 Banks index. Securities Firms series is S&P 500 Investment Banks and Brokerages index.

Equity Index Implied Volatility: 1-Month



Source: Bloomberg

Difference of Implied and Realized Volatility



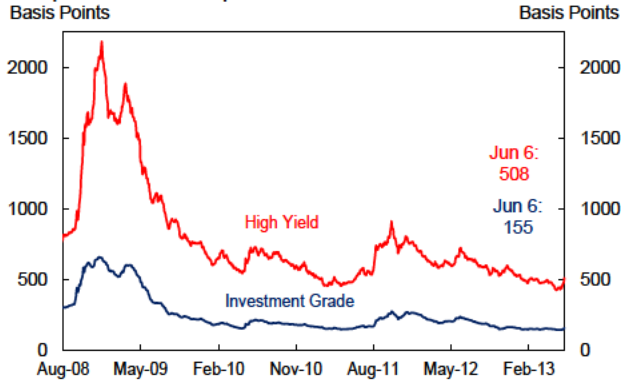
Source: Bloomberg

Note: Realized volatility is annualized 1-month rolling standard deviation of daily returns (360-day year) for S&P 500 and Nasdaq 100.

A. Significant Developments

Exhibit A-7: Credit

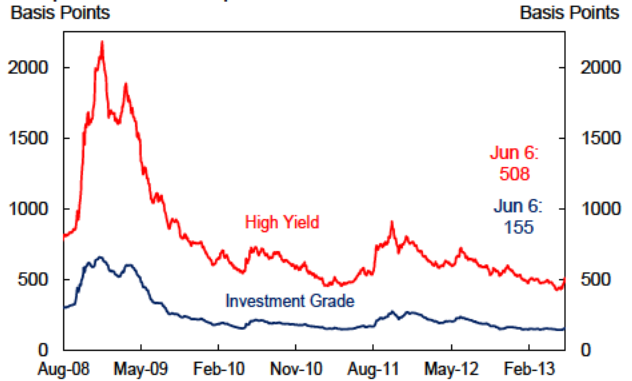
Corporate Credit Spreads



Source: Merrill Lynch

Note: Option-adjusted spreads.

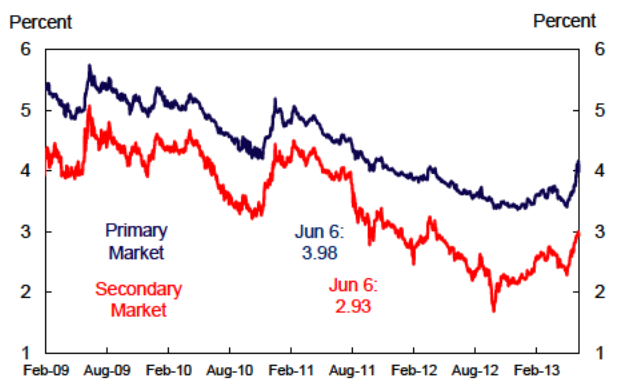
Corporate Credit Spreads



Source: Merrill Lynch

Note: Option-adjusted spreads.

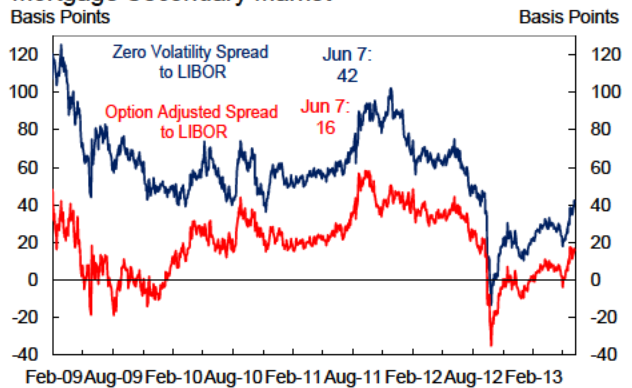
Mortgage Market Rates



Source: Bloomberg

Note: 30-year fixed mortgage rate and Fannie Mae current coupon yield.

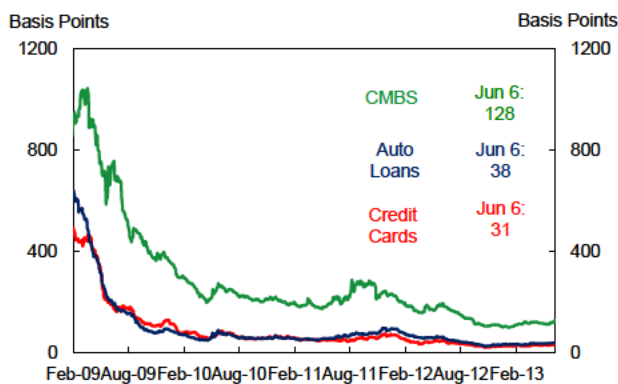
Mortgage Secondary Market



Source: J.P. Morgan

Note: 30 year current coupon Fannie Mae MBS.

AAA-Rated ABS/CMBS Spreads



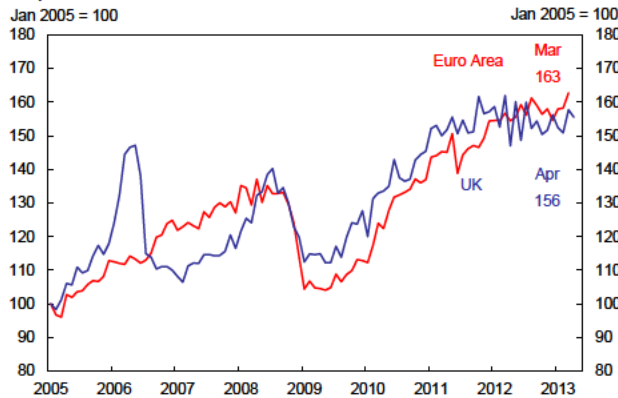
Source: Merrill Lynch

Note: Option-adjusted spreads.

A. Significant Developments

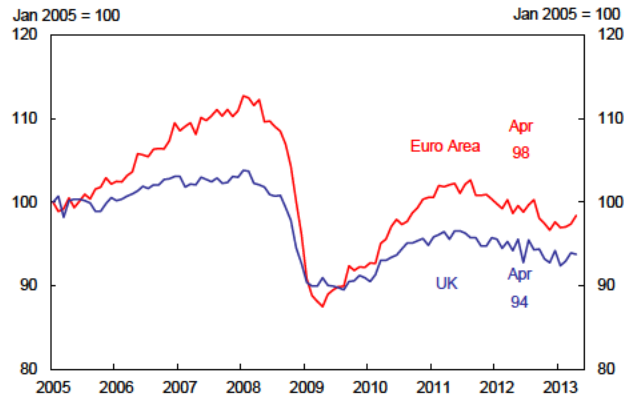
Exhibit A-8: Exports and Industrial Production

Exports



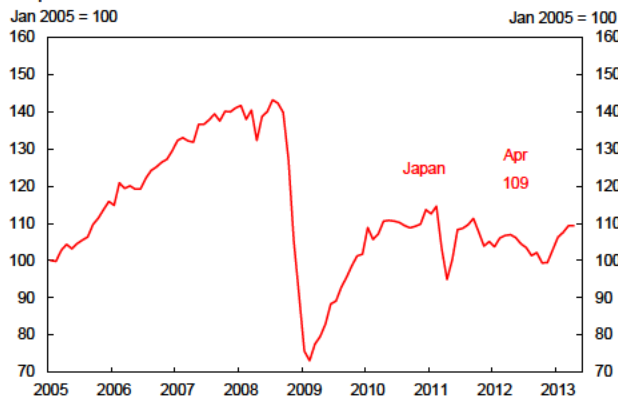
Source: Haver

Industrial Production



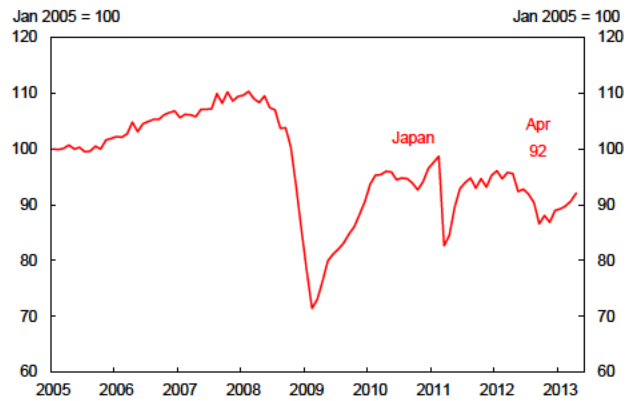
Source: Haver

Exports



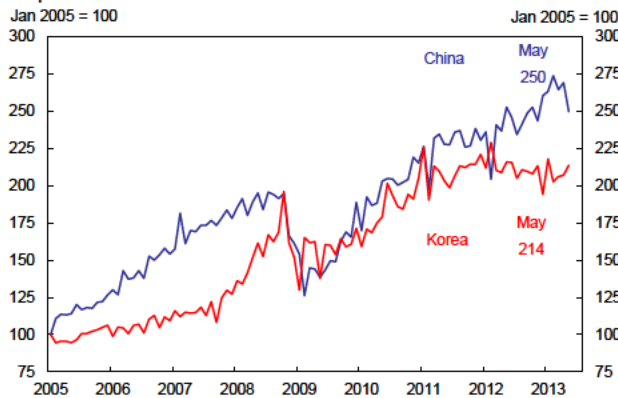
Source: Haver

Industrial Production



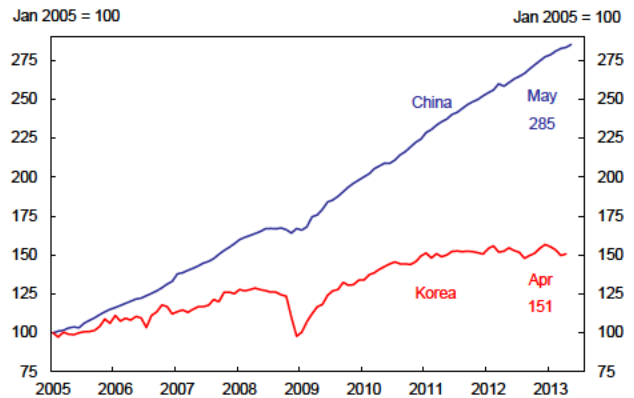
Source: Haver

Exports



Source: Haver

Industrial Production

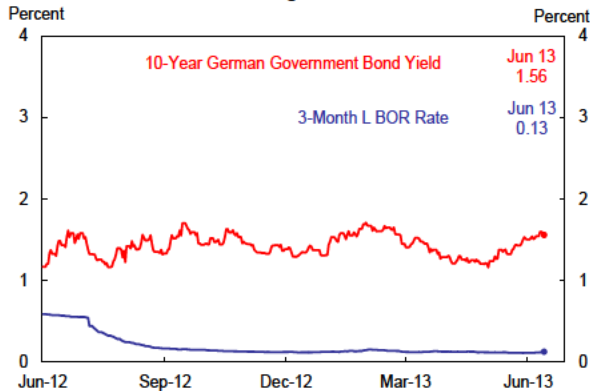


Source: Haver

A. Significant Developments

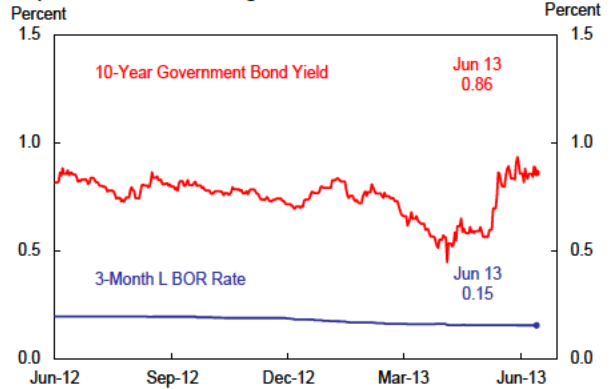
Exhibit A-9: Global Interest Rates and Equity Markets

Euro Area Short- and Long-Term Interest Rates



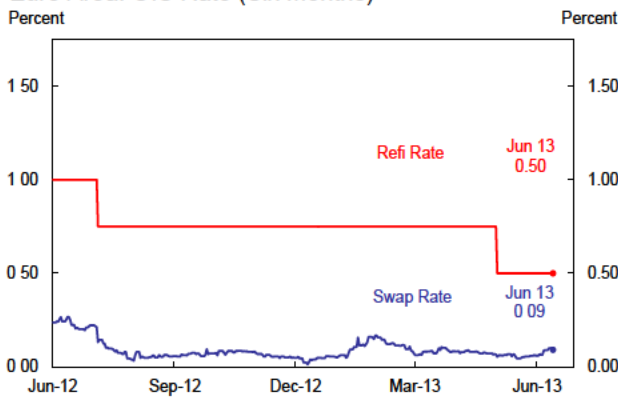
Source: Bloomberg

Japan Short- and Long-Term Interest Rates



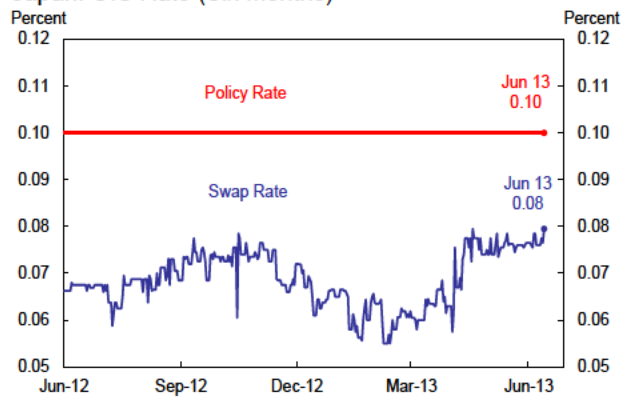
Source: Bloomberg

Euro Area: OIS Rate (Six Months)



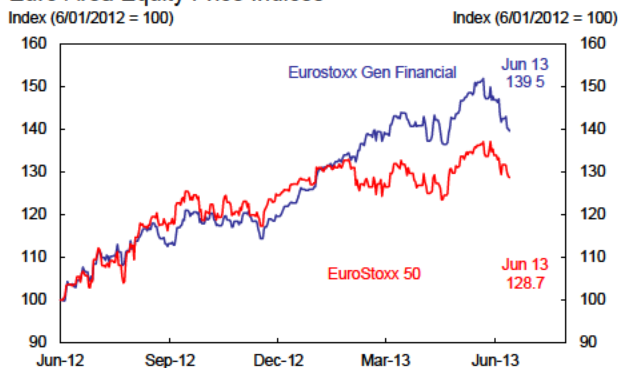
Source: Bloomberg

Japan: OIS Rate (Six Months)



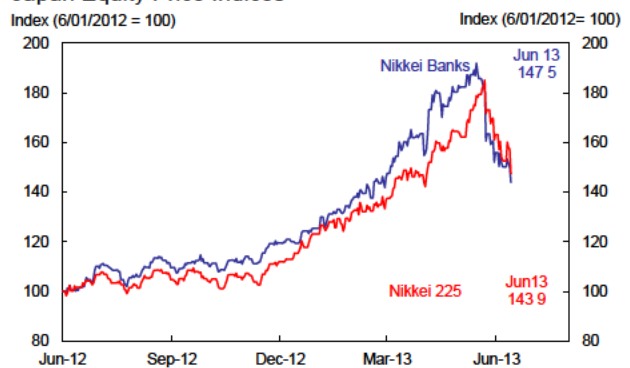
Source: Bloomberg

Euro Area Equity Price Indices



Source: Bloomberg

Japan Equity Price Indices

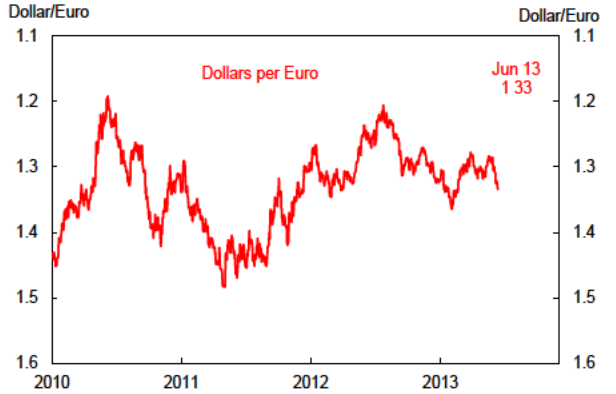


Source: Bloomberg

A. Significant Developments

Exhibit A-10:
Exchange Rates

Dollar-Euro Exchange Rate



Source: Bloomberg

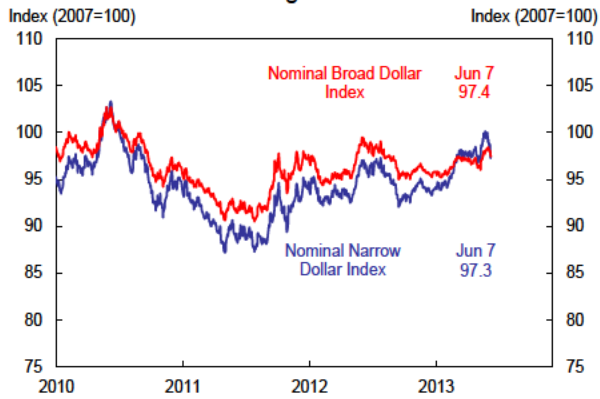
Note: Exchange rate scale is inverted.

Yen-Dollar Exchange Rate



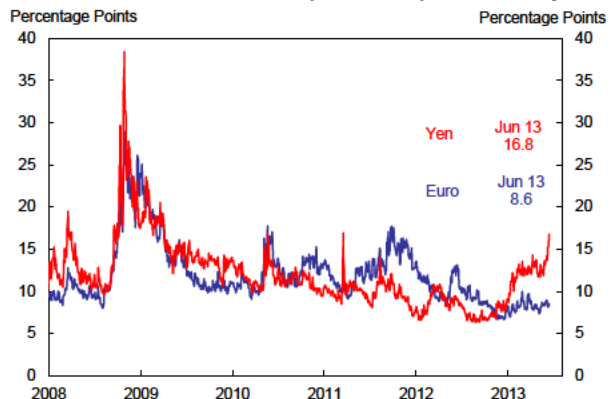
Source: Bloomberg

Nominal Effective Exchange Rates



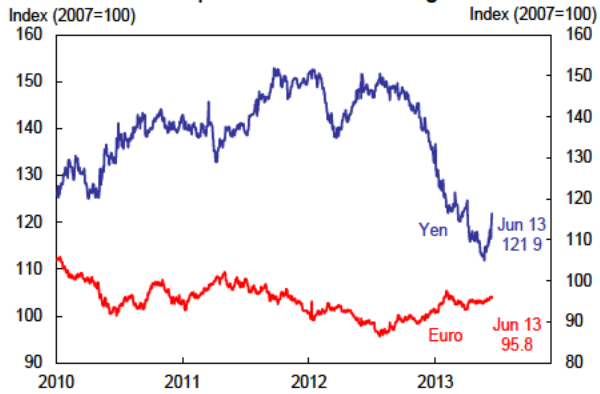
Source: Board of Governors

Euro and Yen One-Month Implied FX Option Volatility



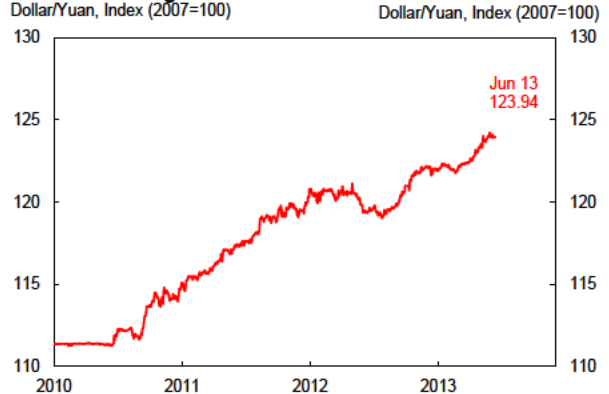
Source: Bloomberg

Euro Area and Japan Effective Exchange Rates



Source: Bloomberg and JPMorgan

China Exchange Rates



Source: Bloomberg

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**		
	Mar	Apr	Jun	Mar	Apr	Jun	Mar	Apr	Jun	Mar	Apr	Jun
2012												
Q1	2.2	2.2	2.2	2.0	2.0	2.0	8.3	8.3	8.3	0-0.25	0-0.25	0-0.25
Q2	1.7	1.7	1.7	1.3	1.3	1.3	8.2	8.2	8.2	0-0.25	0-0.25	0-0.25
Q3	1.1	1.1	1.1	3.1	3.1	3.1	8.0	8.0	8.0	0-0.25	0-0.25	0-0.25
Q4	0.9	1.0	1.0	0.1	0.4	0.4	7.8	7.8	7.8	0-0.25	0-0.25	0-0.25
2013												
Q1	1.4	1.2	1.3	2.6	2.5	2.4	7.8	7.7	7.7	0-0.25	0-0.25	0-0.25
Q2	1.4	1.1	0.7	1.9	2.0	1.5	7.7	7.6	7.6	0-0.25	0-0.25	0-0.25
Q3	1.5	1.2	1.0	2.3	2.2	2.4	7.6	7.6	7.5	0-0.25	0-0.25	0-0.25
Q4	1.6	1.3	1.3	2.3	2.6	2.7	7.5	7.5	7.4	0-0.25	0-0.25	0-0.25
2014												
Q1	1.7	1.5	1.5	3.2	3.4	3.1	7.3	7.2	7.2	0-0.25	0-0.25	0-0.25
Q2	1.9	1.7	1.7	3.4	3.4	3.2	7.0	7.1	7.0	0-0.25	0-0.25	0-0.25
Q3	2.0	1.9	1.9	3.6	3.7	3.3	6.7	6.8	6.8	0-0.25	0-0.25	0-0.25
Q4	2.0	2.1	2.1	3.7	3.9	3.4	6.4	6.4	6.5	0-0.25	0-0.25	0-0.25
Q4/Q4												
2011	1.7	1.7	1.7	2.0	2.0	2.0	-1.3	-1.3	-1.3	0.0	0.0	0.0
2012	1.5	1.5	1.5	1.6	1.7	1.7	-0.8	-0.8	-0.8	0.0	0.0	0.0
2013	1.5	1.2	1.1	2.3	2.3	2.3	-0.6	-0.7	-0.7	0.0	0.0	0.0
2014	1.9	1.8	1.8	3.5	3.6	3.3	-0.8	-0.6	-0.7	0.0	0.0	0.0

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

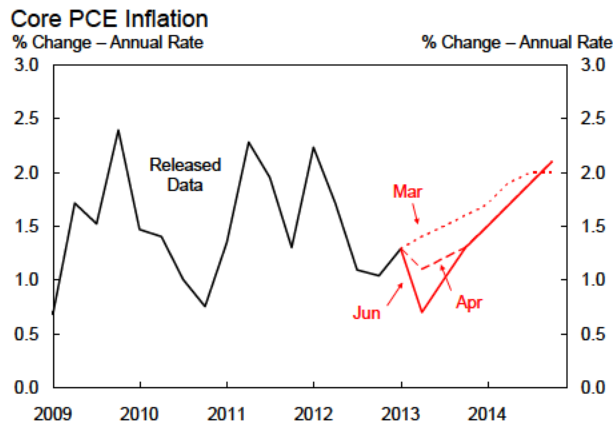
*Quarterly values are the average rate for the quarter. Yearly values are the difference between Q4 of the previous year and Q4 of the listed year.

**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.

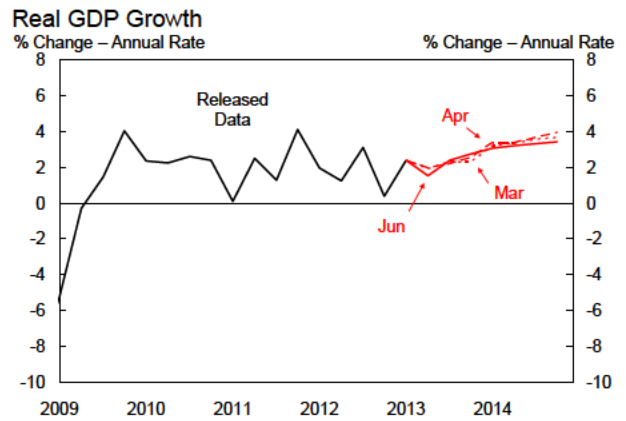
B. FRBNY Forecast Details

Exhibit B-2: Evolution of Projected Quarterly Paths

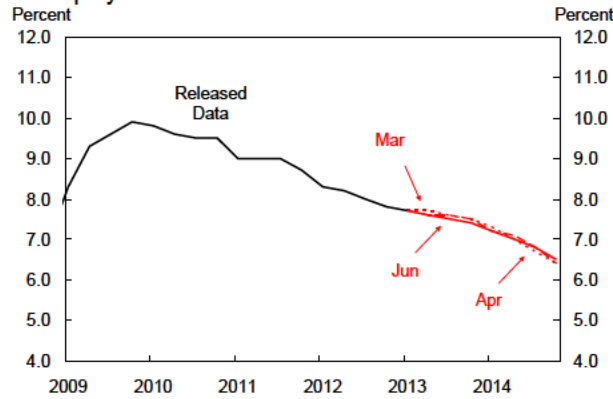
Key Indicators



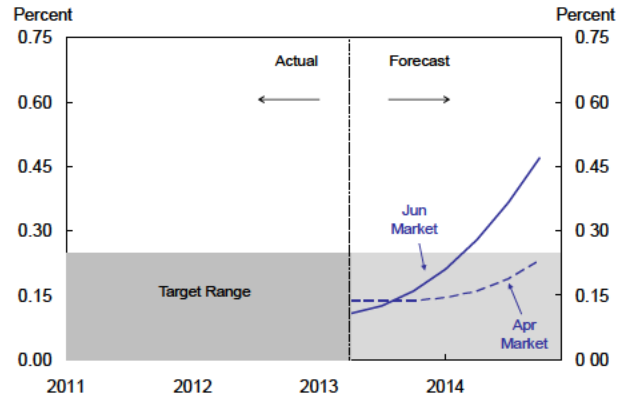
Forecast Assumptions



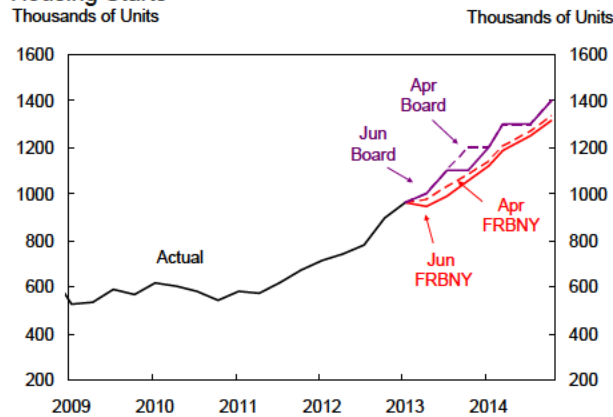
Unemployment Rate



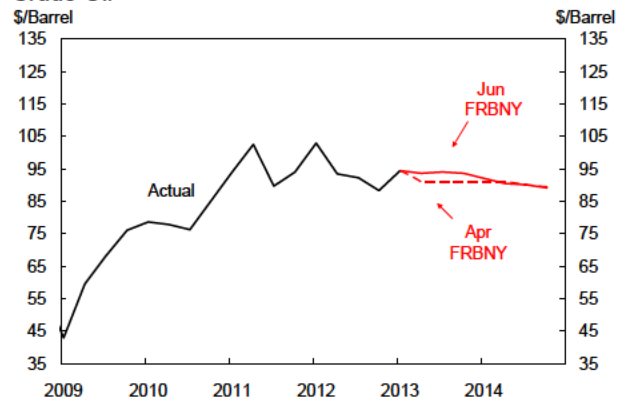
Federal Funds Rate



Housing Starts



Crude Oil



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

B. FRBNY Forecast Details

Exhibit B-3: Near-Term Projections

	<u>Quarterly Growth Rates (AR)</u>		<u>Quarterly Growth Contributions (AR)</u>	
	2013Q2	2013Q3	2013Q2	2013Q3
OUTPUT				
Real GDP	1.5 (2.0)	2.4 (2.2)	1.5 (2.0)	2.4 (2.2)
Final Sales to Domestic Purchasers	1.4 (2.0)	2.0 (1.9)	1.5 (2.1)	2.0 (2.0)
Consumption	2.2 (2.0)	2.2 (2.1)	1.6 (1.4)	1.6 (1.5)
BFI: Equipment and Software	3.0 (8.0)	6.0 (10.0)	0.2 (0.6)	0.4 (0.7)
BFI: Nonresidential Structures	2.0 (2.0)	2.0 (4.0)	0.1 (0.1)	0.1 (0.1)
Residential Investment	15.0 (29.4)	18.0 (17.4)	0.4 (0.7)	0.5 (0.5)
Government: Federal	-6.9 (-8.0)	-6.2 (-10.0)	-0.5 (-0.6)	-0.5 (-0.7)
Government: State and Local	-1.7 (-0.5)	-0.5 (-0.5)	-0.2 (-0.1)	-0.1 (-0.1)
Inventory Investment	-- --	-- --	-0.2 (-0.2)	0.1 (-0.1)
Net Exports	-- --	-- --	0.3 (0.1)	0.3 (0.3)
INFLATION				
Total PCE Deflator	-0.1 (0.3)	1.8 (1.4)		
Core PCE Deflator	0.7 (1.1)	1.0 (1.2)		
PRODUCTIVITY AND LABOR COSTS*				
Output per Hour	0.8 (1.3)	1.2 (1.5)		
Compensation per Hour	1.6 (1.1)	1.4 (1.0)		
Unit Labor Costs	0.8 (-0.1)	0.2 (-0.5)		

Note: Numbers in parentheses are from the previous FOMC meeting.

*Nonfarm business sector.

B. FRBNY Forecast Details

Exhibit B-4: Medium-Term Projections

	Q4/Q4 Growth Rates			Q4/Q4 Growth Contributions		
	2012	2013	2014	2012	2013	2014
OUTPUT						
Real GDP	1.7	2.3	3.3	1.7	2.3	3.3
	(1.7)	(2.3)	(3.6)	(1.7)	(2.3)	(3.6)
Final Sales to Domestic Purchasers	1.8	1.9	3.3	1.8	2.0	3.4
	(1.8)	(2.1)	(3.7)	(1.8)	(2.1)	(3.8)
Consumption	1.8	2.6	2.7	1.3	1.8	1.9
	(1.8)	(2.4)	(2.7)	(1.3)	(1.7)	(1.9)
BFI: Equipment and Software	4.7	5.4	12.5	0.3	0.4	1.0
	(4.7)	(8.2)	(15.5)	(0.3)	(0.6)	(1.2)
BFI: Nonresidential Structures	7.3	1.1	8.5	0.2	0.0	0.3
	(7.3)	(2.9)	(11.0)	(0.2)	(0.1)	(0.3)
Residential Investment	14.9	15.7	14.2	0.3	0.4	0.4
	(14.9)	(19.4)	(16.0)	(0.3)	(0.5)	(0.5)
Government: Federal	-2.8	-7.0	-6.1	-0.2	-0.5	-0.4
	(-2.8)	(-9.1)	(-5.5)	(-0.2)	(-0.7)	(-0.4)
Government: State and Local	-1.1	-1.2	2.2	-0.1	-0.1	0.3
	(-1.1)	(-0.6)	(2.2)	(-0.1)	(-0.1)	(0.3)
Inventory Investment	--	--	--	-0.5	0.2	0.2
	--	--	--	(-0.5)	(0.2)	(0.2)
Net Exports	--	--	--	0.3	0.1	-0.4
	--	--	--	(0.3)	(0.0)	(-0.5)
INCOME						
Personal Income	5.7	1.8	5.2			
	(5.0)	(2.1)	(5.4)			
Real Disposable Personal Income	3.8	-0.3	3.0			
	(3.2)	(0.6)	(3.2)			
Personal Saving Rate	5.3	2.6	3.0			
	(4.7)	(3.0)	(3.6)			
Corporate Profits Before Taxes	3.1	-2.7	1.8			
	(3.1)	(3.7)	(3.1)			

Note: Numbers in parentheses are from the previous FOMC meeting.

B. FRBNY Forecast Details

Exhibit B-5: Medium-Term Projections, Continued

	Q4/Q4 Growth Rates		
	2012	2013	2014
INFLATION			
Total PCE Deflator	1.6 (1.6)	1.1 (1.1)	2.0 (1.9)
Core PCE Deflator	1.5 (1.5)	1.1 (1.2)	1.8 (1.8)
Total CPI Inflation	1.9 (1.9)	1.2 (1.3)	2.7 (2.7)
Core CPI Inflation	1.9 (1.9)	1.7 (1.8)	2.4 (2.4)
GDP Deflator	1.8 (1.8)	1.3 (1.4)	2.2 (2.1)
PRODUCTIVITY AND LABOR COSTS*			
Output	2.5 (2.5)	2.6 (2.8)	4.1 (4.5)
Hours	1.9 (1.9)	1.7 (1.9)	2.6 (2.8)
Output per Hour	0.6 (0.5)	1.0 (0.9)	1.5 (1.7)
Compensation per Hour	4.4 (2.6)	0.1 (1.0)	1.8 (1.7)
Unit Labor Costs	3.8 (2.1)	-0.9 (0.1)	0.4 (-0.1)
LABOR MARKET			
Unemployment Rate (Avg. Q4 Level)	7.8 (7.8)	7.4 (7.5)	6.5 (6.4)
Participation Rate (Avg. Q4 Level)	63.7 (63.7)	63.5 (63.5)	63.8 (63.8)
Avg. Monthly Nonfarm Payroll Growth (Thous.)	181 (181)	178 (144)	265 (302.3)

Note: Numbers in parentheses are from the previous FOMC meeting.
*Nonfarm business sector.

B. FRBNY Forecast Details

Exhibit B-6: FRBNY and Tealbook Forecast Comparison

	FRBNY (Q4/Q4)			Board (Q4/Q4)		
	2012	2013	2014	2012	2013	2014
OUTPUT						
Real GDP	1.7	2.3	3.3	1.7	2.5	3.4
	(1.7)	(2.3)	(3.6)	(1.7)	(2.6)	(3.2)
GDP Growth Contributions						
Final Sales to Domestic Purchasers	1.8	2.0	3.4	1.8	2.2	3.4
	(1.8)	(2.1)	(3.8)	(1.8)	(2.2)	(2.2)
Consumption	1.3	1.8	1.9	1.3	2.1	2.7
	(1.3)	(1.7)	(1.9)	(1.3)	(2.0)	(1.4)
BFI	0.6	0.4	1.2	0.6	0.4	0.6
	(0.6)	(0.7)	(1.6)	(0.6)	(0.5)	(0.6)
Residential Investment	0.3	0.4	0.4	0.3	0.4	0.5
	(0.3)	(0.5)	(0.5)	(0.3)	(0.4)	(0.5)
Government	-0.4	-0.7	-0.2	-0.4	-0.7	-0.4
	(-0.4)	(-0.8)	(-0.1)	(-0.4)	(-0.6)	(-0.4)
Inventory Investment	-0.5	0.2	0.2	-0.4	0.3	0.2
	(-0.5)	(0.2)	(0.2)	(-0.4)	(0.3)	(0.3)
Net Exports	0.3	0.1	-0.4	0.3	0.0	-0.1
	(0.3)	(0.0)	(-0.5)	(0.3)	(-0.1)	(-0.1)
INFLATION						
Total PCE Deflator	1.6	1.1	2.0	1.6	0.9	1.4
	(1.6)	(1.1)	(1.9)	(1.6)	(1.0)	(1.5)
Core PCE Deflator	1.5	1.1	1.8	1.5	1.2	1.6
	(1.5)	(1.2)	(1.8)	(1.5)	(1.5)	(1.7)
INTEREST RATE ASSUMPTION						
Fed Funds Rate (End-of-Year)	0-0.25	0-0.25	0-0.25	0-0.25	0-0.25	0-0.25
	0-0.25	0-0.25	0-0.25	0-0.25	0-0.25	0-0.25
PRODUCTIVITY AND LABOR COSTS*						
Output per Hour	0.6	1.0	1.5	0.6	0.9	1.6
	(0.5)	(0.9)	(1.7)	(0.9)	(0.9)	(1.6)
Compensation per Hour	4.4	0.1	1.8	4.4	0.7	2.8
	(2.6)	(1.0)	(1.7)	(0.7)	(0.7)	(2.8)
Unit Labor Costs	3.8	(0.9)	0.4	3.8	-0.2	1.3
	(2.1)	(0.1)	(-0.1)	(-0.2)	(-0.2)	(1.3)
LABOR MARKET						
Unemployment Rate (Avg. Q4 Level)	7.8	7.4	6.5	7.8	7.3	7.3
	(7.8)	(7.5)	(6.4)	(7.8)	(7.4)	(6.9)
Participation Rate (Avg. Q4 Level)	63.7	63.5	63.8	63.7	63.5	63.5
	(63.7)	(63.5)	(63.8)	(63.7)	(63.6)	(63.5)
Avg. Monthly Nonfarm Payroll Growth (Thous.)	181	178	265	188	171	170
	(181)	(144)	(302)	(179)	(172)	(180)
SAVING						
Personal Saving Rate (Avg. Q4 Level)	5.3	2.6	3.0	5.3	2.6	2.4
	(4.7)	(3.0)	(3.6)	(4.7)	(2.6)	(2.6)
HOUSING						
Housing Starts (Avg. Q4 Level, Thous.)	896	1055	1315	800	1000	1300
	(901)	(1085)	(1335)	(800)	(1000)	(1300)

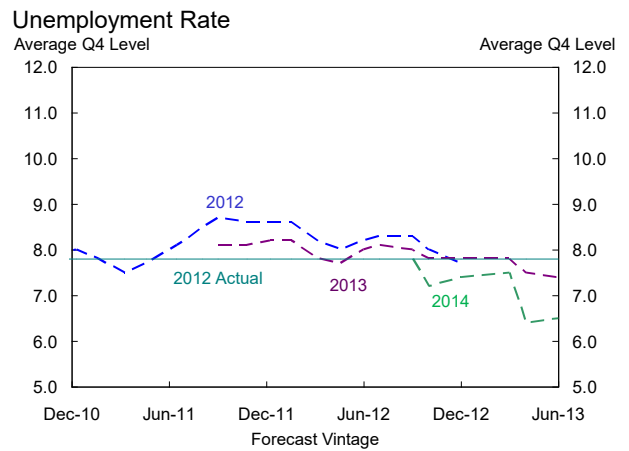
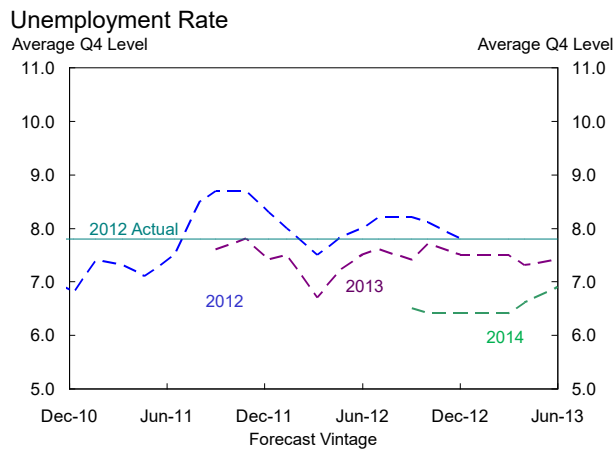
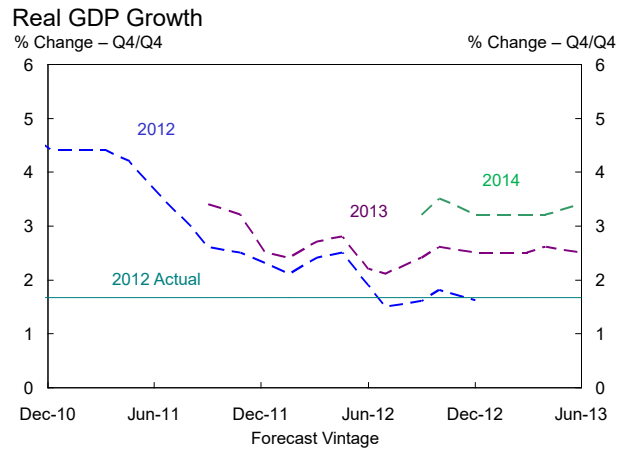
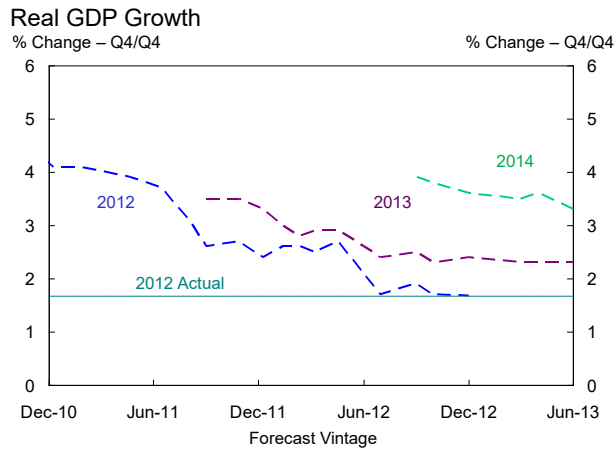
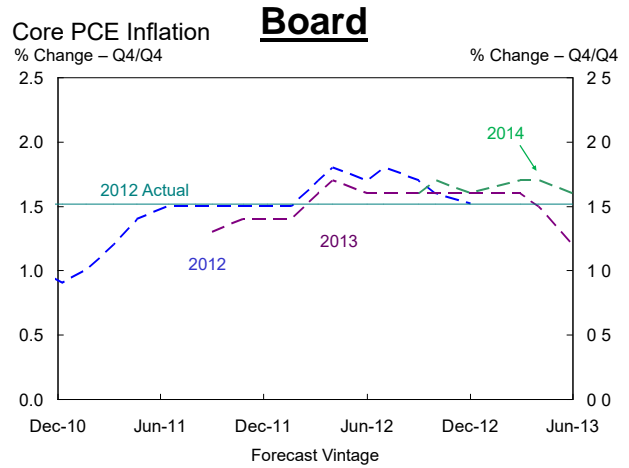
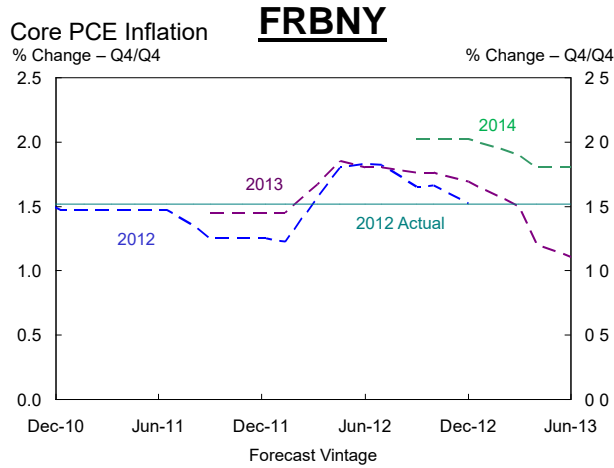
Note: Numbers in parentheses are from the previous Blackbook.

FRBNY Blackbook, June 14, 2013

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B. FRBNY Forecast Details

Exhibit B-7: Evolution of FRBNY and Board Forecasts since the end of 2010



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

B. FRBNY Forecast Details

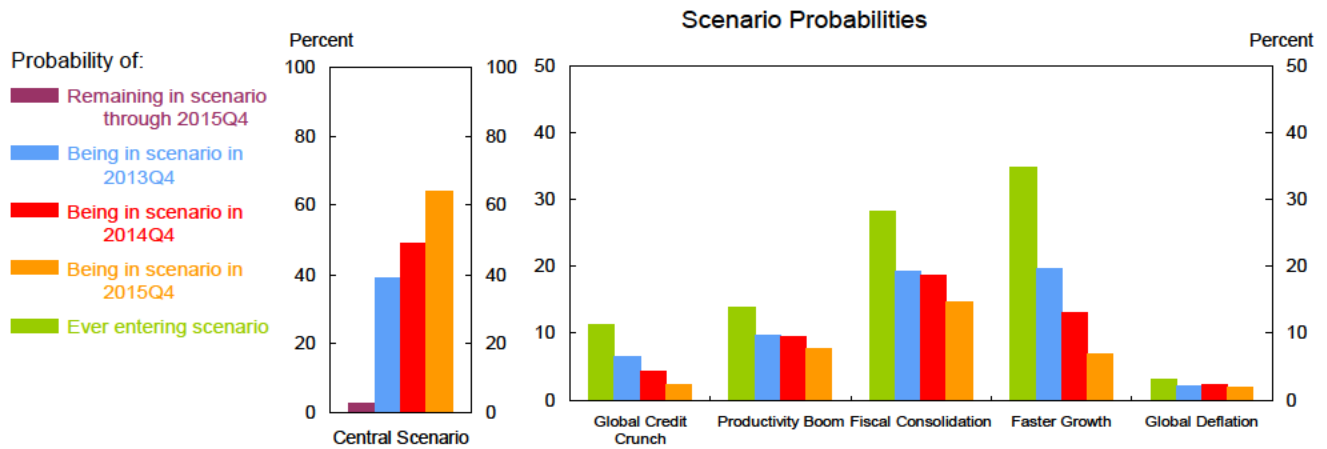
Exhibit B-8: Alternative GDP and Inflation Forecasts

Real GDP Growth					
	Release Date	2013Q2	2013Q3	2013 Q4/Q4	2014 Q4/Q4
FRBNY	6/13/2013	1.5 (2.0)	2.4 (2.2)	2.3 (2.3)	3.3 (3.6)
Blue Chip	6/10/2013	1.8 (1.7)	2.3 (2.3)	2.3 (2.3)	2.8 (2.8)
Median SPF	5/10/2013	1.8 (2.3)	2.3 (2.6)	2.3 (2.3)	- -
Macro Advisers	6/13/2013	1.4 (2.4)	2.4 (2.9)	2.4 (2.6)	3.3 (3.3)
FRBNY-DSGE	6/13/2013	1.5 (2.3)	1.8 (2.4)	1.9 (2.3)	1.8 (1.9)
Core PCE Inflation					
	Release Date	2013Q2	2013Q3	2013 Q4/Q4	2014 Q4/Q4
FRBNY	6/13/2013	0.7 (1.1)	1.0 (1.2)	1.1 (1.2)	1.8 (1.8)
Median SPF	5/10/2013	1.4 (1.7)	1.6 (1.8)	1.5 (1.6)	1.9 (1.9)
Macro Advisers	6/13/2013	0.7 (1.1)	1.2 (1.3)	1.1 (1.3)	1.6 (1.6)
FRBNY-DSGE	6/13/2013	0.7 (1.0)	0.8 (1.0)	0.9 (1.1)	1.2 (1.3)
CPI Inflation					
	Release Date	2013Q2	2013Q3	2013 Q4/Q4	2014 Q4/Q4
FRBNY	6/13/2013	-0.3 (0.2)	1.9 (1.9)	1.2 (1.3)	2.7 (2.3)
Blue Chip	6/10/2013	1.3 (1.1)	2.0 (2.1)	1.5 (1.7)	2.2 (2.1)
Median SPF	5/10/2013	1.6 (2.1)	2.0 (2.1)	1.7 (2.0)	2.2 (2.2)
Macro Advisers	6/13/2013	-0.4 (0.3)	2.7 (2.6)	1.2 (1.4)	1.4 (1.4)
Core CPI Inflation					
	Release Date	2013Q2	2013Q3	2013 Q4/Q4	2014 Q4/Q4
FRBNY	6/13/2013	1.4 (1.8)	1.7 (1.7)	1.7 (1.8)	2.4 (2.2)
Median SPF	5/10/2013	1.9 (2.0)	2.0 (2.0)	2.0 (1.9)	2.1 (2.1)
Macro Advisers	6/13/2013	1.3 (1.7)	1.5 (1.7)	1.6 (1.7)	1.6 (1.6)

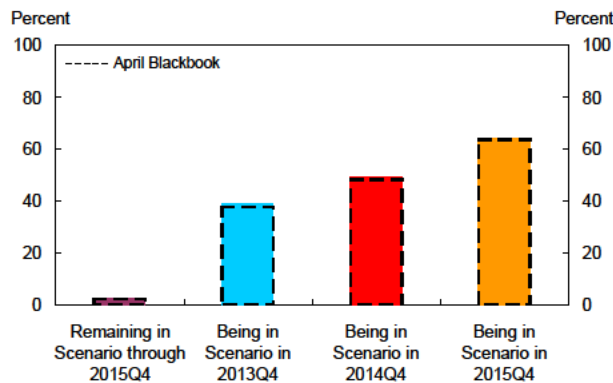
*Note: Numbers in gray are from the previous FOMC meeting.

C. FRBNY Forecast Distributions

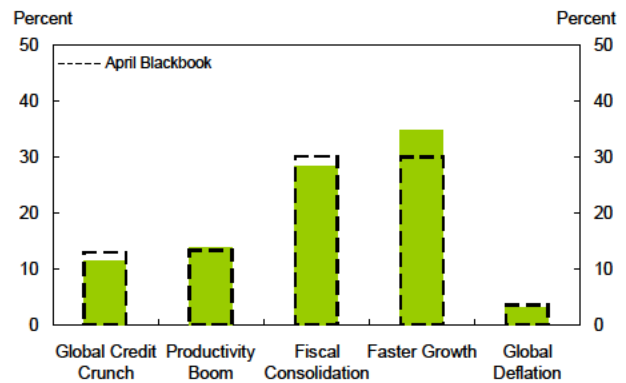
**Exhibit C-1:
Risks**



Change in Central Scenario Probabilities



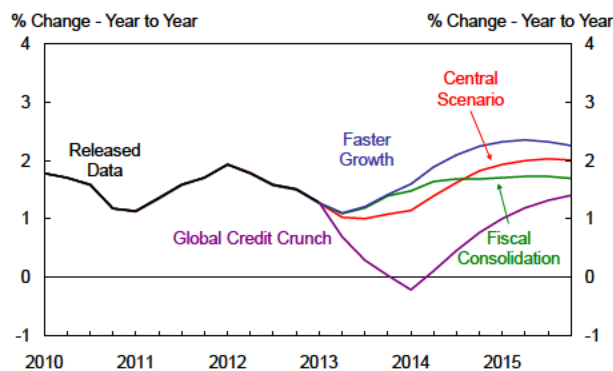
Change in Alternative Scenario Probabilities*



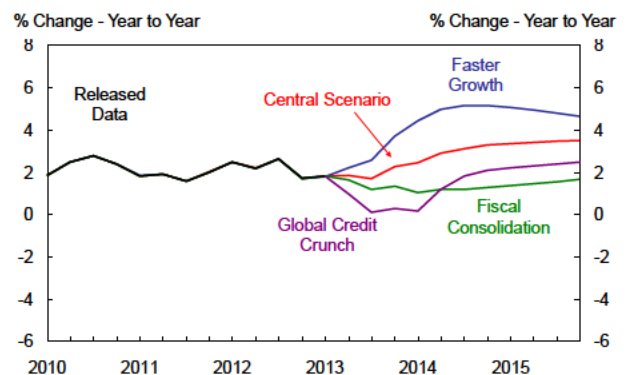
*Probability of ever reaching scenario

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

Core PCE Inflation under Alternative Scenarios Selected



Real GDP Growth under Alternative Scenarios Selected

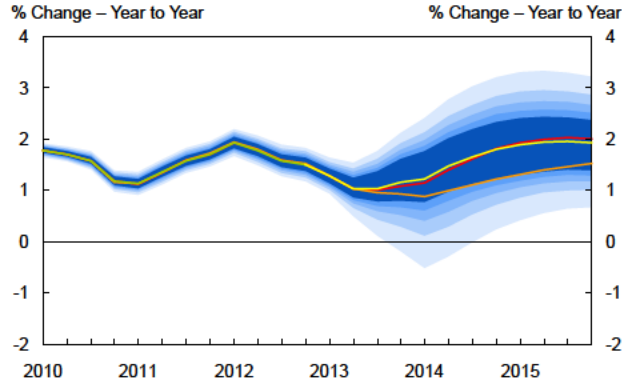


Source: MMS Function (FRBNY)

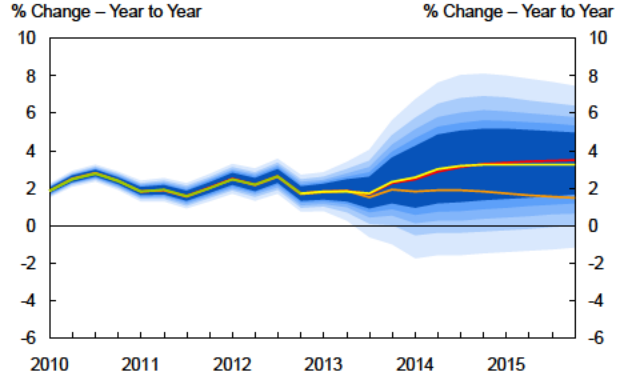
C. FRBNY Forecast Distributions

Exhibit C-3: Inflation and Output Forecast Distributions

Core PCE Inflation Forecast Distribution

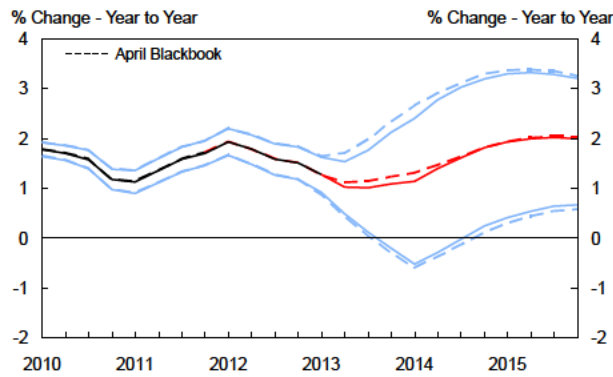


Real GDP Growth Forecast Distribution

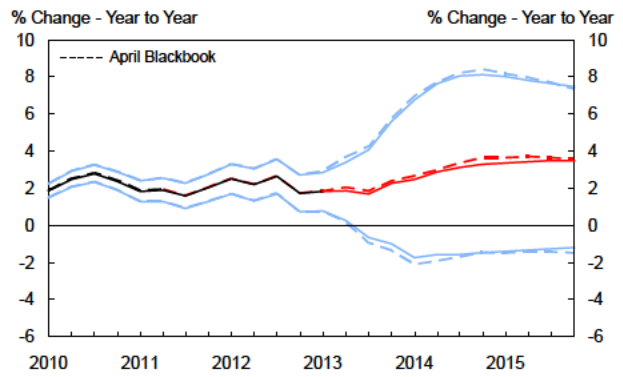


The yellow line is the expected value of the forecast distribution, the red line is the FRBNY central projection, the orange line is the DSGE forecast, and the green line is released data. The shading represents the 50, 60, 70, 80 and 90 percent probability that the four-quarter change will be within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

Change in Core PCE Inflation Forecast Distribution

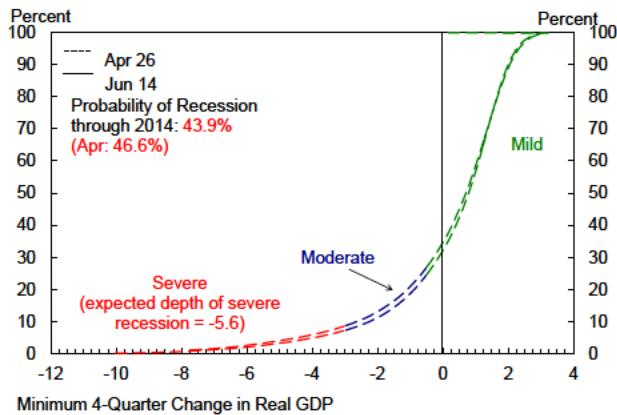


Change in Real GDP Growth Forecast Distribution

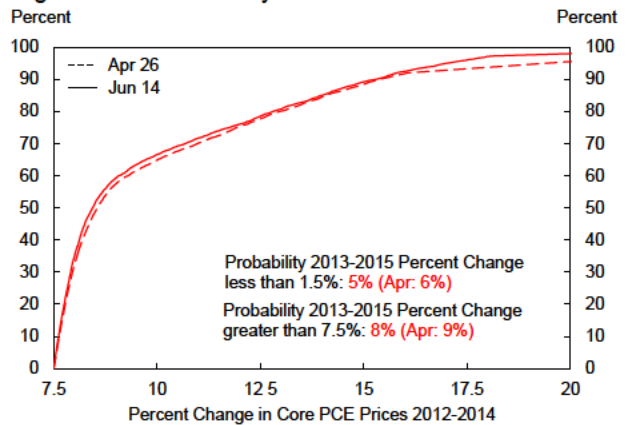


The blue lines are the 90% chance the four-quarter change will be within the lines, the red line is the central scenario projection, and the black line is released data. Dashed lines represent forecasts from the previous Blackbook.

Depth of Recession



High Inflation Probability and Distribution

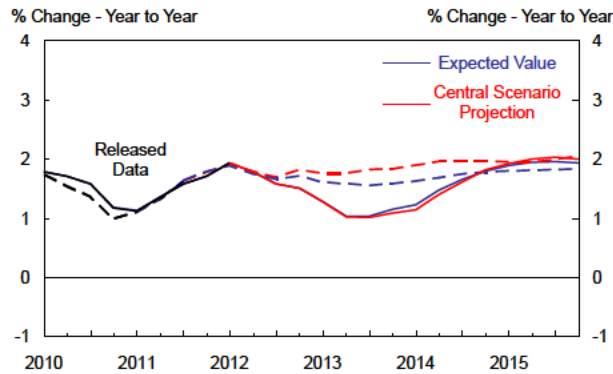


Source: MMS Function (FRBNY)

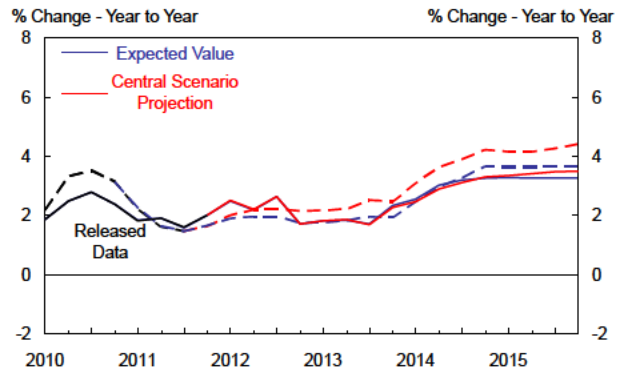
C. FRBNY Forecast Distributions

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

One-Year Comparison of Core PCE Inflation Forecast

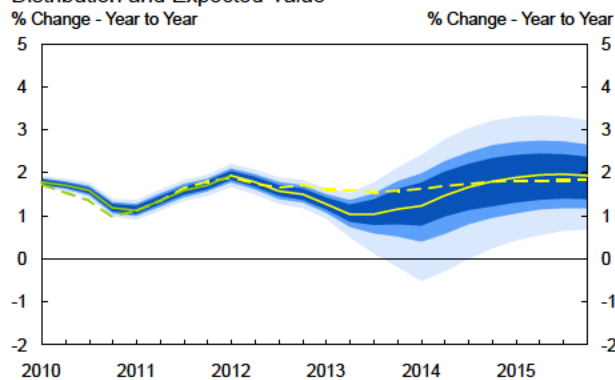


One-Year Comparison of Real GDP Growth Forecast

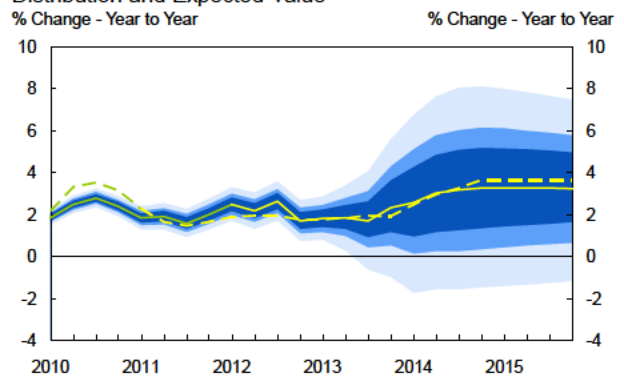


The solid lines represent the current central scenario projection and expected value, while the dashed lines represent those from the year-ago Blackbook.

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



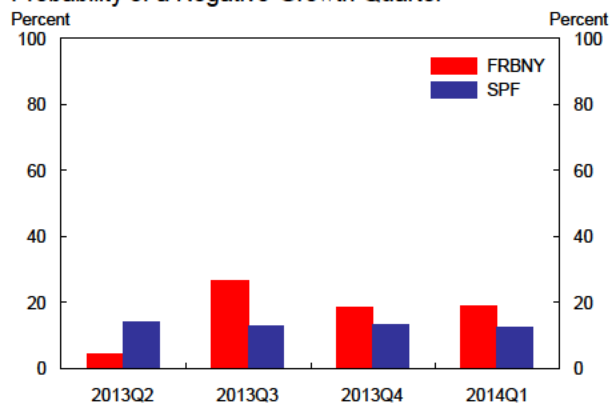
One-Year Comparison of Real GDP Growth Forecast Distribution and Expected Value



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

Exhibit C-5: Probability of a Negative Growth Quarter

Probability of a Negative-Growth Quarter

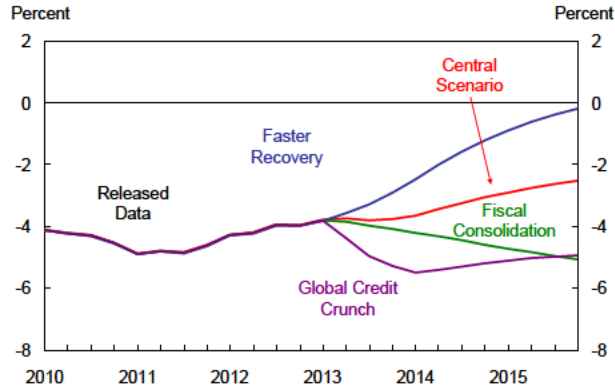


Source: MMS Function (FRBNY)

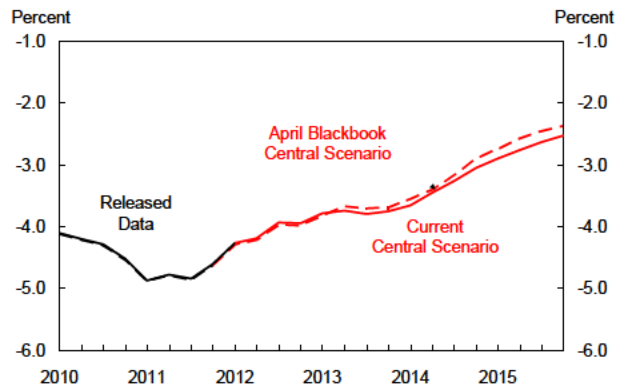
D. FRBNY Fed Funds Rate Projections

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

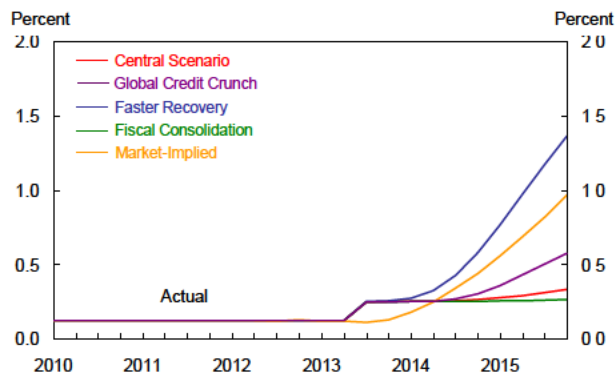
Real FFR under Alternative Scenarios



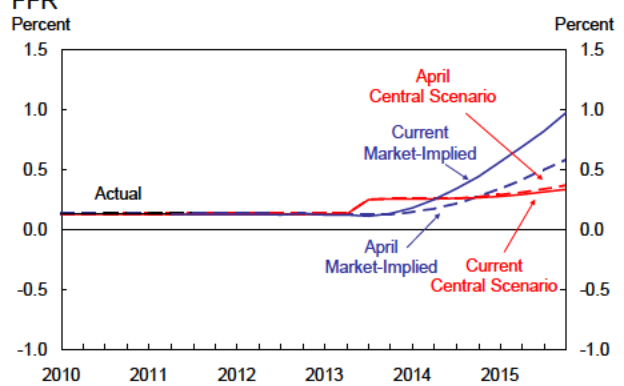
Change in Central Scenario Real FFR



Nominal FFR under Alternative Scenarios

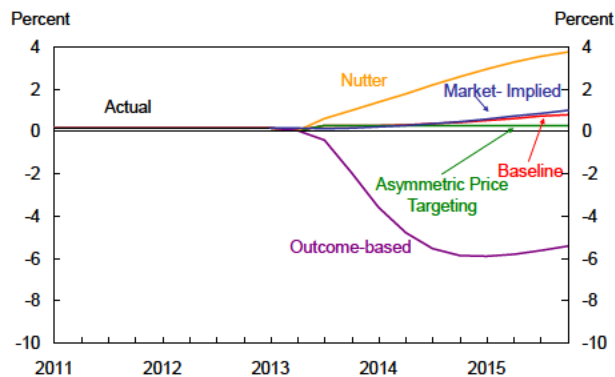


Change in Central Scenario and Market-Implied Nominal FFR



**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

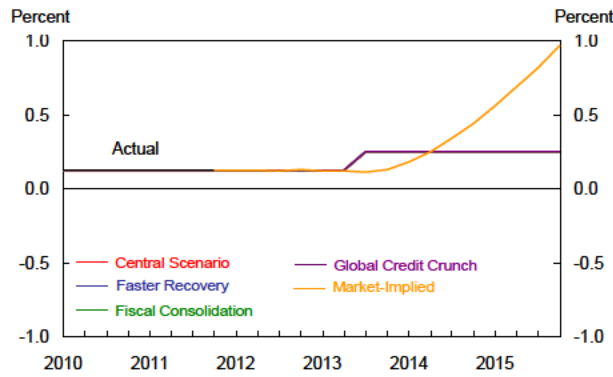
Source: MMS Function (FRBNY)

D. FRBNY Fed Funds Rate Projections

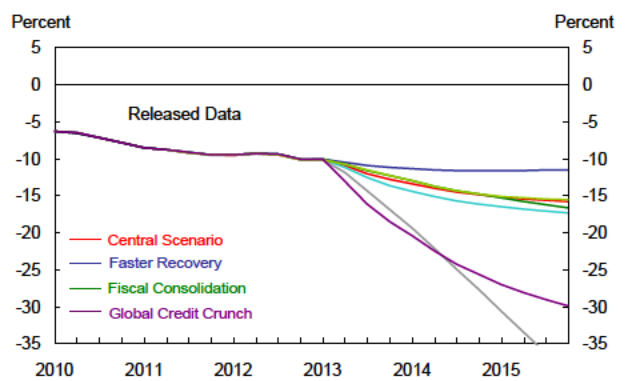
Exhibit D-3: Alternative Policy Rule Analysis

Policy Rule: *Asymmetric Price Targeting*

Nominal FFR under Alternative Scenarios

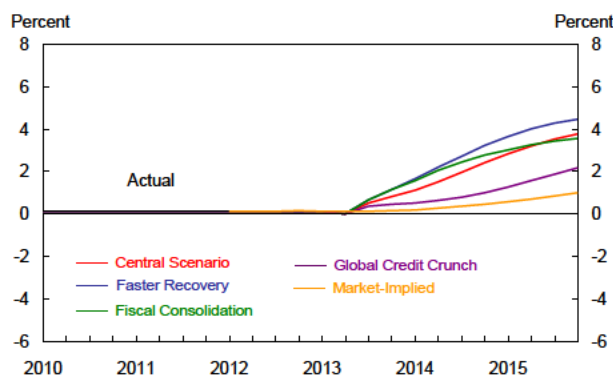


Real FFR under Alternative Scenarios

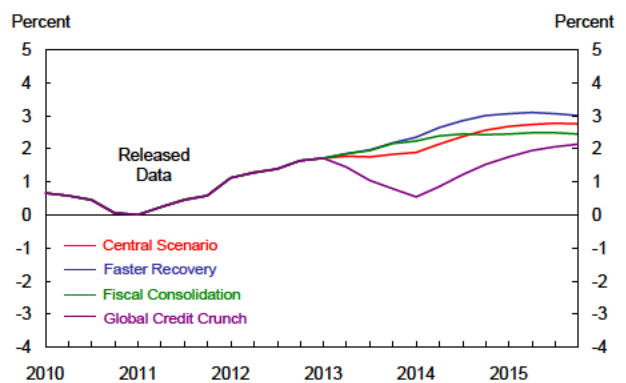


Policy Rule: *Nutter*

Nominal FFR under Alternative Scenarios

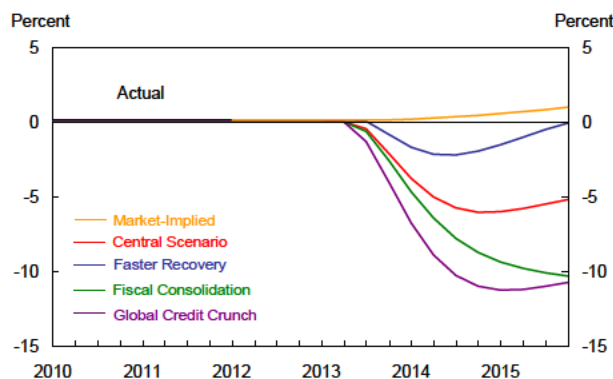


Real FFR under Alternative Scenarios

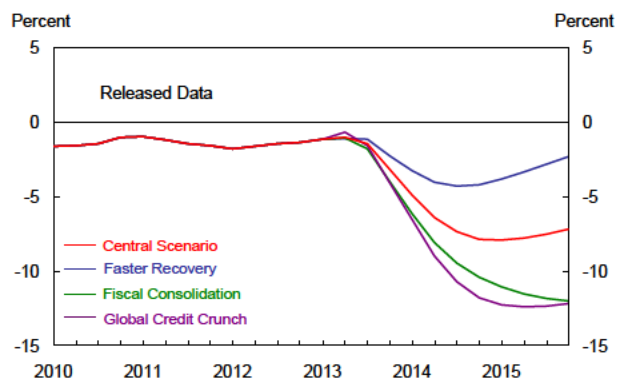


Policy Rule: *Outcome-based*

Nominal FFR under Alternative Scenarios



Real FFR under Alternative Scenarios

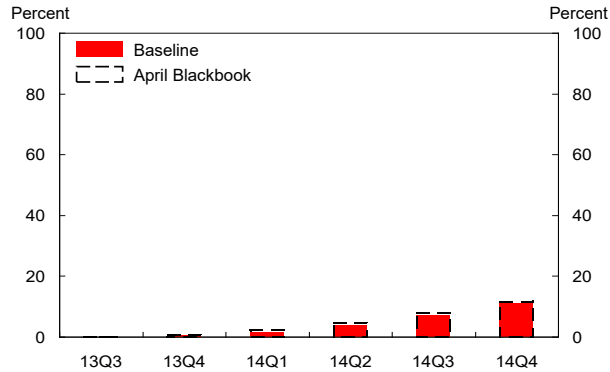


Source: MMS Function (FRBNY)

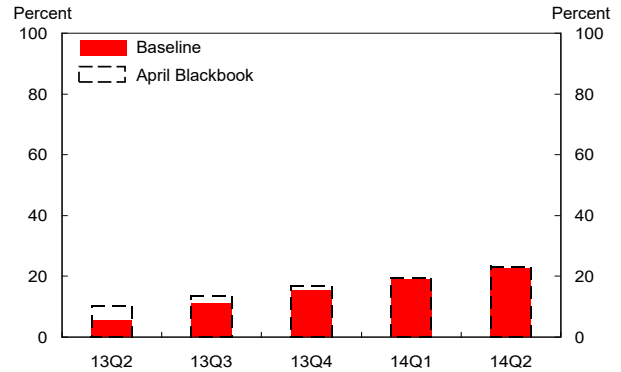
D. FRBNY Fed Funds Rate Projections

Exhibit D-4: FFR Probabilities

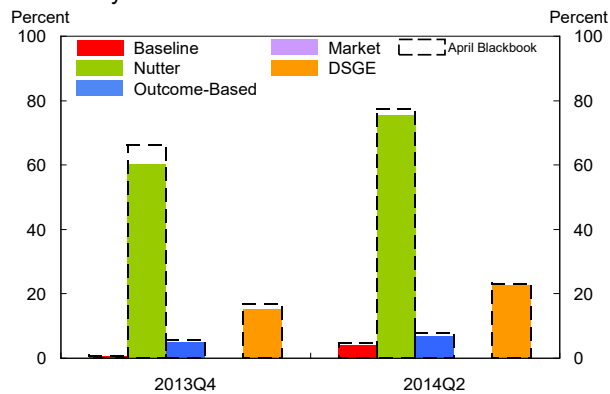
Probability of FFR above 0.5% for Next Year
FRBNY Forecast Distributions



Probability of FFR above 0.5% for Next Year
FRBNY DSGE Model



Probability of FFR above 0.5% for Next Year

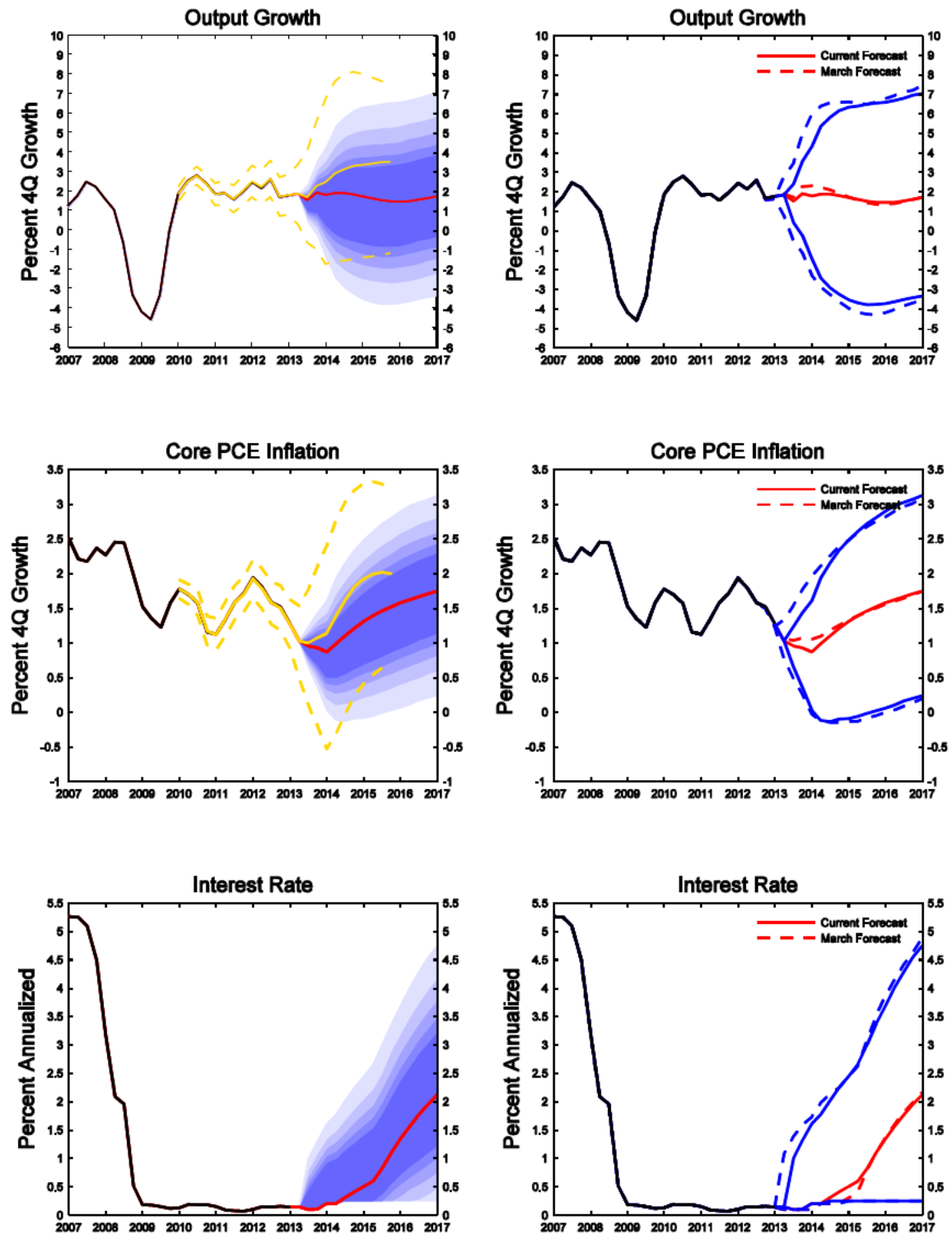


Note: Probability displayed is probability of FFR being above 0.5% in quarter noted and remaining above 0.5% in subsequent four quarters. DSGE results are shown for model including zero bound restriction.

Source: MMS Function (FRBNY)

E. FRBNY-DSGE Model

Exhibit E-1: FRBNY-DSGE Forecasts

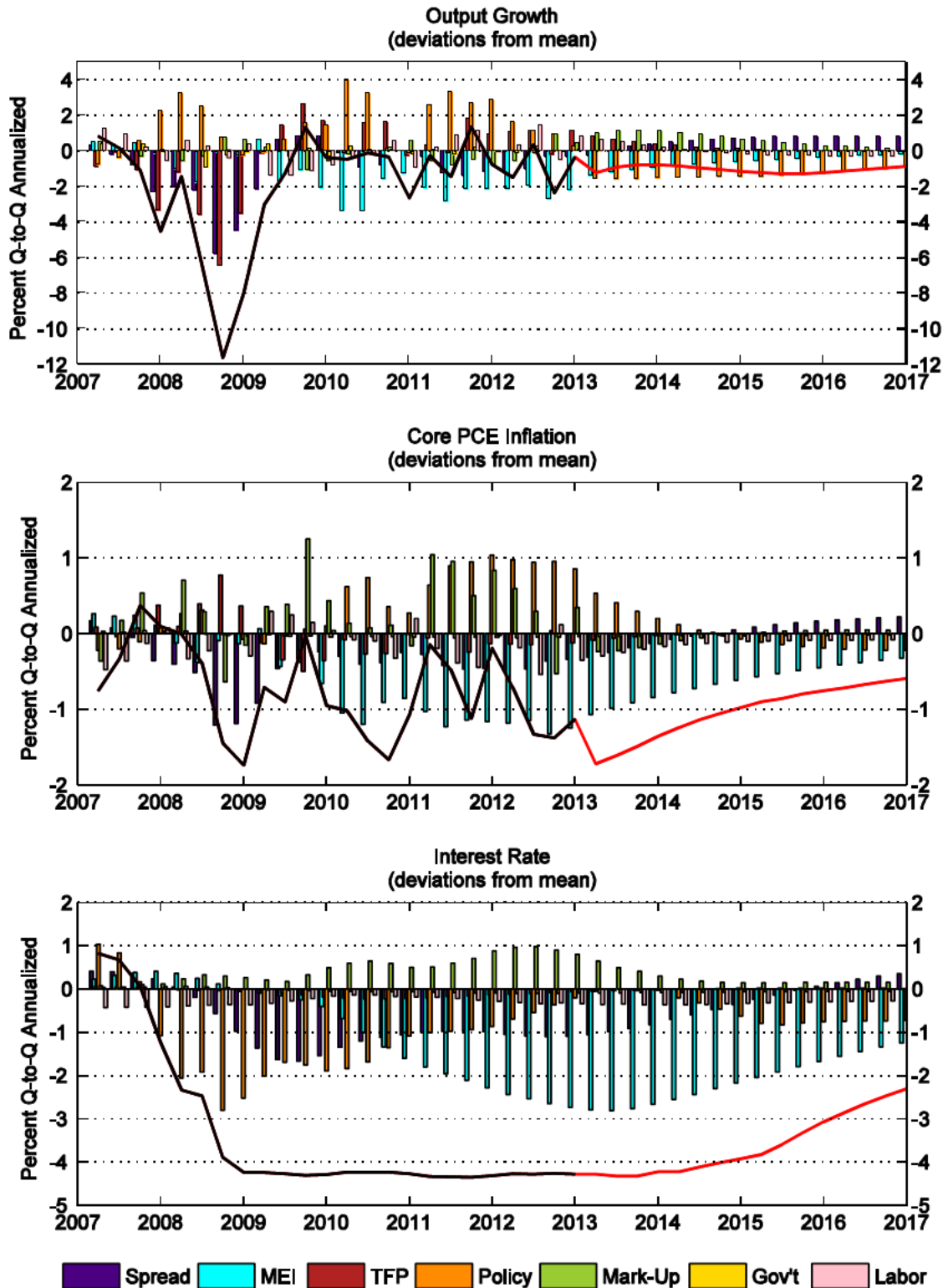


Note: Black lines indicate data, red lines indicate mean forecasts, and shaded areas mark the parameter and shock uncertainty associated with our forecast as 50, 60, 70, 80, and 90 percent probability intervals. For comparison, we report the FRBNY Central Projection for output growth and inflation (solid yellow line) and the 90 percent bands for the FRBNY forecast distribution (dashed yellow lines). Blackbook forecast comparisons (right-hand side charts) display 90 percent bands.

Source: MMS Function (FRBNY)

E. FRBNY-DSGE Model

Exhibit E-2: FRBNY-DSGE Shock Decomposition



Note: The solid lines (black for realized data, red for mean forecast) show each variable in deviation from its steady state. The bars represent the shock contributions; specifically, the bars for each shock represent the counterfactual values for the observables (in deviations from the mean) obtained by setting all other shocks to zero.

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 alternative scenario considers the impact of above-trend productivity growth. Our current assumption of trend productivity growth is around 1.75% on a nonfarm business sector basis. Sustained productivity growth above this assumption would have important consequences for the economy. Typically, because below-trend productivity growth also has important consequences, we have included an alternative scenario that incorporates that assumption (*Productivity Slump*). However, because the near-term consequences of that scenario and the *Fiscal Consolidation* scenario are similar, we have combined those two scenarios into a single revamped *Fiscal Consolidation* scenario, which allows us to add a new scenario (*Faster Growth/Recovery*). We also currently consider four additional scenarios. In one (*Faster Growth/Recovery*), the recent “headwinds” subside more quickly than expected, leading to stronger aggregate demand effects from monetary and fiscal policy. In another (*Loss of Credibility*), the public and investors lose confidence in the current stances of monetary and fiscal policy. In the other two (*Global Credit Crunch* and *Global Deflation*), the recent stresses in global financial and economic conditions continue to have an impact on U.S. economic conditions; the differences between the two mainly reflect differing assessments of how protracted the negative effects could be.

Alternative 1: *Productivity Boom*

After a lull in the mid-2000s, productivity growth has been robust and above our current estimate of trend productivity growth. This rapid growth raises 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 previous post-WWII periods of high productivity growth (pre-1973 and the mid-1990s through the mid-2000s). As such, we could see persistent productivity growth above our assumed trend, implying a higher potential growth rate for output and thus expected real output growth that is higher than

our current estimate. (A higher potential growth rate may also imply that the output gap that opened during the 2007-2009 recession is larger than we currently estimate). Strong productivity growth would also limit labor cost pressures and thereby help to subdue inflation.

Alternative 2: *Fiscal Consolidation*

Events in Europe in 2010 and so far in 2011 concerning the fiscal position of several euro zone countries raise issues about the possible economic consequences if similar concerns were to develop about the sustainability of the U.S. government's fiscal position. The *Fiscal Consolidation* scenario envisions a situation in which concerns on the part of investors about the fiscal sustainability of the United States leads to an increase in long term interest rates and term premia that contribute to a decline in output growth below that of the central forecast. As the U.S. government responds to those concerns by reducing government spending and/or raising taxes, the consequent decline in aggregate demand would imply that growth of real activity continues to be weak. In this scenario inflation temporarily rises above the central forecast, in part due to a likely depreciation of the dollar and possible increases in inflation expectations². [As stated earlier, the near-term implications of this scenario are similar to those of a supply shock or productivity slump, which is one reason we have folded in the weight of the old *Productivity Slump* scenario into this scenario.] However, after several quarters, with the government embarking on a credible fiscal consolidation, inflation declines below the central forecast as a consequence of the drop in aggregate demand and output growth.

Alternative 3: *Faster Growth/Recovery*

The recovery from the 2007-09 recession has been quite weak, especially given the severe drop in real activity during the recession. Factors behind the slow pace of recovery include the continued stress faced by financial markets and institutions as they slowly mend from the financial crisis and a slow process of repairing household balance sheets damaged in the financial crisis and recession. However, the relative strength in recent real PCE and other aggregate demand indicators raise the possibility that the process of

² Some economic models imply that if the public and investors see the fiscal situation as unsustainable, they could raise inflation expectations because of the possibility that part of the long-term fiscal budget gap is closed through higher inflation.

mending may be beginning to reach an end. The *Faster Growth/Recovery* scenario envisions a situation where these factors that have inhibited growth subside more quickly than anticipated by policymakers. In particular, the diminution of these factors would lead to a stronger impact from accommodative monetary policy and from the fiscal stimulus associated with the fiscal agreement passed in December 2010, leading to faster growth in aggregate demand. In that case, real GDP growth could be higher than anticipated, and inflation pressures could materialize more quickly.

Alternative 4: *Loss of Credibility*

In the wake of the monetary and fiscal stimulus used to combat the 2007-2009 recession, some commentary has focused on the possibility that these policies could lead to higher inflation expectations and eventually to higher inflation. The continued elevated levels of some commodity prices are consistent with such commentary. Even though the FOMC has made its commitment to low rates contingent on “subdued inflation trends” and “stable inflation expectations,” it is possible that market participants may begin to believe that the FOMC is not credibly committed to keeping inflation around the presumed implicit target level, especially if the unemployment rate remains high. In addition, concerns about the possible influence of continued high fiscal deficits on monetary policy could lead investors and the public to question FOMC credibility on inflation: FRBNY survey evidence suggests that, for at least some market participants, increases in government debt lead to higher inflation expectations, regardless of the reason for the increased debt. If the concerns about credibility were to become widespread, they would likely cause a rise in inflation and inflation expectations above forecast.

Alternative 5: *Global Credit Crunch*

Although financial markets are generally notably healthier than they were during the most extreme periods of the financial crisis, continued impairments in some markets as well as general economic uncertainty may be keeping credit availability very tight. In addition, consumers suffered wealth losses during the crisis, of which only a small part has been recovered, and volatility in equity markets is still elevated. Most central banks are maintaining what would appear to be very accommodative policy stances. This combination of factors suggests that the neutral rate is still lower than it was 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 well below our lower estimate of the neutral rate, tight credit conditions, continued stresses in global financial markets, and a still-significant chance of a further deterioration in global economic conditions create a risk that output growth will fall significantly below the level projected in the central forecast; this development would likely be accompanied by inflation below the level in the central forecast. Nevertheless, under this scenario we assume that financial markets will begin to function more normally and that, as they do, the economy will exit the *Global Credit Crunch* scenario and begin growing faster than its potential growth rate. The strong output growth experienced when the economy leaves the scenario should result in a closing of the output gap over time.

Alternative 6: *Global Deflation*

Recent price level indicators point to low inflation in many regions of the world. With inflation at such levels, sluggish growth in some parts of the world, concerns about the future of the euro zone, and continued financial market uncertainty suggest that there is some risk of global deflation going forward. This possibility is further exacerbated as many central banks around the world have their policy rates at or very near 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, resulting in both inflation and output growth far below the levels projected in the central forecast. Because of the difficulty of exiting such a situation, we see the *Global Deflation* scenario as quite persistent. Unlike the *Global Credit Crunch* scenario, the economy does not generally “bounce back” from *Global Deflation* to close the output gap. Instead, the U.S. is much more likely to experience a prolonged period of essentially no growth, and in many simulations in which the economy enters the *Global Deflation* scenario the level of output in 2013 does not surpass the 2009Q2 peak.

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. *Fiscal Consolidation*: inflation initially above and then below central forecast,

output below central forecast.

3. *Faster Growth/Recovery*: inflation above central forecast, output above central forecast.
4. *Loss of Credibility*: inflation far above central forecast, output slightly below central forecast.
5. *Global Credit Crunch*: inflation below central forecast, output significantly 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 (except for the *Nutter* rule, which ignores output deviations), while incorporating some degree of inertia. For each of the FFR paths and each of the policy rules, we determine these deviations using the inflation and output paths generated in Exhibit C.

Baseline Policy Rule 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)

$i^* = 3.75$ 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 *Nutter* 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.³ 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 price-level targeting is only implemented on the downside. When the cumulative gap in

³ All of the policy rules are subject to an effective lower bound of 0.25%.

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 *Nutter* rule reacts more strongly than the *Baseline* rule to changes in inflation. Specifically, the *Nutter* rule increases the weight on deviations of core PCE inflation from the target ($\varphi_{\pi}=2$ instead of 1.5). The *Nutter* rule does not react to changes in the output gap.

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)⁴.

We also want to compare the policy paths and distributions calculated using these rules with the market-implied path and distribution. In these charts, we use the standard path of market policy expectations derived from fed funds and Eurodollar futures contracts that is pictured in Exhibit A-5. For Exhibit D-4, 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).

Using a weighting scheme, it is possible to combine the *Baseline* and the two variants into an *Average* rule that may better reflect market beliefs about FOMC preferences and views of the structure of the economy than does any individual rule. (That is, we can think of the market-implied path as reflecting an amalgam of different perceived FOMC preferences, etc.) Each cycle we construct the *Average* rule by taking the weighted average of the *Baseline* rule and the two FRBNY-derived variants that matches the

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

market-implied path as closely as possible. (We do not currently display the *Average* rule or the weights used to calculate the *Average* rule in the Blackbook). Examining the change in the weights used to construct the *Average* rule from one cycle to the next can provide insight into the reasons behind shifts in the market path not explained by changes in the outlook.