

FRBNY BLACKBOOK

RESEARCH AND STATISTICS GROUP

FOMC Background Material

August 2011

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FRBNY BLACKBOOK

August 2011

CONTENTS

1. Policy Recommendation and Rationale	2
<i>Special Topic: Nominal GDP-Level Targeting in the FRBNY DSGE Model</i>	6
2. Evolution of Outlook and Risks	10
2.1 Central Forecast	10
<i>Special Topic: Has the economy entered a stall?</i>	17
2.2 Alternative Scenarios and Risks	21
3. Forecast Comparison	23
3.1 Comparison with Private Forecasters	23
4. Robustness of Policy Recommendation	24
4.1 Sensitivity to Alternative Scenarios and Policy Rules	24
4.2 Comparison to Market Expectations	25
5. Significant Developments	26
5.1 Economic Developments	26
<i>Special Topic: Overview of Annual NIPA Revision</i>	32
5.2 Financial Markets	37
<i>Special Topic: ML II Sales and the Performance of Non-Agency RMBS</i>	41
5.3 Global Economic Policy	44

EXHIBITS

A. Significant Developments	46
B. FRBNY Forecast Details	55
C. FRBNY Forecast Distributions	63
D. FRBNY Fed Funds Rate Projections	66

EXHIBIT OVERVIEW

Alternative Scenario Descriptions	69
Policy Rule Descriptions	74

1. Policy Recommendation and Rationale

Economic and financial market developments since the June Blackbook have led us to lower our real activity outlook and raise the downside risks to the forecast. We also see greater uncertainty around our central outlook. We recommend maintaining the FFR target range at 0-0.25%--under our forecast we expect it to remain in this range at least until the end of 2012--and retaining the policy to reinvest principal payments from securities holdings to prevent a reduction in the size of the Federal Reserve's balance sheet. We also recommend providing more explicit forward guidance about the extent to which monetary policy accommodation will be maintained through a *state-contingent* commitment that specifies policy under alternative scenarios.

Rationale—Outlook. The real activity releases since the June Blackbook generally came in weaker than expected. Based on the advance release, real GDP grew less than 1% (annual rate) in the first half of 2011, well below our expectations. The annual GDP revisions also indicate that the recession was more severe and the subsequent recovery more subdued than previously thought. Furthermore, labor market conditions continued to be weak, consumer spending was very soft, and manufacturing activity appeared to flatten. Consequently, we have again lowered our real GDP growth forecasts for this year (1.7% (Q4/Q4) vs. 3.0% in the June Blackbook) and next year (3.1% compared to 3.7%) as well as raised the projected path for the unemployment rate. Overall CPI and PCE inflation have come down due to lower energy prices, while underlying inflation measures have shown tentative signs of moderation from the higher levels of recent months. As such, our inflation forecasts have changed relatively little.

Rationale—Uncertainty and Risks

The developments during the inter-meeting period, particularly the annual revisions to the GDP data, have raised our assessment of the uncertainty around our central outlook. These revisions are consistent with a number of alternative explanations: the economy has faced larger and/or more persistent shocks since the beginning of the financial crisis, trend productivity is lower than we thought, or the economy has become less resilient because of the financial crisis. As such, we have raised our assessment of the general

uncertainty around the historical data and our outlook, widening our already wide probability intervals around the central forecast.

We also have shifted our risk assessment for real activity and inflation downward. Current events, including the debt ceiling crisis and the continuing European debt crisis, indicate higher probabilities of greater fiscal consolidation, more balance sheet restructuring, a severe tightening in credit conditions, and renewed global deflation. They also point to lower probabilities of strong productivity growth and of the onset of strong recovery dynamics. The balance of risks to real activity thus has shifted further to the downside, and the probability that the economy moves into recession by the end of 2012 has risen to around 60 percent. These shifts in our alternative scenario weights also imply that the balance of risks to the inflation outlook has shifted from roughly balanced to a downside skew.

Policy Recommendation

Given our outlook and risk assessment, more policy accommodation is needed. At the same time, policy continues to be constrained by the zero lower bound and an elevated Federal Reserve balance sheet. In addition, market participants have shifted down their expectations of the path of the FFR and the implied volatilities of Eurodollar rates have declined to near historical lows, suggesting a greater likelihood that the economy is in a liquidity trap.

In this environment, we recommend providing greater accommodation through a state contingent policy. Under such a policy, the FOMC would state more explicitly the conditions that would warrant maintaining the federal funds rate target range at 0-0.25% and the balance sheet at its current size, along with conditions that would warrant further actions (such as increasing the size of the balance sheet or changing its maturity composition) to provide accommodation as well as conditions that would warrant the beginning of an exit strategy.

One major issue with moving to an explicit state contingent policy is stating the terms of the triggers for actions. One option is to adopt price level targeting, an option we recommended last year around this time. Price level targeting was discussed extensively in the September 2010 Blackbook, and so we do not delve into it here. In this Blackbook instead, we discuss an alternative option that we also believe is worth considering, nominal GDP targeting, in a special topic *Nominal GDP-Level Targeting in the FRBNY DSGE Model*.

These two alternatives involve tradeoffs in the current environment. Under price level targeting, inflation expectations would move in appropriate directions—rising after a period when inflation was below the mandate-consistent range and falling after a period when inflation was above that range—and thus ensure long-term inflation expectations remained anchored. However, the current “inflation debt” may not be considered sufficiently large to provide political support for much more accommodation, even though the prospective inflation debt under our central forecast is larger.

Under nominal GDP targeting, there appears to be a large “nominal GDP gap” based on plausible values of the target growth rate, thus providing more scope for accommodation. Moreover, as discussed in the special topic, this policy can be as effective as price level targeting in providing accommodation. The target growth rate of nominal GDP would depend on the FOMC’s desired long-term inflation rate and an estimate of the economy’s potential growth rate. Given the greater uncertainty about the economy engendered by the GDP revisions, there is concern that the FOMC may overestimate the potential growth of the economy. This could lead to unexpectedly higher inflation and inflation expectations becoming unanchored. In this situation, however, the FOMC would have the tools to tighten policy and would be expected to re-assess the target growth rate of nominal GDP once it realized its misstep.

Finally, given the difficulty in determining triggers for a state-contingent policy quickly, there may be interest in an explicit time-commitment policy to provide accommodation in the interim. We would recommend against this alternative because it has a number of

undesirable features. First, it could put the FOMC in a box if it leads the public to view the date as a commitment, regardless of changes in economic conditions—indeed if the policy is successful, the FOMC probably would wish to tighten before the end of the commitment period. Second, if the date is far into the future, it may have the negative effect of solidifying expectations of a slow recovery, exacerbating liquidity trap conditions. Conversely, a nearby date probably would not provide much additional accommodation.

Special Topic

Nominal GDP-Level Targeting in the FRBNY DSGE Model

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In the current situation where the fed funds rate (FFR) is constrained by the zero lower bound, a Nominal GDP-level targeting policy offers an option for additional policy stimulus. This policy translates into a commitment that the accommodative stance of near zero FFR will be maintained as long as the combination of price level and real activity is below the target path.

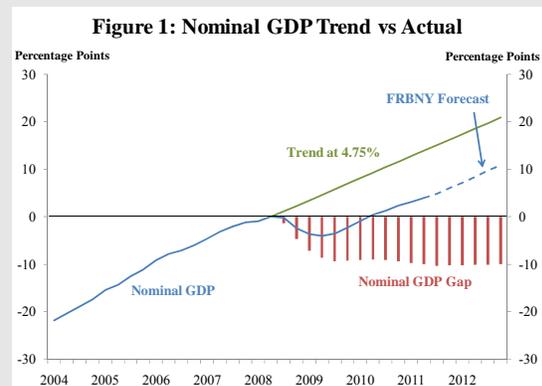
In this box we discuss the nature of nominal GDP level targeting (NGDP) and investigate the macroeconomic effects of introducing such a policy in the FRBNY DSGE model. According to FRBNY staff forecasts, the economy is not expected to revert to the pre-crisis trend growth within the next couple of years, as shown in Figure 1. A NGDP policy targets a return to a trend level close to the one before the crisis, hence closing the gap between actual and target nominal GDP.

The underlying conceptual framework for a NGDP policy is similar to that of a price-level targeting (PLT) policy. A NGDP policy, provided it is credible and well understood, affects current activity through expectations: the fall of NGDP below its target level generates expectations that future NGDP would be higher. Higher expected future real activity tends to stimulate current activity.

Moreover, higher expected future activity tends to raise inflation expectations, lowering the real interest rate today, thus stimulating current real demand.

The key difference between a NGDP and a PLT policy is that nominal GDP targeting addresses both price and output stability in one single target. This has the following advantages over a PLT policy: (i) it reflects the Fed's dual mandate, with equal weights on both of its legs, and (ii) it presents a policy that may be more easily understood by the public, since it is a policy intended to "raise incomes" back to historical trend in a period of recession or slow recovery (even though prices may be rising).

Critical issues in the implementation of a NGDP policy are, as for any 'level' targeting rule, how to determine the starting point for computing the trend path, and the slope of the trend path. In contrast to a PLT policy, NGDP targeting requires an assessment of the potential growth rate of real GDP: if this is



overestimated (e.g., if it is thought to be 3% whereas it in fact declined to 2%), NGDP targeting may result in over-stimulating the economy, thereby raising inflation. In this case there is a risk of un-anchoring inflation expectations, which would make it costly to restore the central bank's credibility.

NGDP targeting in the FRBNY DSGE model

We now evaluate a NGDP targeting policy in the FRBNY DSGE model. We replace the model's baseline policy rule with one that implements a NGDP targeting regime starting in 2011Q2, where the FFR adjusts in response to the NGDP gap. With the new rule in place, we compute output and inflation forecasts and compare them to those obtained under the baseline rule. As in the baseline model, we assume in this experiment that the zero lower bound on nominal interest rates remains binding until 2012Q2.

Using the estimated model parameters¹ and the new policy rule, we perform counter-factual forecasts using the NGDP targeting policy, assuming that the switch in policy is perfectly understood by the public and that the new policy is fully credible. Figure 2 summarizes the results. A commitment to bringing NGDP back to its historical trend does provide a considerable boost to real GDP growth in the short run (with real GDP rising by as much as 8% in the first year following the policy switch), causing inflation to rise.

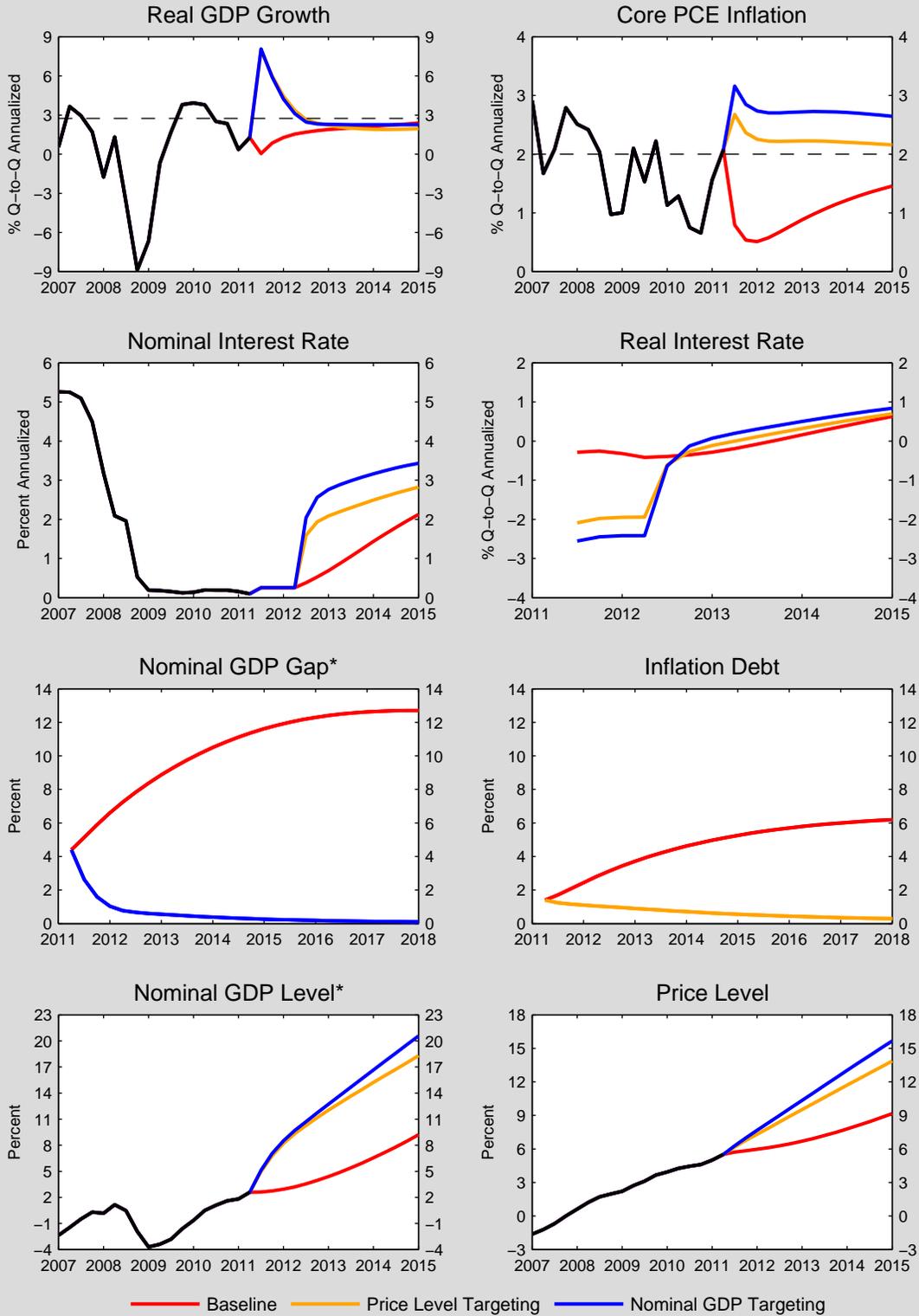
This higher expected inflation contributes to lowering the real interest rate, hence stimulating real output in the short run. Note that while under the NGDP-targeting policy the NGDP gap tends to close fairly rapidly, to less than 0.8% by mid 2012, it remains large throughout the forecasting horizon under historical policy.

It is also interesting to note that by stimulating the economy and generating a more rapid rise in inflation, the NGDP targeting policy implies a sharper rise in the nominal interest rate than under the baseline policy. This illustrates that NGDP targeting involves only a conditional commitment to maintaining low interest rates. When nominal GDP returns to the target path, the interest rate adjusts accordingly. An implication of the more rapid renormalization in short-term interest rates is that long-term nominal rates may actually increase under NGDP targeting. This is not a failure of policy, but an implication of the general equilibrium nature of the model.

As a comparison, the counter-factual simulations obtained under a PLT policy are shown in yellow in Figure 2. Notice that a commitment to a PLT policy has a similar effect on both output growth and inflation in

¹The specific policy rule we consider sets the coefficient on the NGDP gap equal to 0.4, assumes that the initial gap in 2011Q2 is -4.4% and that target NGDP grows at 4.75% per year, which reflects an assumed 2% target core PCE inflation rate and a 2.75% potential growth rate of real GDP.

Figure 2: Nominal GDP Targeting



*Nominal GDP is computed using real GDP and core PCE deflator.
Black lines show actual data.

the short run, though a NGDP policy implies slightly higher inflation in the years following the policy switch. Nonetheless, both policies have remarkably similar implications which differ substantially from those of the historical policy.

In conclusion, simulations from the FRBNY DSGE model illustrate that a change in policy that adjusts the interest rate in response to the NGDP gap could provide considerable stimulus in the current environment. This occurs because the anticipation of maintained stimulus reduces the real interest rate today, thereby raising real output and inflation immediately. The quantitative implications of these simulations should of course be taken with caution because of the extreme assumptions embedded in the model; namely that the public fully understands the new policy and that the commitment to NGDP is credible. This tends to overstate the stimulative effects of such policy, as agents would in reality more likely learn the new policy environment over time. Nonetheless, the experiments show that a NGDP targeting policy, as well as a PLT policy, may be quite effective.

Appendix: Formal comparison of historical policy with NGDP and Price Level Targeting

Historical policy in the FRBNY DSGE model is given by the following rule

$$i_t = \max\{0, \phi_0(1-\rho) + \phi_p(\pi_t - \pi^*) + \phi_y(g_{y,t} - g_{y^*}) + \rho i_{t-1}\}$$

where π_t denotes inflation, π^* is the inflation target, $g_{y,t}$ is real GDP growth, g_{y^*} represents long-run real output growth, and ϕ_0 , ϕ_p , ϕ_y , and ρ are constant coefficients. The estimated degree of interest-rate smoothing ρ is 0.8. This implies that the historical policy rule resembles a “difference form” of a (price- or nominal GDP-) level rule. Indeed, if we set $\rho=1$ we obtain a form of a PLT rule, which also assigns some weight to deviations of real output from potential. If we set $\rho=1$ and equal coefficients on the policy objectives ($\phi_p = \phi_y$), we obtain a nominal GDP-level targeting rule:

$$i_t = \max\{0, \phi_p[(p_{t+y_t}) - (p_{t+y_t}^*)]\}.$$

Notice that NGDP level targeting does not imply a “radical” change from estimated historical policy: both rules are perfectly equivalent when starting on target and in the absence of shocks. When shocks hit, the NGDP level-rule, however, keeps track of the accumulated past deviations of NGDP growth from the target growth rate.

2. Evolution of Outlook and Risks

2.1 Central Forecast

Over the first half of 2011 economic growth slowed markedly, with real GDP up at an annual rate of just 0.8%. The unemployment rate, which had declined to 8.8% as of March, rose to 9.2% in June. For July the unemployment rate declined to 9.1%, but this was associated with a 0.2 percentage point decline of the labor force participation rate. This renewed weakening of labor market conditions has led to significant declines of consumer confidence of late, led by significant deterioration in assessments of labor market conditions.

There are reasons to believe that this first half slowdown was due in part to transitory factors. However, the magnitude and breadth of the slowdown now suggest that other, less transitory factors have contributed as well. Thus, while we continue to believe that growth will strengthen over the forecast horizon, it is clear that the economy entered the second half of the year with less forward momentum than we would have thought just a month or two ago.

The transitory forces depressing growth in the first half of the year are widely known at this point. Energy and other commodity prices rose sharply over the six or seven month period ending in May of this year. This sapped consumers' real purchasing power. While in nominal terms disposable personal income rose at a respectable 4¼% annual rate over the first half of 2011, adjusted for inflation that increase was under 1%. As is usually the case in such circumstances, consumers initially responded to the loss of purchasing power by reducing the personal saving rate somewhat. However, they subsequently reduced the rate of growth of their spending; as a result, the personal saving rate recovered somewhat. For the second quarter, real consumer spending was essentially unchanged, rising just 0.1% at an annual rate. While not unprecedented, it is very unusual for consumer spending to be so weak except when the economy is in recession.

A second important, transitory factor is the supply chain disruptions emanating from the earthquake and tsunami that occurred in Japan in March. These disruptions have been most evident in the production and sales of light weight motor vehicles. Despite the fact that inventories were relatively lean, production of motor vehicles and parts declined at a 16% annual rate in 2011Q2. Production of computers and of electrical equipment, which also rely on imported subcomponents, also declined in the second quarter. Sales of light weight motor vehicles fell below 12 million units (annual rate) in May and June from over 13 million units over the preceding three months. For July sales recovered slightly, to 12.2 million units. Industry reports suggest that inventories of popular, fuel efficient models were quite low and that prices of such models have firmed. Apparently, many prospective buyers are delaying their purchases until inventories and prices return to more normal levels.

With respect to inflation, both headline and underlying inflation moved up more over the first half of 2011 than we anticipated at the beginning of the year. The rise in global commodity prices that began in the final months of 2010 and continued until around the middle of the second quarter of this year led to a marked increase of headline inflation. On a year-over-year basis, total PCE deflator inflation rose to 2.6% in May and June from an average of 1.3% in 2010Q4. Over that same period, core PCE deflator inflation rose to 1.3% as of June from an average of 1% in 2010Q4. This rise in core inflation was due to a combination of factors including a firming of rents as household formations have begun to increase, second round effects of higher commodity prices into price of such things as airfares and apparel prices, pass through of higher import prices, and higher prices for new and used vehicles associated with the supply chain disruptions.

Conditioning assumptions. In light of the recent NIPA revisions, we have lowered our estimate of potential GDP growth over the forecast horizon to between 2% and 2¼% from around 2½%. The Board staff has reduced their estimate of potential for the period from 2009 through the end of the forecast horizon, with the estimate for 2011 and 2012 at 2.1% versus 2.3% and 2.4%, respectively. The Board staff estimate of the output gap for 2010Q2 was revised to -6.2% from -5.8%.

We expect the lower degree of inflation persistence evident since the early 1990s to continue. This assumption is in contrast to the greater degree of inflation persistence assumed in recent Board staff forecasts. In our central scenario, inflation expectations remain well anchored. This assumption is central to our projection of a gradual rise of core inflation back toward the midpoint of the FOMC's objective for core PCE inflation of 1.5% to 2.0%.

The FRBNY outlook for foreign real GDP growth in 2011 has been lowered to 3.3% (Q4/Q4 on a GDP-weighted basis) from 3.6% in June. This reflects downward revisions to projected growth for Canada, Japan, the Euro area, and the UK with a modest upward adjustment of growth in China. Projected foreign real GDP growth for 2012 has also been revised lower, to 3.3% from 3.5%, reflecting downward adjustment to projected growth in Japan and Canada. The Board staff projection for 2011 is 3.1%, unchanged from June, and for 2012 is 3.3%, down from 3.5% in the last Tealbook.

The projected path of oil prices in this forecast is lower for the remainder of 2011 but essentially unchanged for 2012. Based on futures quotes, we expect an average price of WTI of \$99 per barrel for 2011Q4, \$3 per barrel lower than in June. The Board assumes \$94.5 per barrel for 2011Q4, \$3.50 per barrel lower than in June. Further out, the oil futures curve has a slight upward slope, with our forecast assuming a price of \$103 for 2012Q4 and the Board assuming \$100.

Our assumptions regarding federal fiscal policy, which are the same as that of the Tealbook, are unchanged from June. For calendar 2011, federal fiscal policy is expected to be a roughly neutral influence on aggregate demand. However, in 2012 fiscal policy is anticipated to exert a drag on growth of about 1¼ percentage point as the payroll tax reduction and investment expensing provisions expire, the emergency unemployment benefits are phased out, the grants to state and local governments included in the 2009 stimulus bill are exhausted, and the spending cuts enacted in the Budget Control Act of 2011 begin to kick in.

We also adopt the Tealbook assumptions regarding equity prices. When the Tealbook for this cycle was prepared, equity prices were about 2% lower than was assumed in June. However, equity prices were still expected to increase at a 9% annual rate through the end of 2012. Thus, relative to June, the path for equity prices is a parallel shift downward. The main driver of this increase in equity prices is the return of the equity premium to more normal levels.

Also reflecting intermeeting developments, the Board's assumed path of the nominal exchange value of the dollar is lower with a decline of 5.4% in 2011 versus 4.4% in June. The assumed decline in 2012 is unchanged at 2.0%. Our assumed path of the nominal exchange rate is a decline of 5.9% in 2011 and 1.5% in 2012, with an end point value essentially the same as that of the Tealbook.

Finally, following some firming from early 2009 through mid 2010, the Core Logic repeat sales home price index declined at a 9¼% annual rate over the second half of 2010. Over the first six months of 2011 that index has continued to decline, but the rate of decline has slowed to an annual rate of about 4%. That rate of decline is expected to continue over the remainder of 2011 such that the 2011Q4/Q4 decline is 4%. For 2012 home prices are expected to be essentially unchanged.

The Outlook. From just 0.8% (annual rate) over the first half of 2011, we expect growth to pick up to 2½% over the second half of 2011 and then strengthen a bit more to about 3% (Q4/Q4) in 2012. The main reason to expect this firming of growth is that the shocks experienced during the first half of the year have begun to dissipate. Indeed, gasoline prices fell significantly in May and June, and while they have edged back up a bit in July they remain well below their previous peak levels. Motor vehicle production has ramped up over the course of July, and further increases in August are now expected. This may have been a contributing factor to the recent decline of initial claims for unemployment insurance to a level of around 400,000 per week.

In addition to the dissipation of these temporary factors, other reasons to expect growth to improve somewhat in the second half are that there continue to be important pockets of strength for the U.S. economy and many underlying fundamentals have improved significantly. For example, exports are likely to continue to make a significant contribution to growth in coming quarters. The exchange value of the dollar has returned to levels that prevailed prior to the financial crisis. And, despite our troubles, growth prospects for the emerging economies of the world still look quite good. Corporate profits are strong and U.S. businesses continue to invest in new equipment and software. Moreover, it looks like we may have turned the corner on the long cycle of business investment in nonresidential structures. Construction of single-family housing looks to have bottomed out while there is actually a modest uptrend in production of multifamily housing as demand shifts toward rental housing. Nonmortgage consumer credit has begun to increase. Terms and standards on lending to business continue to ease while C&I loans on bank balance sheets have begun to expand.

That being said, we have lowered our projected growth over the forecast horizon as the loss of forward momentum has been greater than previously expected. While we cannot say for certain why that is the case, it is likely that both the federal and the state and local government sectors are weighing on the economy to a greater extent than previously appreciated. Both employment and spending by the state and local government sector have been declining for some time, and the rate of decline intensified over the first half of 2011. State and local government employment is now down by 525,000 from its peak in the third quarter of 2008, with 160,000 or nearly a third of that decline occurring over the first six months of this year. As of 2011Q2, real spending by state and local governments was down by 2½% from the same period in 2010, with most of that decline in the investment category, which includes spending on infrastructure such as roads, bridges, etc. While state and local government tax receipts have recovered and have nearly returned to their previous peak, grants in aid from the federal government, which increased substantially as part of the federal stimulus legislation of 2009, appear to have peaked and are now declining. Thus, spending and employment at the state and local government level may continue to decline over the near future.

At the federal level, fiscal policy is evolving from providing a great deal of stimulus to the economy in 2010 to being essentially neutral in mid-2011. As discussed above, the stimulus provided by the increase of spending and tax relief incorporated in the American Recovery and Reinvestment Act of 2009 is thought to have peaked in mid to late 2010 and is now subsiding. Year over year growth of unemployment benefits is now negative as the number of people receiving emergency unemployment benefits is declining, in many cases due to the exhaustion of eligibility. As we look toward 2012, federal fiscal policy will begin to exert a significant drag on growth. The reduction of the employee's share of the OASDI payroll tax and the full expensing of qualified investment in equipment and software, enacted in late 2010, are both set to expire at the end of 2011. The recently enacted Budget Control Act of 2011 calls for about a \$25 billion of reduction of discretionary spending in FY2012, with additional deficit reduction measures possible once the Congressional Joint Select Committee on Deficit Reduction releases its proposals latter this year.

Another factor that is likely impeding the development of a robust recovery is the ongoing disequilibrium in the housing sector. Home prices have fallen sharply over the past several years, with several widely followed national home price indices suggesting that prices are down by about one-third from their peak. We have had for some time a very large inventory of homes for sale, many of which are described as "distressed" as they are either properties that lenders have taken possession of through foreclosure or they are being offered as "short sales." At the same time, home sales remain at depressed levels despite very high cash flow affordability, due to a variety of factors including tight underwriting standards, a weak labor market, and general uncertainty about the future path of home prices. This inventory is sufficiently large relative to sales to be putting additional downward pressure on home prices. Adding to this bad dynamic, large numbers of loans are seriously delinquent or already in the foreclosure process, with a high percentage of them likely to be offered for sale in the not too distant future. Finally, large numbers of homeowners have outstanding mortgage balances that either exceed or are quite close to the current value of their property.

With this downgrading of projected growth over the forecast horizon, the projected path of the unemployment rate is substantially higher. We expect an average unemployment rate of around 9% for 2011Q4—about ½ percentage point higher than in June—and 8½% for 2012Q4—a full percentage point higher than in the last Blackbook. In addition, we have lowered the projected path of the labor force participation rate.

Regarding inflation, energy and many other commodity prices have declined from their peak levels. Motor vehicle production is returning to more normal levels, which will boost inventories over the coming months. Thus, barring another energy price shock, which futures markets do not anticipate, it appears that year over year increases of headline and core inflation are at or near their peaks and will be heading lower over the remainder of the year. Fundamentals remain consistent with a slowing in the rate of inflation. Even if we assume that the natural rate of unemployment has increased somewhat, the economy is operating with substantial slack. Profit margins are quite wide, prompting greater price competition going forward. Moreover, despite the recent run up of inflation, inflation expectations remain well anchored within the ranges of the past few years.

Special Topic

Has the economy entered a stall?

Jonathan McCarthy x5645

Low growth in the first half of the year indicates the economy may have entered a stall, suggesting an increased risk of recession in the near-term.

According to the advance estimate, real GDP growth in 2011Q2 was a slow 1.3% (annual rate); in addition, real growth in 2011Q1 was revised downward considerably. As a result, the four-quarter change of real GDP in 2011Q2 was 1.6%, below our estimate of potential growth. These developments have raised greater concern that the US economy has entered a “stall” that increases the likelihood that the economy could tip into recession.

In this note, I examine the probabilities of the economy being in a recession within a year conditional on varying thresholds for growth rates of real GDP as well as the output gap.

The major conclusions are as follows:

- The two- and four-quarter changes in real GDP as of 2011Q2 have historically been associated with a high probability of recession within a year.
- Conditioning on the change in the output gap—which takes into account the current low growth rate of potential GDP (according to the CBO)—mitigates this probability, although it is still fairly high.

The concern about a possible stall is that it may increase the likelihood of the economy falling into a recession. To assess this possibility, I use post-WWII data to measure the probability of the economy being in a recession within a year after GDP growth passes a threshold, where “within a year” is defined as the current quarter and 4 quarters ahead, inclusive. The rationale for including the current quarter in the probability time horizon is that there is often real-time uncertainty about whether the economy is in a recession; for example, recall the debate during 2008H1.

As a benchmark to the conditional probabilities, I calculate the unconditional probability of being in a recession within a year, which is the frequency of quarters either in a recession or within one year prior to a recession over the post-WWII period. The data indicate that the unconditional probability of recession within a year is about one-third.

Estimating the conditional probability of recession: real GDP growth

I now consider the probability of being in a recession within a year, conditional on the growth rate of real GDP. Chart 1 presents the conditional probabilities for both two- and four-quarter real GDP growth rates between 0 and 3 percent (annual rate), in addition to the unconditional probability.

As seen in the chart, the conditional probabilities over the displayed range are above the unconditional probability and well above it for lower growth rates from 0% to 2%.

Concentrating on the two- and four-quarter growth rates in 2011Q2 (0.8% and 1.6%, respectively), the estimated probabilities of recession within a year are about 0.85 for both measures.

Estimating the conditional probability of recession: real GDP growth relative to potential

One qualification of the calculations in Chart 1 is that it does not account for fluctuations in potential growth, which may affect the “stall properties” of a particular real GDP growth rate over time. For example, as seen in Chart 2, the potential growth rate as calculated by the CBO has been low over the past two years, in part reflecting the impact of low investment during the recession. Consequently, a 2% growth rate would be considered well below potential in the early 1960s (above 4%), but slightly above potential during the past couple of years (below 2%).

To address this issue, I estimate the probability of recession within a year, conditional on the percentage point change (annualized) of the output gap (deviations of real GDP from potential), where potential growth is as measured by the CBO. Chart 3 presents these conditional probabilities for two- and four-quarter output gap changes ranging from -2 to 2 percentage points, along with the unconditional probability.

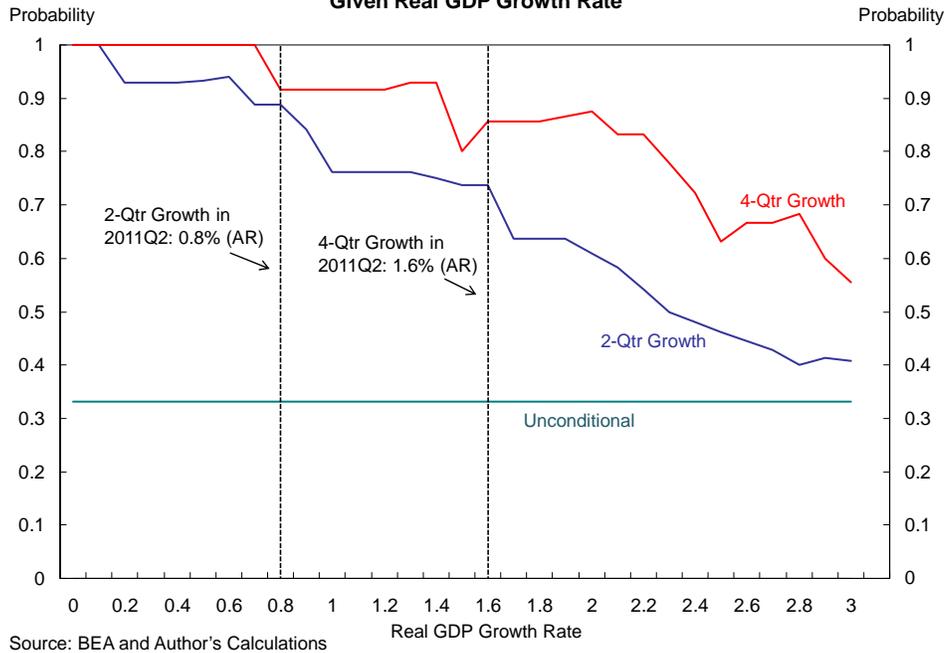
The conditional probability functions lie above the unconditional probability when real GDP growth is below the potential rate, but frequently lie below it when real GDP growth is above potential growth. Again concentrating on the two- and four-quarter values in 2011Q2 (-1.1 percentage points and -0.2 percentage points, respectively), the estimated conditional probabilities of a recession within a year are about 0.55 and 0.6 respectively. These are notably lower than in the case of examining real GDP growth rates in isolation, but still well above the unconditional probability.

Conclusion

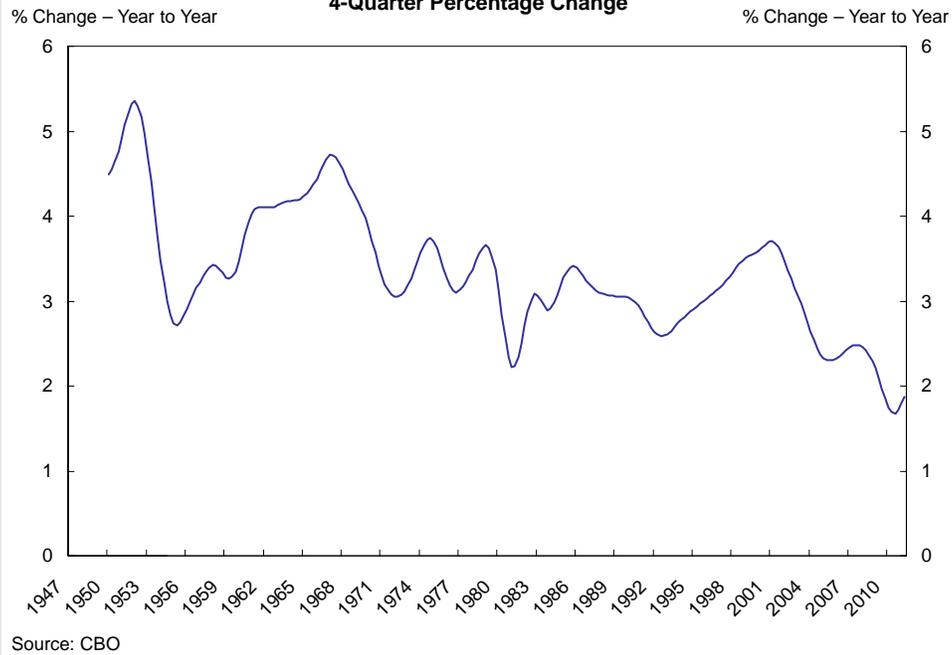
The conditional probabilities estimated in this note are consistent with the idea of a “stall speed” for the US economy: historically, if the real GDP growth rate falls to a low level (in either absolute terms or relative to potential growth), the conditional probability of the economy being in a recession within a year is well above the unconditional probability. Based on these conditional probabilities, the weak growth in the first half of this year indicates a significant risk of the economy entering a recession over the near term.

One factor that may mitigate this risk is that monetary policy probably will not be tightened significantly (as has been the case for most post-war recessions) over the near term, although the fiscal policy outlook is not as favorable.

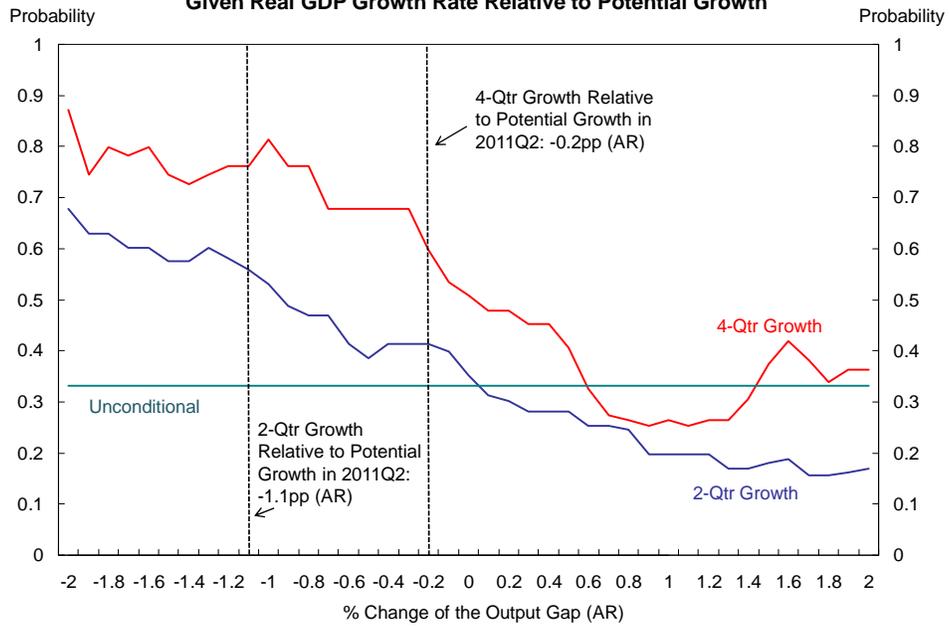
**Chart 1: Estimated Probability of Recession Within One Year
Given Real GDP Growth Rate**



**Chart 2: CBO Estimated Potential Real GDP
4-Quarter Percentage Change**



**Chart 3: Estimated Probability of Recession Within One Year
Given Real GDP Growth Rate Relative to Potential Growth**



Source: BEA, CBO, and Author's Calculations

2.2 Alternative Scenarios and Risks

Over the intermeeting period the balance of risks to real activity became further skewed to the downside, reflecting both an increase in downside risks and a reduction in upside risks. These shifts were driven in large part by a number of weaker-than-expected real activity releases, particularly the 2011Q2 advance GDP report (including the annual revisions) and the June labor market report. Moreover, the potential drag resulting from greater-than-expected fiscal consolidation also represents a downside risk to real activity. Risks to inflation have also shifted to the downside as a consequence of the weakness in real activity, but the changes are smaller than for output.

The *Central Scenario* forecast for real GDP growth also became substantially more pessimistic than in June. Because the risks are defined relative to the *Central Scenario*, the entire forecast distribution has shifted downward considerably. As far as the alternative scenarios, the likelihood of the *Fiscal Consolidation* scenario increased further and now stands at 40%, making it the most likely scenario [Exhibit C-1]. This scenario envisions a decline in aggregate demand due to a sudden contraction in fiscal spending, but also more broadly to a widespread reluctance on the part of households and firms to consume and invest as they restructure their balance sheets. The likelihood of the *Global Credit Crunch* scenario also increased and now stands at about 15%. In addition, the weight on our most persistent downside scenario, *Global Deflation*, has increased such that it again has a small but not insignificant effect on our forecast distributions [not pictured]. Not surprisingly, the probabilities for scenarios associated with upside real risks, notably the *Productivity Boom* and *Faster Growth* scenarios, have decreased. In March the *Productivity Boom* scenario was the most likely scenario, while its likelihood is currently about half that of the *Fiscal Consolidation* scenario, reflecting the sizable shift in risk assessment. The probability associated with the *Loss of Credibility* scenario also has decreased a bit. The paths for core PCE inflation and GDP growth associated with the previously existing scenarios have changed mainly as a result of changes in the *Central* scenario [Exhibit C-2].

The changes in both the *Central Scenario* forecast and our risk assessment result in a

notable downward shift in the forecast distribution for real GDP growth [Exhibit C-3]. The likelihood of negative 12-month output growth in 2011Q4 is non-negligible, at about 25%. The 5th percentile of the distribution remains below zero throughout the forecast horizon. The forecast distribution for core PCE inflation moved upward in the very short run, due to an uptick in *Central Scenario* forecast, but downward in the medium term. The likelihood of negative 12-month Core PCE inflation in 2012Q2 is almost 10%.

Because of the lower central forecast for real GDP growth and the downward shift in the risk assessment, we now include a chart assessing the probability and depth of a recession should one occur by the end of 2012. We assess the probability of a recession at about 40% in the current quarter and about 60% through the end of 2012. The “Depth of Recession” chart shows that if a recession should occur, it is most likely to be relatively mild, similar to that in 2001; however, given current conditions, that would still probably lead to the unemployment rate moving well above 10%. The probability of a moderate to severe decline in output is about 10%; this probability rises to about 20% conditional on there being a recession.

With inflation measures still somewhat elevated, we continue to include a chart assessing the probability of high core PCE inflation (>2.5% annual rate). Because of the downward shift in the inflation forecast distribution, this probability has declined. Furthermore, the “High Inflation Probability and Distribution” chart shows that the conditional distribution has shifted down, reflecting the lower weight on the *Loss of Credibility* scenario.

Exhibit C-3 also shows the mean forecasts from the FRBNY DSGE model. The forecasts for output and inflation are close to the expected value of the FRBNY forecast distribution through the end of 2011. Afterwards, the inflation forecasts are still broadly similar, but the output forecasts are more pessimistic, as the DSGE model does not foresee growth significantly above trend at any time over the forecast horizon.

3. Forecast Comparison

3.1 Comparison with Private Forecasters¹

The FRBNY forecasts for GDP growth are substantially below the range of private forecasts for 2011Q3 and 2011Q4, as well as for the year 2011 (Q4/Q4). This difference reflects the fact that FRBNY forecasts incorporate information from the most recent downbeat data releases such as the real GDP data for 2011H1, in contrast to available private forecasts, which were last revised in early July. Over the medium term, 2012 (Q4/Q4) real GDP growth forecasts are in line with private forecasts. The FRBNY core inflation projection for 2011Q3 is higher than the private forecasts July by 0.3 percentage point. For 2011Q4, and 2012 (Q4/Q4), however, the FRBNY core inflation forecasts are lower than private forecasts.

Real GDP Growth. In the few weeks following the last FOMC meeting, private forecasts for 2011Q3 were revised down moderately. These forecasts have, however, not been revised since mid-July and thus do not incorporate the subsequent negative data releases. The FRBNY forecast for 2011Q3 is 2.6% (annual rate), down from 3.6% in the June Blackbook, and below Macro Advisers (3.9%) and Blue Chip (3.2%). The FRBNY forecast for 2011Q4 is 2.5%, sharply lower than the June Blackbook forecast (4.6%), and now also below Blue Chip (3.2%) and Macro Advisers (3.0%). The FRBNY forecast for 2011 (Q4/Q4) has been lowered by 1.3 percentage point to 1.7%, which is well below the projections of Macro Advisers (2.7%) and Blue Chip (2.6%). In part, this difference reflects the downward revisions to the GDP data for the first half of this year that were not available at the time of the release of the private forecasts. Our forecast for 2012 (Q4/Q4) has been reduced 0.6 percentage point to 3.1%, which is slightly above Blue Chip (3.0%) and below Macro Advisers (3.5%) .

Inflation. The FRBNY projection for core PCE inflation in 2011Q3 has been raised from 1.4% (annual rate) in the June Blackbook to 1.9%, which is above Macro Advisers

¹ The details of the forecast comparison are in Exhibit B-8. Release dates of the private forecasts discussed in this section are in parentheses: Blue Chip consensus (7/10), SPF (5/13), and Macro Advisers (7/7). Quarterly numbers are SAAR.

(1.6%). Our forecasts for 2011Q4 and 2011(Q4/Q4) core PCE inflation (1.4% and 1.7%, respectively) were revised up 0.1 percentage point and are closer to those of Macro Advisers (1.5% and 1.7%). For 2012 (Q4/Q4), the FRBNY projection for core PCE inflation was revised down to 1.3% from 1.5% in the June Blackbook, and lies below the Macro Advisers forecast (1.6%). Our forecast for headline CPI inflation for 2011 (Q4/Q4) is unchanged at 3.1%, and is at the low end of private forecasts. For 2012 (Q4/Q4), our forecast was lowered by 0.1 percentage point since the June Blackbook to 2.1%, slightly below that of Blue Chip (2.2%), but above that of Macro Advisers (1.8%). The FRBNY projection for core CPI inflation in 2011 (Q4/Q4) is 2.1%, up from 1.9% in the June Blackbook, and it is the same as Macro Advisers. For 2012 (Q4/Q4), our forecast was revised down 0.1 percentage point to 1.7%, which is below that of Macro Advisers (1.9%).

4. Robustness of Policy Recommendation

4.1 Sensitivity to Alternative Scenarios and Policy Rules

Our current policy recommendation is to maintain the target range for the federal funds rate at 0–0.25% at least through the end of 2012 if the *Central Scenario* forecast materializes. This represents a delay in the lift-off date relative to the June Blackbook, and reflects the worsening of the outlook and risk assessment. Our recommendation is consistent with the *Baseline* policy rule under all scenarios except the *Loss of Credibility* and *Faster Recovery* scenarios [Exhibit D-1]. Under these scenarios, which envision higher inflation than the *Central Scenario*, the *Baseline* policy rule instead implies a quicker lift-off in 2011Q4.

Exhibit D-2 shows the prescription of various policy rules using the expected value of the forecast distribution as an input. The *Nutter* rule, which only puts weight on inflation, prescribes a first rate hike in the current quarter, while the paths implied by all the other rules is essentially consistent with our policy recommendation. Exhibit D-2 also shows the implied nominal FFR for the *Outcome-based* rule, ignoring the zero bound. Under the expected value of the forecast distribution, the unconstrained nominal FFR from this

rule is almost -7% by 2013Q1 and is still barely above -6% by the end of the forecast horizon.

Exhibit D-3 shows the prescriptions from alternative policy rules under the various scenarios. The *Nutter* rule prescribes a lift-off before the end of 2011 for all scenarios. FFR paths under the *Asymmetric Price Targeting* rule are at the lower bound (0.25%) throughout the forecast horizon. For the *Outcome-based* rule, the paths are at or below zero through the end of the forecast horizon under all scenarios except for the *Faster Recovery* scenario.

Exhibit D-1 shows the real FFR rates implied by the *Baseline* rule under the various scenarios, ignoring the zero bound constraint. Under the *Central* scenario, this rule implies a gradual renormalization of the real rate, increasing from about -4% in the current quarter to about -1.5% by the end of 2013. Exhibit D-3 shows the real rate (under alternative scenarios) for the *Asymmetric Price Targeting*, the *Nutter*, and the *Outcome-based* rules. The real FFR remains negative throughout the forecast horizons for the *Asymmetric Price Targeting* and *Outcome-based* rules under all scenarios. It is positive throughout the forecast horizon for the *Nutter* rule.

We also use the DSGE model to assess the current stance of monetary policy by performing a counterfactual exercise that eliminates current and past policy shocks. From this exercise, we find that the DSGE model predicts a counterfactual FFR for the current quarter roughly in line with the policy rate.

4.2 Comparison to Market Expectations

The start of the renormalization process implied by FFR futures is the second half of 2013, about four quarters later than at the time of the June Blackbook. The implied renormalization process is also very gradual, with rates below 50bps by the end of 2013. Primary dealers' expectations for the path of the fed funds target rate also changed substantially relative to the last survey: the median dealer's expectation for the timing of the first tightening shifted from 2012Q3 to 2012Q4. Further, the entire distribution of the

first policy rate hike shifted towards later dates, and its mode moved from 2012Q2 to 2012Q4. On average, respondents attach a 30% probability to the first policy rate hike occurring in 2013Q2 or later.

5. Significant Developments

5.1 Economic Developments

Real Activity. GDP: Based on the advance estimate, real GDP grew 1.3% (annual rate) in 2011Q2. The release also provided the annual revision of the NIPA accounts, with real GDP growth in 2011Q1 now estimated at just 0.4% (annual rate) versus the pre-revision estimate of 1.9%. The revised data also indicate the 2007Q4 – 2009Q2 recession was deeper than previously thought, with real GDP declining by 5.1% rather than the 4.1% based on the pre-revision data, and the recovery somewhat shallower.

Production: Total industrial production increased 0.2% in June. Manufacturing production was unchanged in June, and the 12-month change was 3.7%. Production declined again in motor vehicles, reflecting the lingering effects from supply chain disruptions associated with earthquake and tsunami in Japan. Production in high-tech industries rose 0.5% in June and the 12-month change was 10%. Outside of motor vehicles and the high tech sector, manufacturing production increased 0.1% in June, the third consecutive month of very modest or no growth. This release raises concerns that the recent weakness in manufacturing activity may be indicative of more than just a temporary soft patch.

Orders and Shipments: New orders for manufactured goods fell 0.8% in June, after rising by 0.6% in May. Growth in manufacturing shipments rose 0.2% in June after being essentially unchanged in May. Turning to capital spending indicators, new orders for nondefense capital goods excluding aircraft rose 0.4% in June, while shipments of those goods increased 1.1%. On net, the data were consistent with other indicators pointing to softness in manufacturing activity in June.

ISM: The manufacturing index dropped 4.4 points to 50.9 in July. The decline was well below expectations, with the index and a number of its components at their lowest levels in two years. The nonmanufacturing index declined to 52.7 in July, 0.6 points lower than the June reading. Both reports are consistent with a downshifting in overall activity and increased concerns that the growth slowdown in 2011H1 may persist longer than previously expected.

Inventories: Business inventories increased 1.0% in May. Manufacturing inventories increased 0.2% in June, while wholesale inventories rose 1.8% in May (their highest monthly increase this year). Retail inventories for May increased 0.4%, with retail inventories excluding motor vehicles rising 0.3%. The total business inventories-sales ratio rose slightly from 1.27 to 1.28, which is still relatively low. The ratios in manufacturing and wholesale trade rose. The recent behavior of the inventories-sales ratios for the total business sector suggests they may be near their desired levels.

PCE: Nominal PCE decreased 0.2% in June, the biggest drop since September 2009, after rising 0.1% in May. Real PCE fell by less than 0.1% in June, compared to declines of 0.1% in both May and April. While there was hope that consumer expenditures would strengthen as the increases in energy prices began to fade, the release confirms a continuation of the slower growth from the first quarter into the second quarter.

Retail Sales: Total retail sales edged up 0.1% in June, after dipping 0.1% in May, as a rebound in sales of auto dealers offset the biggest drop in gasoline sales in a year. Retail sales excluding autos were unchanged. Nominal sales of the PCE control (retail sales excluding motor vehicles and building materials) fell 0.1% in June. The weakness in the PCE control along with downward revisions in April sales suggests a weaker outlook for consumer spending.

Personal Income: Nominal personal income rose 0.1% in June, below the increase of 0.2% in May and 0.4% in April, and well below the average increase of 0.7% during 2011Q1. Personal income for 2008 was revised up by 0.6% relative to pre-revision

estimates, but was revised down in 2009 and 2010 by 2.0% and 1.3% respectively. Wage and salary income was essentially unchanged in June, a weaker performance than in the earlier months of the year. Real disposable income increased by 0.3% in June, with lower energy prices helping to offset the slowing in nominal terms. Weak income growth has probably been a factor restraining growth of consumer expenditures.

Home Sales/Starts: Sales of new single-family homes fell 1.0% in June to 312,000 units (seasonally-adjusted annual rate). Existing home sales fell 0.8% in June to 4.77 million units (seasonally-adjusted annual rate), the third straight monthly decline and the lowest level in seven months. The decline in part reflected an unexpected spike in contract cancellations. Total housing starts rose 14.6% in June to 629,000 units (seasonally-adjusted annual rate). Single-family starts rose 9.4% in June to 453,000 units, the highest level since November 2010. Multi-family starts, which can be quite volatile from month to month, rose 30.4% in June to 176,000. While housing production remains at very depressed levels, recent data points to residential investment beginning to make a modest contribution to growth later this year and into 2012.

Construction: Spending on construction increased 0.2% in June, with upward revisions to the prior two months. Private nonresidential construction rose, while private residential and public construction fell. Even with the June rise and upward revisions, the construction sector remains weak with any recovery likely to occur at a gradual pace.

Labor: Nonfarm payroll employment increased by 117,000 in July after rising an average of 50,000 per month in May and June. Private payroll employment rose 154,000 in June. The unemployment rate declined from 9.2% to 9.1%, but this was principally due to a decline in the labor force participation rate from 64.1% to 63.9%. The labor force participation rate is now at its lowest level since January 1984. Household employment decreased by 38,000 after declining by 445,000 in June. On a payroll-consistent basis, household employment increased 47,000 after falling sharply in June. The employment-to-population ratio fell in July from 58.2% to 58.1%, its lowest level since July 1983. While the July labor market report was better than that for May and

June, it points to little improvement in conditions. The pace of payroll employment gains in July is only enough to absorb new entrants, and the decline in participation likely reflects the expiration of unemployment insurance benefits as well as some deterioration in job prospects.

Prices. *CPI:* The overall CPI decreased by 0.2% in June, the first decline since June 2010, compared to an increase of 0.2% in May. The decline in the CPI was led by energy prices (-4.4%). On a 12-month basis, the index climbed 3.6%, the same as in May. Core CPI inflation rose 0.3% in June and 1.6% over the year, with the gains in core prices fairly broad-based and particularly notable in categories such as vehicles, apparel, and lodging away from home.

PCE deflator: The overall PCE deflator index fell by 0.2% in June, following a 0.2% rise in May. Energy prices declined by 4.5%, while food prices rose by 0.1%. The 12-month change in the overall index was +2.6% in June, unchanged from May. The core PCE deflator rose 0.1% in June, down from 0.2% in May. The 12-month change in the core PCE deflator was 1.3%, the same as in May. Revisions in both overall and core PCE inflation over the past year were fairly small.

Home Prices: The CoreLogic national home price index for June indicates that trends established earlier this year continued. With distressed sales included, the seasonally-adjusted CoreLogic index fell 0.8% in June and its 12-month change was -6.9%, the largest 12-month decline since September of 2009. However, with distressed sales excluded, the seasonally-adjusted CoreLogic index rose 0.6% in June, the sixth consecutive monthly increase. Nonetheless, the 12-month change of this index is -1.1%.

Trade. The trade deficit widened from a revised \$43.6 billion in April to \$50.2 billion in May. Export volumes were down 1.5 percent in May, offsetting the growth in April. Over the 12 months ending in May, real exports moved up only 7.6 percent. Nonoil import volumes were up 0.5 percent in May, following minimal growth in April, resulting in an 8.3 percent increase over the year. Oil volumes continued to exhibit high volatility,

with a 6 percent jump in May over the previous month. The advance GDP release estimates that net exports will add 0.6 percentage points to GDP growth in 2011Q2.

Foreign Data Releases. *Euro area:* Manufacturing rose in May, putting output up 6 percent over the year, but PMI readings weakened over the intermeeting period and are now just above the breakeven threshold. The economic sentiment index has declined since February but was still 3 percent above its long-run average in July. The consumer confidence index fell slightly but is still near where it has been for the past year.

U.K.: Real GDP grew just 0.7 percent (saar) in 2011Q2 and data released over the intermeeting period were weaker than expected. Manufacturing output and export volumes in April and May were below their 2011Q1 averages and the PMI manufacturing survey declined in July, falling below the threshold that signals expansion for the first time in two years.

Japan: Monthly indicators suggest GDP likely dropped again in 2011Q2. Production increased in May and June to near year-ago levels, but the recovery was not enough to keep the two-month average from being below the 2011Q1 level. A survey of producers' forecasts suggests production continued to recover in July, albeit at a slower pace than in May and June.

EM Asia: China's growth in 2011Q2 was stronger than expected. Retail sales, investment, and production have eased only modestly and exports are growing at roughly a 20 percent pace. Some indicators, though, point to more significant slowing: manufacturing PMIs fell in July toward the breakeven mark. There was unexpectedly weak 2011Q2 GDP growth in Singapore and Taiwan.

Latin America: Indicators for manufacturing activity in Brazil have shown weakness of late. The labor market remains tight and consumer credit is growing strongly. Following a deceleration in 2011Q1, Mexico's economy looks to have picked up some speed in

2011Q2. Auto supply chain disruptions depressed April manufacturing activity, but production snapped back strongly in May.

Special Topic

Overview of Annual NIPA Revision

Dick Peach x5654

The NIPA revisions show that the last recession was deeper and the current recovery more subdued than thought.

With the release of the advance estimate of 2011Q2 GDP on July 29, BEA released its annual revision of the National Income and Product Accounts. Annual revisions typically revise the data of the preceding three years. However, BEA is now following a “flexible” annual revision approach under which data for more than three years may be revised.

Table 1 presents 2011Q1 nominal levels of income and expenditures pre- and post-revision. Nominal GDP was revised lower by \$150 billion or 1%. Nominal PCE was revised down by \$100 billion or 1%, with most of the decline within services. Incorporation of new source data from the 2007 Economic Census and the Quarterly Survey of Services resulted in significant changes in the composition of consumer spending as well as its overall level. Fixed investment was revised down by \$24 billion or 1.3%, with the bulk of that in the equipment and software category. Imports were revised up by \$18 billion or 0.7%. Elsewhere, the changes were modest.

On the income side of the ledger, national income was revised up by just 0.2%.

However, there were some sizable changes in the individual components of national income. In particular, corporate profits were revised up by nearly 13% while net interest was revised down by 25%. Chart 1 presents the pre- and post-revision levels of corporate profits as a share of national income. Based on the revised data, that series reached a peak of 14.3% in 2010Q4, surpassing the previous peak of 13.7% in 2006Q3 and the highest level since 1950Q4. Rental income of persons was revised up by 18%. With expenditures revised downward and national income revised upward, the statistical discrepancy was revised from +\$159 billion to -\$33 billion.

The revisions to both total and core PCE deflator inflation were relatively modest. The revised data indicate a slightly more pronounced increase of total inflation over the past year, with the total PCE deflator up 1.8% over the four quarters ending in 2011Q1 rather than 1.6%. But with somewhat slower rates of inflation in 2007 and 2008, the revised level of the PCE deflator in 2011Q1 is just 0.1% higher than prior to the revision. The bulk of the upward revision of recent inflation was in the core measure. As shown in Chart 2, the four-quarter change of the core PCE deflator as of 2011Q1 is now 1.1% rather than 0.9% prior to the revision. As with the total PCE deflator,

the level of the core PCE deflator in 2011Q1 is now just 0.1% higher. Finally, the upward revision of recent core inflation was more than accounted for by the nonmarket components. The four quarter change of the market-based core PCE deflator as of 2011Q1 was very slightly lower than it was prior to revision, while the level of that index in 2011Q1 is now 0.2% lower.

As shown in Chart 3, the revised data indicate that the Great Recession was even deeper than previously thought, with the peak to trough decline of real GDP now 5.1% rather than 4.1%. The early stages of the recovery were a bit stronger, with real GDP from 2009Q2 to 2010Q2 now up 3.3% rather than 3%. Overall, however, the recovery is modestly weaker, with real GDP over the period from 2009Q2 through 2011Q2 up 5.0% rather than 5.3%. As now estimated, the level of real GDP in 2011Q1 is 1.6% lower than previously thought. An Okun's Law relationship (sample period of 2004Q1 to 2011Q2) based on this revised data suggests that the economy's potential growth rate has declined to around 2% to 2¼% from around 2½%. In the latest Tealbook, the Board staff has lowered their estimate of potential growth for the period from 2009 through 2012, with 2.1% being the estimate for 2011 and 2012. The net effect of these changes is that their estimate of the output gap for 2011Q2 is -6.2% versus -5.8% in the June Tealbook.

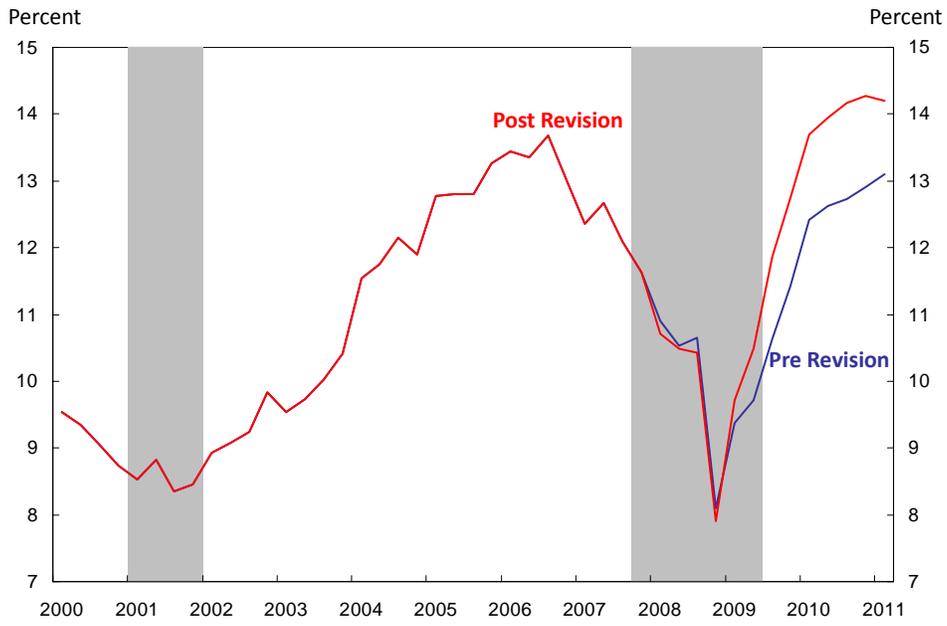
Lastly, Chart 4 presents the pre- and post-revision levels of the personal saving rate. Over the period from 2004 through 2008 the revised level is modestly lower, while over the period since 2008 the revised level is modestly higher with very recent levels essentially unchanged. There has been no change in our assessment that the current level of the saving rate is in line with the historical relationship between household net worth and the saving rate.

Table 1: Income and Expenditures for 2011-Q1
Pre and Post Revisions

SAAR, Billions of Dollars

	Income			Expenditures	
	Pre	Post		Pre	Post
Gross Domestic Product	15,018	14,868	Gross Domestic Product	15,018	14,868
Net Factor Income	237	227	Consumption	10,671	10,571
Gross National Product	15,255	15,095	Durables	1,159	1,155
Consumption of Fixed Capital	1,912	1,914	Nondurables	2,469	2,438
Private Consump. of Fixed Capital	1,566	1,571	Services	7,043	6,980
Gov't Consumption of Fixed Capital	346	344	Investment	1,883	1,853
Net National Product	13,343	13,181	BFI	1,815	1,791
Statistical Discrepancy	159	-33	Equipment	1,100	1,081
National Income	13,184	13,213	Structures	381	380
Compensation of Employees	8,153	8,162	Residential	334	331
Wage and Salary Accruals	6,531	6,569	Change in Inventories	68	62
Suppl. to Wages and Salaries	1,622	1,593	Farm	-3	-9
Proprietors Income with Adj	1,098	1,096	Nonfarm	71	71
Rental Income of Persons With Adj	325	385	Net Exports	-563	-571
Corporate Profits	1,300	1,466	Exports	2,014	2,024
Net Interest and Misc. Payments	744	557	Imports	2,577	2,595
Taxes on Production and Imports	1,025	1,027	Government	3,027	3,014
Business Current Transfer Payments	134	135	Federal	1,224	1,220
Current Surplus of GSEs	-13	-16	State and Local	1,803	1,794

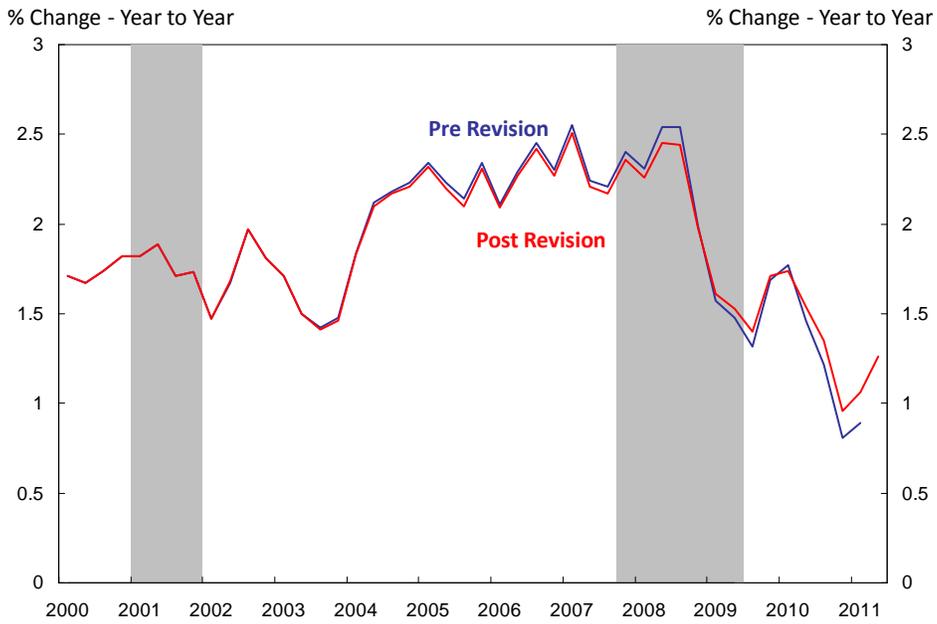
Chart 1: Corporate Profits' Share of National Income



Source: Bureau of Economic Analysis

Note: Shading represents NBER recessions.

Chart 2: Core PCE Deflator Growth Rate



Source: Bureau of Economic Analysis

Note: Shading represents NBER recessions.

Chart 3: Real GDP Growth Rate

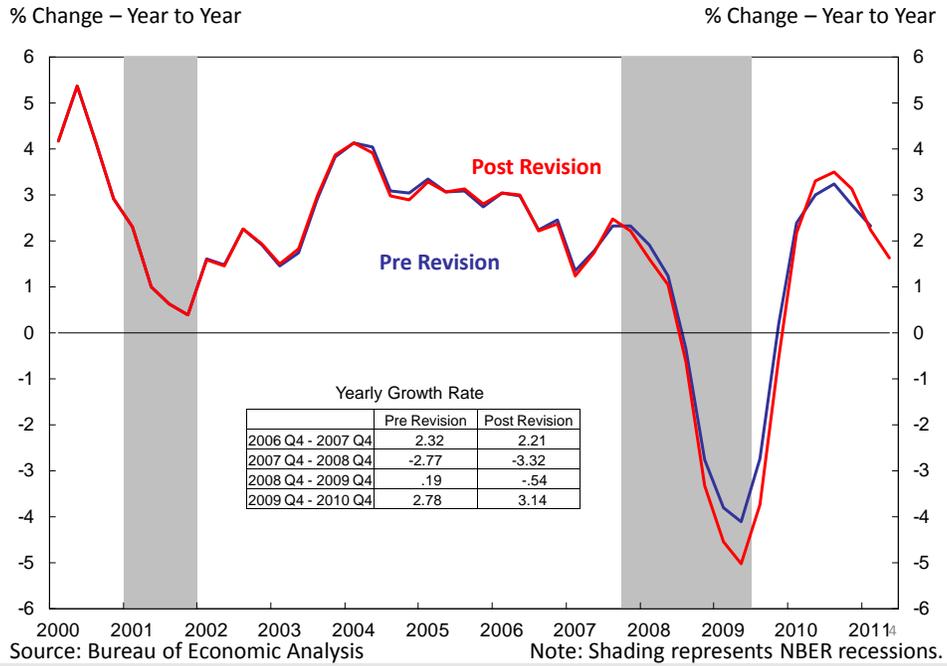
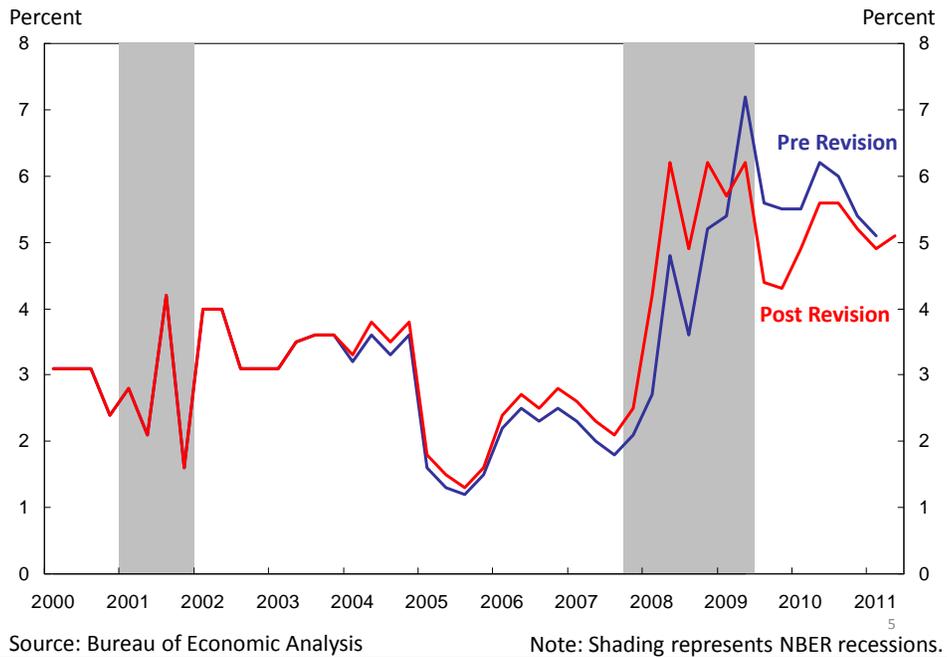


Chart 4: Personal Saving Rate



5.2 Financial Markets

Domestic Financial Markets. Since the last FOMC meeting, Treasury yields and expected future policy rates have shifted down markedly, equity markets declined, and short term funding rates were volatile. These market movements are mainly attributable to the weaker-than-expected economic data and increased concerns about a possible new U.S. recession as well as about the global growth outlook. The political uncertainty arising from the events surrounding the statutory debt limit in the U.S. as well as the ongoing fiscal crisis in the euro area also contributed to the price action.

Nominal Interest Rates: Since the last FOMC meeting, Treasury yields generally continued to decline and have fallen to their lowest levels since November 2010. The 10-year yield fell 58 basis points over the intermeeting period to 2.40% on August 4, and the 2-year yield declined 11 basis points to 0.26%. The 3-month yield remained just above zero over the intermeeting period, but experienced a brief uptick in the period just before the resolution of the debt limit debate. [Exhibit A-3: Treasury Yields]

Expected Policy Rate Path: The expected path of the fed funds rate, as inferred from futures markets, has continued to shift down since the last FOMC meeting. Market prices are currently consistent with a target fed funds rate of 0.0-0.25% through the second quarter of 2013. The uncertainty around the implied path as inferred from options has also retreated markedly and is now close to its historical lows of November 2010. Professional forecasters revised down their expected policy rate paths somewhat less in the August Blue Chip Financial Forecasts Survey. The median survey expectation for the fourth quarter of 2012 is now 1.0%, down from 1.2% in July. The disagreement among professional forecasters as measured by the interquartile range of their fed funds projections for the fourth quarter of 2012 has also declined by 20 basis points. Short term funding rates have been volatile over the intermeeting period. General collateral repo rates increased sharply as money market funds experienced large outflows just prior to the August 2 resolution of the debt ceiling debate. Partly in response to the announcement of Bank of New York Mellon to charge a fee for custodial cash holdings

on August 4, GC repo rates fell sharply and are now back to levels seen earlier in the cycle. [Exhibit A-5: Policy Expectations]

Inflation Compensation: The sharp decrease in nominal Treasury yields since the last FOMC meeting was accompanied by even sharper declines in real yields. Both the 0-5 year and the 5-10 year forward real rates have dropped to historical lows in recent days. Accordingly, market-based measures of expected inflation have increased slightly since the last FOMC meeting. The 0-5 year measure, which gauges expected inflation over the next five years, increased about 10 basis points over the intermeeting period to 1.98% on August 4. The 5-10 year measure, which gauges expected inflation 5-10 years out, increased about 21 basis points over the intermeeting period to 3.09% on August 4. This uptick in market-based measures of inflation compensation is consistent with the higher readings of both headline and core inflation in recent weeks. Despite their recent increase, market-based inflation expectations remain well within the range observed in recent years. [Exhibit A-4: Real Yields and Implied Inflation]

Equity Markets: Equity markets declined sharply over the intermeeting period with the S&P 500 index down 7% as of August 4. For the first time since the financial crisis, the S&P 500 experienced seven consecutive daily declines between July 22 and August 2, and on August 4 the index had its largest daily loss since March 2009. The S&P 500 is now back at levels of December 2010, but remains well above its level at the time of Chairman Bernanke's August 2010 Jackson Hole speech. Implied equity volatility, as measured by the VIX, rose 12 percentage points over the intermeeting period to 32% on August 4, but remains below its peaks of the spring of 2010. [Exhibit A-6: Equity]

Credit Spreads: Credit spreads were fairly flat over most of the intermeeting period, but ticked up somewhat in early August. Compared to their levels at the last FOMC meeting, spreads on investment grade corporate bonds widened 7 basis points to 173 basis points. Spreads on high-yield corporate bonds widened 51 basis points to 616 basis points on August 4. At the same time, CDS spreads on high yield corporate bonds also increased 90 basis points to 578 basis points on August 4. Overall, credit spreads are now at their

widest levels since the fall of 2010, but remain well below levels observed during the crisis. While mortgage rates were rather flat over most of July, they fell sharply in early August in line with the moves in other risky assets. [Exhibit A-7: Credit]

Foreign Financial Markets. *Euro Area:* Euro area peripheral spreads have widened significantly over the inter-meeting period. On July 21, Euro area officials announced several measures to provide additional aid funding to Greece and to stem euro area contagion. Additional financial support totaling €109 billion was pledged for Greece. There was also a modest component of private sector participation in a Greek debt restructuring. Officials also announced measures to increase the flexibility of the EFSF. These include allowing the EFSF to purchase sovereign debt in the secondary markets, establishing lines of credit for distressed sovereigns and allowing it to capitalize banks in non-aid program countries. Despite these measures, Italian and Spanish spreads subsequently widened further, mainly driven by concerns that the EFSF's lending capacity would be insufficient to accommodate a request from either Spain or Italy, despite the measures meant to improve its flexibility. The Eurostoxx equity index fell almost 11 percent over the intermeeting period and the euro weakened against most major currencies.

Japan: Prior to the Japanese currency intervention on August 4, the yen had appreciated more than 5 percent against both the U.S. dollar and euro. These moves were predominantly driven by the U.S. debt ceiling debate, ongoing concerns about euro area peripheral countries, and a more downbeat global growth outlook. Although the yen depreciated as much as 3.5 percent against the dollar following the intervention announcement, there has been little impact on other asset classes. Japanese equities were largely unchanged since the last FOMC meeting. Longer-dated Japanese government bond yields declined modestly, due in part to ongoing global growth concerns.

Emerging Asia: EM Asian currencies appreciated 1 percent against the U.S. dollar, with gains of almost 3 percent in Southeast Asian currencies. The Chinese yuan appreciated 0.5 percent relative to the dollar, while the 12-month appreciation rate implied by

forward contracts was largely unchanged at just over 1 percent. Equities in this part of the world advanced 2 percent on average despite small declines in China and Taiwan.

Latin America: Latin American currencies appreciated by 1 percent against the dollar. Brazilian authorities imposed a tax on currency futures positions in an effort to alleviate appreciation pressures. Equity markets shed 4 percent on average, led by declines in Chilean and Brazilian shares.

Special Topic

ML II Sales and the Performance of Non-Agency RMBS*

Michael Fleming x6372, Asani Sarkar x8943

Market participants have cited ML II sales as an important underlying source for the recent poor performance of non-agency RMBS. We find little evidence to support this claim. Instead, the observed price declines are more meaningfully explained by broader market and macroeconomic trends.

On March 30, 2011, the Federal Reserve announced it would sell its ML II portfolio securities holdings. Since then, prices on non-agency RMBS have declined, especially in the sub-prime sector. Market participants attribute the price declines to various factors, including deterioration in the macroeconomic outlook and housing sector, ML II supply pressures, and supply pressures from other sellers.¹ In this memo, we attempt to distinguish among these various explanations.

We use prices on ABX indices to gauge the performance of the RMBS market. As shown in Figure 1, prices for the AAA tranches declined 5% to 21% between March 30 and June 24, before rebounding 2% to 15% between June 24 and July 1.² Note that prices for most AAA tranches reached a year-to-date peak in mid-February and had been declining for some time in advance of the March 30 announcement.

We estimate a model of ABX returns in which the daily returns depend on past returns and the performance of other financial assets, with the latter intended to pick up the effects of developments unrelated to the Maiden Lane II sales. Our analysis is limited to the AAA tranches because of their greater liquidity. In particular, we focus on the 2006-2 vintage for its liquidity, although we perform robustness tests using the other vintages. Our sample period starts February 11, 2009 – reflecting data availability – and runs to July 1, 2011.

Our baseline model relates daily ABX returns to lagged returns, changes in CDX investment grade and high yield spreads, changes in sovereign CDS spreads for the GIIPS (Greece, Ireland, Italy, Portugal, and Spain), S&P 500 index returns, and changes in the 3-month Libor-OIS spread. As shown in Table 1, all of the coefficients in the baseline model are statistically significant at conventional levels; moreover, they are all of the expected sign, implying that an increase in prices in other markets (i.e., decrease in spreads) is associated with an increase in ABX returns. The baseline model explains 26% of the variation in daily ABX returns. Our results are robust to the

* Thanks to Casidhe Horan for excellent research assistance.

¹ For details on the ML II sales and the market's response, see the June 16, 2011 MarketSource piece "Maiden Lane II Sales Weigh on the Non-Agency RMBS Market" by Cathy Lu and Tanya Rakpraja.

² We focus on developments since the March 30 close, because the Fed's March 30 announcement came after the close that day.

inclusion of other explanatory variables, such as nonfarm payrolls surprises, new home sales surprises, and housing starts surprises.

We forecast the performance of the ABX after March 30 using the results of our baseline model and predict a decline in the ABX (2006-2 AAA) of 4.7% between March 30 and July 1 vs. an actual decline of 10.3%. In other words, the baseline model explains 45% of the 10.3% decline ($45\% = 4.7\%/10.3\%$). Nearly all of the predicted decline can be explained by the widening of sovereign CDS spreads over this period.

We proceed to examine whether there is systematic evidence of the Maiden Lane II sales affecting prices by appending our baseline model with four additional variables: an announcement dummy variable for March 31 (intended to capture the initial response to the Fed's March 30 asset sales announcement), dummy variables for each of the days on which a bid list was released, dummy variables for each of the days on which there was an auction close, and a dummy variable for July 1, intended to capture the initial response to the Fed's June 30 announcement that sales were being suspended.³

The results, shown in the last column of Table 1, indicate a negative but insignificant effect of most ML II sale events on ABX prices, and a positive and significant effect of the June 30 sales suspension announcement.⁴ Controlling

for other factors, ABX (2006-2 AAA) returns were 0.7% lower the day after the program was announced, 0.6% lower on bid list release dates, 0.2% lower on auction close dates, and 3.5% higher the day following the June 30 announcement. In sum, over all ML II event dates, the ML II coefficients explain a decline in the ABX of 3.1% between March 30 and July 1, accounting for 30% of the total decline in the index over that period ($30\% = 3.1\%/10.3\%$).

To conclude, we are unable to find strong evidence that ML II sales explain the poor performance of non-agency RMBS. While ABX prices have tended to decline on ML II program announcement, bid list, and auction close dates, the declines on such dates are not statistically significant. ABX prices did rise after the June 30 sales suspension announcement, but the increase is only significant for two of the four AAA vintages. We do find that broader market and macroeconomic trends are significantly related to ABX returns and that they explain a meaningful part of the decline in ABX prices since March 30. That said, our quantitative evidence leaves much of the recent price behavior unexplained.

³ The June 30 announcement came late in the day (like the March 30 announcement) so we capture the initial market response using a dummy variable for the following day.

⁴ Note that the June 30 announcement coefficient is positive for the three other AAA ABX vintages, but statistically insignificant for two of the three.

Fig. 1: ABX AAA Prices



Source: JPMorgan Chase

Table 1: Explaining ABX (2006-2) Returns

	Baseline Model	With ML II Sales Variables
Constant	-0.0001	-0.0000
Lagged ABX Return	0.2957***	0.2917***
CDX IG Spread, Change	-0.0603***	-0.0633***
CDX HY Spread, Change	-0.0055*	-0.0056*
GIIPS Average CDS Spread, Change	-0.0161***	-0.0151***
S&P 500 Return	0.1766***	0.1666***
Libor-OIS Spread, Change	-0.1139*	-0.1160*
ML II Program Announcement		-0.0075
ML II Bid List Release Date		-0.0056
ML II Auction Close Date		-0.0016
ML II June 30 Announcement		0.0354***
Adjusted R ²	26.3%	26.9%

Note: *, **, *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.

5.3 Global Economic Policy

Euro Area: As expected, the ECB raised its policy rate by 25 basis points to 1.5 percent at its July meeting and left policy rates unchanged at the August meeting. At the press conference after the August meeting President Trichet described the stance of monetary policy as “accommodative” and said the ECB would “continue to monitor very closely” upside risks to price stability. This leaves the door open for a further hike in the fall. The ECB’s refinancing operations will continue to be conducted with full allotment until at least January 2012. The ECB also resumed its purchases of peripheral debt under the securities markets program, which had been inactive since March.

Japan: The Bank of Japan is keeping its policy rate in a range of 0.0-0.10 percent and will continue to do so until its official projections suggest price stabilization in the near-to-medium term. On August 4, Japan’s Ministry of Finance directed the Bank of Japan to intervene in currency markets unilaterally to weaken the yen. In support of these measures, the Bank of Japan increased the size of its asset purchase program from ¥10 trillion to ¥15 trillion. These additional purchases will mainly be in JGBs and Treasury bills. The Bank also increased the size of its fixed rate funds-supplying operation against pooled collateral by ¥5 trillion to ¥35 trillion.

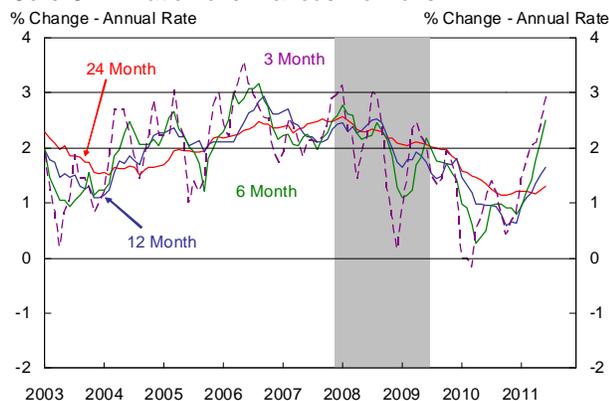
EM Asia: EM Asian authorities continue to tighten policy. The Chinese central bank raised interest rates by 25 basis points early last month, the fifth such move since last October. In India, the central bank hiked rates by 50 basis points last month, an unexpectedly sharp increase. Authorities in Taiwan and Thailand also have raised policy rates in recent weeks. Going forward, the prospect is for only incremental further tightening in the EM Asian region, given concerns about the global growth outlook. Outside of China, reserve accumulation held to a moderate pace in 2011Q2, amidst relatively muted capital inflows. Reserve accumulation in China was essentially steady in 2011Q2, against an apparent slowing in financial inflows.

Latin America: In Mexico, expectations for the start of a tightening cycle continue to be pushed back with analysts not projecting a policy rate hike until the second half of 2012. Brazil's central bank raised its policy rate by 25 basis points in July to 12.5 percent, bringing the cumulative tightening in 2011 to 175 basis points. The central bank signaled in its official statement and in the minutes of its last meeting that the policy tightening to date may be sufficient to bring inflation to its target trajectory. The Brazilian authorities also imposed two additional measures aimed at relieving currency appreciation pressures: tighter limits on banks' short U.S. dollar positions and a new tax on increases in short futures positions.

A. Significant Developments

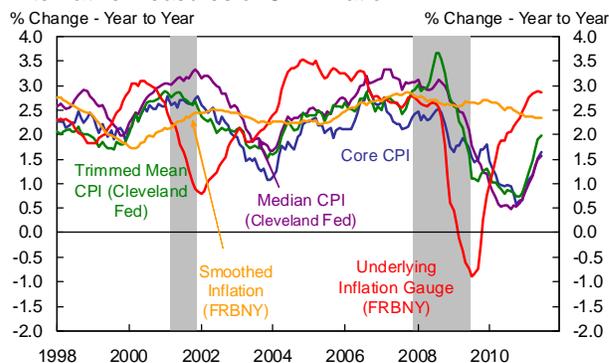
Exhibit A-1: Measures of Trend Inflation

Core CPI Inflation over Various Horizons



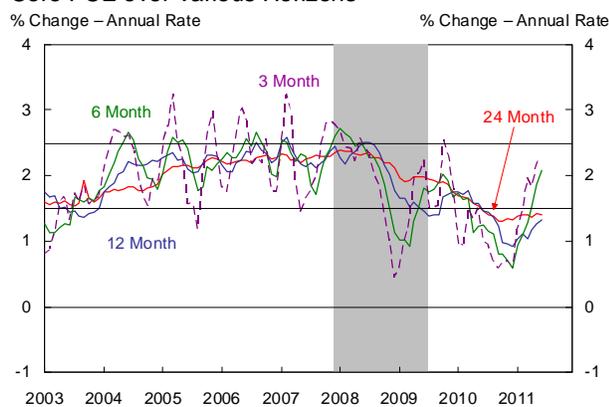
Source: Bureau of Labor Statistics

Alternative Measures of CPI Inflation



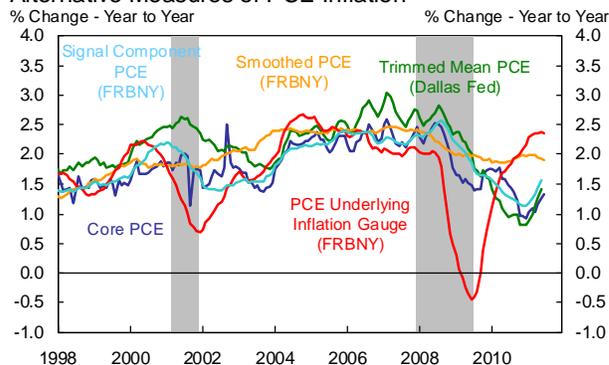
Source: Bureau of Labor Statistics, Cleveland Fed, MMS Function (FRBNY), and Swiss National Bank

Core PCE over Various Horizons



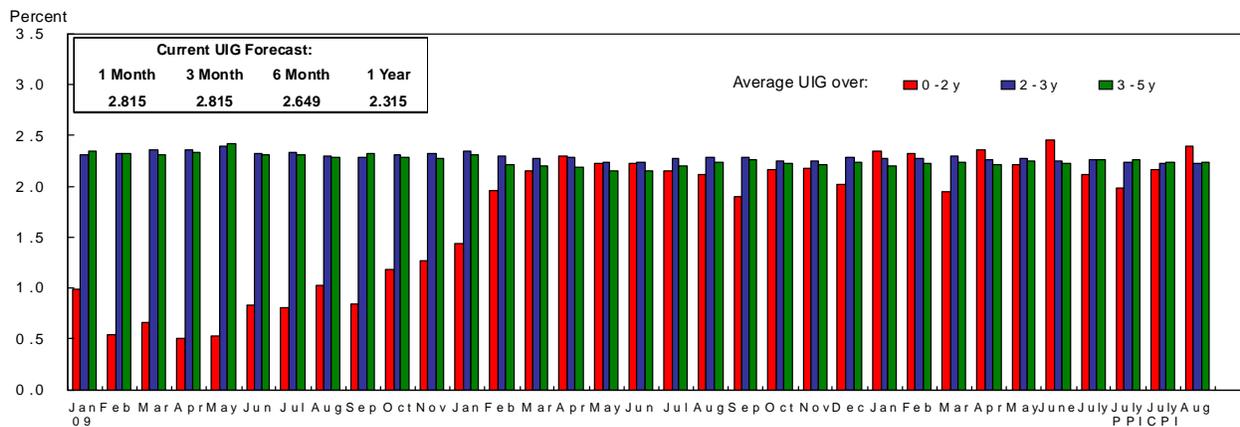
Source: Bureau of Economic Analysis

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)

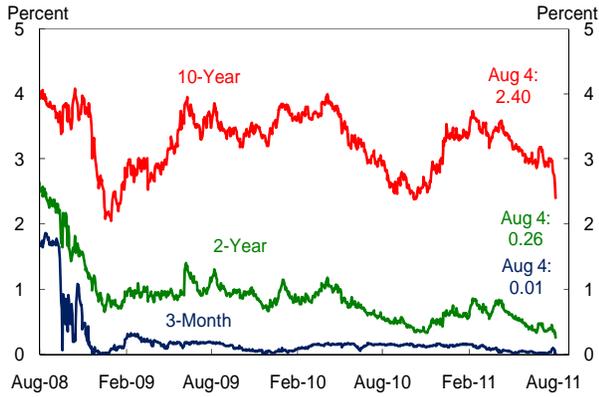


Source: MMS Function (FRBNY) and Swiss National Bank

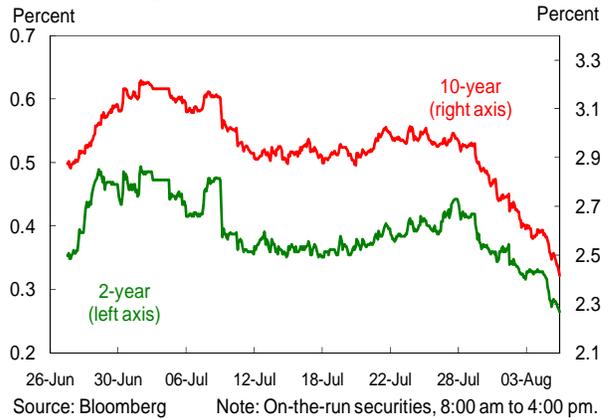
A. Significant Developments

Exhibit A-3: Treasury Yields

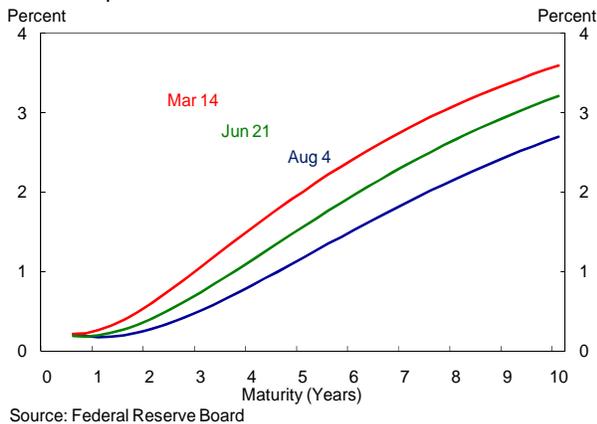
Short- and Long-Term Rates



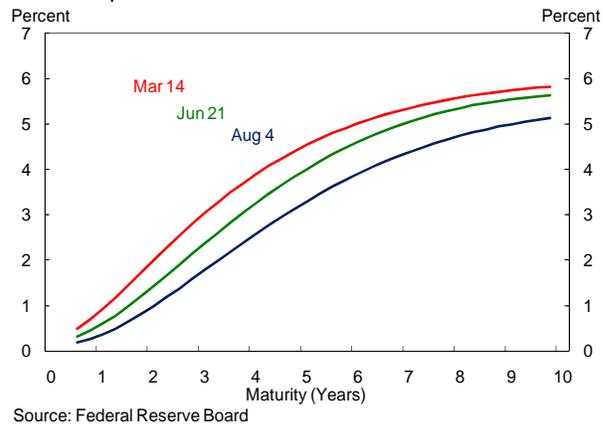
Short- and Long-Term Rates (Intraday)



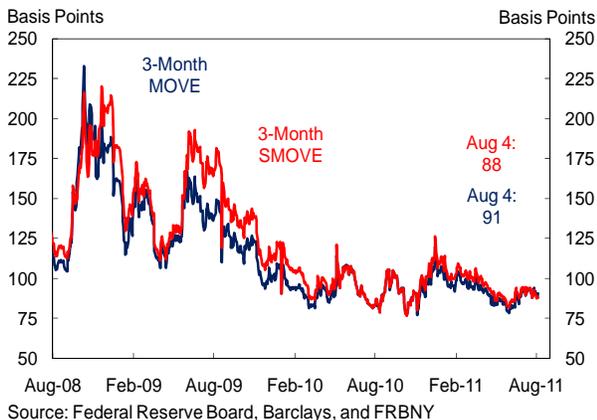
Zero Coupon Yield Curves



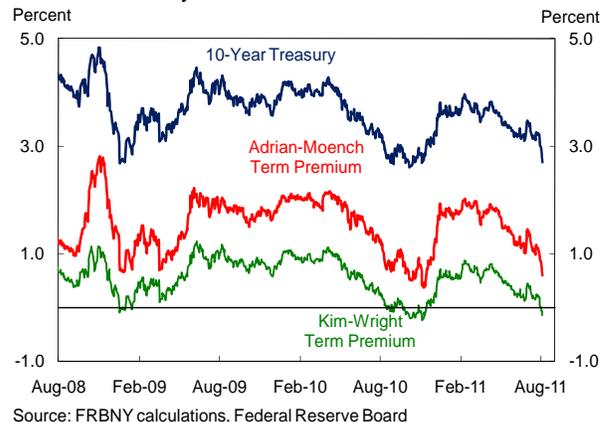
Zero Coupon Yield Curves: One-Year Forward Rates



Option and Swaption Volatility Expectations



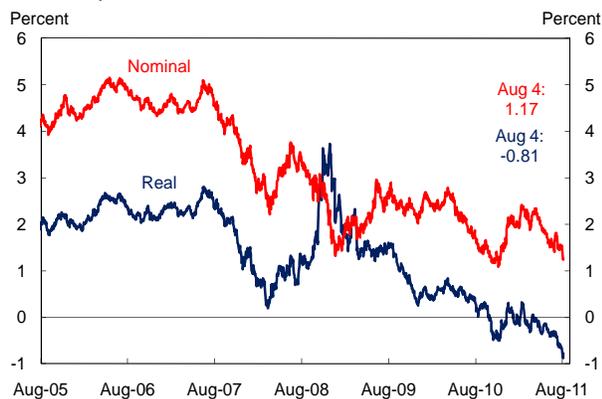
10-Year Treasury and Term Premia



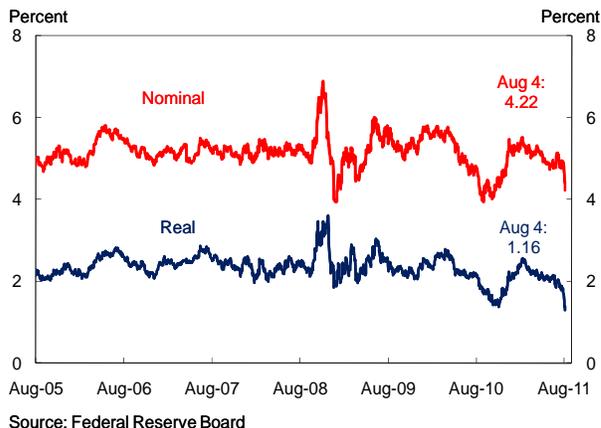
A. Significant Developments

Exhibit A-4: Real Yields and Implied Inflation

5 Year Spot Rate



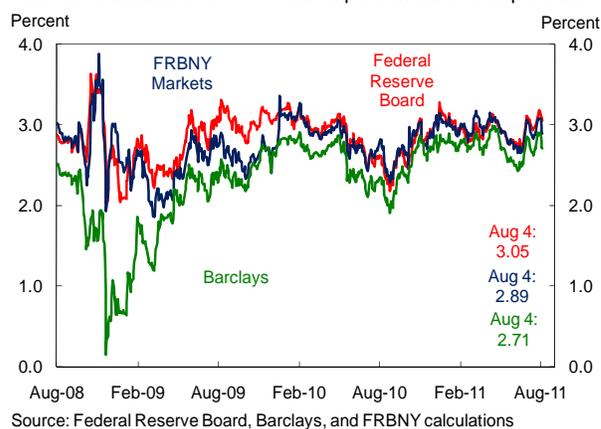
5-10 Year Forward Rates



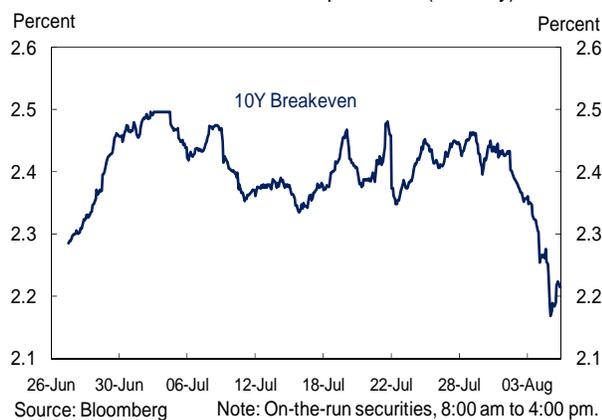
TIPS Implied Inflation Compensation: 0-5, 5-10 Year Horizons



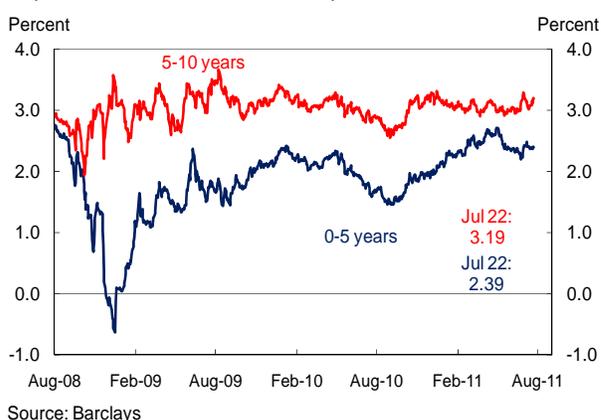
Alternative Measures of 5-10 Year Implied Inflation Compensation



10-Year Breakeven Inflation Compensation (Intraday)



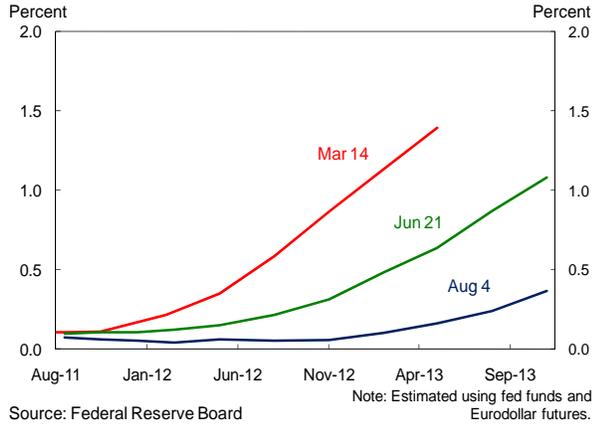
Implied Inflation from Inflation Swaps: 0-5, 5-10 Year Horizon



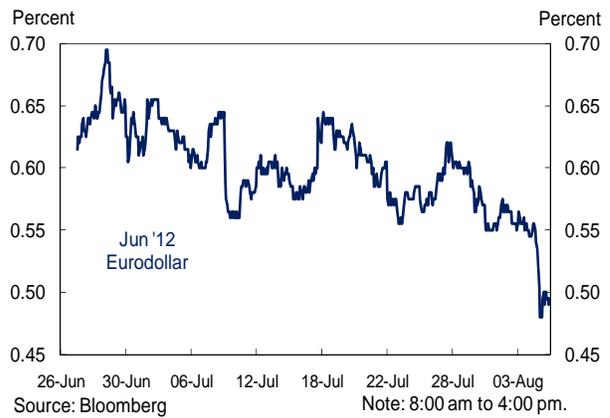
A. Significant Developments

Exhibit A-5: Policy Expectations

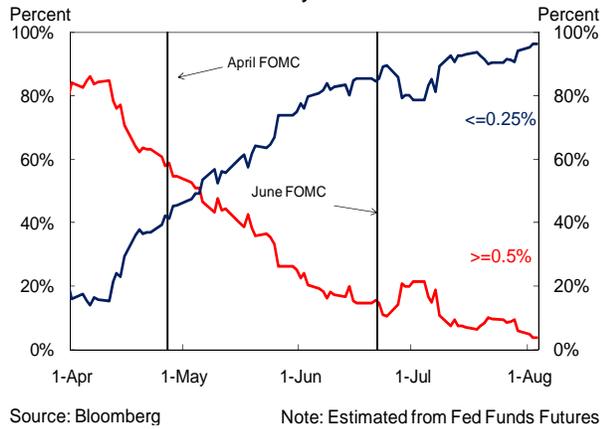
Fed Funds Futures Implied Rates



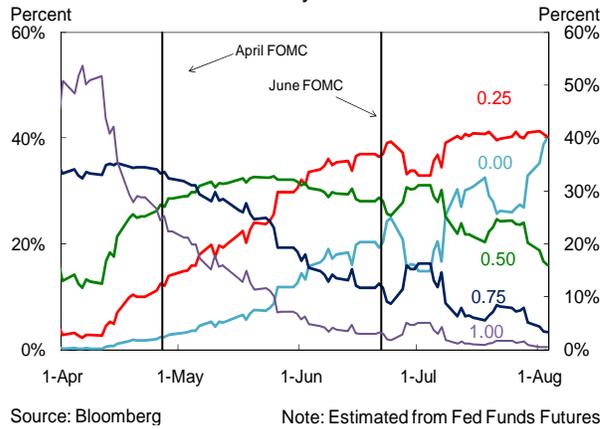
Implied Eurodollar Rates (Intraday)



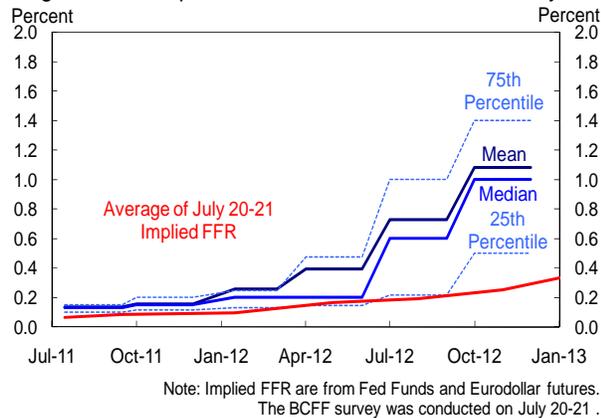
Fed Funds Probabilities July 2012



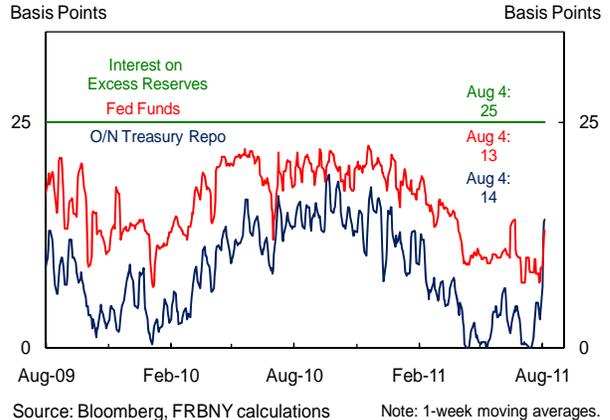
Fed Funds Probabilities July 2012



August 2011: Expected Fed Funds from BCFF Survey



Short Term Funding Rates



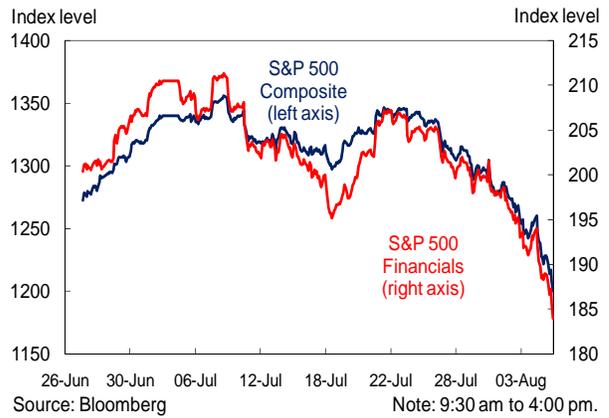
A. Significant Developments

Exhibit A-6:
Equity

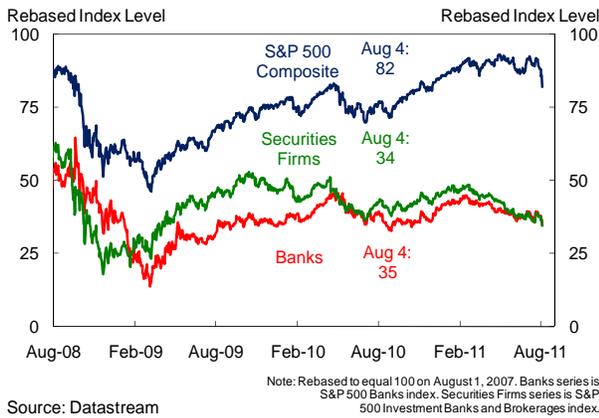
Equity Index Levels



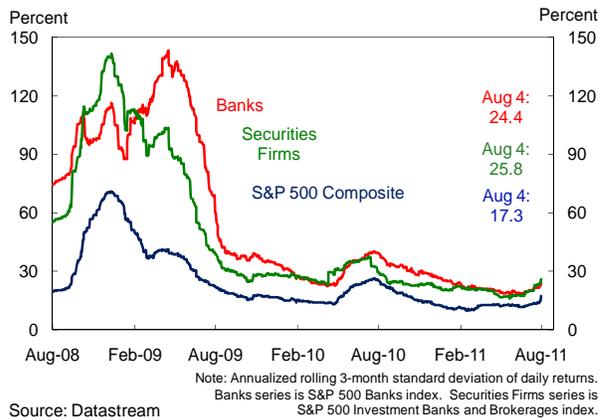
S&P 500 Indices (Intraday)



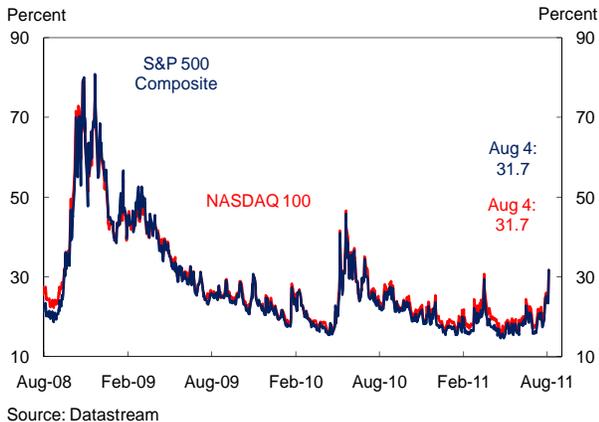
Equity Performance



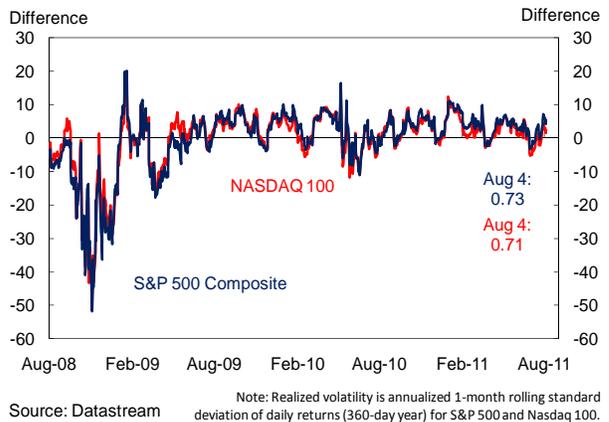
Historical Equity Volatility



Equity Index Implied Volatility: 1-Month



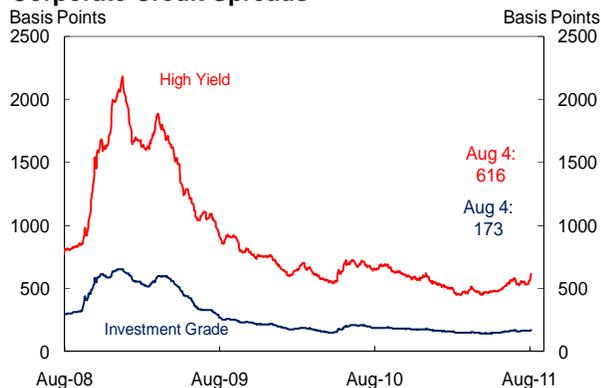
Difference of Implied and Realized Volatility



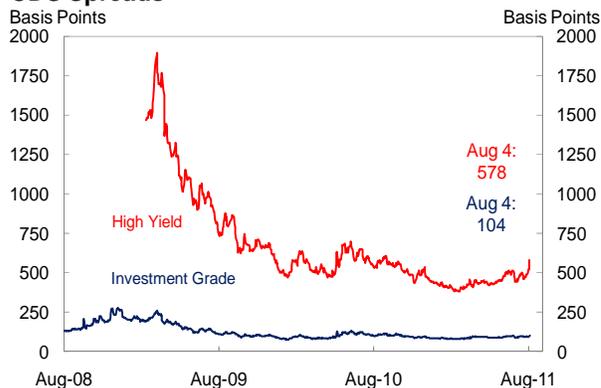
A. Significant Developments

Exhibit A-7: Credit

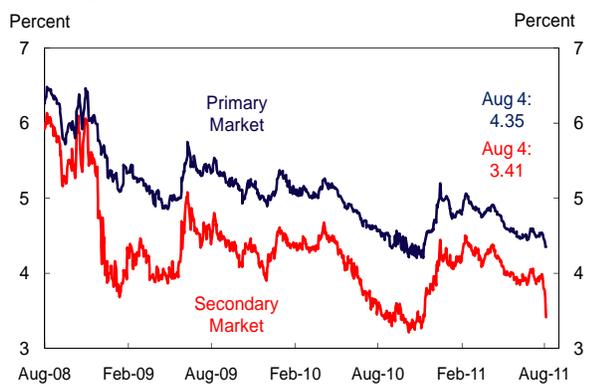
Corporate Credit Spreads



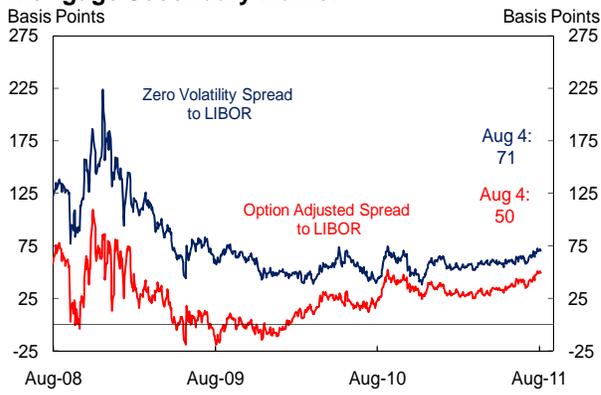
CDS Spreads



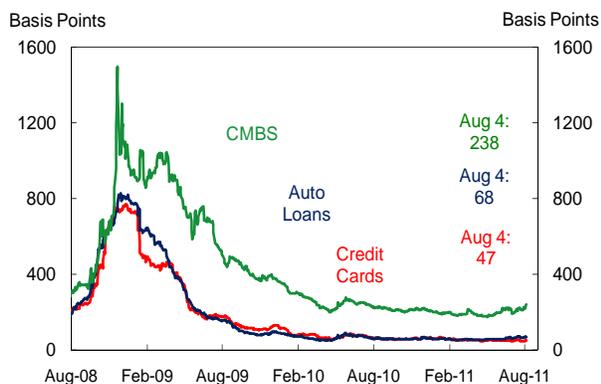
Mortgage Market Rates



Mortgage Secondary Market



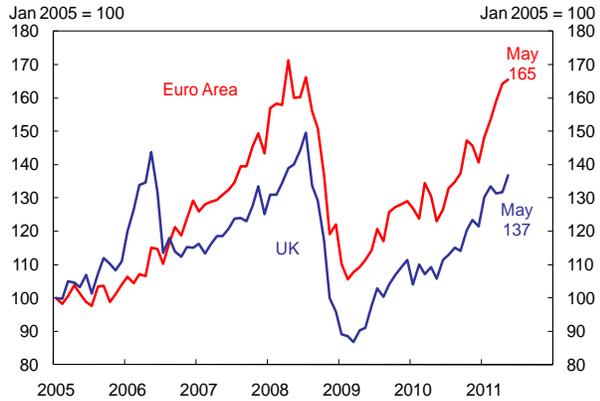
AAA-Rated ABS/CMBS Spreads



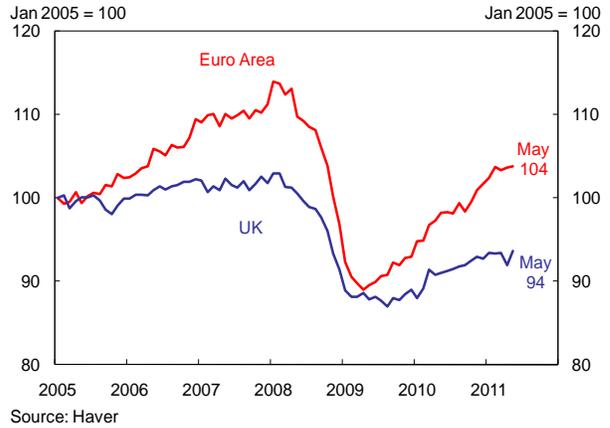
A. Significant Developments

Exhibit A-8: Exports and Industrial Production

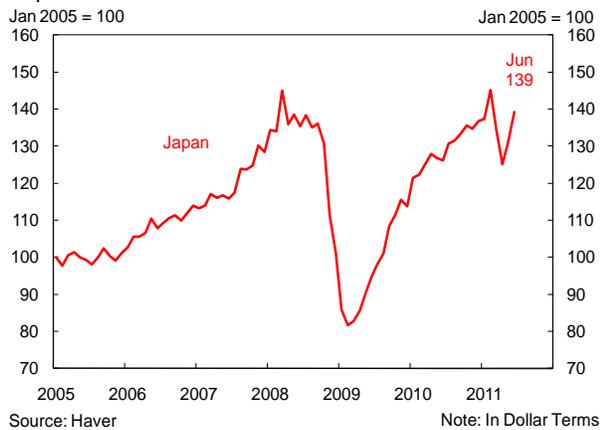
Exports



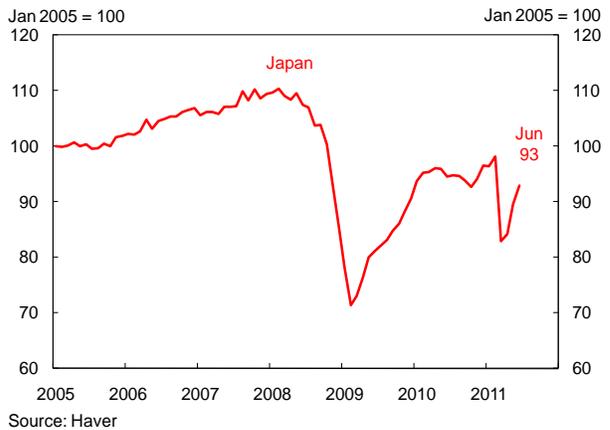
Industrial Production



Exports



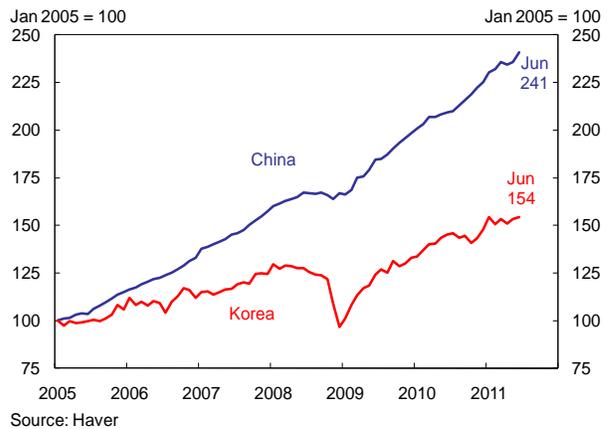
Industrial Production



Exports



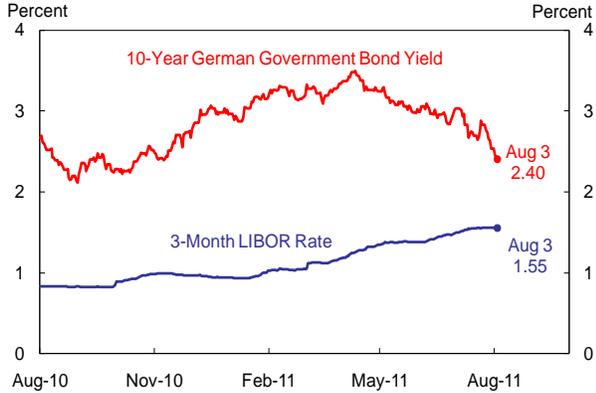
Industrial Production



A. Significant Developments

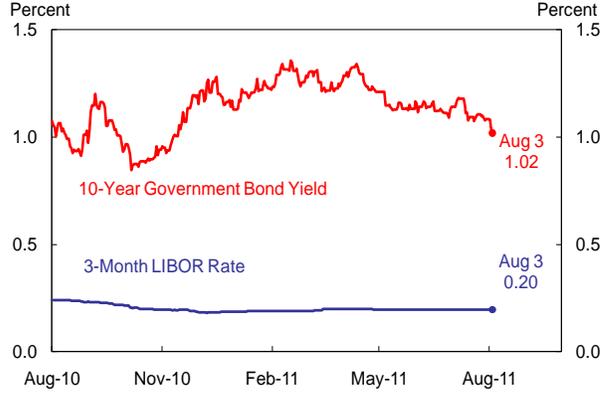
**Exhibit A-9:
Global Interest Rates and Equity Markets**

Euro Area Short- and Long-Term Interest Rates



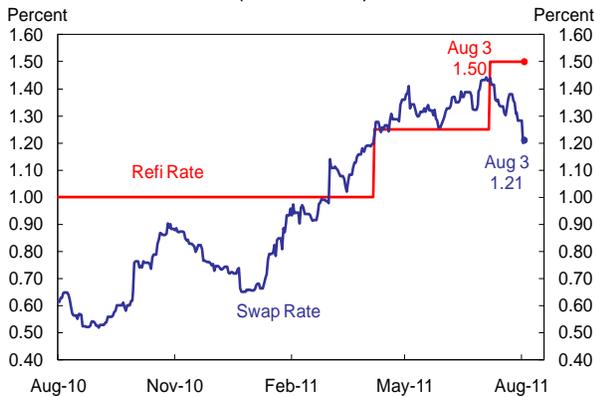
Source: Bloomberg

Japan Short- and Long-Term Interest Rates



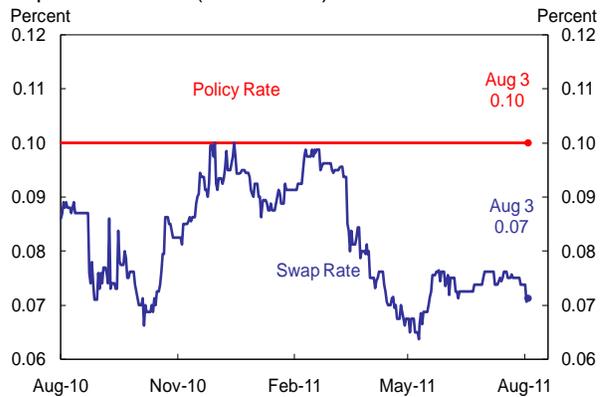
Source: Bloomberg

Euro Area: OIS Rate (Six Months)



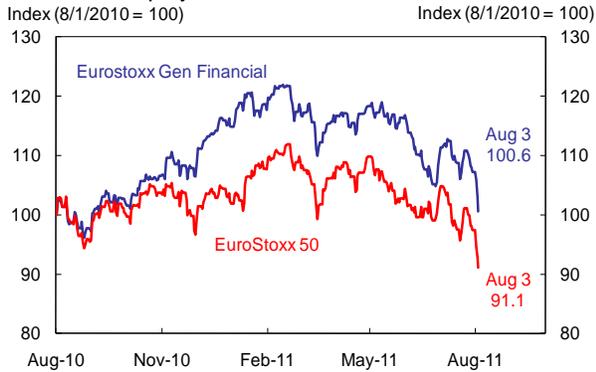
Source: Bloomberg

Japan: OIS Rate (Six Months)



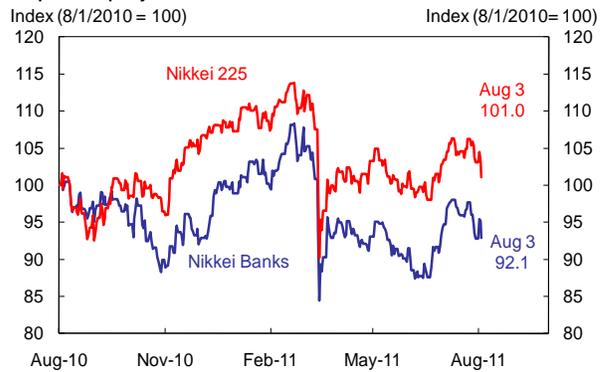
Source: Bloomberg

Euro Area Equity Price Indices



Source: Bloomberg

Japan Equity Price Indices

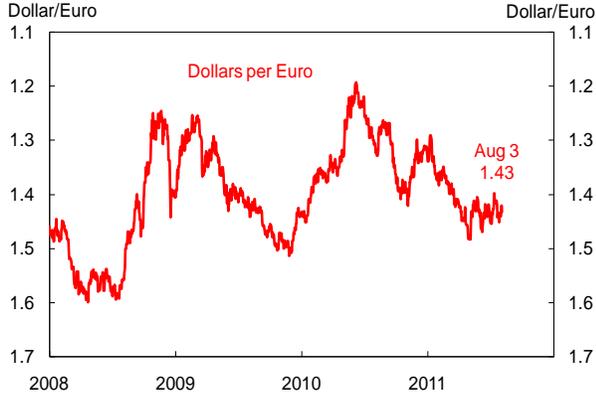


Source: Bloomberg

A. Significant Developments

**Exhibit A-10:
Exchange Rates**

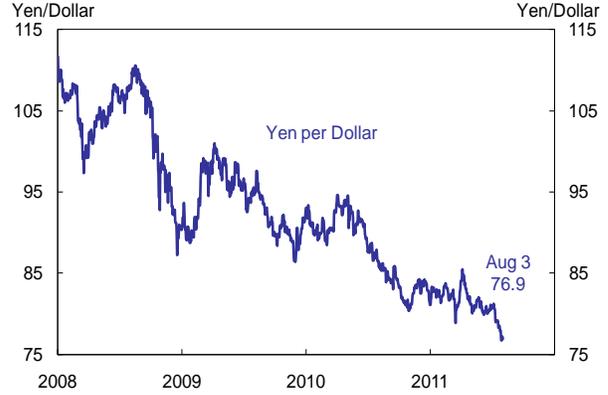
Dollar-Euro Exchange Rate



Source: Bloomberg

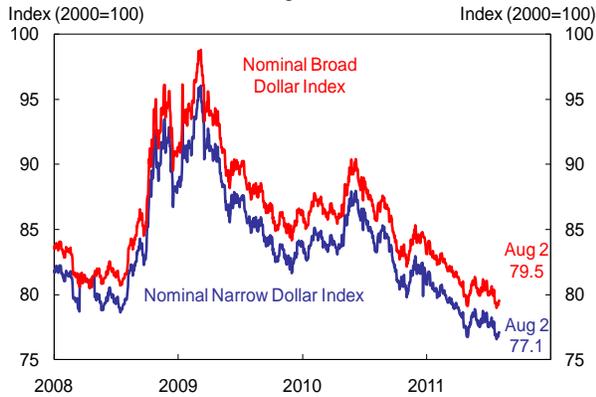
Note: Exchange rate scale is inverted.

Yen-Dollar Exchange Rate



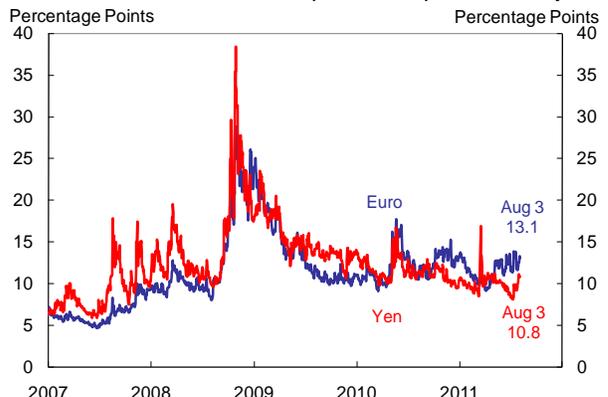
Source: Bloomberg

Nominal Effective Exchange Rates



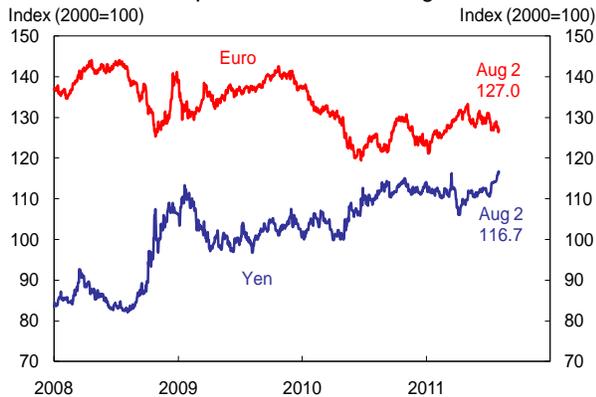
Source: Bloomberg and JPMorgan

Euro and Yen One-Month Implied FX Option Volatility



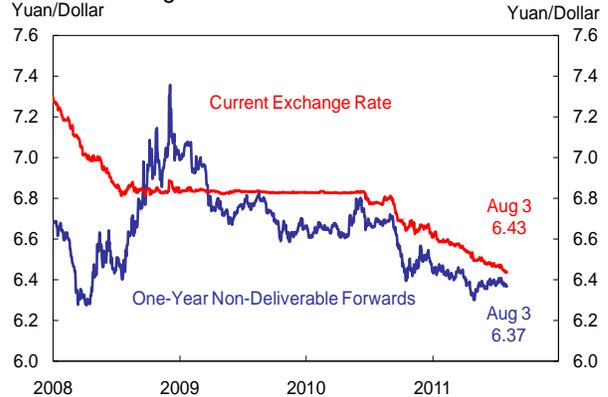
Source: Bloomberg

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**		
	Apr	Jun	Aug	Apr	Jun	Aug	Apr	Jun	Aug	Apr	Jun	Aug
2010												
Q1	1.2	1.2	1.1	3.7	3.7	3.9	9.7	9.7	9.7	0-0.25	0-0.25	0-0.25
Q2	1.0	1.0	1.3	1.7	1.7	3.8	9.6	9.6	9.6	0-0.25	0-0.25	0-0.25
Q3	0.5	0.5	0.7	2.6	2.6	2.5	9.6	9.6	9.6	0-0.25	0-0.25	0-0.25
Q4	0.4	0.4	0.7	3.1	3.1	2.3	9.6	9.6	9.6	0-0.25	0-0.25	0-0.25
2011												
Q1	1.5	1.4	1.5	2.1	1.8	0.4	8.9	8.9	8.9	0-0.25	0-0.25	0-0.25
Q2	1.7	2.2	2.1	3.6	2.2	1.3	8.7	9.1	9.1	0-0.25	0-0.25	0-0.25
Q3	1.1	1.4	1.9	3.6	3.6	2.6	8.5	8.8	9.1	0-0.25	0-0.25	0-0.25
Q4	1.2	1.3	1.4	5.4	4.6	2.5	8.1	8.4	9.0	0-0.25	0-0.25	0-0.25
2012												
Q1	1.3	1.3	1.2	3.6	3.0	2.8	7.8	8.2	8.9	0-0.25	0-0.25	0-0.25
Q2	1.4	1.4	1.3	4.1	4.0	2.9	7.6	7.9	8.8	0-0.25	0-0.25	0-0.25
Q3	1.5	1.5	1.4	3.9	4.1	3.4	7.4	7.7	8.7	0.25	0-0.25	0-0.25
Q4	1.6	1.6	1.5	4.1	3.7	3.4	7.1	7.5	8.5	0.5	0.3	0.25
Q4/Q4												
2009	1.7	1.7	1.7	0.2	0.2	-0.5	3.1	3.1	3.1	0.0	0.0	0.0
2010	0.8	0.8	1.0	2.8	2.8	3.1	-0.3	-0.3	-0.3	0.0	0.0	0.0
2011	1.4	1.6	1.7	3.7	3.0	1.7	-1.8	-1.4	-0.7	0.0	0.0	0.0
2012	1.5	1.5	1.3	3.9	3.7	3.1	-1.3	-1.0	-0.1	0.5	0.3	0.25

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

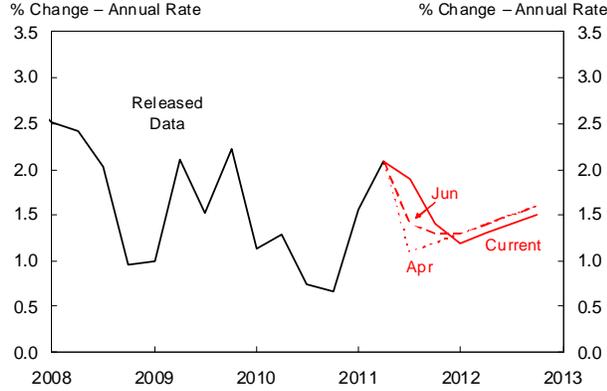
*Quarterly values are the average rate for the quarter. Yearly values are the difference between Q4 of the previous year and Q4 of the listed year.

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

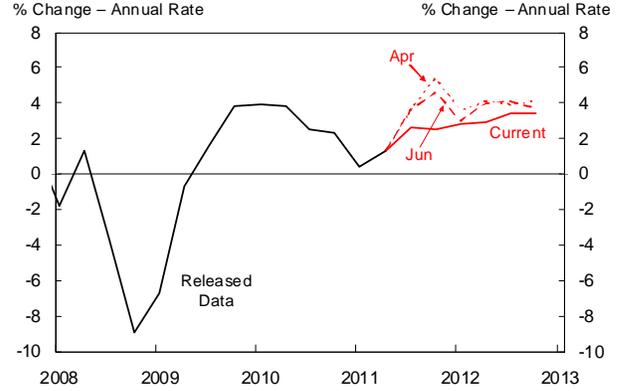
B. FRBNY Forecast Details

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

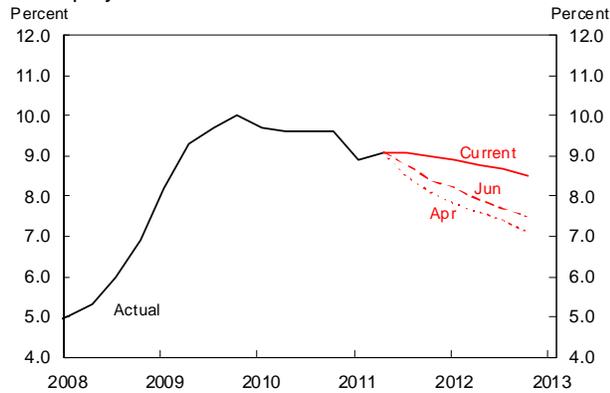
Core PCE Inflation



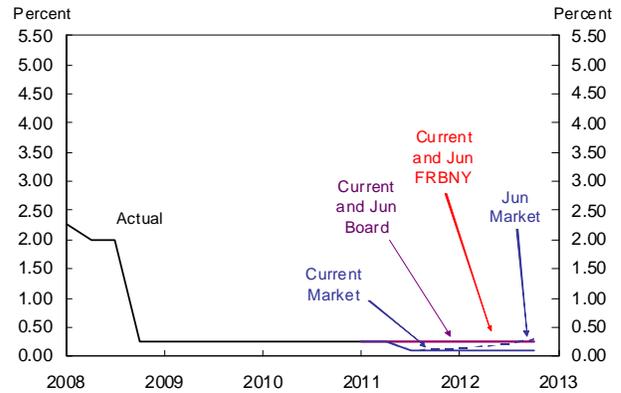
Real GDP Growth



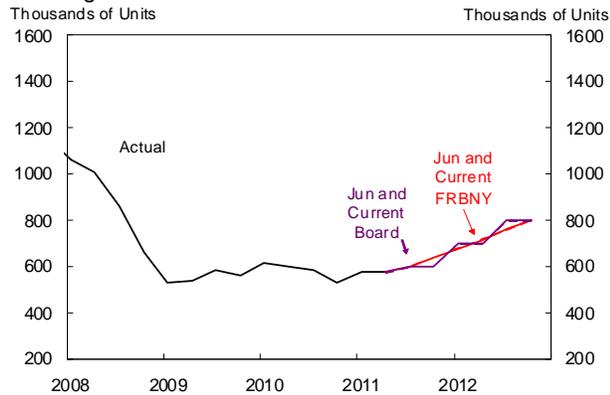
Unemployment Rate



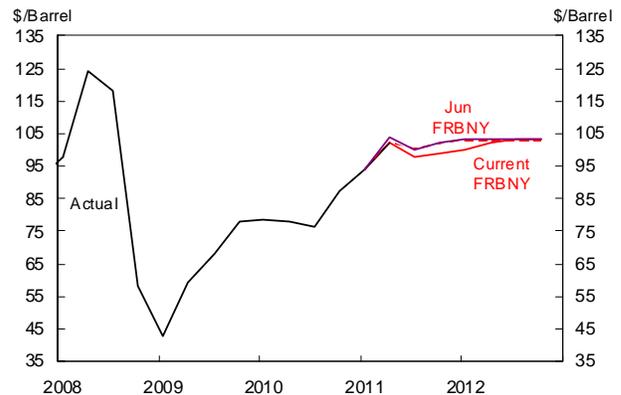
Federal Funds Rate



Housing Starts



Crude Oil



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

B. FRBNY Forecast Details

Exhibit B-3: Near-Term Projections

	Quarterly Growth Rates (AR)		Quarterly Growth Contributions (AR)	
	2011Q3	2011Q4	2011Q3	2011Q4
OUTPUT				
Real GDP	2.6 (3.6)	2.5 (4.6)	2.6 (3.6)	2.5 (4.6)
Final Sales to Domestic Purchasers	1.7 (2.4)	2.0 (3.0)	1.8 (2.5)	2.0 (3.1)
Consumption	1.9 (2.1)	1.8 (2.2)	1.3 (1.5)	1.2 (1.6)
BFI: Equipment and Software	4.0 (10.0)	8.0 (15.0)	0.3 (0.7)	0.6 (1.1)
BFI: Nonresidential Structures	6.0 (4.0)	5.0 (6.0)	0.2 (0.1)	0.1 (0.2)
Residential Investment	5.3 (8.0)	3.9 (6.2)	0.1 (0.2)	0.1 (0.1)
Government: Federal	1.2 (1.2)	1.2 (1.2)	0.1 (0.1)	0.1 (0.1)
Government: State and Local	-2.0 (-1.0)	-1.0 (0.3)	-0.2 (-0.1)	-0.1 (0.0)
Inventory Investment	-- --	-- --	0.8 (0.3)	-0.5 (0.9)
Net Exports	-- --	-- --	0.2 (0.7)	1.0 (0.6)
INFLATION				
Total PCE Deflator	1.1 (1.3)	1.5 (1.5)		
Core PCE Deflator	1.9 (1.4)	1.4 (1.3)		
PRODUCTIVITY AND LABOR COSTS*				
Output per Hour	3.3 (2.0)	1.5 (2.0)		
Compensation per Hour	1.4 (2.3)	1.8 (2.5)		
Unit Labor Costs	-1.9 (0.3)	0.3 (0.5)		

Note: Numbers in parentheses are from the previous Blackbook.

*Nonfarm business sector.

B. FRBNY Forecast Details

Exhibit B-4: Real GDP and Inflation Projections

	Q4/Q4 Growth Rates			Q4/Q4 Growth Contributions		
	2010	2011	2012	2010	2011	2012
OUTPUT						
Real GDP	3.1 (2.8)	1.7 (3.0)	3.1 (3.7)	3.1 (2.8)	1.7 (3.0)	3.1 (3.7)
Final Sales to Domestic Purchasers	2.9 (2.9)	1.1 (2.0)	2.2 (3.0)	3.0 (3.0)	1.2 (2.1)	2.3 (3.1)
Consumption	3.0 (2.6)	1.5 (2.0)	2.1 (2.7)	2.1 (1.9)	1.0 (1.4)	1.5 (1.9)
BFI: Equipment and Software	16.6 (16.9)	6.6 (11.6)	7.0 (8.5)	1.1 (1.1)	0.5 (0.8)	0.5 (0.6)
BFI: Nonresidential Structures	-1.8 (-4.0)	0.8 (-0.4)	6.5 (8.0)	0.0 (-0.1)	0.0 (-0.0)	0.2 (0.2)
Residential Investment	-6.3 (-4.6)	2.6 (2.9)	9.0 (14.9)	-0.2 (-0.1)	0.1 (0.1)	0.2 (0.3)
Government: Federal	2.9 (4.8)	-1.3 (-0.5)	-0.8 (-0.8)	0.2 (0.4)	-0.1 (-0.0)	-0.1 (-0.1)
Government: State and Local	-1.7 (-1.3)	-2.4 (-1.9)	-0.1 (0.9)	-0.2 (-0.2)	-0.3 (-0.2)	0.0 (0.1)
Inventory Investment	-- --	-- --	-- --	0.8 (0.4)	0.2 (0.5)	0.0 (0.1)
Net Exports	-- --	-- --	-- --	-0.6 (-0.6)	0.3 (0.5)	0.8 (0.6)
INFLATION						
Total PCE Deflator	1.3 (1.1)	2.4 (2.5)	1.6 (1.7)			
Core PCE Deflator	1.0 (0.8)	1.7 (1.6)	1.3 (1.5)			
Total CPI Inflation	1.2 (1.2)	3.1 (3.1)	2.1 (2.2)			
Core CPI Inflation	0.6 (0.6)	2.1 (1.9)	1.7 (1.8)			
GDP Deflator	1.6 (1.3)	2.0 (2.2)	1.4 (1.6)			

Note: Numbers in parentheses are from the previous Blackbook.

B. FRBNY Forecast Details

Exhibit B-5: Projections of Other Key Economic Variables

	Q4/Q4 Growth Rates		
	2010	2011	2012
INTEREST RATE ASSUMPTIONS			
Federal Funds Rate (End-of-Year)	0-0.25 (0-0.25)	0-0.25 (0-0.25)	0-0.25 (0.25)
10-Year Treasury Yield (Avg. Q4 Level)	1.6 (2.9)	1.5 (3.5)	1.5 (4.3)
PRODUCTIVITY AND LABOR COSTS*			
Output	3.7 (3.7)	2.9 (4.2)	3.8 (4.7)
Hours	1.7 (1.7)	1.6 (2.8)	2.2 (3.0)
Output per Hour	2.0 (2.0)	1.4 (1.4)	1.6 (1.8)
Compensation per Hour	1.4 (1.8)	1.7 (2.3)	2.2 (2.9)
Unit Labor Costs	-0.6 (-0.2)	0.3 (0.9)	0.7 (1.2)
LABOR MARKET			
Unemployment Rate (Avg. Q4 Level)	9.6 (9.6)	9.0 (8.4)	8.5 (7.5)
Participation Rate (Avg. Q4 Level)	64.4 (64.4)	64.0 (64.3)	64.0 (64.6)
Avg. Monthly Nonfarm Payroll Growth (Thous.)	59 (59)	116 (231)	176 (296)
INCOME			
Personal Income	5.4 (3.8)	5.0 (6.0)	3.2 (4.0)
Real Disposable Personal Income	3.5 (2.2)	1.5 (2.4)	1.3 (1.9)
Personal Saving Rate	5.2 (5.4)	5.5 (5.9)	4.9 (5.3)
Corporate Profits Before Taxes	18.2 (7.0)	2.8 (4.8)	2.8 (4.8)

Note: Numbers in parentheses are from the previous Blackbook.

*Nonfarm business sector.

B. FRBNY Forecast Details

Exhibit B-6: FRBNY and Tealbook Forecast Comparison

	FRBNY (Q4/Q4)			Board (Q4/Q4)		
	2010	2011	2012	2010	2011	2012
OUTPUT						
Real GDP	3.1 (2.8)	1.7 (3.0)	3.1 (3.7)	3.1 (2.8)	1.8 (2.7)	3.0 (3.5)
GDP Growth Contributions						
Final Sales to Domestic Purchasers	3.0 (3.0)	1.2 (2.1)	2.3 (3.1)	2.9 (3.0)	1.1 (1.9)	2.2 (2.7)
Consumption	2.1 (1.9)	1.0 (1.4)	1.5 (1.9)	2.1 (1.9)	1.0 (1.6)	1.8 (2.0)
BFI	1.0 (1.0)	0.5 (0.8)	0.7 (0.9)	1.0 (1.0)	0.5 (0.6)	0.4 (0.6)
Residential Investment	-0.2 (-0.1)	0.1 (0.1)	0.2 (0.3)	-0.2 (-0.1)	0.0 (0.0)	0.1 (0.1)
Government	0.0 (0.2)	-0.4 (-0.3)	-0.1 (0.0)	0.0 (0.2)	-0.4 (-0.3)	-0.1 (0.0)
Inventory Investment	0.8 (0.4)	0.2 (0.5)	0.0 (0.1)	0.7 (0.4)	0.3 (0.3)	0.0 (0.3)
Net Exports	-0.6 (-0.6)	0.3 (0.5)	0.8 (0.6)	-0.6 (-0.6)	0.4 (0.4)	0.7 (0.6)
INFLATION						
Total PCE Deflator	1.3 (1.1)	2.4 (2.5)	1.6 (1.7)	1.3 (1.1)	2.4 (2.3)	1.5 (1.5)
Core PCE Deflator	1.0 (0.8)	1.7 (1.6)	1.3 (1.5)	1.0 (0.8)	1.8 (1.7)	1.5 (1.5)
INTEREST RATE ASSUMPTION						
Fed Funds Rate (End-of-Year)	0-0.25 (0-0.25)	0-0.25 (0-0.25)	0-0.25 0.25	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	2.0 (2.0)	1.4 (1.4)	1.6 (1.8)	2.5 (2.0)	0.5 (1.3)	1.7 (1.7)
Compensation per Hour	1.4 (1.8)	1.7 (2.3)	2.2 (2.9)	1.7 (1.4)	2.2 (2.1)	2.3 (2.5)
Unit Labor Costs	-0.6 (-0.2)	0.3 (0.9)	0.7 (1.2)	-0.9 (-0.6)	1.7 (0.8)	0.6 (0.7)
LABOR MARKET						
Unemployment Rate (Avg. Q4 Level)	9.6 (9.6)	9.0 (8.4)	8.5 (7.5)	9.6 (9.6)	9.2 (8.9)	8.5 (8.1)
Participation Rate (Avg. Q4 Level)	64.4 (64.4)	64.0 (64.3)	64.0 (64.6)	64.5 (64.5)	64.2 (64.3)	64.3 (64.4)
Avg. Monthly Nonfarm Payroll Growth (Thous.)	59 (59)	116 (231)	176 (296)	58 (58)	117 (167)	175 (208.3)
SAVING						
Personal Saving Rate (Avg. Q4 Level)	5.2 (5.4)	5.5 (5.9)	4.9 (5.3)	5.2 (5.4)	5.4 (5.3)	5.3 (5.2)
HOUSING						
Housing Starts (Avg. Q4 Level, Thous.)	539 (539)	640 (640)	800 (800)	600 (600)	600 (600)	700 (700)

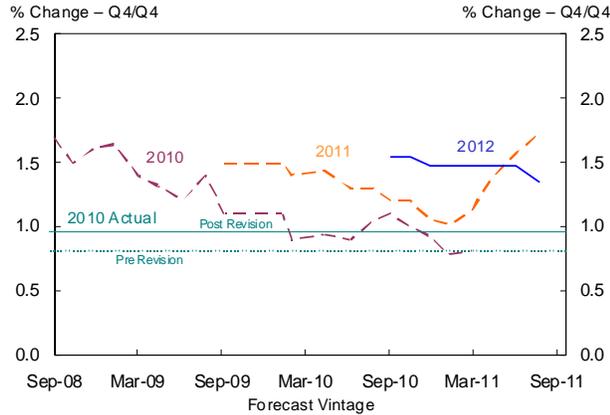
B. FRBNY Forecast Details

Exhibit B-7: Evolution of FRBNY and Board Forecasts since Mid-2007

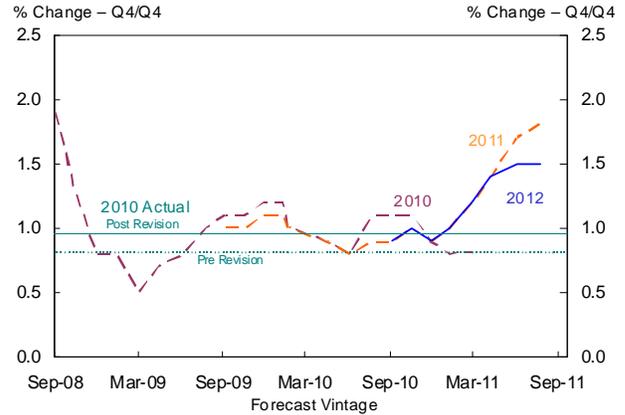
FRBNY

Board

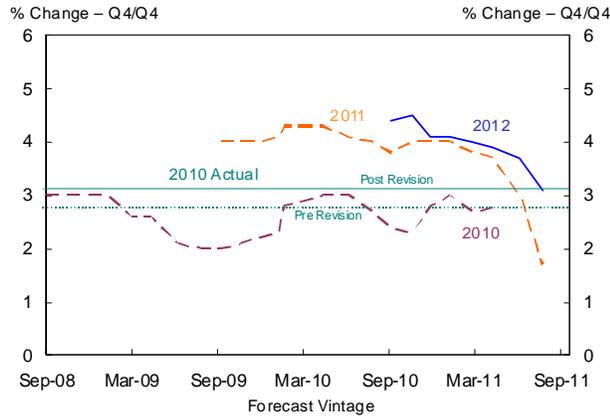
Core PCE Inflation



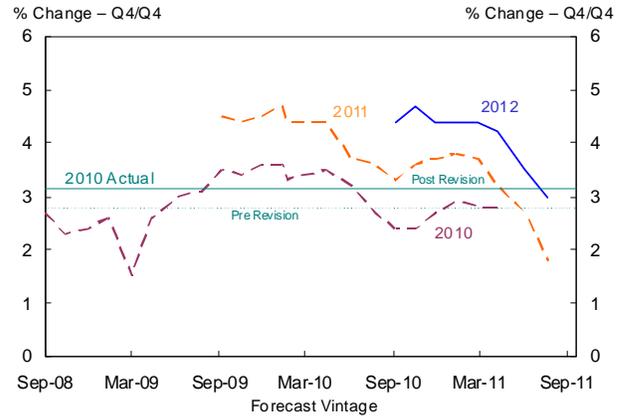
Core PCE Inflation



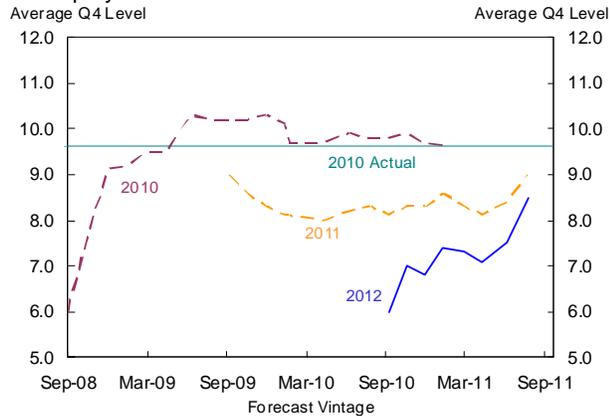
Real GDP Growth



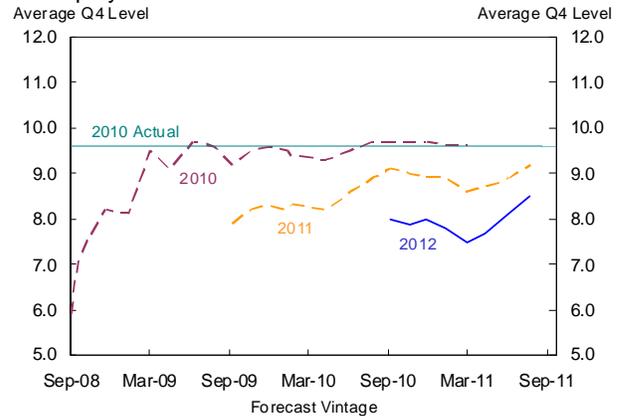
Real GDP Growth



Unemployment Rate



Unemployment Rate



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	2011Q3	2011Q4	2011 Q4/Q4	2012 Q4/Q4
FRBNY	8/5/2011	2.6 (3.6)	2.5 (4.6)	1.7 (3.0)	3.1 (3.7)
Blue Chip	7/10/2011	3.2 (3.3)	3.2 (3.4)	2.6 (2.8)	3.0 (3.1)
Median SPF	5/13/2011	3.4 (3.5)	3.5 (3.5)	3.0 (3.4)	-- --
Macro Advisers	7/7/2011	3.9 (3.9)	3.0 (3.1)	2.7 (2.8)	3.5 (3.3)

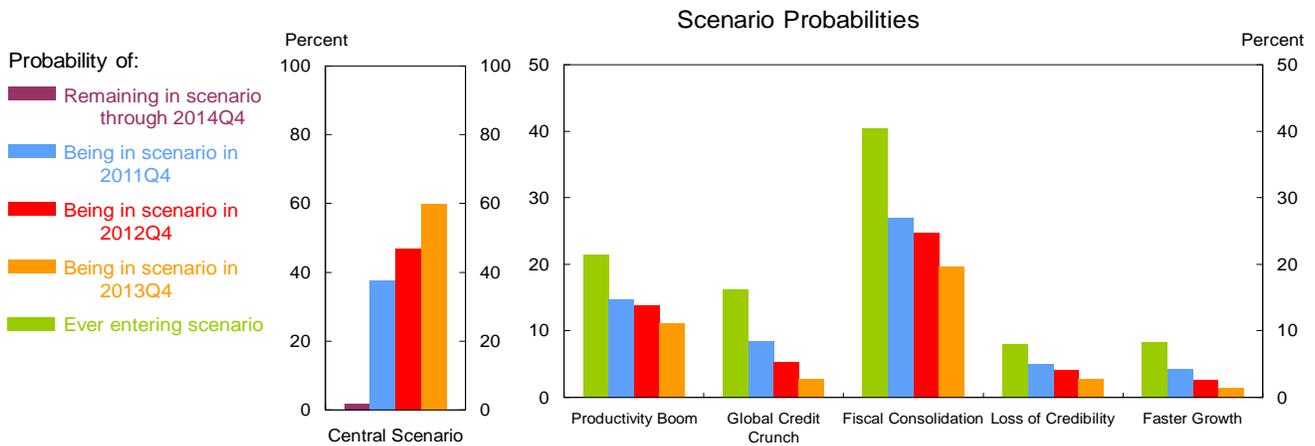
		Core PCE Inflation			
	Release Date	2011Q3	2011Q4	2011 Q4/Q4	2012 Q4/Q4
FRBNY	8/5/2011	1.9 (1.4)	1.4 (1.3)	1.7 (1.6)	1.3 (1.5)
Median SPF	5/13/2011	1.4 (1.3)	1.5 (1.3)	1.5 (1.3)	1.6 (1.6)
Macro Advisers	7/7/2011	1.6 (1.2)	1.5 (1.3)	1.7 (1.4)	1.6 (1.4)

		CPI Inflation			
	Release Date	2011Q3	2011Q4	2011 Q4/Q4	2012 Q4/Q4
FRBNY	8/5/2011	1.4 (1.1)	1.6 (1.7)	3.1 (3.1)	2.1 (2.2)
Blue Chip	7/10/2011	2.0 (2.1)	2.0 (1.9)	3.5 (3.4)	2.2 (2.2)
Median SPF	5/13/2011	2.2 (1.3)	2.0 (1.3)	3.1 (1.7)	2.2 (2.0)
Macro Advisers	7/7/2011	1.7 (2.7)	1.9 (1.6)	3.3 (3.4)	1.8 (1.6)

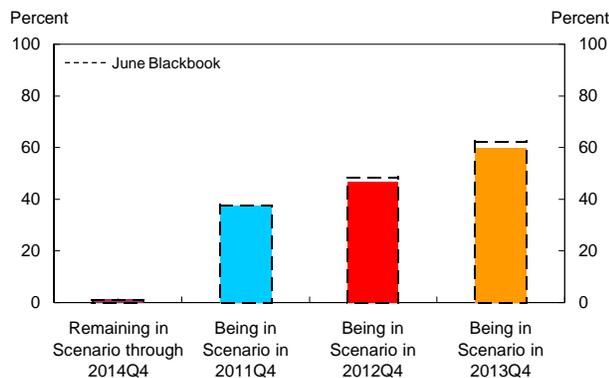
		Core CPI Inflation			
	Release Date	2011Q3	2011Q4	2011 Q4/Q4	2012 Q4/Q4
FRBNY	8/5/2011	2.5 (1.7)	1.6 (1.7)	2.1 (1.9)	1.7 (1.8)
Median SPF	5/13/2011	1.6 (1.2)	1.6 (1.2)	1.6 (1.3)	1.9 (1.7)
Macro Advisers	7/7/2011	2.2 (1.9)	1.9 (1.8)	2.1 (1.9)	1.9 (1.7)

C. FRBNY Forecast Distributions

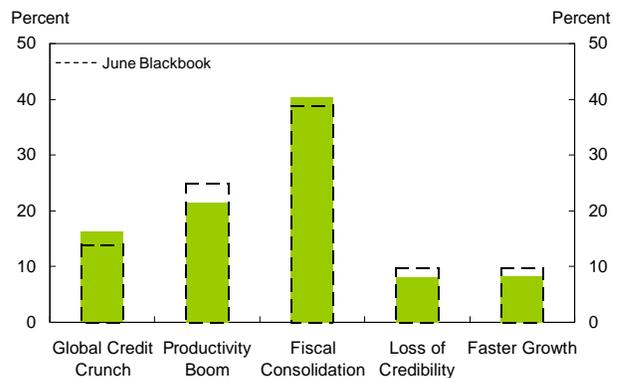
**Exhibit C-1:
Risks**



Change in Central Scenario Probabilities



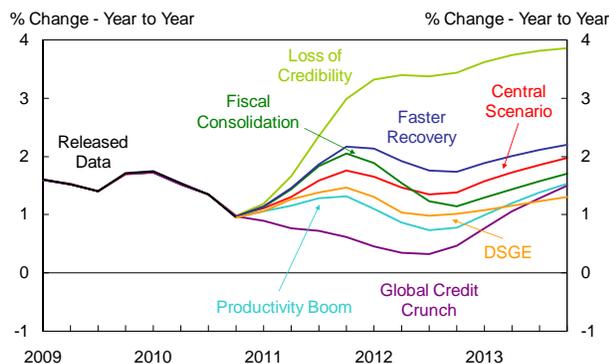
Change in Alternative Scenario Probabilities*



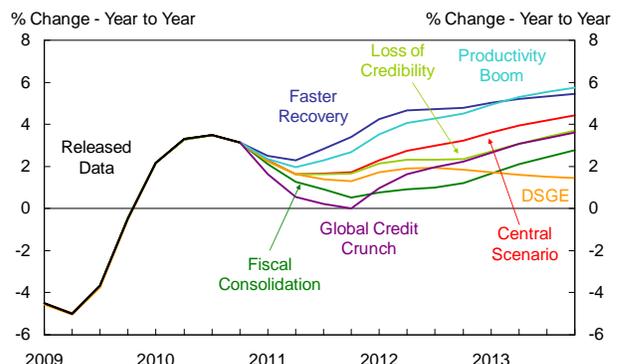
*Probability of ever reaching scenario

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

Core PCE Inflation under Alternative Scenarios



Real GDP Growth under Alternative Scenarios

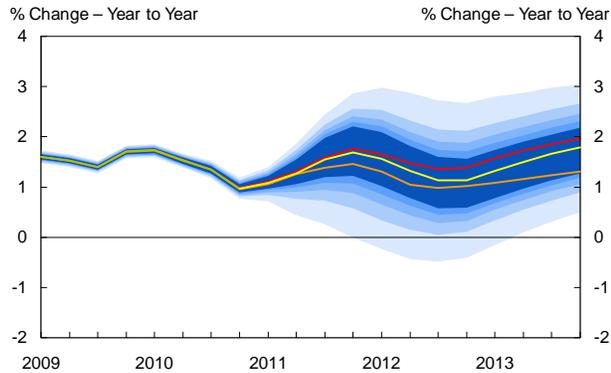


Source: MMS Function (FRBNY)

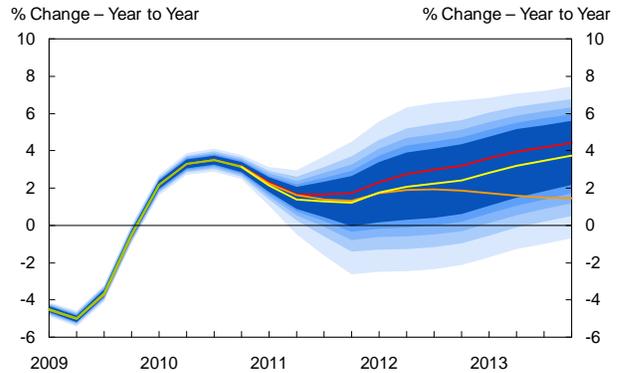
C. FRBNY Forecast Distributions

Exhibit C-3: Inflation and Output Forecast Distributions

Core PCE Inflation Forecast Distribution

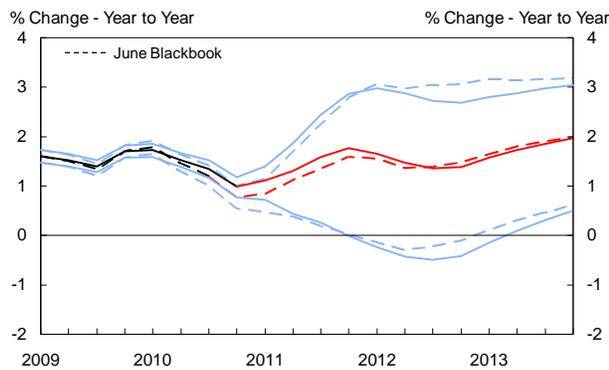


Real GDP Growth Forecast Distribution

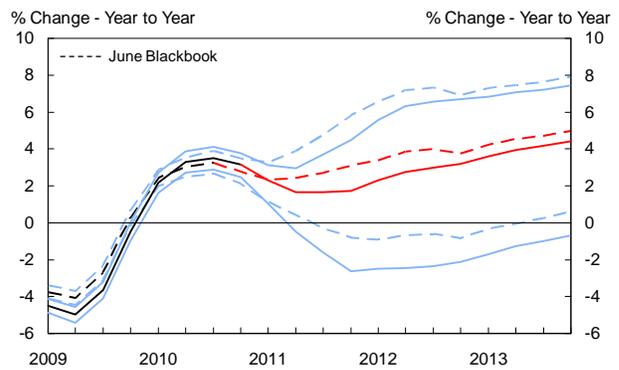


The yellow line represents the expected value of the forecast distribution, the red line represents the FRBNY central projection, the orange line represents the DSGE forecast, and the green line represents released data. The shading represents the 50, 60, 70, 80 and 90 percent probability that the four-quarter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

Change in Core PCE Inflation Forecast Distribution

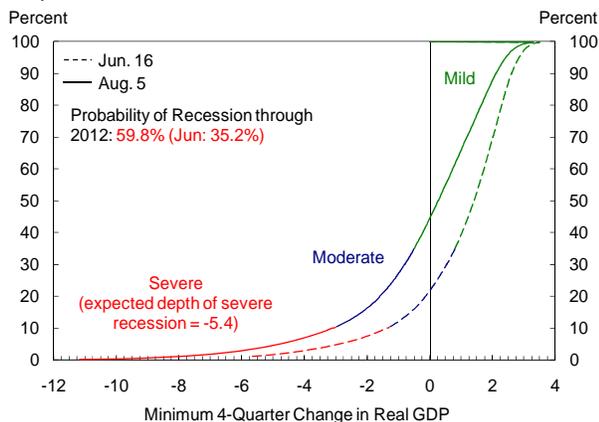


Change in Real GDP Growth Forecast Distribution

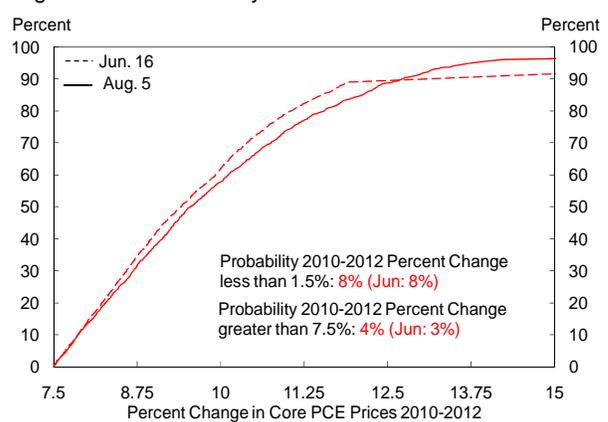


The blue lines are the 90% chance the four-quarter change will be within the lines, the red line is the central scenario projection, and the black line is released data. Dashed lines represent forecasts from the previous Blackbook.

Depth of Recession



High Inflation Probability and Distribution

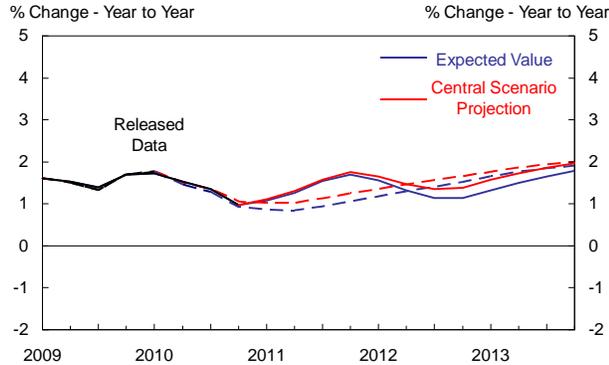


Source: MMS Function (FRBNY)

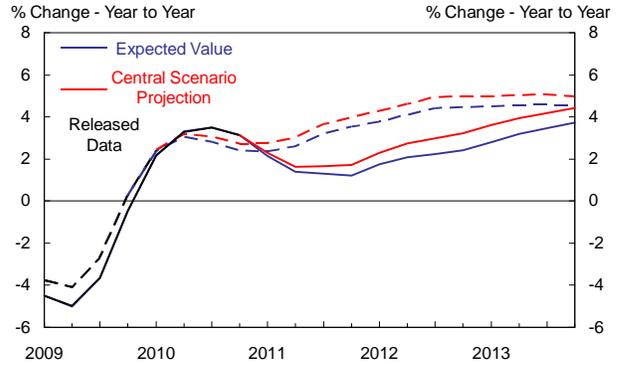
C. FRBNY Forecast Distributions

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

One-Year Comparison of Core PCE Inflation Forecast

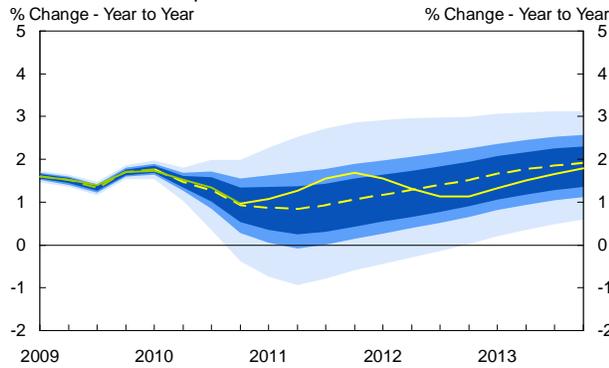


One-Year Comparison of Real GDP Growth Forecast

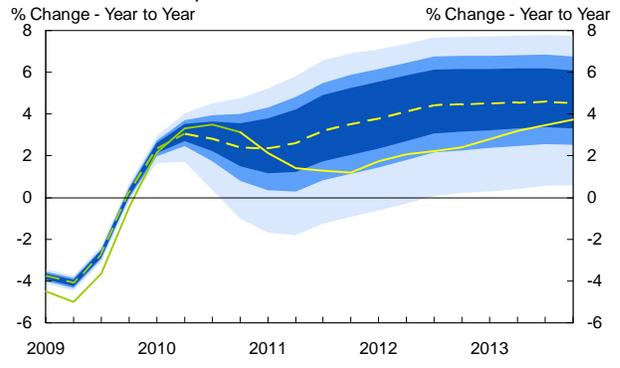


The solid lines represent the current central scenario projection and expected value, while the dashed lines represent those from the year-ago Blackbook.

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



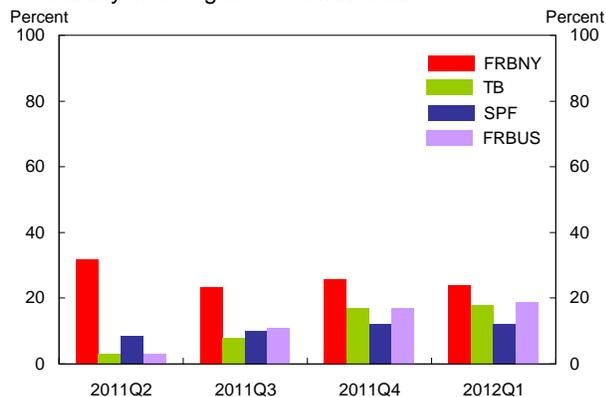
One-Year Comparison of Real GDP Growth Forecast Distribution and Expected Value



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

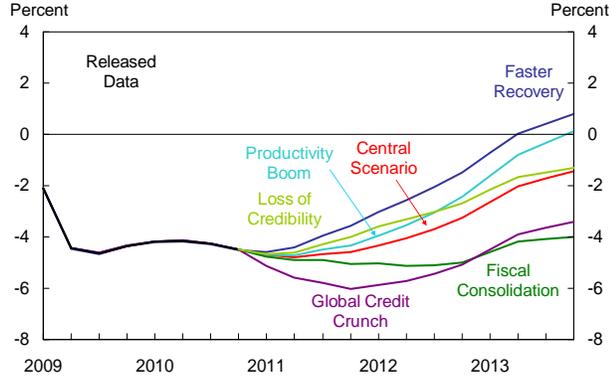


Source: MMS Function (FRBNY)

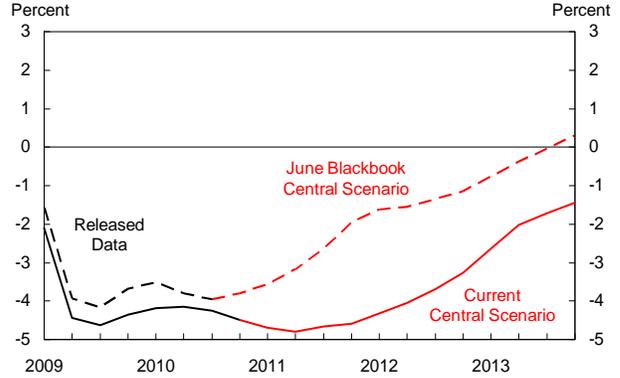
D. FRBNY Fed Funds Rate Projections

Exhibit D-1: *Baseline* Policy Rule Analysis

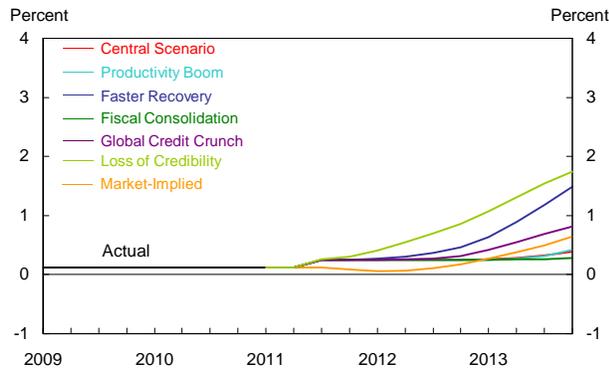
Real FFR under Alternative Scenarios



Change in Central Scenario Real FFR



Nominal FFR under Alternative Scenarios



Change in Central Scenario and Market-Implied Nominal FFR

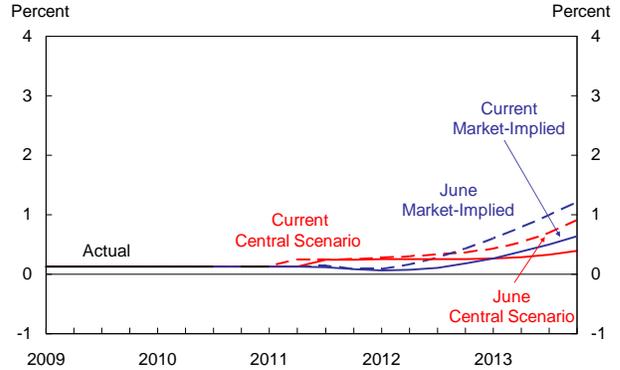
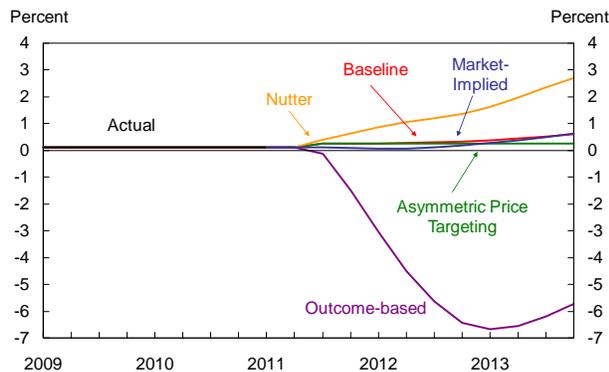


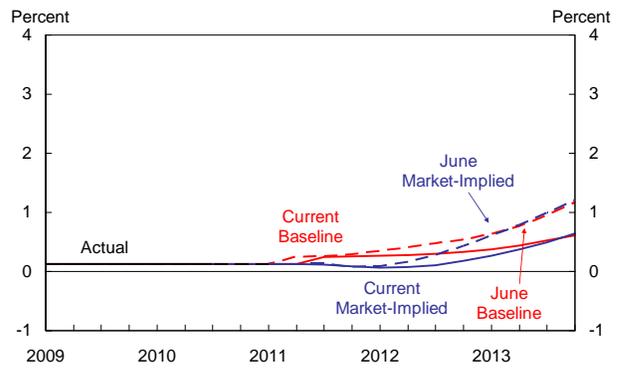
Exhibit D-2: Alternative Policy Rules under Expected Value of Forecast Distribution

Nominal FFR using Alternative Policy Rules*



*Evaluated using yellow line from C-3

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



*Evaluated using yellow line from C-3

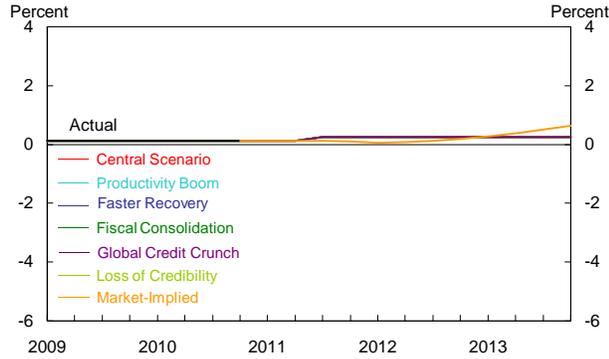
Source: MMS Function (FRBNY)

D. FRBNY Fed Funds Rate Projections

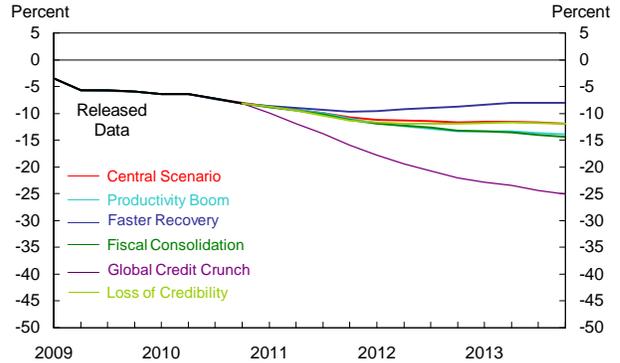
Exhibit D-3: Alternative Policy Rule Analysis

Policy Rule: *Asymmetric Price Targeting*

Nominal FFR under Alternative Scenarios

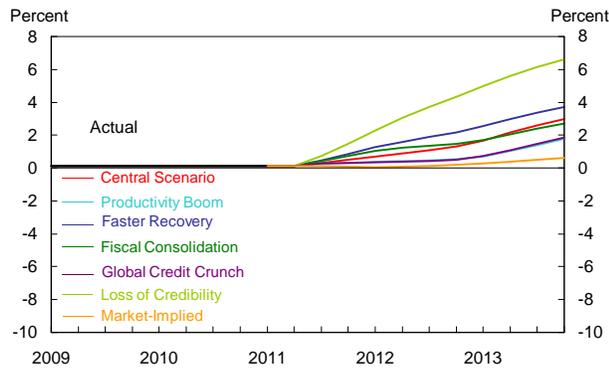


Real FFR under Alternative Scenarios

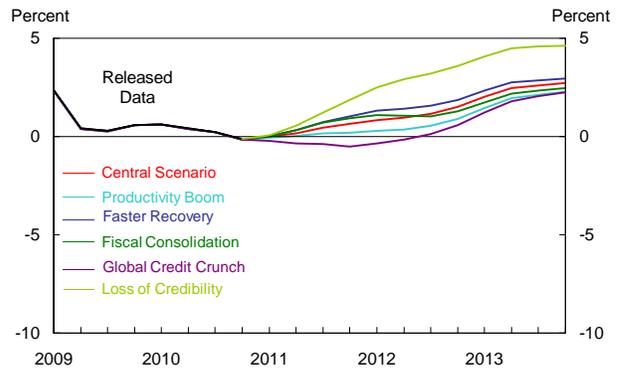


Policy Rule: *Nutter*

Nominal FFR under Alternative Scenarios

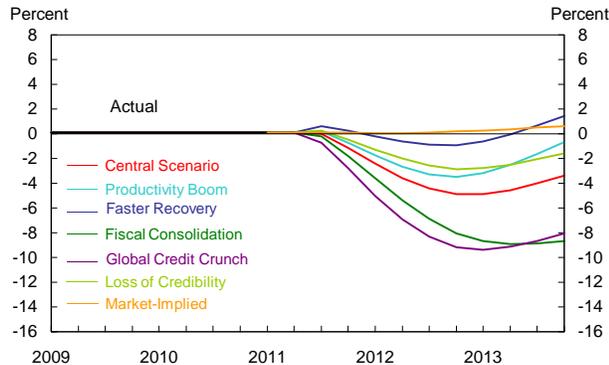


Real FFR under Alternative Scenarios

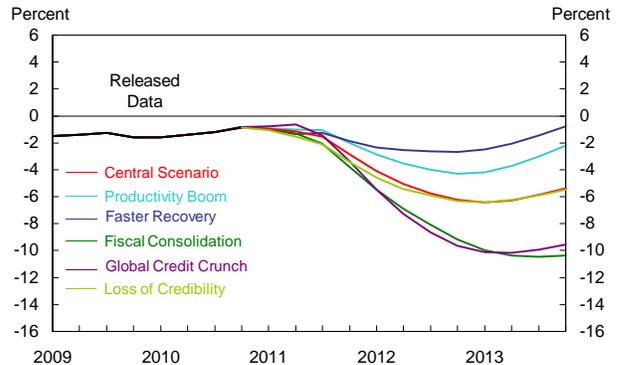


Policy Rule: *Outcome-based*

Nominal FFR under Alternative Scenarios



Real FFR under Alternative Scenarios

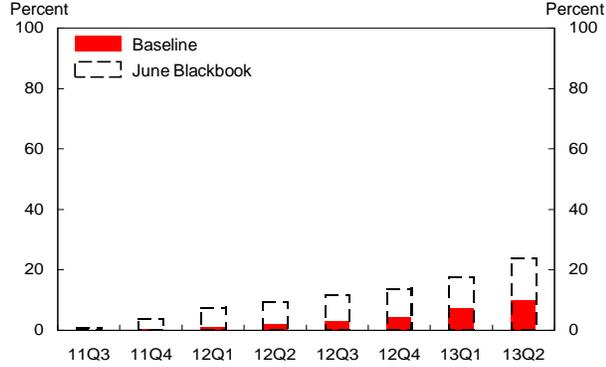


Source: MMS Function (FRBNY)

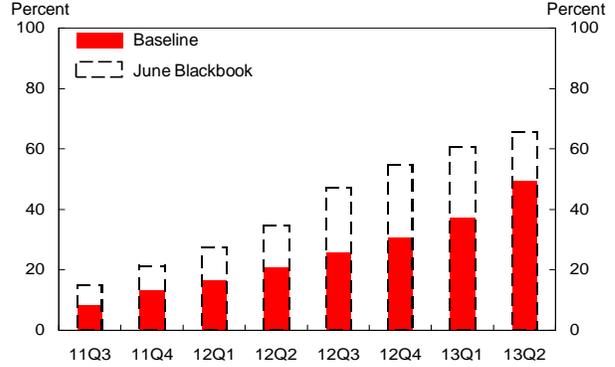
D. FRBNY Fed Funds Rate Projections

Exhibit D-4: FFR Probabilities

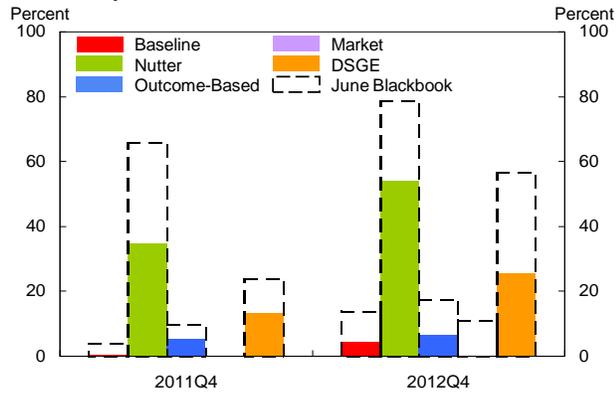
Probability of FFR above 0.5% for Next Year
FRBNY Forecast Distributions



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)

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

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.

recent real PCE and other aggregate demand indicators raise the possibility that the process of 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:

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

$\rho = 0.8$ (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

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

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 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.