Economic Advisory Panel Meeting
May 14, 2010

Agenda:

Overview of Forecast and Risks
(Dick Peach and Simon Potter)

Financial Stability: Monitoring and Policy
(Tobias Adrian)

Go-round on Monetary Policy
Forecast Overview

Dick Peach
Key Features of FRBNY Modal Forecast

- Muted recovery of consumer spending
  - Shock to household net worth and restricted access to credit lead to gradual upward trend of the personal saving rate

- Muted recovery of residential investment
  - Substantial excess supply of housing; tightened underwriting standards

- Fiscal contraction in the state and local government sector

- Delayed recovery of business fixed investment

- Waning fiscal and monetary stimulus

- Stubbornly high unemployment rate
  - Rising participation rate and average weekly hours

- Persistent slack puts downward pressure on trend inflation

- More robust cyclical recovery begins in 2011 as headwinds subside
| FRBNY Outlook | May ’10  
(October ’09) |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Q4/Q4 growth rate</strong></td>
<td>2010H1 (AR)</td>
</tr>
<tr>
<td>GDP</td>
<td>3.1 (1.4)</td>
</tr>
<tr>
<td>Total PCE Inflation</td>
<td>1.3 (1.3)</td>
</tr>
<tr>
<td>Core PCE Inflation</td>
<td>0.8 (1.0)</td>
</tr>
</tbody>
</table>
| Unemployment  
(End of Period Level) | 10.0 (10.3) | 10.1 (10.2) | 10.0 (10.0) | 10.1 (10.2) | 8.4 (8.6) |
| Personal Saving Rate  
(End of Period Level) | 3.1 (3.8) | 3.3 (4.2) | 3.9 (3.7) | 3.3 (4.2) | 4.8 (5.4) |
| Productivity | 2.4 (2.3) | 1.4 (1.4) | 5.6 (4.3) | 1.9 (1.8) | 1.8 (1.3) |
Real PCE per capita
(Series Set to 1.0 at NBER Peak)

Source: Bureau of Labor Statistics

Note: Dashed line represents FRBNY forecast.
Real Per Capita Household Net Worth
(Series Set to 1.00 at NBER Peak)

Source: Federal Reserve Board, Bureau of Economic Analysis, Census Bureau
Real Residential Investment
(Series Set to 1.0 at NBER Peak)

Quarters Since NBER Peak

Source: Bureau of Labor Statistics

Note: Dashed line represents FRBNY forecast.
Excess Supply of Housing

Source: Federal Reserve Board

Note: Shading represents NBER recessions.
First Mortgage New Delinquency Transition Rate

Balance Weighted

From current to 30-60 days delinquent

From current to 90+ days delinquent

Source: FRBNY Equifax Dataset
Real State and Local Government
(Series Set to 1.0 at NBER Peak)

Source: Bureau of Labor Statistics

Note: Dashed line represents FRBNY forecast.
Real Business Fixed Investment
(Series Set to 1.0 at NBER Peak)

Source: Bureau of Labor Statistics

Note: Dashed line represents FRBNY forecast.
Beveridge Curve

Productivity: Nonfarm Business Sector

% Change – Annual Rate

Source: Bureau of Labor Statistics

Note: Dashed line represents FRBNY forecast.
Rent of Primary Residence Inflation
(Series Set to 0.0 at NBER Peak)

Source: Federal Reserve Board, Bureau of Economic Analysis, Census Bureau
Risks and Stance of Policy

Simon Potter
May ‘10 Forecast Distributions

Core PCE Inflation

% Change – Year to Year

Real GDP Growth

% Change – Year to Year
Probability of recovery at least as strong as post-1981-82 recovery:
10% (May '10)
8% (Oct '09)

Modal Forecast

Maximum 4-Quarter Change in Real GDP after Trough
## Current Stance of Policy

<table>
<thead>
<tr>
<th>Policy Rule</th>
<th>Rate Prescription</th>
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</thead>
<tbody>
<tr>
<td>Taylor rule, Contemporaneous Feedback</td>
<td>-0.8 to 0.7</td>
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<tr>
<td>Taylor rule, Forecast-Based</td>
<td>-0.9 to 0.6</td>
</tr>
<tr>
<td>Taylor rule, Forecast-Based with Risks</td>
<td>-1.1 to 0.4</td>
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<tr>
<td>Contemporaneous Difference Rule</td>
<td>0.1 increase</td>
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<tr>
<td>Forecast-Based Difference Rule</td>
<td>0.4 increase</td>
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<tr>
<td>Counterfactual with DSGE-VAR</td>
<td>0.5</td>
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<td>Counterfactual with DSGE</td>
<td>0 to 1</td>
</tr>
<tr>
<td>Optimal Rate in DSGE with credit frictions</td>
<td>0 to 0.9</td>
</tr>
</tbody>
</table>
Lower Bound and Monetary Policy

Current Policies

- Commit to hold interest rates at the lower bound for longer than conventional rule would imply along certain paths the economy could take
  - Requires a credible commitment that inflation can temporarily overshoot the objective
- Buy long duration assets and through a “portfolio balance effect” directly lower long-term yields on private liabilities
  - Requires a credible commitment not to sell the assets immediately when economy improves

“Blanchard Proposal”

- Conduct interest rate policy with a higher average nominal rate
  - Requires a credible commitment to hold at the new higher inflation objective
Large Downward Price Level Deviations
Conditional on Average Inflation Below 0.5%

Probability 2010-2012 Percent Change less than 1.5%: 6% (Oct: 9%)
The aftermath of the Lehman crisis traced out a startlingly larger negative tail than most anybody had earlier imagined. I assume, with hope more than knowledge, that that was indeed the extreme of possible financial crisis that could be experienced in a market economy.

-Alan Greenspan
Large Upward Price Level Deviations
Conditional on Average Inflation Above 2.5%

Probability 2010-2012 Percent Change greater than 7.5%: 7% (Oct: 8%)
Financial Stability: Monitoring and Policy

Tobias Adrian
Quantitative Surveillance in the Federal Reserve

- Bank supervision: microprudential

- Macro-finance linkages (lessons from the SCAP)
  - Stress scenarios for the financial system
  - Feedback from the financial system to the real economy

- Financial markets and institutions
  - Asset price misalignments and bubbles detection
  - Balance sheet leverage and haircut monitoring
  - Shadow banking and hedge funds

- Systemic risk monitoring
  - Via direct exposures among financial institutions
  - Between diverse market participants, such as the CDS market
Funding Liquidity

- Funding liquidity fuels the leverage of intermediaries
- Leverage amplifies shocks (margin calls, limited liability)
- Potentially leading to systemic risk

- Particularly in the shadow banking sector
The pricing and availability of funding fuels both regulated and unregulated institutions

Key contributors: credit insurance and short term funding

<table>
<thead>
<tr>
<th>Institution</th>
<th>Direct Public Enhancement</th>
<th>Indirect Public Enhancement</th>
<th>Unenhanced</th>
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<td></td>
<td>Explicit</td>
<td>Implicit</td>
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<td>Federal Loan Programs</td>
<td>Loan guarantees</td>
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<td>GSEs</td>
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<td>Agency Debt</td>
<td>Agency MBS</td>
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<td>Depository Institutions</td>
<td>Insured deposits</td>
<td>Conduit lines</td>
<td>Money market funds</td>
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<td>Other debt</td>
<td>Commitments</td>
<td>Securities lending</td>
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<td>Annuities</td>
<td>Tri-party clearing</td>
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<td></td>
<td>Insurance policies</td>
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<td></td>
<td>Unfunded liabilities</td>
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<tr>
<td>Insurance Companies</td>
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<tr>
<td>Pensions</td>
<td>ILC deposits</td>
<td>Hybrid ABCP</td>
<td>Liquidity puts (ABS, VRDO, ARS)</td>
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<td>Tri-party repo</td>
<td>Credit hedge funds</td>
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<td></td>
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<td>Money market funds</td>
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<td>Finance Companies</td>
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<td>Securities lending</td>
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<td>Diversified broker-dealers</td>
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<td>Securities lending</td>
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<td>Monoline</td>
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<td>Financial guarantees</td>
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<td>Independent intermediaries</td>
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<td>Finance company</td>
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<td>Credit hedge funds</td>
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<td>Multi-seller conduit</td>
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<tr>
<td>Money market fund</td>
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<tr>
<td>European banks</td>
<td></td>
<td>Conduit lines</td>
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</table>
Financial Conditions and Risk Appetite

- Financial Condition Indices are atheoretical summary statistics
- ‘Risk appetite’ indicators estimate risk aversion directly from models
- Challenge: neither FCIs nor risk appetite measures identify credit boom

More quantification of shadow banking activity needed
Credit Growth Monitoring

- Financial intermediary leverage (both on and off balance sheet) interacts with household and potentially public sector leverage.
- There is also a strong interaction with the current account.

- Decomposition of the credit growth – GDP gap into sectors.
Policy Tools for Financial Stability I: Macroprudential Regulation

- Capital reform
  - Level and quality of capital (common equity in Tier 1)
  - Risk weighting including off-balance sheet exposures
  - Macroprudential aspects: time series and cross section

- Liquidity regulation
  - Hold assets against stress scenarios on the liability side

- Challenge: regulatory arbitrage in the shadow banking system
  - Address this by using other tools: haircuts, margins, LTVs
  - Targeting asset prices is not appropriate
Policy Tools for Financial Stability II: Monetary Policy

- The FCI of HHMSW has a strongly positive correlation with the Fed Funds target in response to crises (‘87, ‘98, ‘08), and a strongly negative relationship otherwise

![Correlation of FCI with Fed Funds](chart)

Source: HHMSW, Federal Reserve Board

- Should monetary policy pre-empt?
Financial Stability and Monetary Policy

- Challenge is to integrate financial sector into monetary transmission
  - Macroprudential tools clearly affect financial conditions and are most appropriate line of defense against asset price misalignments
  - Liquidity facilities might have to complement interest rate policy

- Should monetary policy be ruled out to pre-empt bubbles?
  - The level of the Fed Funds rate is not a sufficient indicator of financial conditions
  - Monetary policy should be forward looking relative to financial conditions
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Go-round on Monetary Policy
### FRBNY Outlook: Contributions to GDP Growth

#### May ’10
(October ‘09)

<table>
<thead>
<tr>
<th>Q4/Q4 growth rate</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.1</td>
<td>3.0</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>(-0.1)</td>
<td>(2.0)</td>
<td>(4.0)</td>
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<tr>
<td>Consumption</td>
<td>0.7</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>(0.8)</td>
<td>(0.8)</td>
<td>(1.7)</td>
</tr>
<tr>
<td>Residential Investment</td>
<td>-0.4</td>
<td>0.1</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>(-0.3)</td>
<td>(0.2)</td>
<td>(0.5)</td>
</tr>
<tr>
<td>Business Fixed Investment</td>
<td>-1.6</td>
<td>0.3</td>
<td>1.1</td>
</tr>
<tr>
<td></td>
<td>(-1.8)</td>
<td>(0.1)</td>
<td>(1.1)</td>
</tr>
<tr>
<td>Inventory Investment</td>
<td>0.1</td>
<td>0.6</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>(0.1)</td>
<td>(0.7)</td>
<td>(0.4)</td>
</tr>
<tr>
<td>Net Exports</td>
<td>1.0</td>
<td>0.1</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td>(0.9)</td>
<td>(0.1)</td>
<td>(0.0)</td>
</tr>
<tr>
<td></td>
<td>Release Date</td>
<td>2010 Q4/Q4</td>
<td>2011 Q4/Q4</td>
</tr>
<tr>
<td>------------------------</td>
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<tr>
<td><strong>Real GDP Growth</strong></td>
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<td>FRBNY</td>
<td>5/14/2010</td>
<td>3.0</td>
<td>4.3</td>
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<td>Blue Chip</td>
<td>5/10/2010</td>
<td>3.1</td>
<td>3.1</td>
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<td>Macro Advisers</td>
<td>5/10/2010</td>
<td>3.7</td>
<td>3.9</td>
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<tr>
<td><strong>Core PCE Inflation</strong></td>
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<tr>
<td>FRBNY</td>
<td>5/14/2010</td>
<td>0.9</td>
<td>1.4</td>
</tr>
<tr>
<td>Blue Chip</td>
<td>5/10/2010</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Macro Advisers</td>
<td>5/10/2010</td>
<td>0.8</td>
<td>0.9</td>
</tr>
<tr>
<td><strong>Unemployment Rate</strong></td>
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<tr>
<td>FRBNY</td>
<td>5/14/2010</td>
<td>10.1</td>
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<td>Blue Chip</td>
<td>5/10/2010</td>
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<td>Macro Advisers</td>
<td>5/10/2010</td>
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<td><strong>Personal Saving Rate</strong></td>
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<td>FRBNY</td>
<td>5/14/2010</td>
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<td>Blue Chip</td>
<td>5/10/2010</td>
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<td>n/a</td>
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<tr>
<td>Macro Advisers</td>
<td>5/10/2010</td>
<td>2.4</td>
<td>2.6</td>
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</tbody>
</table>
Exhibit 12: Perceptions of Consumers and Financial Experts

A. Consider the following scenario: over the next 12 months, the government debt ends up growing substantially more than the administration has predicted BECAUSE tax revenues are lower than expected while the level of government spending remains on target. Under this scenario, how would this change your forecast for the rate of inflation over the next 12 months?

B. Now consider this alternative scenario: over the next 12 months, the government debt ends up growing substantially more than the administration has predicted BECAUSE the level of government spending is much higher than expected while tax revenues remain on target. Under this alternative scenario, how would this change your forecast for the rate of inflation over the next 12 months?

<table>
<thead>
<tr>
<th>Number (percentage) responding:</th>
<th>Question A</th>
<th>Question B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consumers</td>
<td>Experts</td>
</tr>
<tr>
<td>I would expect much lower inflation</td>
<td>8 (2%)</td>
<td>1</td>
</tr>
<tr>
<td>I would expect somewhat lower inflation</td>
<td>41 (10%)</td>
<td>5</td>
</tr>
<tr>
<td>I don't believe that it would have an effect on inflation</td>
<td>74 (18%)</td>
<td>4</td>
</tr>
<tr>
<td>I would expect somewhat higher inflation</td>
<td>245 (60%)</td>
<td>1</td>
</tr>
<tr>
<td>I would expect much higher inflation</td>
<td>37 (9%)</td>
<td>0</td>
</tr>
<tr>
<td>Total responses</td>
<td>409</td>
<td>11</td>
</tr>
</tbody>
</table>

Exhibit 13: Consumer Expectations

In percentage terms, by how much do you expect the level of government debt to be [higher/lower] twelve months from now?

<table>
<thead>
<tr>
<th>Quartiles of distribution of expected percentage change in government debt</th>
<th>All</th>
<th>College</th>
<th>Less than College</th>
</tr>
</thead>
<tbody>
<tr>
<td>25th percentile</td>
<td>+5%</td>
<td>+5%</td>
<td>+5%</td>
</tr>
<tr>
<td>Median</td>
<td>+10%</td>
<td>+10%</td>
<td>+12%</td>
</tr>
<tr>
<td>75th percentile</td>
<td>+20%</td>
<td>+20%</td>
<td>+25%</td>
</tr>
<tr>
<td>Total responses</td>
<td>1,198</td>
<td>615</td>
<td>583</td>
</tr>
</tbody>
</table>
Background: Asset Bubbles

- Heterogeneous beliefs and short-sale constraint
  - Investors strictly prefer assets that can be resold

- Limits to arbitrage: Noise trader risk, synchronization risk
  - Ride the bubble “as long as the music plays” (since single trader can’t bring down bubble, all trades wait for each other to attack bubble)
  - Small (non-fundamental) news can lead to large price swings

- “Greater fool theory”
  - Hold overpriced assets in the hope to sell it at an even higher price to someone else

- Rational bubbles – symmetric info
  i. Violation of transversality condition
  ii. Fiat money is a bubble

- Asymmetric information bubbles
Bursting of the Technology and Housing Bubbles

- Housing is ultimately illiquid collateral
- Housing debt held on highly levered household and financial institution balance sheets

Who holds what matters

Source: BEA, Federal Reserve Board, S&P

Note: Values represent peak-to-trough percent change in variable. For unemployment, value is peak-to-trough difference. Housing and stock market wealth as measured by flow of funds, financial sector wealth approximated using S&P Financials index.
Real Durable PCE
(Series Set to 1.0 at NBER Peak)

Source: Bureau of Labor Statistics
Personal Saving Rate
(Series Set to 1.00 at NBER Peak)

Difference

Quarters Since NBER Peak

Source: Bureau of Economic Analysis

Note: Dashed line represents FRBNY forecast.
Asset Income as a Percent of Disposable Income
(Series Set to 1.0 at NBER Peak)

Source: Bureau of Economic Analysis
Government Transfers as a Percent of Disposable Income
(Series Set to 1.0 at NBER Peak)

Source: Bureau of Economic Analysis
Private Nominal Wage and Salary Disbursements
(Series Set to 1.0 at NBER Peak)

Source: Bureau of Economic Analysis
BAA Spread
(Series Set to 1.0 at NBER Peak)

Source: Bureau of Labor Statistics

Note: Vertical lines represent end of NBER recessions. Current recession assumed to end in 2009Q2.
Inventories and Industrial Production

6-Month % Change - Annualized

Inventories: Total Business

Industrial Production: Manufacturing

Source: Federal Reserve Board and Bureau of the Census

Note: Shading represents NBER recessions.
Total Hours of All Persons: Nonfarm Business Sector
(Series Set to 1.0 at NBER Peak)

Source: Bureau of Labor Statistics
LoanPerformance Home Price Index

Source: LoanPerformance

Note: Shading represents NBER recessions.
Actual and Projected House Price Indices

Index, 2000Q1 = 100

Radar Logic

Radar Logic Futures as of May 2010

Radar Logic Futures as of Feb. 2009

<table>
<thead>
<tr>
<th></th>
<th>Peak</th>
<th>Peak to Trough</th>
<th>Trough to 2009Q4</th>
<th>2009Q4 to 2013Q4</th>
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</thead>
<tbody>
<tr>
<td>Radar Logic</td>
<td>2007 Q2</td>
<td>-33%</td>
<td>3%</td>
<td>1%</td>
</tr>
<tr>
<td>Radar Logic (Feb '09)</td>
<td>2007 Q2</td>
<td>-42%</td>
<td>n/a</td>
<td>9%</td>
</tr>
</tbody>
</table>

Source: Radar Logic

Note: Current futures suggest RL trough occurred in 2009Q1. Feb. 2009 futures suggested trough would occur in 2010Q4.
Nonfarm Payroll Employment
(Series Set to 1.0 at NBER Peak)

Source: Bureau of Labor Statistics
Real Business Fixed Investment
(Series Set to 1.0 at NBER Peak)

Quarters Since NBER Peak

Source: Bureau of Labor Statistics
Real Exports
(Series Set to 1.0 at NBER Peak)

Source: Bureau of Labor Statistics
Total and Core CPI

% Change - Year to Year


Source: Bureau of Labor Statistics

Note: Shading represents NBER recessions.
CPI: Core Goods and Core Services Inflation

% Change – Year to Year

Core Services

Core Goods

Source: Bureau of Labor Statistics
Rent Inflation

% Change - Year to Year


Source: Bureau of Labor Statistics

Note: Shading represents NBER recessions. Number in parentheses represents share of core CPI.
Productivity, Compensation, and Unit Labor Costs
Nonfarm Business Sector

% Change - Year to Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Compensation per Hour</th>
<th>Output per Hour</th>
<th>Unit Labor Costs</th>
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</thead>
<tbody>
<tr>
<td>1999</td>
<td></td>
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<tr>
<td>2001</td>
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<td>2003</td>
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<td>2007</td>
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<tr>
<td>2009</td>
<td></td>
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</table>

Source: Bureau of Labor Statistics

Note: Shading represents NBER recessions. Dashed line represents FRBNY forecast.
TIPS Implied Inflation Compensation: 2-3, 4-5, 5-10 Year Horizons

Source: Federal Reserve Board

Note: Carry Adjusted.
Home Prices and Distressed Sales

First American Core Logic National Home Price Index

Overall

Non-Distressed

Unit Share of Home Sales that are Distressed Sales

Source: First American Core Logic
Equity Price Assumption

S&P 500

Note: Dashed line represents FRBNY assumption.
Transition Rates from 30-60 Day Delinquency (Balance Weighted)

Cure Rate

Non-Performing Rate (90+)

Source: FRBNY Equifax Dataset
Short- and Long-Term Rates

Source: Bloomberg

Note: Yields of on-the-run securities.
Commercial and Industrial Loans Outstanding

% Change - Year to Year

Source: Federal Reserve Board
Bank Lending Practices

Net % of Respondents

<table>
<thead>
<tr>
<th>Year</th>
<th>Tightening Standards</th>
<th>Increasing Spreads</th>
<th>Weaker Demand</th>
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<td>Jun-90</td>
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<td>Jun-93</td>
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<tr>
<td>Jun-96</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jun-99</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Jun-02</td>
<td></td>
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<tr>
<td>Jun-05</td>
<td></td>
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<tr>
<td>Jun-08</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Note: Data cover C&I loans to large- and medium-sized firms.

Source: Federal Reserve Board
Nondefense Capital Goods Excluding Aircraft

% Change - 3 months (AR) % Change - 3 months (AR)

New Orders

Shipments

Source: Census Bureau
Nondefense Capital Goods Excluding Aircraft

New Orders

Shipments

Source: Census Bureau
Auto Sales

Light-Weight Vehicle Sales, Production, and Inventories
(millions of units, SAAR)

<table>
<thead>
<tr>
<th>Sales</th>
<th>2009Q2</th>
<th>2009Q3</th>
<th>2009Q4</th>
<th>2010Q1</th>
<th>2010Q2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>9.6</td>
<td>11.5</td>
<td>10.9</td>
<td>11.0</td>
<td>11.2</td>
</tr>
<tr>
<td>Retail Auto</td>
<td>4.9</td>
<td>6.4</td>
<td>5.7</td>
<td>5.7</td>
<td>5.6</td>
</tr>
<tr>
<td>Domestic</td>
<td>3.2</td>
<td>4.2</td>
<td>3.8</td>
<td>3.9</td>
<td>3.8</td>
</tr>
<tr>
<td>Imported</td>
<td>1.7</td>
<td>2.2</td>
<td>1.9</td>
<td>1.9</td>
<td>1.8</td>
</tr>
<tr>
<td>Light Truck</td>
<td>4.7</td>
<td>5.1</td>
<td>5.2</td>
<td>5.2</td>
<td>5.6</td>
</tr>
<tr>
<td>Domestic</td>
<td>3.8</td>
<td>4.1</td>
<td>4.3</td>
<td>4.3</td>
<td>4.7</td>
</tr>
<tr>
<td>Imported</td>
<td>0.9</td>
<td>1.0</td>
<td>0.9</td>
<td>1.0</td>
<td>0.9</td>
</tr>
<tr>
<td>Total Domestic</td>
<td>7.0</td>
<td>8.3</td>
<td>8.1</td>
<td>8.1</td>
<td>8.5</td>
</tr>
<tr>
<td>Domestic Auto Inventories (units)*</td>
<td>933.3</td>
<td>757.9</td>
<td>754.1</td>
<td>765.6</td>
<td>n/a</td>
</tr>
<tr>
<td>Domestic Auto I-S Ratio (level)*</td>
<td>3.6</td>
<td>2.3</td>
<td>2.4</td>
<td>2.4</td>
<td>n/a</td>
</tr>
<tr>
<td>IP: Autos and Light Trucks (Index, 2002=100)**</td>
<td>42.0</td>
<td>60.5</td>
<td>66.2</td>
<td>70.5</td>
<td>n/a</td>
</tr>
<tr>
<td>Domestic Light Vehicle Production (units)**</td>
<td>4.4</td>
<td>6.4</td>
<td>7.0</td>
<td>7.4</td>
<td>n/a</td>
</tr>
<tr>
<td>North American Light Vehicle Production (units)**</td>
<td>7.0</td>
<td>9.8</td>
<td>10.8</td>
<td>11.6</td>
<td>n/a</td>
</tr>
</tbody>
</table>

* Based on data through February 2010.
** Based on data through March 2010.

Source: Bureau of Economic Analysis, Autodata Corporation
Auto Sales

% Change - Year to Year

Source: Autodata Corporation
Source: University of Michigan, ABC News, Washington Post, and the Conference Board
Employment Cost Index: Private Industry Workers

% Change - Year to Year


Source: Bureau of Labor Statistics
Wages and Earnings: Total Private Industries

Source: Bureau of Labor Statistics
Wages and Earnings: Service-Providing Industries

Average Hourly Earnings

ECI: Wages

Source: Bureau of Labor Statistics
Wages and Earnings: Goods-Producing Industries

% Change - Year to Year

Source: Bureau of Labor Statistics

ECI: Wages

Average Hourly Earnings
Three Measures of Employment

Source: ADP and Bureau of Labor Statistics
Three Measures of Employment
12-month moving average of 1-month changes

Source: ADP and Bureau of Labor Statistics
An Alternative Measure of Employment Changes
12-month moving average of 1-month changes

% Change
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4

2002 2003 2004 2005 2006 2007 2008 2009 2010

% Change
0.2
0.1
0.0
-0.1
-0.2
-0.3
-0.4

Source: ADP and Bureau of Labor Statistics

* Weighted average of payroll, household adjusted to total payroll basis, and ADP using principal components.
Single-Family Housing Starts
(Series Set to 1.0 at Housing Start Peak)

1993-1995 Cycle
Current Cycle
Late 1970s Cycle

Ratio

Quarters Since Single-Family Housing Starts Peak

March Number
Forecast

Source: Census Bureau
Single-Family Housing Permits
(Series Set to 1.0 at Housing Start Peak)

Ratio

Quarters Since Single-Family Housing Starts Peak

Source: Census Bureau
Single-Family New Home Sales
(Series Set to 1.0 at Housing Start Peak)

Source: Census Bureau
Single-Family Existing Home Sales
(Series Set to 1.0 at Housing Start Peak)

Source: Census Bureau
New Home Inventory / Sales Ratio
(Series Set to 0.0 at Housing Start Peak)

Source: Census Bureau
Private Nonresidential Construction

% Change - Year to Year

Source: Census Bureau
Pending and Existing Home Sales

Source: National Association of Realtors

Note: For proper comparison, pending sales data leads existing sales by two months.
Pending and Existing Home Sales

Source: National Association of Realtors

Note: For proper comparison, pending sales data leads existing sales by two months.
Ratio of Housing Starts to Population
Single-Family Homes

Starts per 1,000 people

Source: Census Bureau
Ratio of Sales to Population
Single-Family Homes
Sales per 1,000 People

Source: Census Bureau
## Industrial Production: Manufacturing Output

*(percent change at an annual rate)*

<table>
<thead>
<tr>
<th></th>
<th>24 Month</th>
<th>12 Month</th>
<th>6 Month</th>
<th>3 Month</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>-5.6</td>
<td>4.6</td>
<td>5.8</td>
<td>8.4</td>
<td>11.4</td>
</tr>
<tr>
<td><strong>Durable Goods</strong></td>
<td>-8.1</td>
<td>6.0</td>
<td>7.9</td>
<td>12.2</td>
<td>18.0</td>
</tr>
<tr>
<td>Wood Products</td>
<td>-14.1</td>
<td>0.2</td>
<td>-3.2</td>
<td>3.1</td>
<td>15.7</td>
</tr>
<tr>
<td>Nonmetallic Mineral Products</td>
<td>-12.6</td>
<td>-2.6</td>
<td>-10.4</td>
<td>2.5</td>
<td>19.9</td>
</tr>
<tr>
<td>Primary Metals</td>
<td>-12.3</td>
<td>40.2</td>
<td>34.8</td>
<td>16.0</td>
<td>23.8</td>
</tr>
<tr>
<td>Fabricated Metals</td>
<td>-10.0</td>
<td>0.9</td>
<td>9.0</td>
<td>10.2</td>
<td>14.0</td>
</tr>
<tr>
<td>Machinery</td>
<td>-11.1</td>
<td>2.3</td>
<td>20.0</td>
<td>19.8</td>
<td>15.8</td>
</tr>
<tr>
<td>Computers and Electronic Equipment</td>
<td>-1.7</td>
<td>11.3</td>
<td>18.6</td>
<td>28.2</td>
<td>26.5</td>
</tr>
<tr>
<td>Electrical Equipment, Appliances, and Components</td>
<td>-5.6</td>
<td>1.6</td>
<td>7.4</td>
<td>22.2</td>
<td>24.4</td>
</tr>
<tr>
<td>Motor Vehicles and Parts</td>
<td>-10.8</td>
<td>24.3</td>
<td>5.3</td>
<td>12.2</td>
<td>29.4</td>
</tr>
<tr>
<td>Aerospace and Misc. Transportation Equipment</td>
<td>-5.6</td>
<td>-4.6</td>
<td>-9.3</td>
<td>-1.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Furniture and Related Products</td>
<td>-14.9</td>
<td>-8.1</td>
<td>-1.7</td>
<td>1.8</td>
<td>30.2</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>-1.3</td>
<td>3.8</td>
<td>2.3</td>
<td>1.0</td>
<td>4.2</td>
</tr>
<tr>
<td><strong>Nondurable Goods</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food, Beverages, and Tobacco</td>
<td>-2.4</td>
<td>4.2</td>
<td>4.9</td>
<td>7.0</td>
<td>7.4</td>
</tr>
<tr>
<td>Textile Mill Products</td>
<td>0.1</td>
<td>3.4</td>
<td>6.6</td>
<td>9.9</td>
<td>7.9</td>
</tr>
<tr>
<td>Apparel Products</td>
<td>-8.2</td>
<td>6.5</td>
<td>15.0</td>
<td>1.9</td>
<td>-3.7</td>
</tr>
<tr>
<td>Paper</td>
<td>-5.6</td>
<td>3.0</td>
<td>17.0</td>
<td>18.8</td>
<td>3.6</td>
</tr>
<tr>
<td>Printing and Related Activities</td>
<td>-6.4</td>
<td>5.3</td>
<td>-1.4</td>
<td>-3.8</td>
<td>-5.6</td>
</tr>
<tr>
<td>Chemicals</td>
<td>-6.4</td>
<td>5.3</td>
<td>-1.4</td>
<td>-3.8</td>
<td>-5.6</td>
</tr>
<tr>
<td>Petroleum and Coal</td>
<td>-2.2</td>
<td>-2.5</td>
<td>-5.1</td>
<td>8.7</td>
<td>42.7</td>
</tr>
<tr>
<td>Plastics and Rubber</td>
<td>-5.8</td>
<td>8.4</td>
<td>14.7</td>
<td>17.1</td>
<td>22.2</td>
</tr>
</tbody>
</table>

**Memo Item: Special Aggregates**

|                      |          |          |         |         |         |
| IT Equipment         | -3.9     | 14.2     | 22.0    | 33.1    | 24.9    |
| Motor Vehicles and Parts | -10.8 | 24.3     | 5.3     | 12.2    | 29.4    |
| Nonenergy, Non IT, Non Auto | -5.4 | 3.1     | 4.9     | 6.9     | 9.1     |

Source: Federal Reserve Board

Note: Data through March 2010.
ISM Manufacturing Index

Source: Institute for Supply Management
Components of ISM Manufacturing Index

Source: Institute for Supply Management
Components of ISM Manufacturing Index

Supplier Deliveries

Inventories

Source: Institute for Supply Management
ISM Manufacturing Price Index

Source: Institute for Supply Management
ISM Non-Manufacturing Index

Source: Institute for Supply Management
ISM Non-Manufacturing Price Index

Source: Institute for Supply Management
Inventory / Sales: Total Business

Source: Census Bureau
Michigan Survey Inflation Expectations: 1 Year Ahead

Source: University of Michigan
Michigan Survey Inflation Expectations: 5-10 Years Ahead

Source: University of Michigan
Producer Price Index

% Change - Year to Year

Total Finished Goods

Core Finished Goods

Source: Bureau of Labor Statistics
## Real Personal Consumption Expenditures

(percent change at an annual rate)

### Real Personal Consumption Expenditures

(percent change at an annual rate)

<table>
<thead>
<tr>
<th>2010Q1 Nominal Share</th>
<th>24 Months</th>
<th>12 Months</th>
<th>6 Months</th>
<th>3 Months</th>
<th>1 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Consumption Expenditures</td>
<td>100.0</td>
<td>0.3</td>
<td>2.4</td>
<td>4.0</td>
<td>4.7</td>
</tr>
<tr>
<td>Durable Goods</td>
<td>10.3</td>
<td>0.1</td>
<td>10.2</td>
<td>20.0</td>
<td>17.7</td>
</tr>
<tr>
<td>Motor vehicles and parts</td>
<td>3.1</td>
<td>-5.5</td>
<td>8.9</td>
<td>36.5</td>
<td>16.0</td>
</tr>
<tr>
<td>Furnishings and durable household equipment</td>
<td>2.5</td>
<td>-0.2</td>
<td>8.9</td>
<td>14.4</td>
<td>16.5</td>
</tr>
<tr>
<td>Other durable goods</td>
<td>1.4</td>
<td>-0.1</td>
<td>8.0</td>
<td>12.8</td>
<td>25.6</td>
</tr>
<tr>
<td>Nondurable goods</td>
<td>22.5</td>
<td>0.0</td>
<td>2.3</td>
<td>3.8</td>
<td>7.1</td>
</tr>
<tr>
<td>Food and beverages purchased for off-premises consumption</td>
<td>7.8</td>
<td>0.4</td>
<td>3.9</td>
<td>3.0</td>
<td>5.6</td>
</tr>
<tr>
<td>Clothing and shoes</td>
<td>3.2</td>
<td>-0.4</td>
<td>5.3</td>
<td>11.3</td>
<td>20.9</td>
</tr>
<tr>
<td>Gasoline, fuel oil, and other energy goods</td>
<td>3.5</td>
<td>-1.4</td>
<td>-1.3</td>
<td>0.4</td>
<td>4.6</td>
</tr>
<tr>
<td>Other nondurable goods</td>
<td>7.9</td>
<td>0.5</td>
<td>1.2</td>
<td>3.1</td>
<td>4.4</td>
</tr>
<tr>
<td>Services</td>
<td>67.2</td>
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<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td>Housing services</td>
<td>15.3</td>
<td>0.8</td>
<td>0.6</td>
<td>0.6</td>
<td>0.6</td>
</tr>
<tr>
<td>Household utilities</td>
<td>3.0</td>
<td>0.9</td>
<td>2.6</td>
<td>5.6</td>
<td>-6.1</td>
</tr>
<tr>
<td>Gas and electric</td>
<td>2.2</td>
<td>1.3</td>
<td>3.8</td>
<td>7.9</td>
<td>-8.4</td>
</tr>
<tr>
<td>Transportation services</td>
<td>3.0</td>
<td>-2.2</td>
<td>2.2</td>
<td>0.8</td>
<td>0.1</td>
</tr>
<tr>
<td>Medical care services</td>
<td>16.1</td>
<td>1.9</td>
<td>2.1</td>
<td>2.3</td>
<td>1.9</td>
</tr>
<tr>
<td>Recreation services</td>
<td>3.7</td>
<td>-0.3</td>
<td>0.9</td>
<td>3.2</td>
<td>7.9</td>
</tr>
<tr>
<td>Food services and accomodations</td>
<td>6.0</td>
<td>-0.3</td>
<td>2.2</td>
<td>6.9</td>
<td>11.8</td>
</tr>
<tr>
<td>Other</td>
<td>9.3</td>
<td>0.5</td>
<td>0.0</td>
<td>0.2</td>
<td>-0.7</td>
</tr>
<tr>
<td>Energy goods and services</td>
<td>5.7</td>
<td>-0.6</td>
<td>0.5</td>
<td>3.1</td>
<td>-0.6</td>
</tr>
<tr>
<td>PCE less food and energy</td>
<td>86.5</td>
<td>0.4</td>
<td>2.4</td>
<td>4.1</td>
<td>4.9</td>
</tr>
<tr>
<td>PCE less autos and household utilities</td>
<td>93.9</td>
<td>0.6</td>
<td>2.2</td>
<td>2.9</td>
<td>4.6</td>
</tr>
</tbody>
</table>

Source: Bureau of Economic Analysis

Note: Data through March 2010.
Real PCE, Disposable Income and Personal Savings

% Change - Year to Year

Billions of Dollars

Source: Bureau of Economic Analysis