The Art of Economic Forecasting & the US Economic Outlook

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The Art of Economic Forecasting

I. The Problem: The Plight of the Fortune Tellers
II. Types of Forecasting
III. Our Model: The Narrative
IV. The Output: GDP, Employment, Inflation, Interest Rates

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The Problem: The Plight of the Fortune Tellers
The Problem: How do we make decisions about the future in a world of uncertainty?

Where is the economy headed?

What is the path of interest rates?

What are the inflation/deflation risks?

The Cardsharps, Cavaggio (1594)
<table>
<thead>
<tr>
<th>Meteorology</th>
<th>Economics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical science- Measurable</td>
<td>Social science- Challenging</td>
</tr>
<tr>
<td>Rain</td>
<td>Human Beings</td>
</tr>
<tr>
<td>Snow</td>
<td>Human Choice</td>
</tr>
<tr>
<td>Wind</td>
<td>Data Availability</td>
</tr>
<tr>
<td>Laboratory Experiments</td>
<td>History, But Few Labs</td>
</tr>
</tbody>
</table>

“Most fundamentally, and perhaps most challenging for researchers, the crisis should motivate economists to think further about their modeling of human behavior.” – Ben Bernanke commenting on economics in the wake of the financial crisis
Types of Forecasts
# Types of Forecasts

<table>
<thead>
<tr>
<th>Forecast Type</th>
<th>Example</th>
</tr>
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<tbody>
<tr>
<td>“Theory-free” forecasts</td>
<td>Leading Indicators</td>
</tr>
<tr>
<td>Mathematical “models” of the economy</td>
<td>The Fed Model</td>
</tr>
<tr>
<td>Market-based models</td>
<td>The Yield Curve</td>
</tr>
<tr>
<td>“The Mental Model”</td>
<td>Combines narrative + economic indicators + market-based indicators</td>
</tr>
</tbody>
</table>

“Human behavior is simply too complex and nuanced to be fully represented mathematically, at least with the maths known to modern man. Maths can help us to gain insight into economic processes, but it is not the only way to gain such insight, nor even the most productive.” -- DeLisle Worrell, Governor of the Central Bank of Barbados
Theory-Free Example: The US Index of Leading Economic Indicators and GDP Growth

Composite index of 10 leading indicators (Left)
Real Gross Domestic Product (Right)

Recession Periods – United States

Indicating a slower pace of expansion

Quarter-over-Quarter Annualized Percent Change

Sources: The Conference Board and The Commerce Department
### What Are The Leading Economic Indicators (LEI) Telling Us?

<table>
<thead>
<tr>
<th>Financial Indicators</th>
<th>Lead Time (months)</th>
<th>Reliability</th>
<th>Growth Momentum (3-Month Change)</th>
<th>Pointing to Double-Dip?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield Curve</td>
<td>12 to 24</td>
<td>High</td>
<td>Slowing</td>
<td>X</td>
</tr>
<tr>
<td>M2</td>
<td>12 to 24</td>
<td>Low</td>
<td>Stable</td>
<td>X</td>
</tr>
<tr>
<td>Stock Prices</td>
<td>3 to 6</td>
<td>Medium</td>
<td>Slowing</td>
<td>X</td>
</tr>
<tr>
<td>Real Indicators</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Existing Home Sales</td>
<td>6 to 9</td>
<td>High</td>
<td>Negative</td>
<td>X</td>
</tr>
<tr>
<td>ISM Manufacturing Index</td>
<td>3 to 6</td>
<td>High</td>
<td>Slowing</td>
<td>X</td>
</tr>
<tr>
<td>Consumer Expectations</td>
<td>3 to 6</td>
<td>Low</td>
<td>Slowing</td>
<td>X</td>
</tr>
<tr>
<td>New Orders for Durable Goods</td>
<td>1 to 3</td>
<td>High</td>
<td>Negative</td>
<td>X</td>
</tr>
<tr>
<td>Unemployment Insurance Claims</td>
<td>1 to 3</td>
<td>Medium</td>
<td>Slowing</td>
<td>X</td>
</tr>
<tr>
<td>Average Weekly Hours</td>
<td>1 to 3</td>
<td>High</td>
<td>Stable</td>
<td>X</td>
</tr>
</tbody>
</table>

Last Updated: 9/30/2010
The Yield Curve Is Indicating Moderate Yet Positive Growth

LEI Component - Yield Curve
Reliability - High
Momentum - Slowing
Double Dip? – No
Lead time 1-2 years

US Treasury Yield Curve (10Yr - 2Yr) (Left)
US Gross Domestic Product (Right)

Recession Periods - United States

Year-to-Year Percent Change

Sources: Federal Reserve and the Commerce Department
The Money Supply Is Expanding

LEI Component – M2
Reliability - Low
Momentum - Stable
Double Dip? – No
Lead time 1-2 years

Money Supply M2 (Left)
National Product Account GDP (Right)

Recession Periods - United States

Source: The Federal Reserve

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Stocks Prices Are Lower But Still Above Year-Ago Levels

LEI Component – Stock Prices
Reliability: Medium
Momentum: Slowing
Double Dip? – No
Lead time: 3-6 mos

S&P 500 Stock Price Index
Recession Period - United States

Year-to-Year Percent Change

©FactSet Research Systems
Source: Standard & Poor's
Post Tax-Credit, Home Sales Suffer

LEI Component – Home Sales

Reliability - High
Maybe
Momentum - Negative

Double Dip? – Lead time 6-9 mos

US Existing-Home Sales (Left)

US Real Gross Domestic Product (Right)

Recession Periods - United States

Impact of the Federal Home buyer Tax Credit

Sources: National Association of Realtors and Commerce Department
Business Investment is Likely to Moderate

LEI Component – ISM

- Reliability: High
- Momentum: Slowing
- Double Dip? – No
- Lead time 3-6 mos

ISM Manufacturing Index (Right)
Business Investment (Left)
Recession Periods - United States

Year to Year Percent Change

Sources: Institute for Supply Management and the Commerce Department
Consumer Spending May Also Moderate

LEI Component – Consumer Expectation
Reliability - Low
Momentum - Slowing
Double Dip? – No
Lead time 3-6 mos

The Conference Board Consumer Confidence Expectations (Left)
Real Consumer Spending (Right)

Sources: The Conference Board and The Commerce Department
Non-Defense Capital Expenditures Growth is Still Strong

- Business Investment (Left)
- Capital Expenditure Excluding Aircraft and Defense (Right)

Recession Periods - United States

Sources: Census Department and the Commerce Department

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Reliability - High
Momentum - Negative
Double Dip? - No
Lead time 1-3 mos
Average Workweek and Jobless Claims Stabilizing

LEI Component

- Reliability: High
- Momentum: Stable
- Double Dip?: No
- Lead time: 1-3 mos

Initial Claims for Unemployment Insurance (Right)

Average Workweek (Left)

Recession Periods - United States

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Workweek (Hours)</th>
<th>Average Manufacturing Workweek (Hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>42.5</td>
<td>41.5</td>
</tr>
<tr>
<td>2001</td>
<td>43.5</td>
<td>42</td>
</tr>
<tr>
<td>2002</td>
<td>44.5</td>
<td>43</td>
</tr>
<tr>
<td>2003</td>
<td>45.5</td>
<td>44</td>
</tr>
<tr>
<td>2004</td>
<td>46.5</td>
<td>45</td>
</tr>
<tr>
<td>2005</td>
<td>47.5</td>
<td>46</td>
</tr>
<tr>
<td>2006</td>
<td>48.5</td>
<td>47</td>
</tr>
<tr>
<td>2007</td>
<td>49.5</td>
<td>48</td>
</tr>
<tr>
<td>2008</td>
<td>50.5</td>
<td>49</td>
</tr>
<tr>
<td>2009</td>
<td>51.5</td>
<td>50</td>
</tr>
<tr>
<td>2010</td>
<td>52.5</td>
<td>51</td>
</tr>
</tbody>
</table>

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Abstracting Further…

Standard Regression Model:

\[ Y = \alpha + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \varepsilon \]

Example IS (Investment-Savings) Equation of a National Economy

\[ Y = C(Y-T(Y)) + I(i) + G + NX(Y) \]
Example: Market-Based Model

Probability of US Recession Predicted by Treasury Spread*
Twelve Months Ahead (month averages)

* Parameters estimated using data from January 1959 to December 2009, recession probabilities predicted using data through September 2010. The parameter estimates are $\alpha=0.533$, $\beta=0.633$.

Source: New York Federal Reserve Bank

Updated October 4, 2010
Our Model: The Narrative
“Shadow Banking” System vs. The Traditional Banking System

"Shadow Banking" (Repo, GSEs, ABS, CDOs, VRDNs, etc.)* System Liabilities
George Bailey "It's A Wonderful Life" Traditional Banking System Liabilities

George Bailey's system dominated here

Source: Federal Reserve,*=Shadow Banks are financial intermediaries without access to central bank liquidity or public sector guarantees (Pozar, Adrian, Ashcraft, Boesky, 2010)
Post-Credit Crisis Means Slower Growth

Recession Begins

* Real GDP is indexed to 100 at the onset of the recession.

Where We Are Today

Sources: Commerce Department, Payden & Rygel Estimates
Slow Growth Won’t Bring Down the Unemployment Rate

Recovery Begins (July 2009 estimated)

Job creation has not reached “escape velocity”

Source: BLS

Nonfarm Private Payrolls, Monthly Increase/Decrease

300K Needed for “robust” growth

150K To achieve 8% unemployment by 2012
It’s Taking Workers Far Longer To Shift to New Jobs

The average length of unemployment has more than doubled during the recession. The dramatic rise is partially attributable to a worker-job mismatch.

Source: BLS
Current Inflation Rates Are Lowest in 50 Years

Core CPI
Lowest level in 30 years…and below implicit “target zone”

...but not outright deflation

Source: BLS
Consumer Price Inflation Always Preceded By Money and Credit Growth

*Payden & Rygel Money Supply Measure is based on research on traditional bank liabilities + "shadow banking" liabilities

Source: Federal Reserve, Labor Department
Understanding Monetary Policy Goals in One Picture

The Fed wants to increase aggregate demand (spending); if people think prices are set to rise they will increase their spending.
Monetary Policy Scorecard Makes “Quantitative Easing 2” Likely

The Federal Reserve's mandate is "to promote effectively the goals of maximum employment, stable prices, and moderate long-term interest rates" (1977 Federal Reserve Act). Today this is referred to as the "dual mandate" since long-term interest rates can only remain moderate in a stable macroeconomic environment. In the wake of unprecedented monetary policy actions, how has the Fed fared?

<table>
<thead>
<tr>
<th>Macroeconomic Category</th>
<th>Indicator</th>
<th>Policy Goal</th>
<th>Current Reading</th>
<th>Year Ago Reading</th>
<th>Meeting Goal?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>Unemployment Rate</td>
<td>5-7%</td>
<td>9.6%</td>
<td>9.7%</td>
<td>No</td>
</tr>
<tr>
<td>Inflation</td>
<td>Core CPI (year-over-year)</td>
<td>1.5% - 2%</td>
<td>0.95%</td>
<td>1.6%</td>
<td>No</td>
</tr>
<tr>
<td>Payroll Growth</td>
<td>Non-Farm Payrolls (monthly change)</td>
<td>150,000-300,000</td>
<td>-39,000</td>
<td>-197,000</td>
<td>No</td>
</tr>
</tbody>
</table>
Further Ammunition: What Options Are Available?

I Long-Term Treasury Purchases (“Quantitative Easing” or “QE2”)

II More Likely Before Year-End

III Communication Strategy

IV Less Likely

Reduce Interest Paid on Reserves

Raise Inflation Target

The Fed’s Balance Sheet Is An Instrument of Monetary Policy

The Fed has begun reinvesting the proceeds from maturing mortgages into long-term US Treasuries.

“If action is taken by the Fed, a clear option is to grow the size of the balance sheet since the policy interest rate, for all practical purposes, cannot go any lower” – Dennis P. Lockhart, President, Federal Reserve Bank of Atlanta, 9/28/2010

Source: Committee for a Responsible Federal Budget
Paid for With “Bank Reserves” Created By the Fed on the Liability Side “Out of Thin Air”
Would Further “QE” Have an Impact?

On the Real Economy? Probably Not

On Capital Markets? Yes
The Limits of QE: Banks Accumulate Excess Reserves, Not New Loans

In textbooks, reserves work through the “money multiplier” to increase aggregate lending and demand.

The banks are hoarding money…

…and not making new loans.

Source: Federal Reserve
Commercial Banks Appear to Be Hoarding Cash

Assets Of Commercial Banks, Cash Assets, Bil. (Left)
Excess Reserves Of Depository Institutions (Right)
Non-Financial Corporations Also Appear to Be Hoarding Cash

Graph showing the increase in total liquid assets held by nonfarm nonfinancial corporate business from 1946 to 2008.
"It is hard to see how the Fed can do much to cure this [worker mismatch] problem. Monetary stimulus has provided conditions so that manufacturing plants want to hire new workers. **But the Fed does not have a means to transform construction workers into manufacturing workers.**"

-Narayan Kocherlakota, Minneapolis Fed President
The Impact of QE on the Capital Markets: Reducing Total Debt Outstanding Exerts Downward Pressure on Interest Rates

The increase in public debt (net of Fed purchases) is dwarfed by the decline in private sector debt.

Source: Federal Reserve
Meanwhile, Investor Demand for Bonds Has Surged

Year-to-Date Flows By Fund Type, USD Billions

“Their purchases of Treasury, agency debt, and agency MBS likely both reduced the yields on those securities and also pushed investors into holding other assets with similar characteristics, such as credit risk and duration. For example, some investors who sold MBS to the Fed may have replaced them in their portfolios with longer-term, high-quality corporate bonds, depressing the yields on those assets as well.” - Ben Bernanke, August 27, 2010

The Portfolio Balance Effect

Source: ICI
The Implication of Low Rates for Corporations

Terming Out of Debt

- (%) Short-Term Debt As A Percent Of Credit Market Debt (Left)
- US Treasury Constant Maturity - 10 Year - Yield (Right)

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The Contributions to Growth By Major Sector

Q3 2010 Real GDP Growth = 2.0%

Sustainable Drivers of Growth
Temporary Drivers of Growth

Source: The Commerce Department
Trade Is A Growing, Important Part of the Economy

Exports + Imports as a % of GDP

Share of GDP


Source: Census Bureau
Most of the World’s Economic Activity Is Outside the US

The world's economic centre of gravity is again shifting. With the integration of one-third of humanity into the global economy, the world is rapidly becoming multi-polar.”

- Mark Carney, Bank of Canada Governor

Average global life expectancy in 1800: 30 years
Average global life expectancy in 2010: 67 years
The Output: GDP, Employment, Inflation, Interest Rates
The Output: GDP, Employment, Inflation, Interest Rates

“I can calculate the motions of heavenly bodies, but not the madness of people.” – Sir Isaac Newton

<table>
<thead>
<tr>
<th></th>
<th>Actual</th>
<th>Forecast</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2010</td>
<td>2011</td>
</tr>
<tr>
<td></td>
<td>Q1</td>
<td>Q2</td>
</tr>
<tr>
<td>Real GDP (quarter-to-quarter annualized percent change)</td>
<td>3.7</td>
<td>1.6</td>
</tr>
<tr>
<td>Unemployment Rate (percent)</td>
<td>9.7</td>
<td>9.7</td>
</tr>
<tr>
<td>Headline CPI Inflation (year-over-year percent change)</td>
<td>2.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Core CPI Inflation (year-over-year percent change)</td>
<td>1.3</td>
<td>1.0</td>
</tr>
<tr>
<td>Federal Funds Rate (percent)</td>
<td>&lt;0.25</td>
<td>&lt;0.25</td>
</tr>
<tr>
<td>2-Year Treasury (percent)</td>
<td>1.05</td>
<td>0.60</td>
</tr>
<tr>
<td>10-Year Treasury</td>
<td>3.71</td>
<td>3.49</td>
</tr>
</tbody>
</table>

*Data represent quarterly averages
The Risks to the Forecast

“I can calculate the motions of heavenly bodies, but not the madness of people.” – Sir Isaac Newton

State & Local Government Fiscal/Debt
Deflation
Fiscal/Regulatory Uncertainty
Housing Market Supply Overhang
International Currency War