

The 2008/2009 Recession

Lessons from forecast errors

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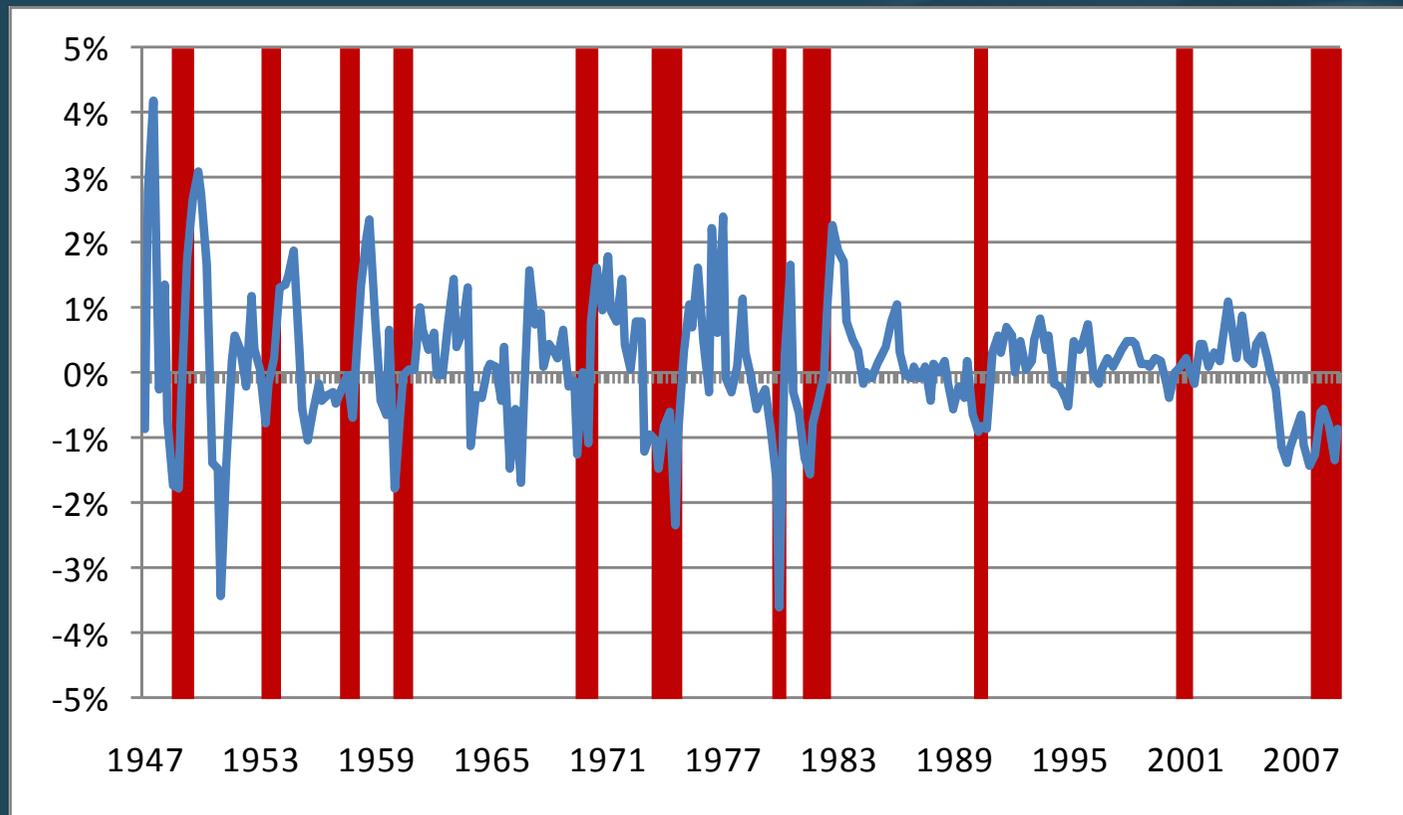
- ◆ Housing And Recessions:
 - Residential construction and Recessions
 - The Rating Agency Forecast Debacle
- ◆ The Recession Call
 - Calling it (some did) and being right (none were) – the lesson of fat tails
- ◆ The Recovery
 - How do we forecast it?
- ◆ The Art of Economic Forecasting
 - Use of theory



HOUSING AND RECESSIONS

Predicting Recessions: The False Positive

- ◆ housing and recessions – strong correlation
- ◆ 2 false positives explained by defense spending



Forecasting Recessions using housing correlations

◆ Forecast the change

linear econometric models

$$\begin{aligned} \% \Delta(\text{GDP}_t) = & \\ & \beta_0 + \beta_1 * \% \Delta(\text{Building Permits}_t) + \\ & \beta_2 * \% \Delta(\text{interest rates}_t) + \beta_3 * \% \Delta(\text{real} \\ & \text{defense spending}_t) + \dots u_t \end{aligned}$$

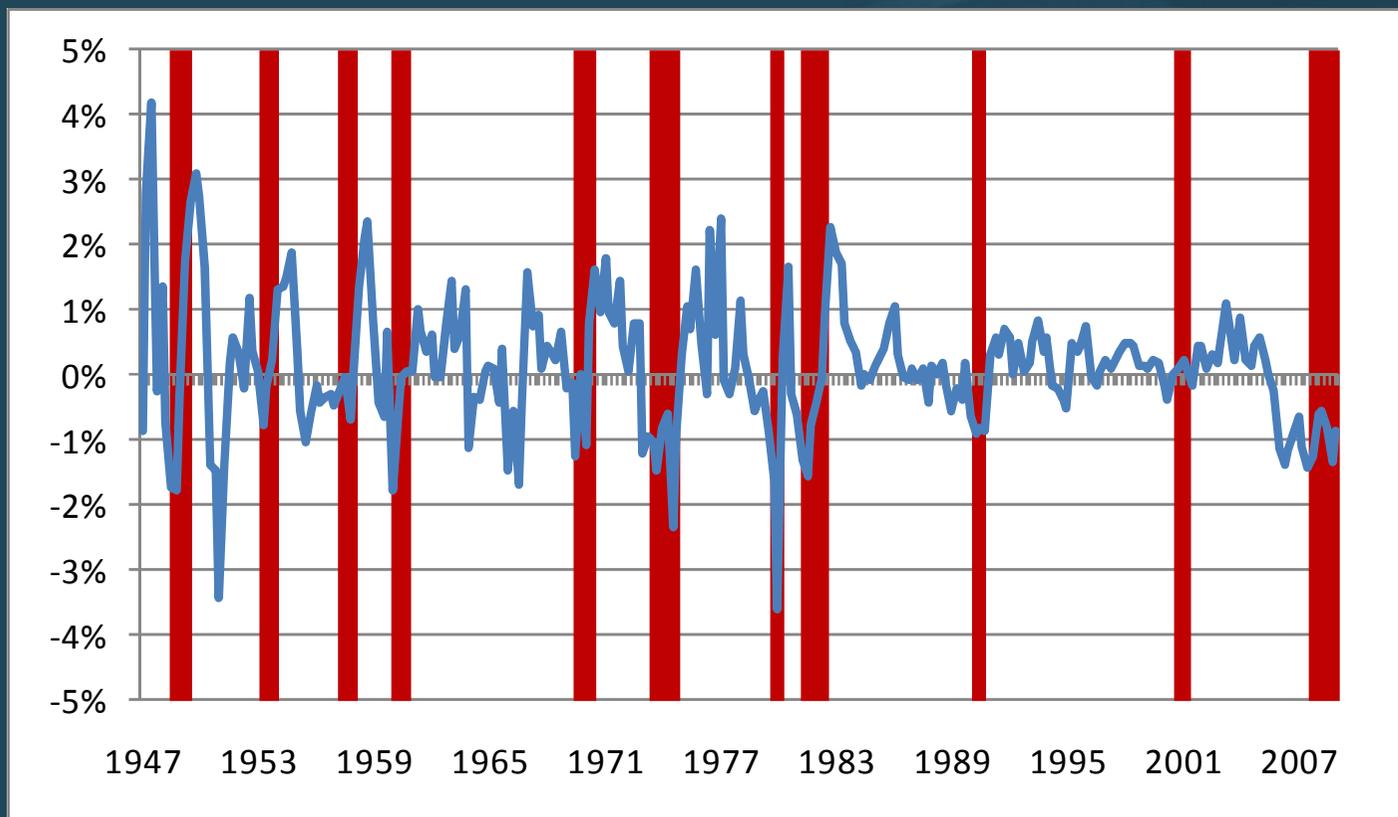
◆ Forecast the probability of change

logit models

$$\begin{aligned} P(\text{Recession} | x) = & \\ & (1 + \exp\{\beta_0 + \beta_1 * \log(\text{Building Permits}_t) + \\ & \beta_2 * \log(\text{interest rates}_t) + \dots\})^{-1} \end{aligned}$$

Model based forecast would have been wrong

- ◆ Using either levels or probabilities predicts a recession in 2006 and 2007



Why did housing yield a false positive and a false negative?

- ◆ Historically, delinquencies and foreclosures coincided with the job loss of recession.

credit based mortgages

- ◆ In this cycle, delinquencies and foreclosures are an affordability problem not a job problem

asset based mortgages

When the underlying structure changes strict reliance on classical econometric models is inappropriate

◆ Add factors

- Change model equations by adding a variable $\xi_{i,t}$ to the r.h.s of model i equation
- Choose value for $\xi_{i,t}$ which will yield desired value of endogenous variable $Y_{i,t}$

◆ Bayesian models

- Difficult to specify priors when the underlying fundamentals have changed
- Priors will move model results by changing parameters rather than inputs

The lesson of housing correlations

- Economic theory is a way of organizing our thoughts about the economy
- Econometric models are a way of quantifying those thoughts

But

- None rise to the level of scientific constants and therefore the forecaster has to be aware of changing underlying environments



THE RECESSION CALL

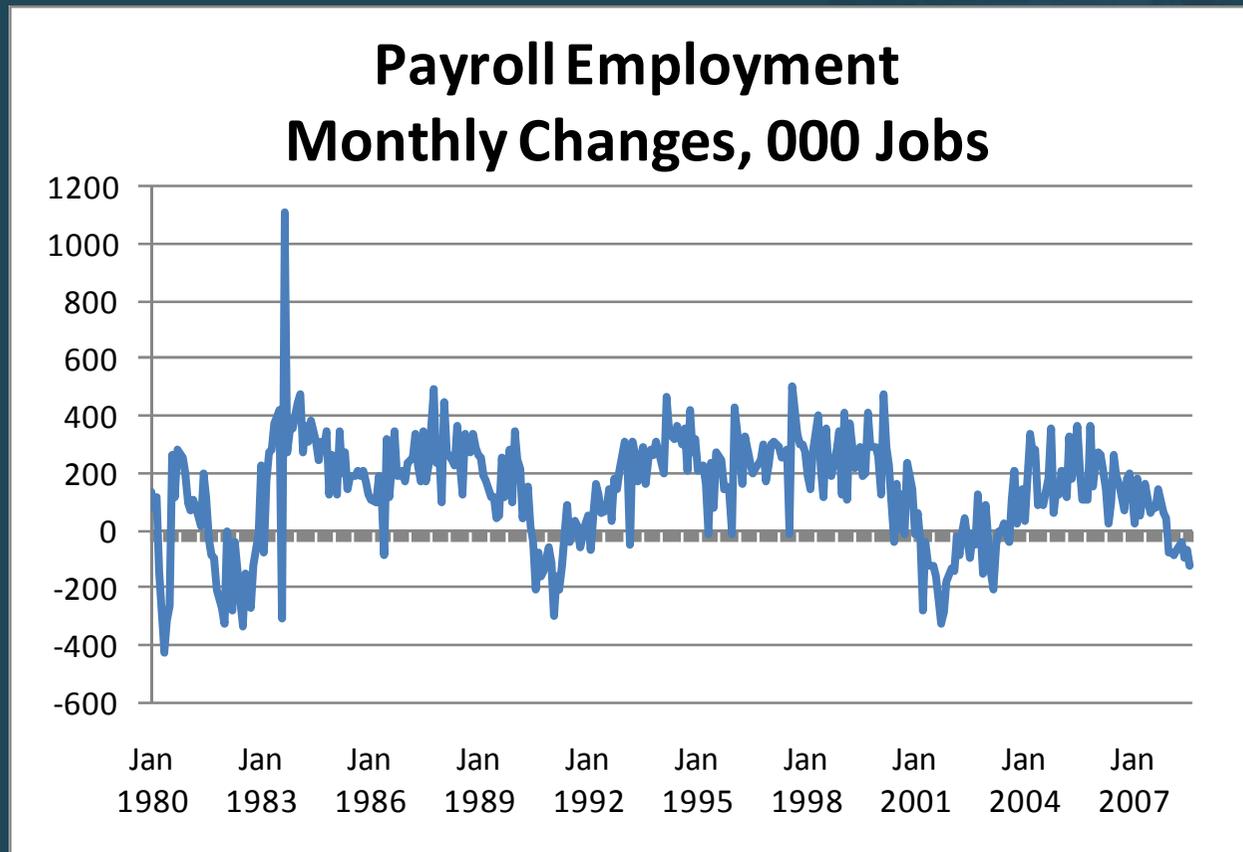
What is a recession?

- ◆ Recessions are called by the NBER
 - Specific patterns of income and employment
 - Called beginning December 2007
- ◆ Two recessions
 - December '07 to August '08 the non-recession recession
 - September '08 begins the real recession

Definitions are important!

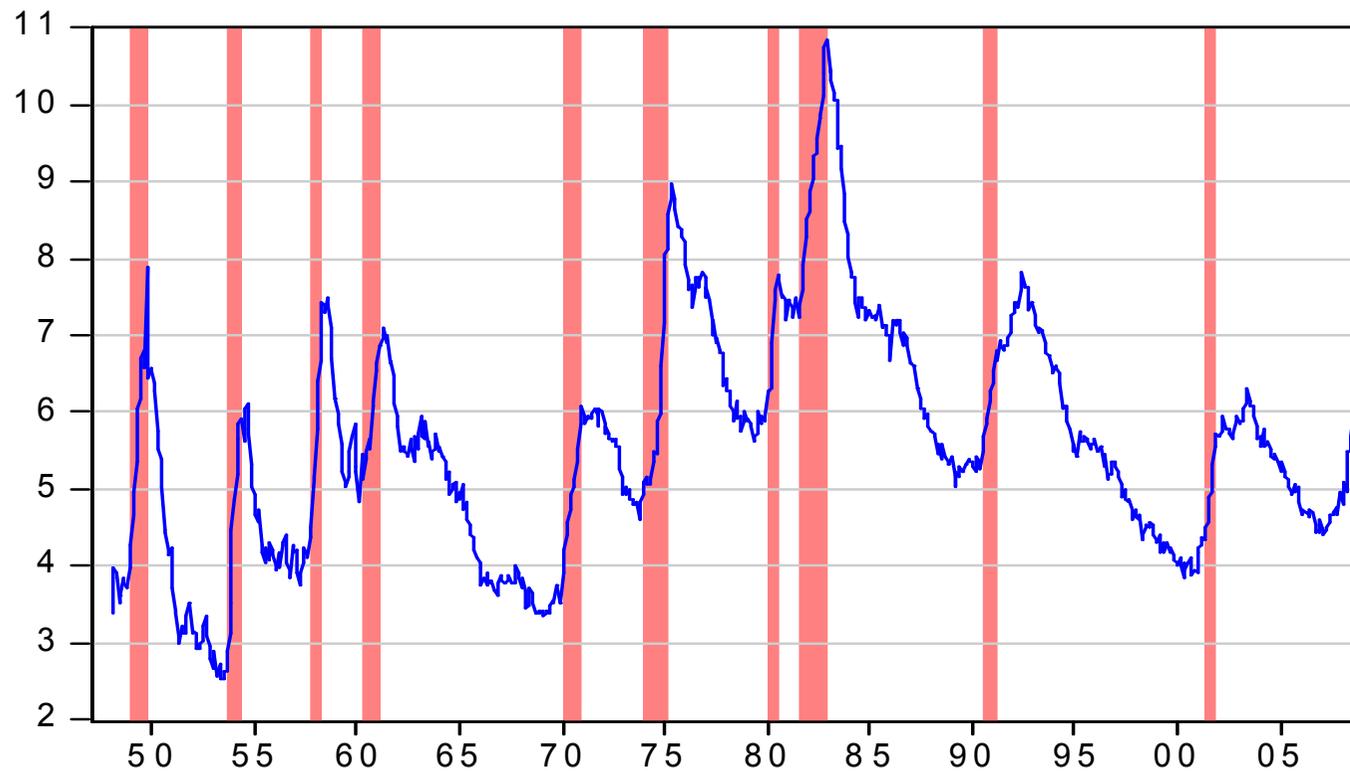
The Data – Early 2008

Payroll Jobs

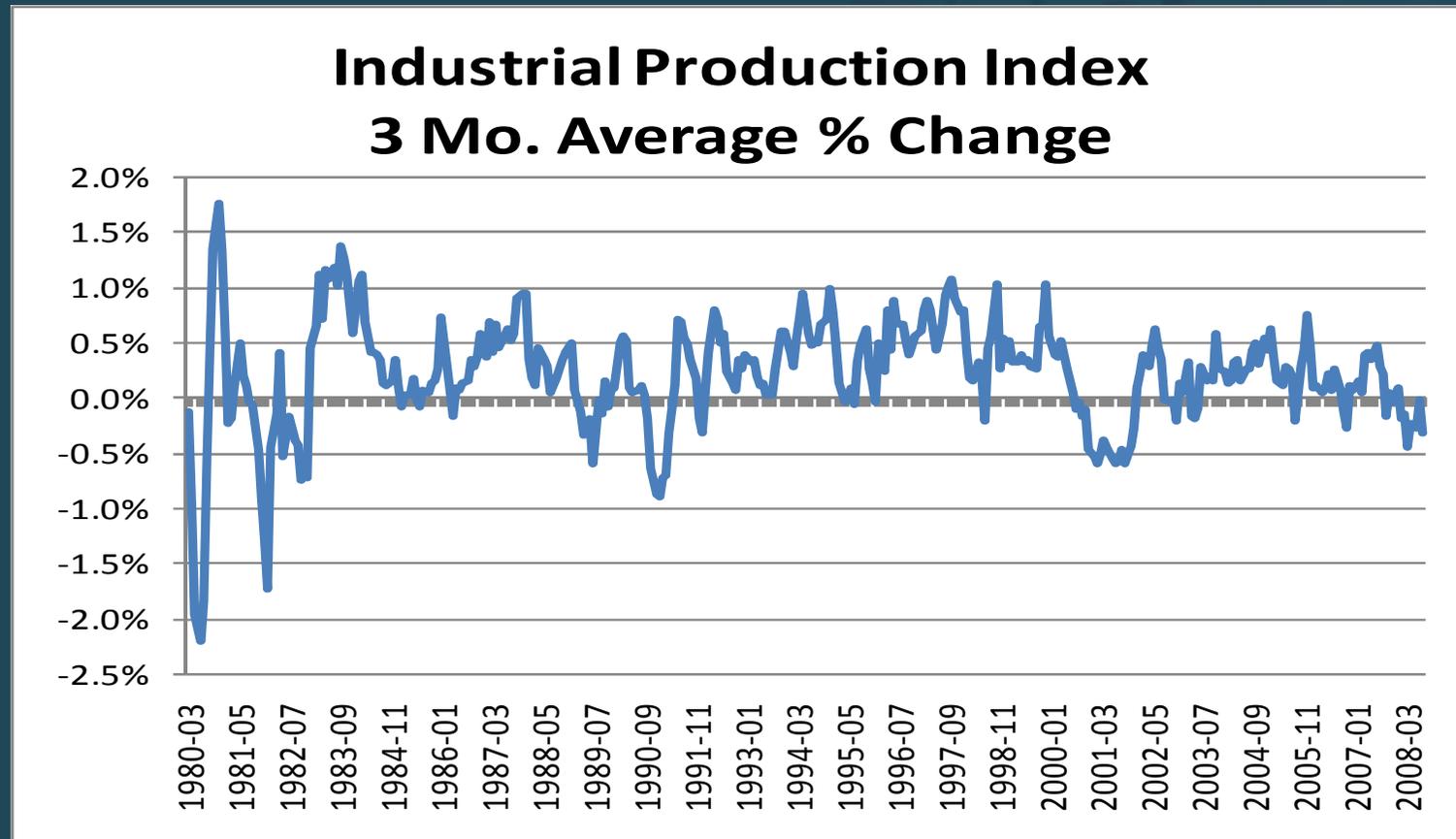


The Data – Early 2008: Unemployment

Civilian Unemployment Rate Through Aug 2008
NBER Recessions Shaded: Peak+1 to Trough

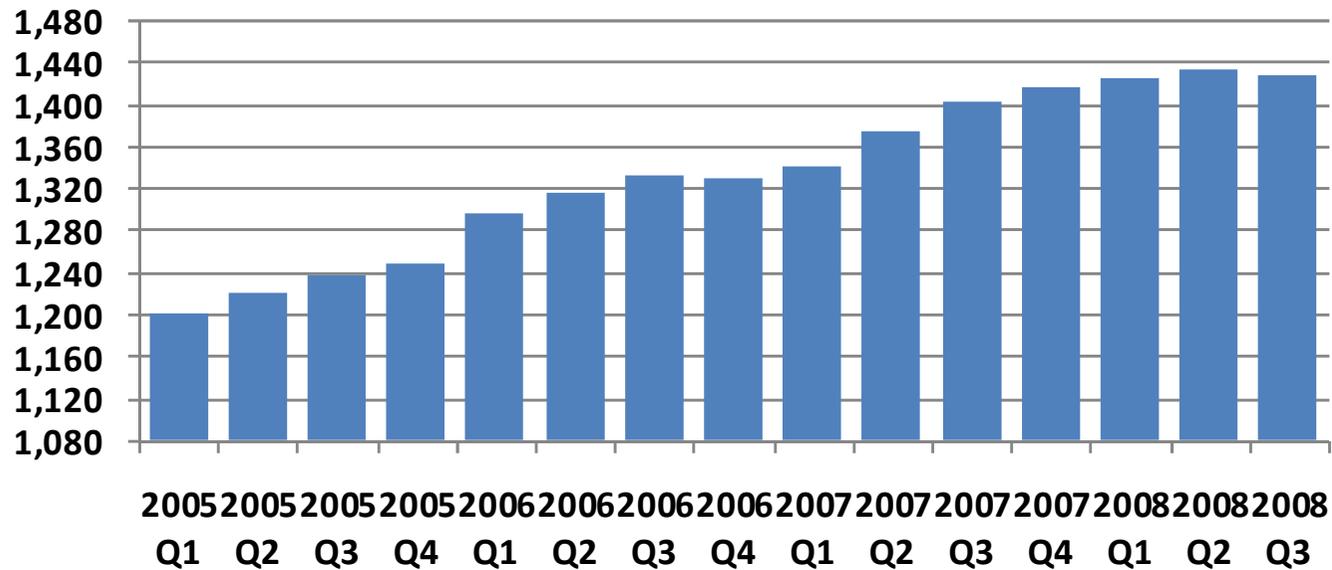


The Data – Early 2008: Industrial Production



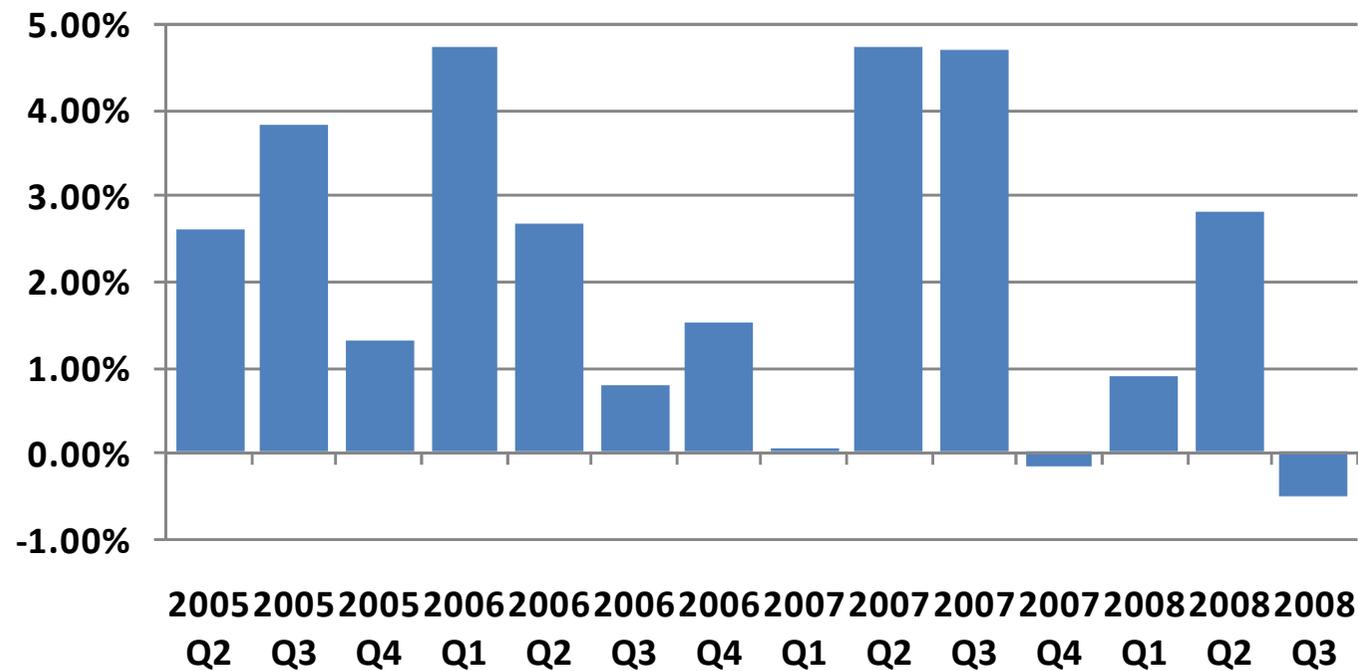
The Data – Early 2008: Non-Residential Investment

U.S. Non-Residential Investment (B 2000 \$)



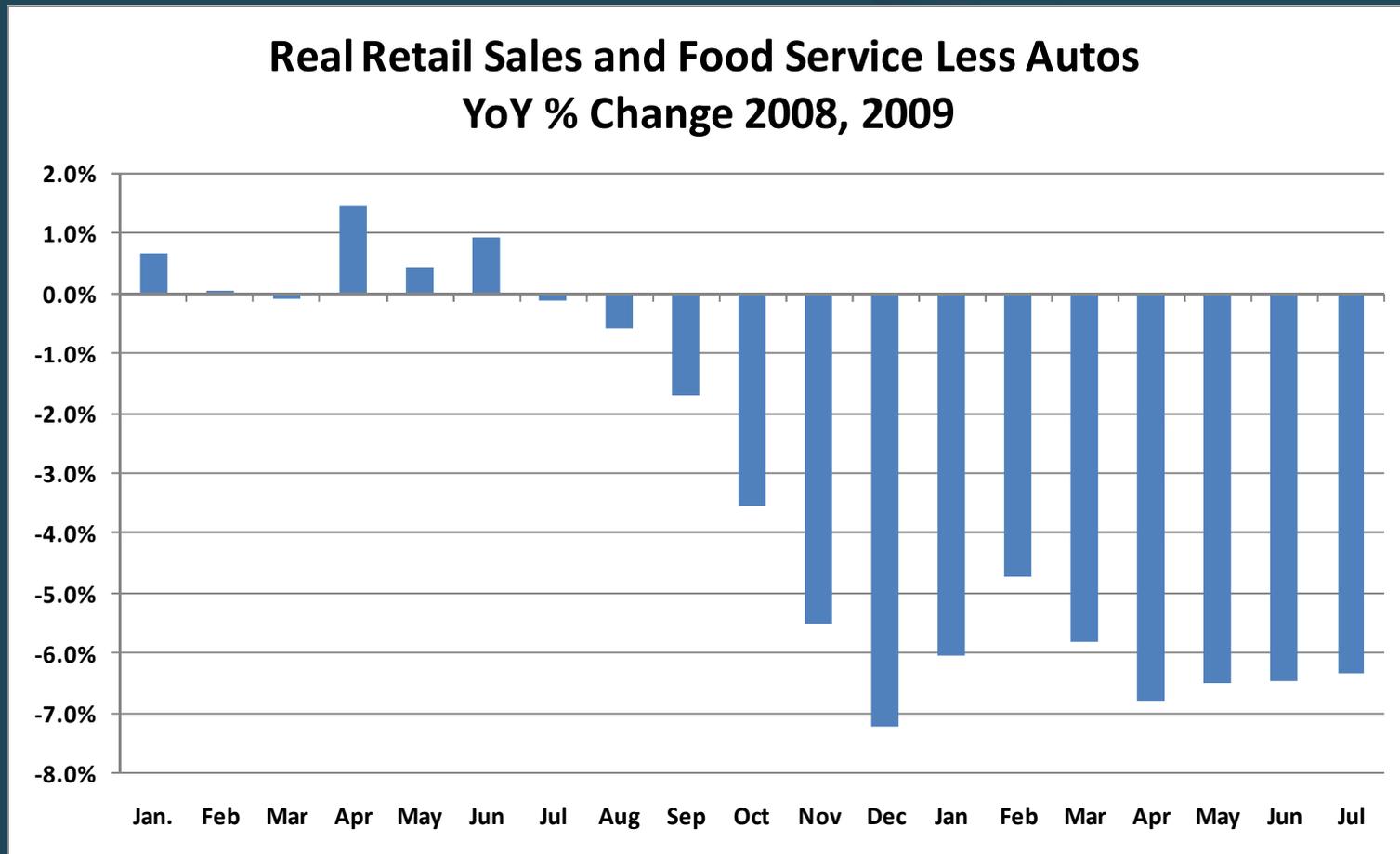
The Data – Early 2008: GDP

Real GDP % Annual Growth Rate



The Data – 2008 and 2009

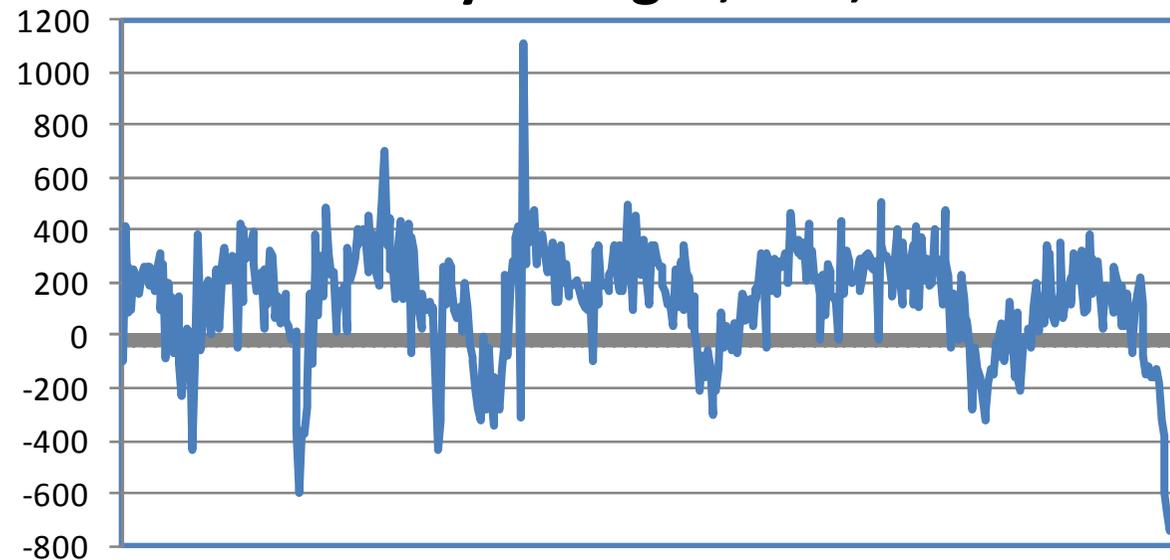
A Tale of Two Recessions



Consumer Demand Collapses and The Economy Takes a Nosedive

Unemployment Rises Sharply
6.1% in September to 9.7% in August

**U.S. Payroll Employment
Monthly Changes, S.A., 000 Jobs**



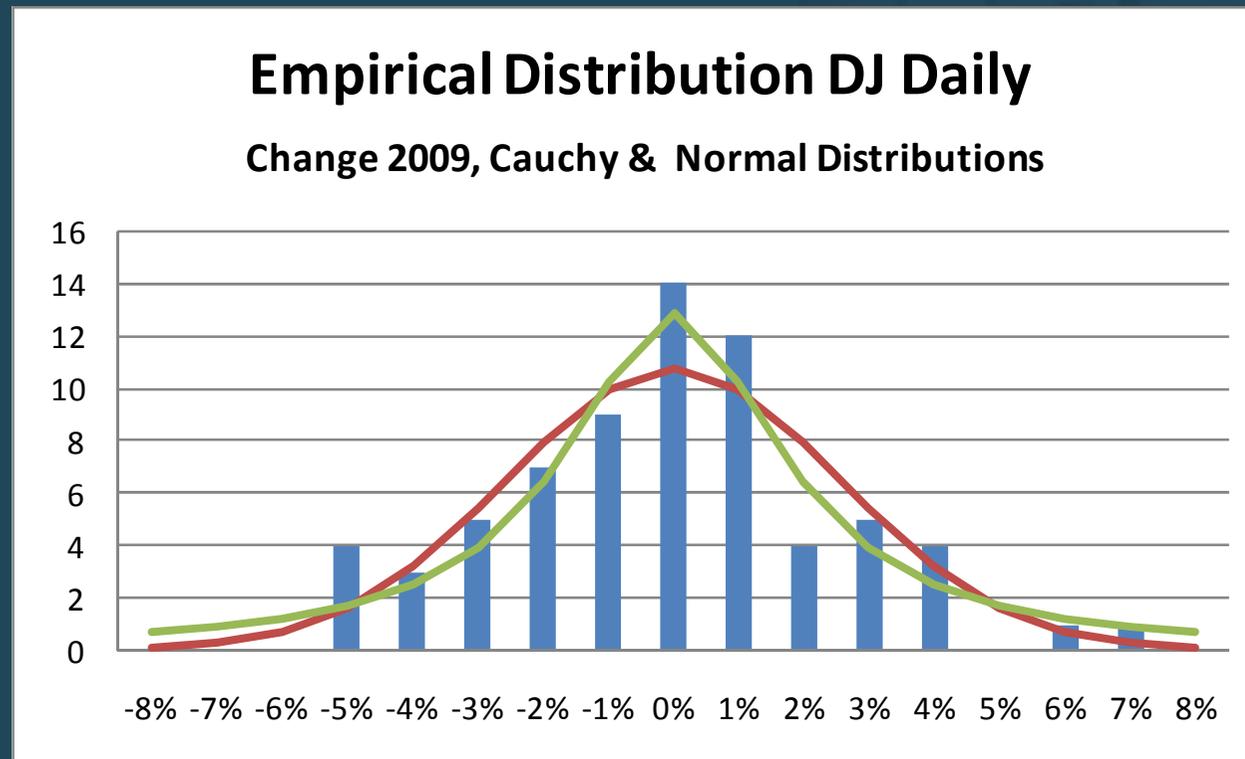
Jan 1968 Jan 1971 Jan 1974 Jan 1977 Jan 1980 Jan 1983 Jan 1986 Jan 1989 Jan 1992 Jan 1995 Jan 1998 Jan 2001 Jan 2004 Jan 2007

September: The Panic of 2008 – a “one-off” collapse in consumption & finance?

- ◆ September 8: Freddie Mac, Fannie Mae Conservatorship
- ◆ September 14: Lehman Bankrupt
- ◆ September 14: B of A – Merrill Merger
- ◆ September 16: AIG Ward of the Fed
- ◆ September 18: Wall Street Bailout Plan Announced

“Despite the efforts of the Federal Reserve, the Treasury and other agencies, global financial markets remain under extraordinary stress,” Mr. Bernanke told the Joint Economic Committee. “Action by the Congress is urgently required to stabilize the situation and avert what otherwise could be very serious consequences for our financial markets and our economy.”

Fat tails and forecasting economic data



Normal Distribution $p(x) = \{1/\sqrt{2\pi \sigma^2}\} * \exp\{(-1/2)*((x-\mu)^2/ \sigma^2)\}$

Cauchy Distribution $p(x) = \{1/\pi\}*(1/(1+x^2))$

Does It Matter? 10/19/87 -22.61% ; 10/28/29 -12.82

Feedback Loops and Economic Forecasting

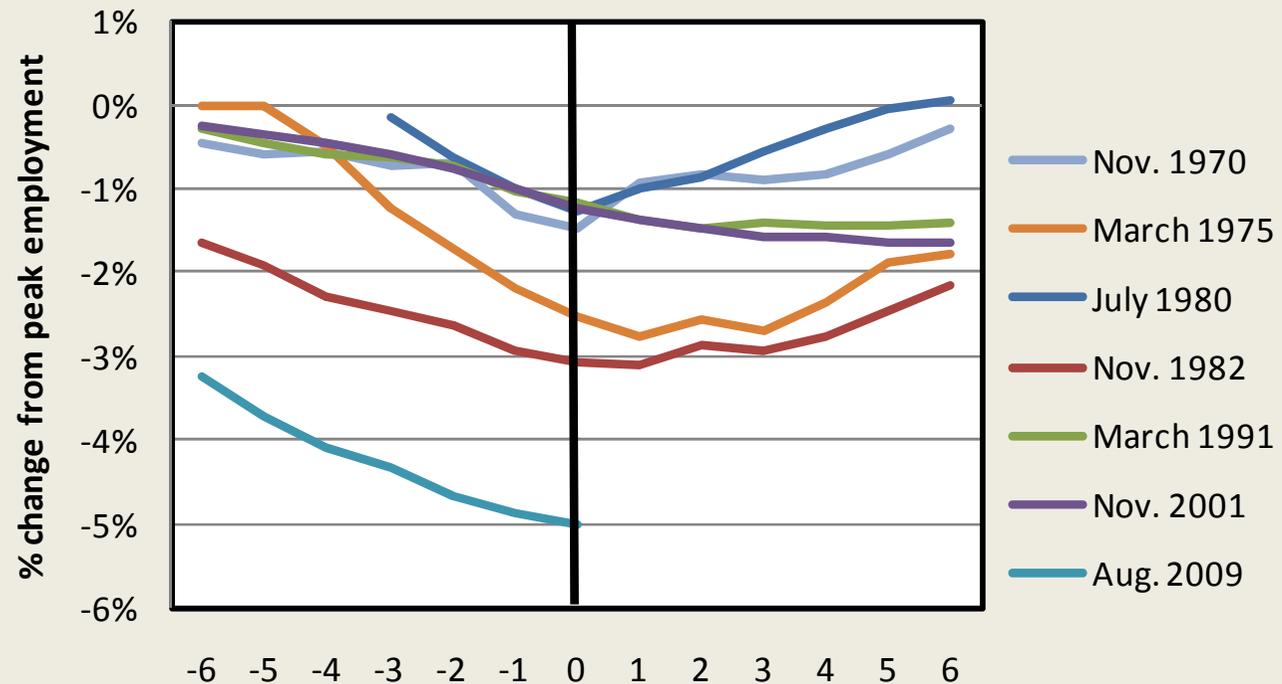
- ◆ Macroeconomics is driven by dynamic decision making:
 - Investment
 - Consumption & Savings
 - Taxes & Government Expenditure
 - Finance
- ◆ Each is driven by expectations
 - e.g. $RoR = -Investment + E\{\sum_i(\text{earnings}(t+i)) + SV(T)\}$
- ◆ Both forecasts & decisions made with forecasts affect $E\{.\}$ but not in a repeated experiment manner



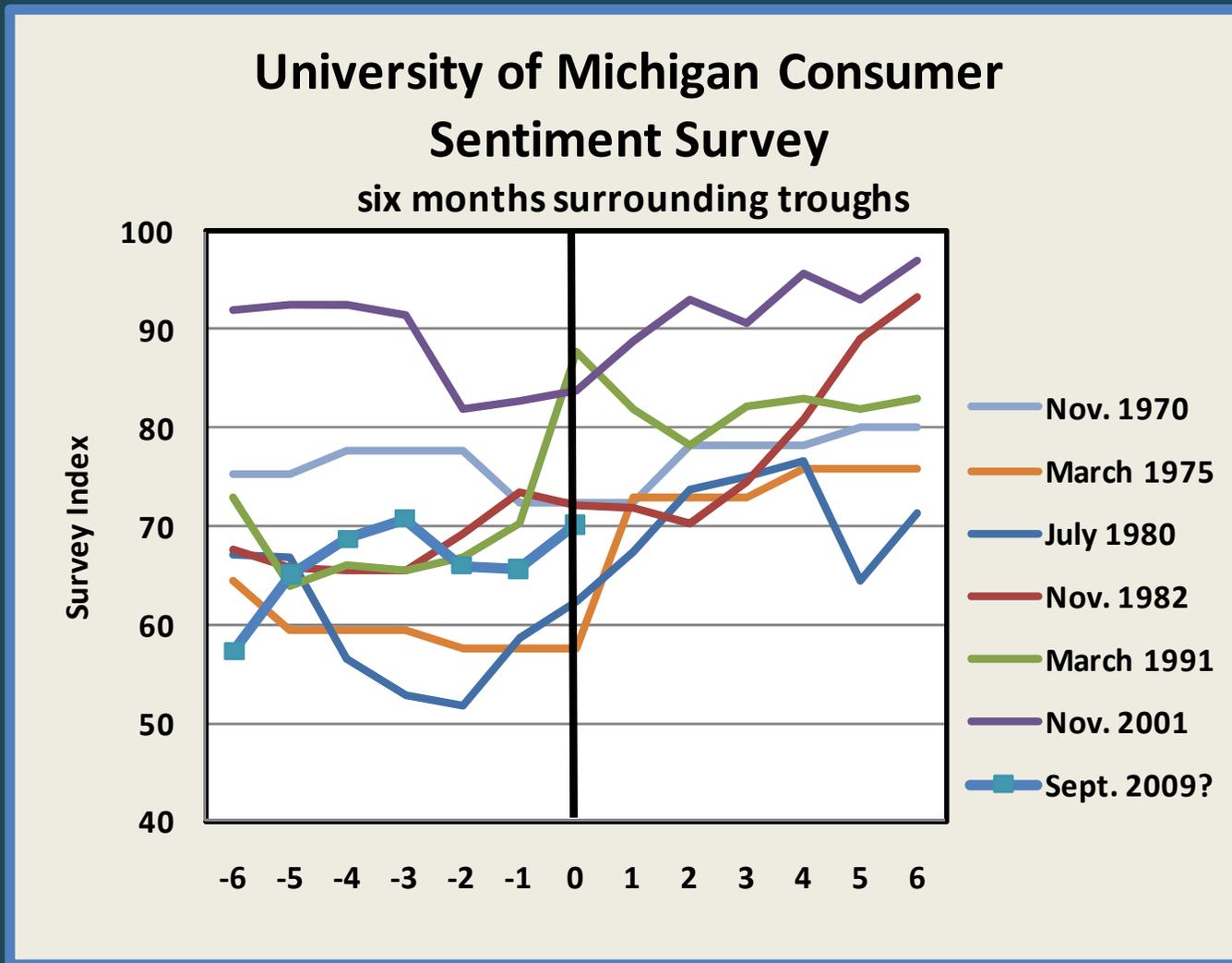
WHAT DOES THE END OF A RECESSION LOOK LIKE

Payroll Job Losses Do Not End Before The Recession

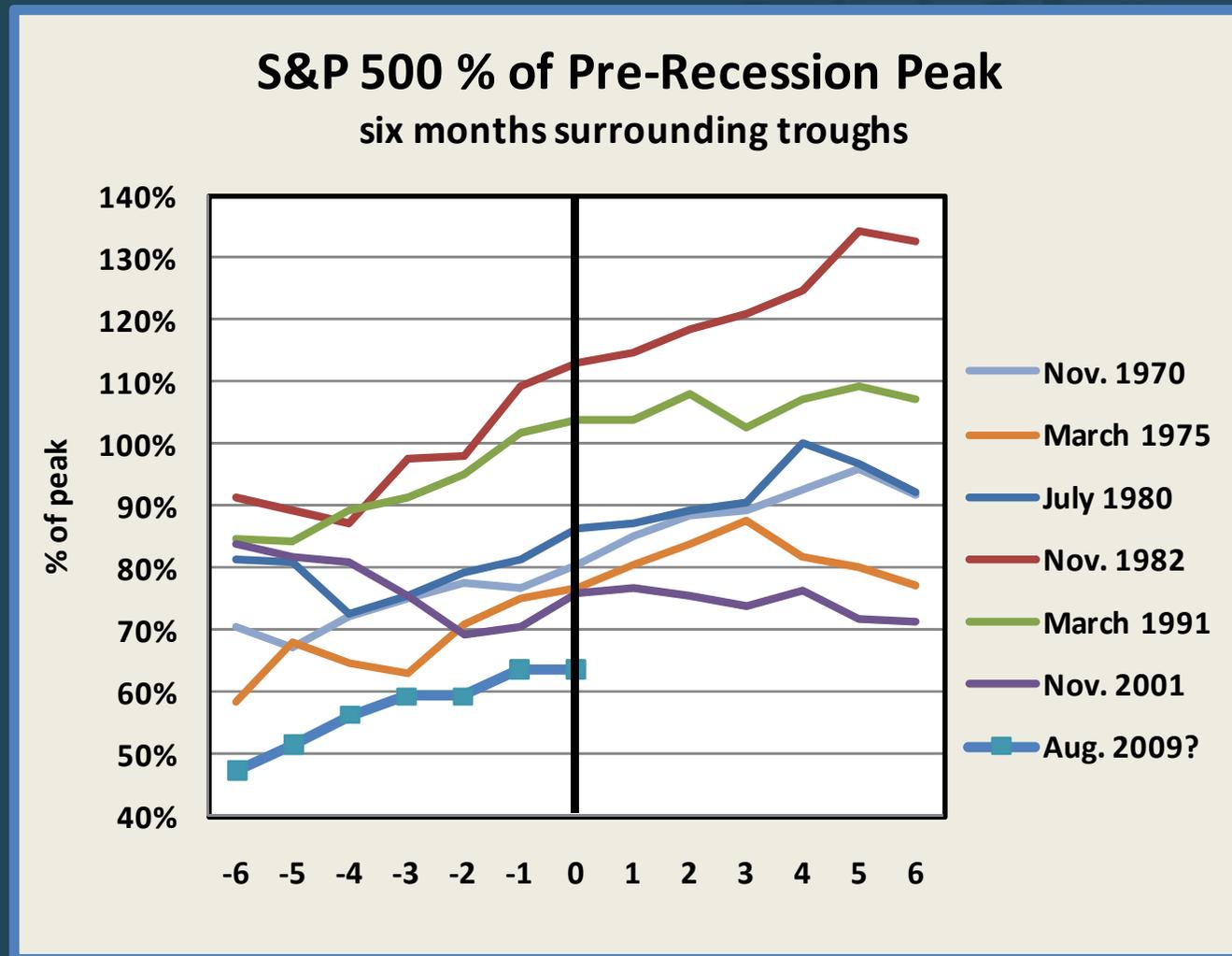
Cumulative Recession Payroll Job Loss six months surrounding troughs (%)



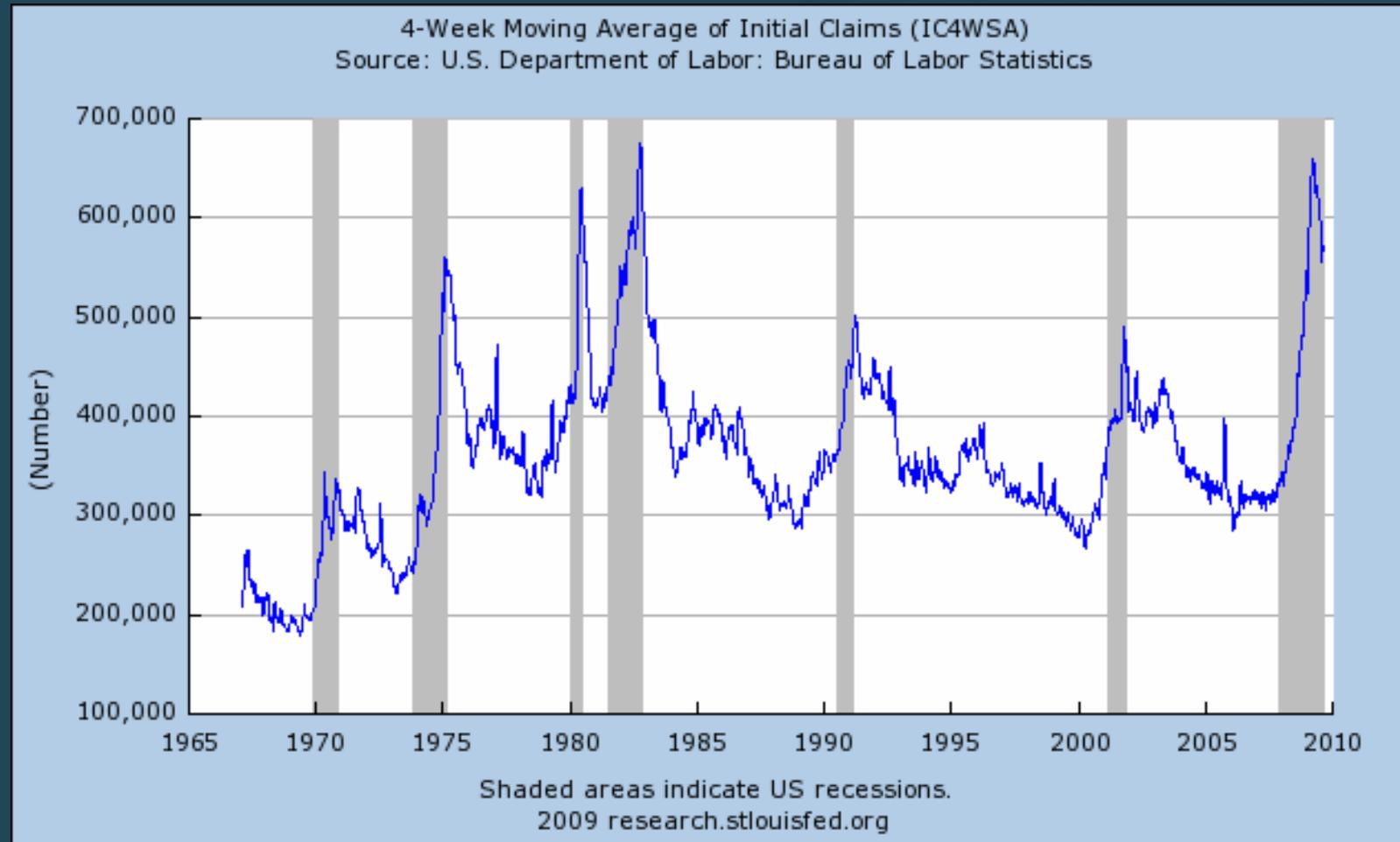
Consumer Confidence Is Often Rising



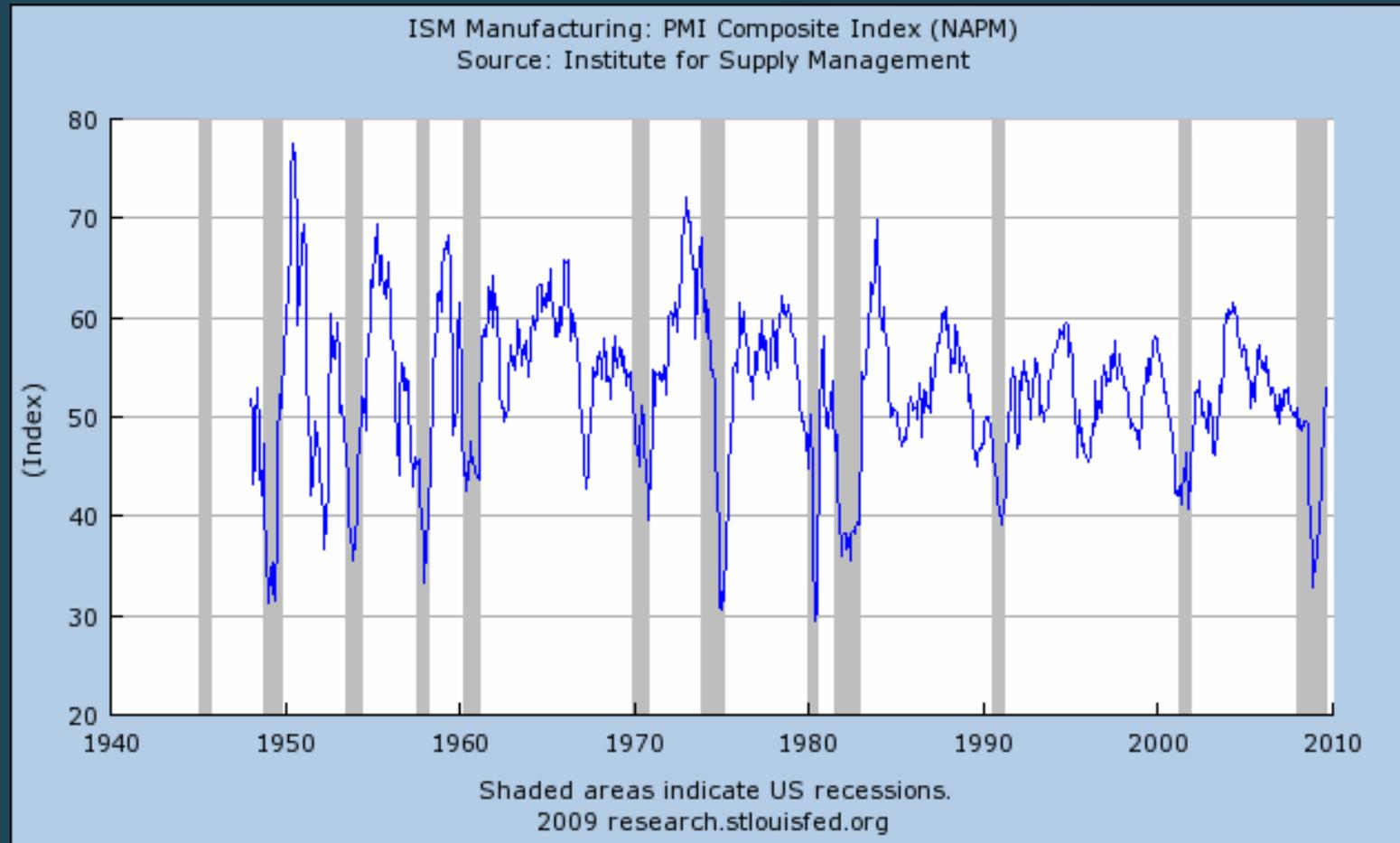
The Stock Market Bottoms Out 5-6 Months Before the End



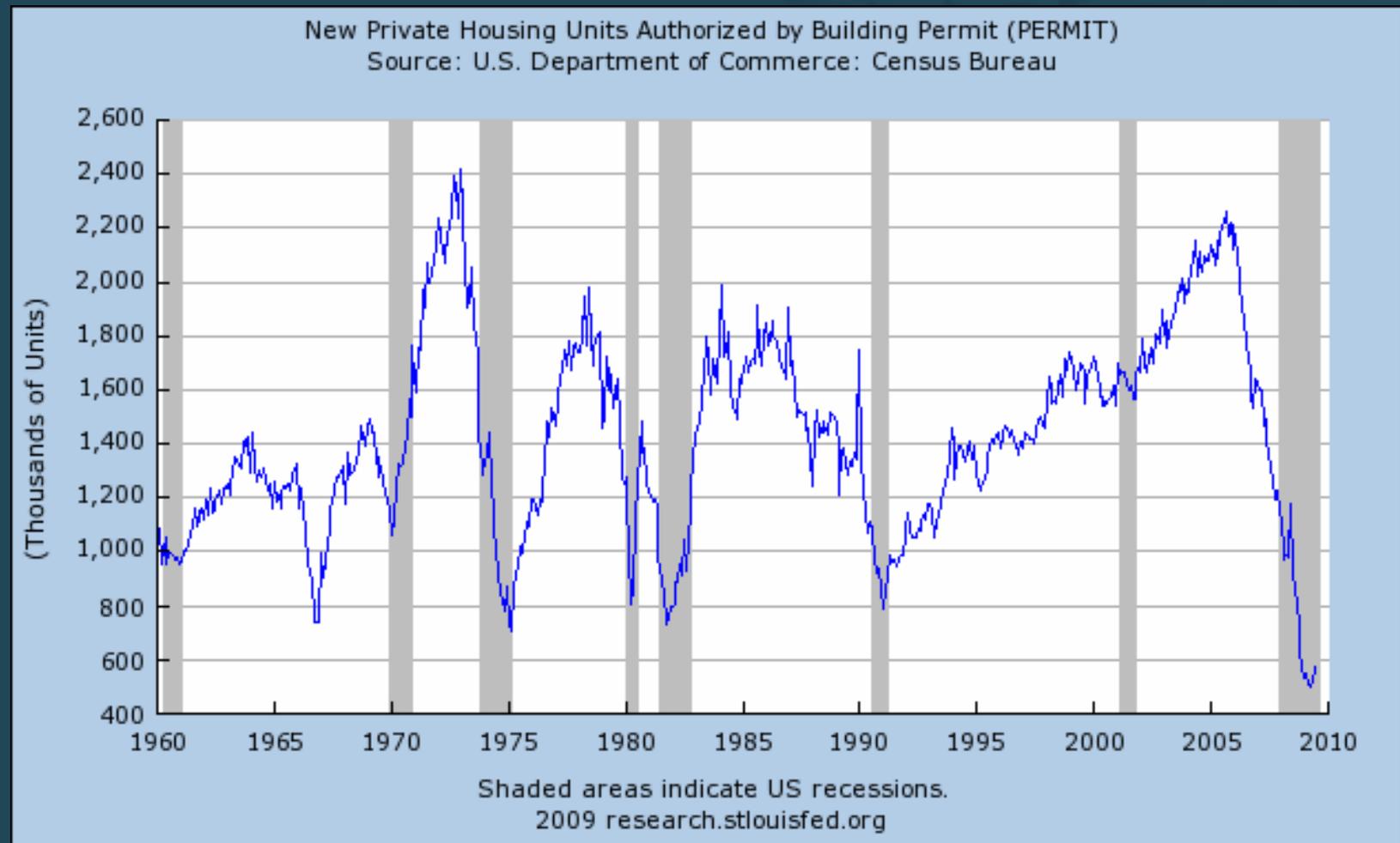
The Recession Ends 2-3 Months After Peak Initial Claims for Unemployment *Claims Peaked in March*



The Recession Ends Soon After the Trough in Manufacturing Activity *ISM Manufacturing Index Hit 50 in August*



The Recession Ends Several Months After the Trough of Building Permits *Building Permits Established a New Low in April*



How to forecast the end of the recession?

- ◆ The data plus models yield recession end forecast
- ◆ What about changing underlying environment?
 - Obama government intervention
 - Trade wars
 - New financial order
- ◆ Fat Tails?
 - Geopolitical
 - Pandemic

In Economic Forecasting

Take the models
seriously, but not too
seriously