

The Gasoline Volatility Premium in the United States: A Subjective Well-Being Approach

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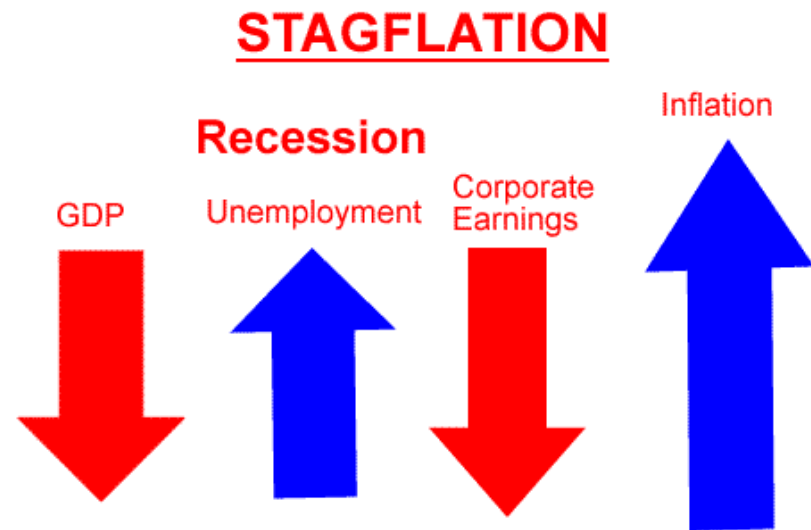
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Extensive Literature on Macroeconomic Impacts of Oil Shocks

- **Work of James Hamilton, Douglas Bohi and others:** notice that all but one post WWII recession preceded by increase in oil price
- **Negative GDP and macroeconomic impacts:** Jones, Leiby and Paik (2004) survey found an elasticity of -0.12 between the oil price and GDP, increase in inflation and unemployment
- **Policy implications:** calculation of an “oil security externality” (Leiby 2007, Brown and Huntington 2010)



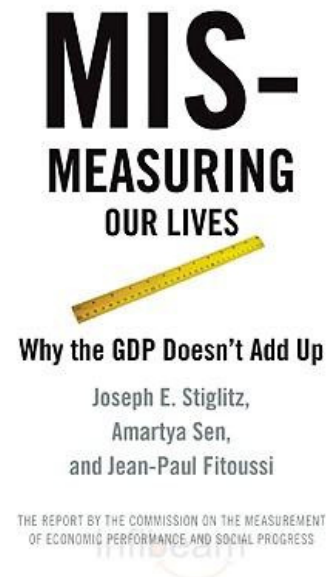
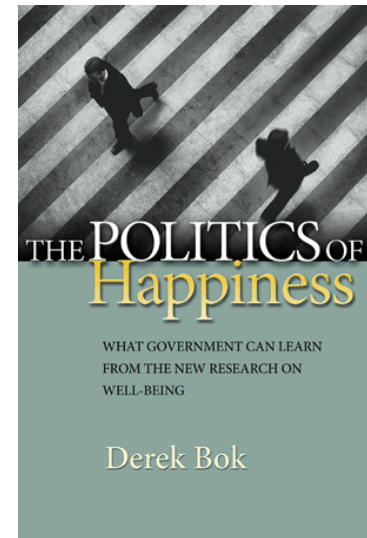
Macroeconomic Effects Present Incomplete View of Well-Being

- **Emotional issues associated with the price increase itself**
 - Loss aversion and adaptation
 - Fear of future economic conditions or national security problems
 - Anger
 - Lack of control
 - Uncertainty – or certainty that conditions will worsen
 - Diminished status of larger vehicles
 - Availability bias

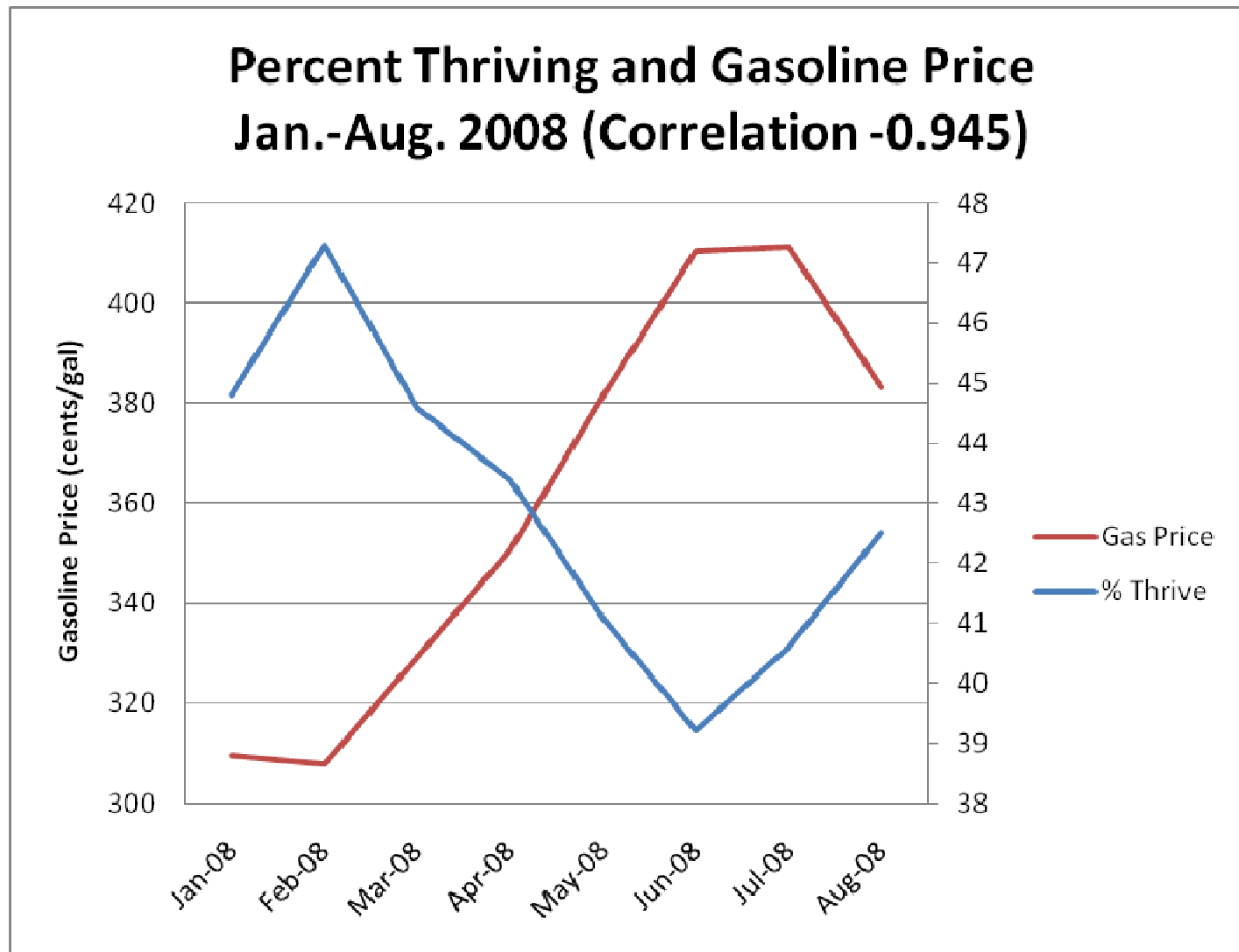


Subjective Well-being Surveys

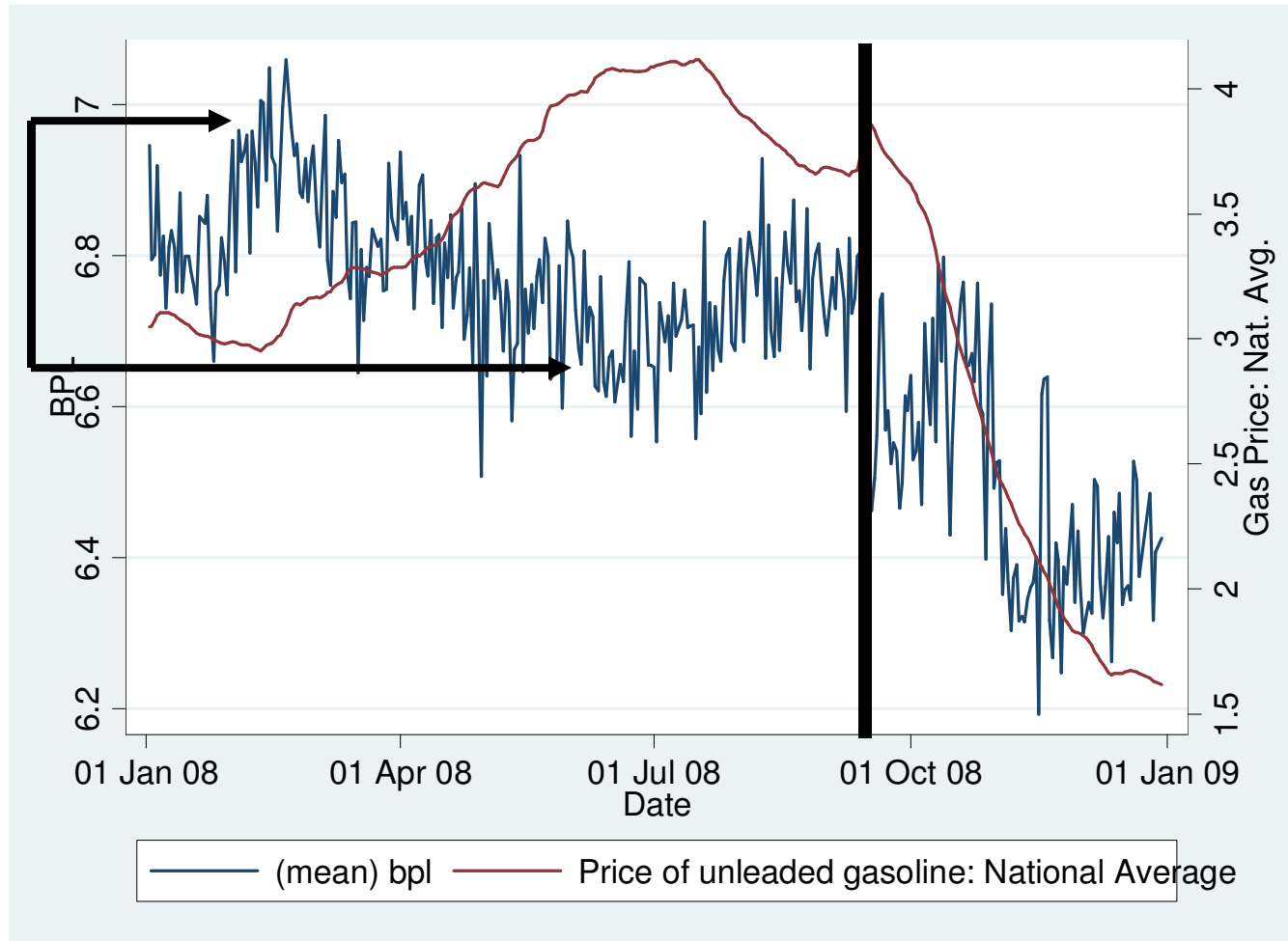
- **Background:** People asked to evaluate their lives with a variety of types questions used, most global (i.e. “On the whole, are you very satisfied, fairly satisfied, not very satisfied, or not at all satisfied with the life you lead?”) and some others immediate (i.e. “Were you angry/sad/frustrated yesterday?”)
 - **Quite long history:** Questions asked in Europe and U.S. every six months or year since 1970s
 - **Rapidly growing field:** In database Scopus, about 4-fold increase in papers mentioning “happiness” or “subjective well-being” from 1999 to 2009 (224 vs. 881 and 77 vs. 278)
 - **Relevant topics studied, but not energy prices:** effect of various macroeconomic conditions, income, distance traveled to work
- Increasing acceptance for use in public policy:**
“Measures of subjective well-being provide key information about people’s quality of life. Statistical offices should incorporate [these] questions” (Commission led by Joseph E. Stiglitz and Amartya Sen, 2009)



Initial Correlations Astounding



Full 2008 Data – Well-being Rising in August 2008



Key Points:

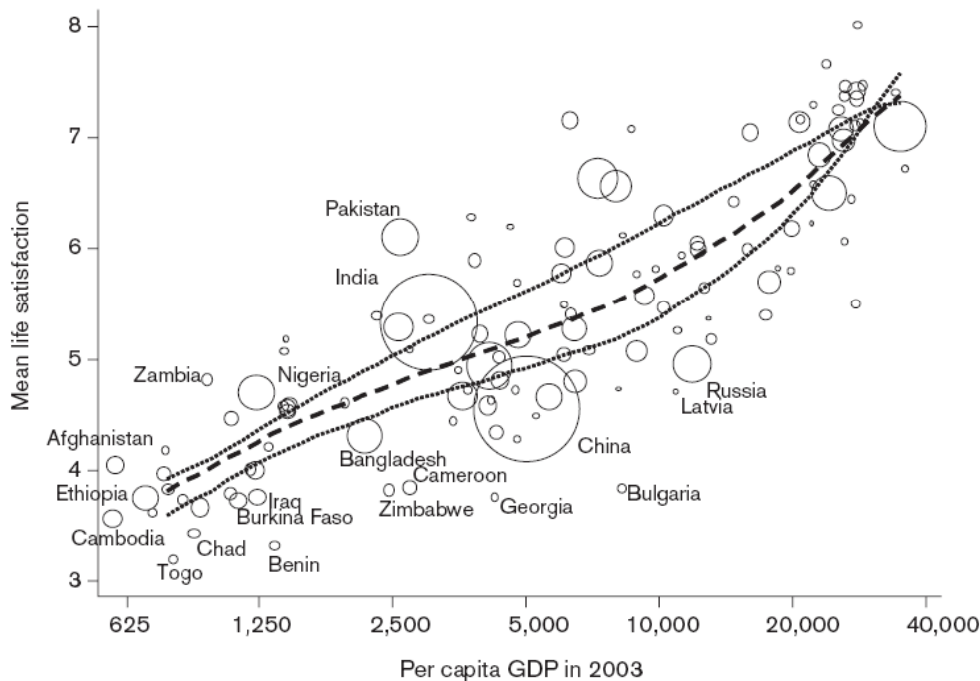
- In Pre-Lehman Period (before 9/15/08), BPL falls from high of ~6.95 in February to low of ~6.65 in June/July, a loss of 0.3
- BPL clearly improves in late July and August

Source: Carol Graham and Soumya Chattopadhyay based on daily Gallup-Healthways survey data

Income Equivalent – Responses Fell 10 Times More than Expected

Figure 2

Each Doubling of GDP Is Associated With a Constant Increase in Life Satisfaction



Source: Penn World Table 6.2.

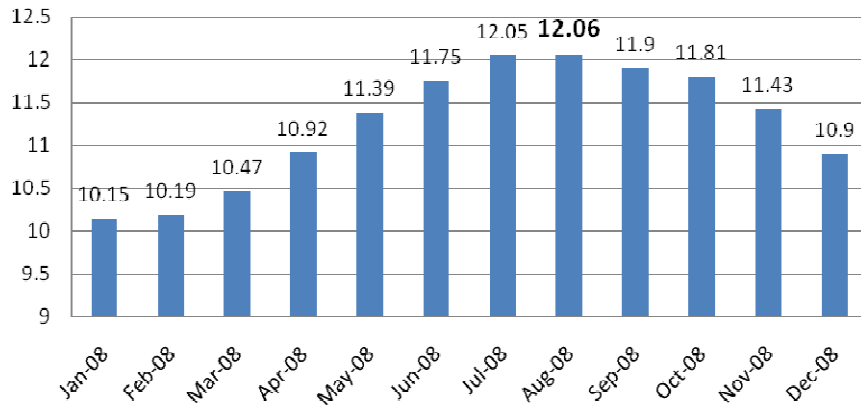
Note: Each circle is a country, with diameter proportional to population. The scale on the x-axis is logarithmic. The middle line shows average life satisfaction for each level of per capita GDP while the outer two lines show the same thing, but for two age groups, ages 15 to 25 — the upper line for most of the figure — and ages 60 and over — which is usually the lower line. GDP per capita in 2003 is measured in purchasing power parity chained dollars at 2000 prices.

Source: Deaton (2008) using Gallup question in Gallup World Poll

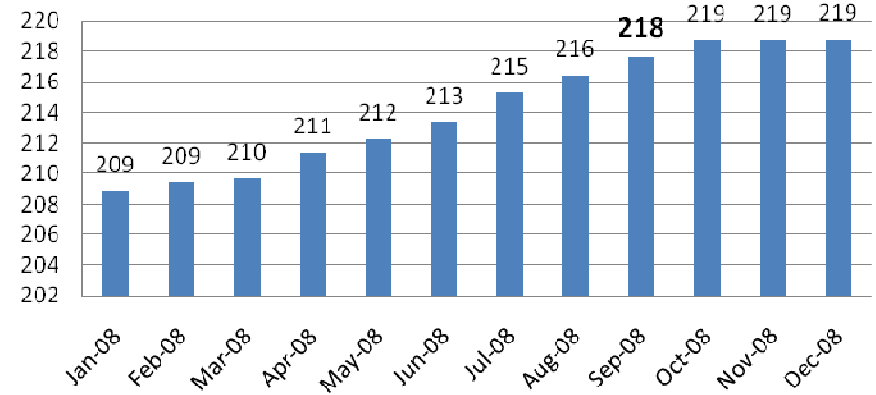
- A log-linear income/best possible life relationship
- On the 0-10 scale, each doubling of income is associated with a change of about **0.6 points**
- Thus, with the US at around \$45,000/person of GDP, the decline of **0.2-0.3 in last graph is equivalent to about \$7,500-\$11,250 in a given year**
- In 2008, with an average price of \$3.30/gal, the average family spent \$2,715 on gasoline and motor oil, using about 820 gallons. **Prices increased about \$1.15/gal, or \$950/year (Consumer Expenditure Survey)**

Other Issues Don't Follow Trajectory and Worsen in August

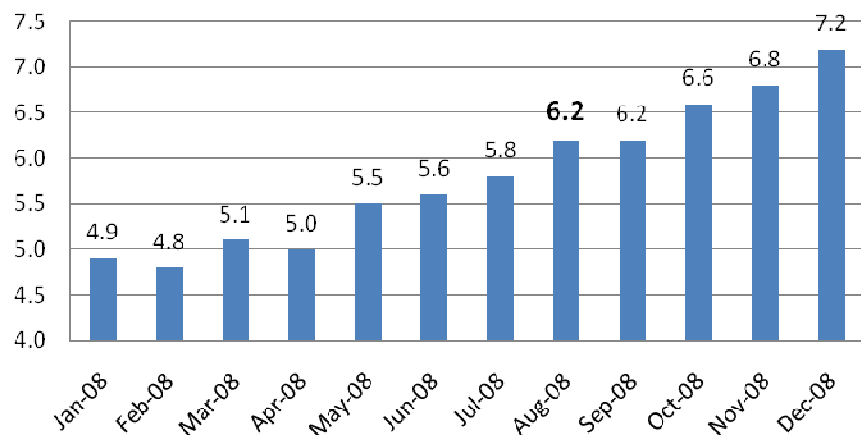
Residential Electricity Prices in the U.S. (cents/kWh)



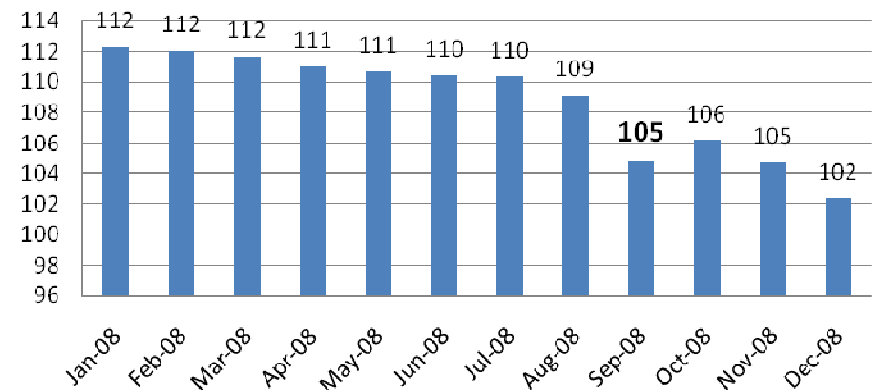
CPI - Food and Beverage Not Seasonally Adjusted (1982-4=100)



Unemployment Rate



Industrial Production Seasonally Adjusted (2002=100)

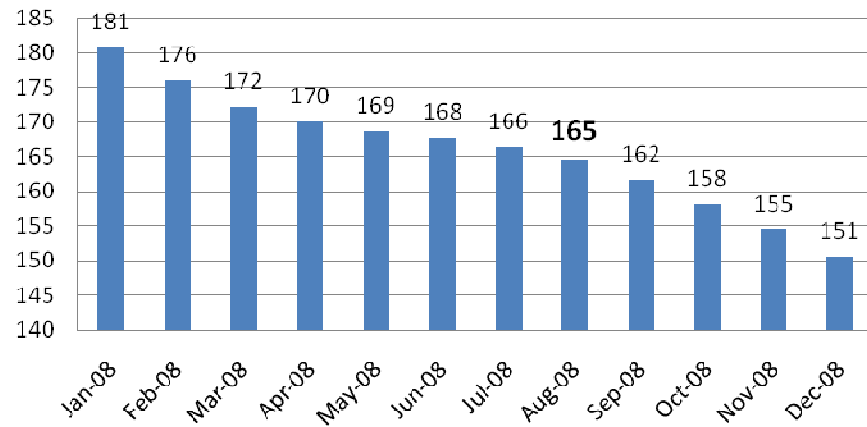


Worsen in August

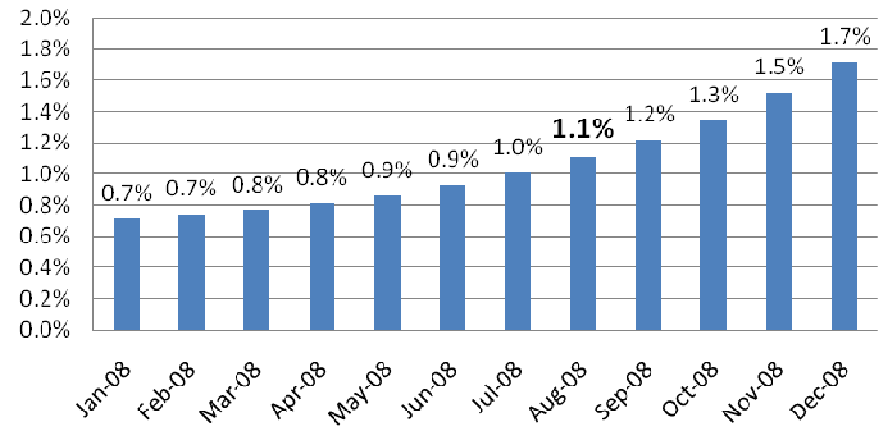
Continue on Same Path in August

Housing Market Cannot Explain Trajectory Either

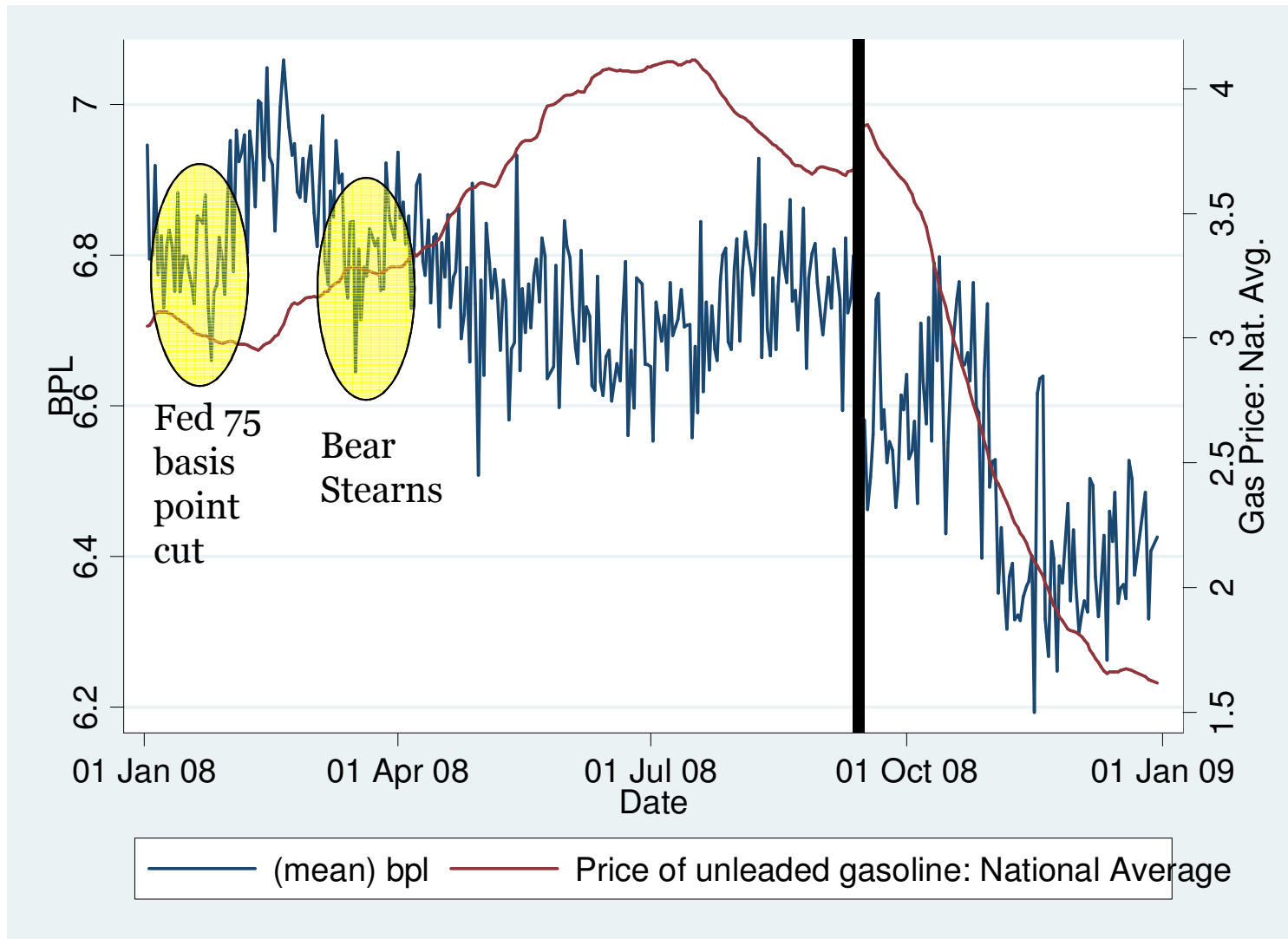
Case Shiller 20-City Home Price Index



Freddie Mac Delinquency Rates

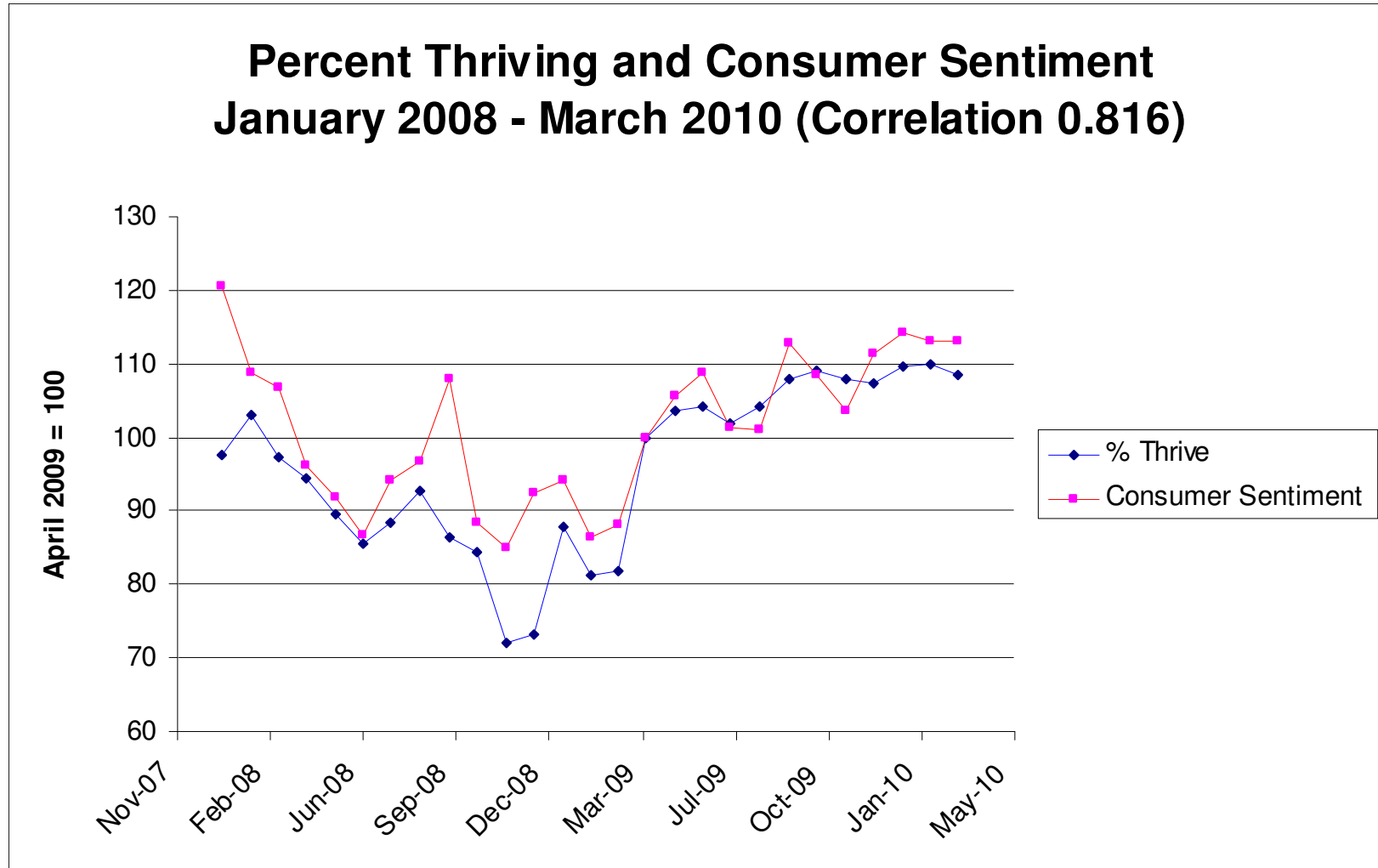


Full 2008 Data – Not Just Gasoline Prices



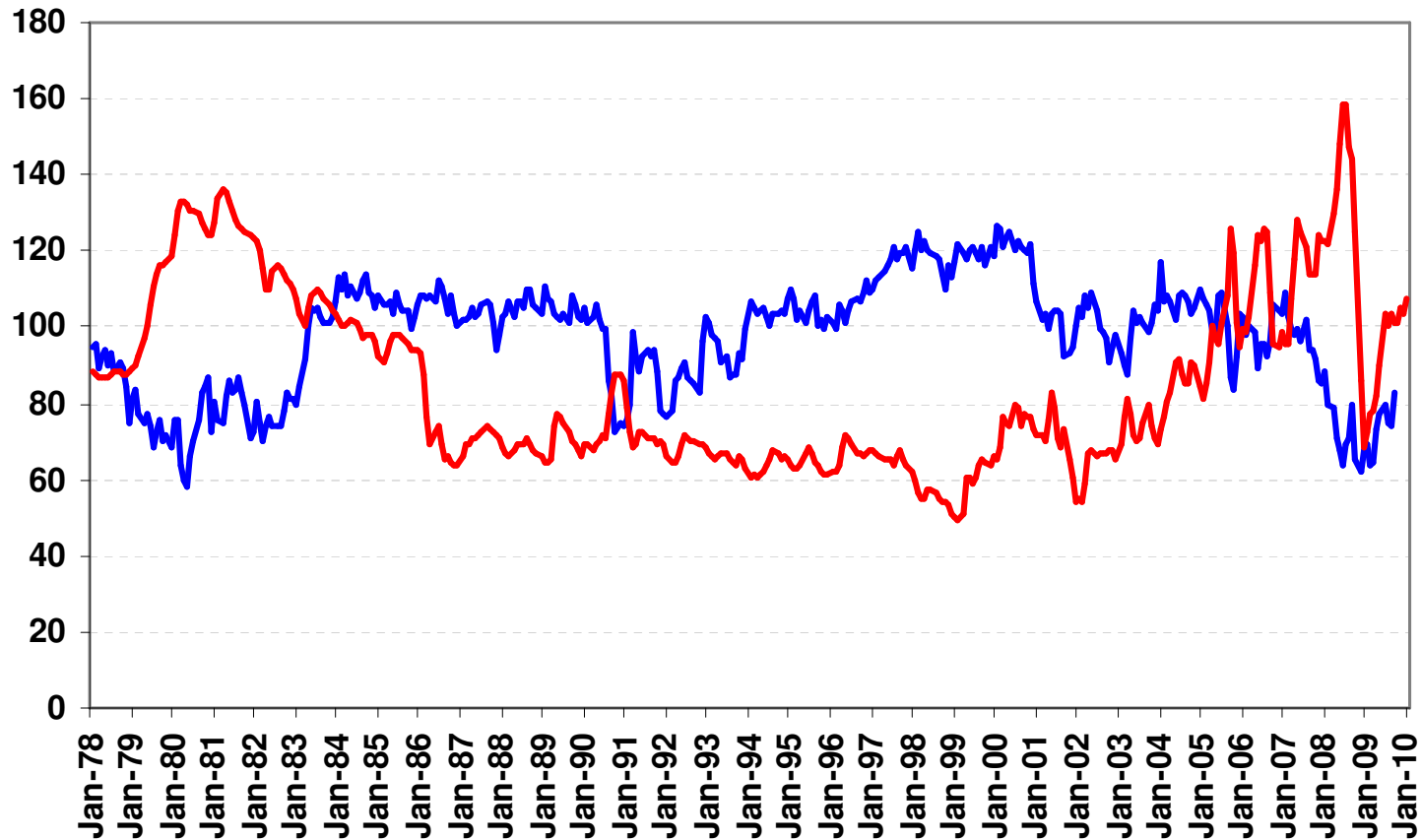
Source: Carol Graham and Soumya Chattopadhyay based on daily Gallup-Healthways survey data

Consumer Sentiment Correlated with “Best Possible Life” Question



Strong Relationship Between Real Gasoline Price and Consumer Sentiment

Index,
2005=100



— Consumer Sentiment Index (2005=100)

— Real Gasoline Price Index (2005=100)

Upcoming Research by September

- **Testing other well-being indicators from Gallup:** Best Possible Life in 5 Years, anger, frustration
- **Additional analysis of overall Gallup data:** impact of price increases and decreases, adaptation, possible asymmetry
- **Traditional cohort analysis:** income/consumption, rural/urban, age, very conservative and liberal districts
- **Project-specific cohorts:** by elasticity, by unusual circumstance such as few vehicles (New York) or large oil industry (Houston)
- **Additional Consumer Sentiment analysis:** Whether gasoline price changes affects consumers more than price changes in other forms of energy
- **Comparison with macroeconomic effects:** Which is worse, the immediate impacts of the price increase measured here, or the actual macroeconomic consequences experienced generally 3-4 quarters later?

Conclusions and Implications

- Gasoline prices seem to be the most important factor moving the Best Possible Life question before September 2008
- Gasoline price changes appear to dramatically impact self-reported well-being
- The impact appears to be about 10 times the magnitude of the income loss
- Consumer Sentiment may largely parallel the movement, allowing for analysis of a longer data set
- These findings would tend to support stronger policies to reduce price volatility (i.e. more aggressive use of the SPR) and likely reduce fuel use (i.e. more stringent fuel economy standards) than traditional analyses would suggest

Thanks to...

- Ken Medlock and Amy Jaffe
- Carol Graham and Soumya Chattopadhyay at the Brookings Institution
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