

Comments on G. Galati, P. Heemeijer, and R. Moessner,  
“How Do Inflation Expectations Form? Evidence from a  
High-Frequency Survey”

Charles F. Manski

Department of Economics and Institute for Policy Research  
Northwestern University

## Themes

1. Interpreting Point Forecasts of Inflation
2. Probabilistic Forecasting
3. Studying the Temporal Variation of Forecasts

## Sources

Manski, C. (2004), "Measuring Expectations," *Econometrica*, 72, 1329-1376.

Engelberg, J., C. Manski, and J. Williams (2009), "Comparing the Point Predictions and Subjective Probability Distributions of Professional Forecasters," *Journal of Business and Economic Statistics*, 27, 30-41.

Engelberg, J., C. Manski, and J. Williams (2010), "Assessing the Temporal Variation of Macroeconomic Forecasts by a Panel of Changing Composition," *Journal of Applied Econometrics*, DOI: 10.1002/jae.1206.

## **Interpreting Point Forecasts of Inflation**

Forecasters are often asked to give point forecasts of real-valued outcomes, such as inflation or GDP growth.

Thoughtful forecasters rarely think that they have perfect foresight.

Their point forecasts at most convey some notion of the central tendency of their beliefs, and nothing about the uncertainty they feel.

Suppose that forecasters have subjective probability distributions for the events they predict.

Then their point predictions should be related to their subjective distributions. But how?

Forecasters may report different distributional features as their point predictions.

Some may report subjective means, while others report subjective medians or modes. Other may report non-central quantiles of their subjective distributions.

Heterogeneous reporting practices are consequential for the interpretation of point predictions.

*Interpreting Cross-Sectional Dispersion in Predictions as  
Forecaster Disagreement*

Forecasters who hold identical probabilistic beliefs may provide different point predictions.

Forecasters with dissimilar beliefs may provide identical point predictions.

If so, comparison of point predictions across forecasters is problematic.

Variation in predictions need not imply disagreement among forecasters.

Homogeneity in predictions need not imply agreement.

*Interpreting Cross-Sectional Dispersion in Predictions as  
Forecaster Uncertainty*

A more severe interpretative problem is the use of cross-sectional dispersion in point predictions to measure forecaster uncertainty about future outcomes.

This research practice is suspect on logical grounds, even if all forecasters make their point predictions in the same way.

Point predictions provide no information about the uncertainty that forecasters feel.

This point was made over twenty years ago by Zarnowitz and Lambros (1987). Nevertheless, some researchers have continued to use the dispersion in point predictions to measure forecaster uncertainty.

## **Probabilistic Forecasting**

Surveys that seek point predictions would be more informative if they would instead pose probabilistic questions asking persons to reveal specified features of their subjective distributions.

Various methods may be used to elicit subjective distributions for real outcomes.

One may ask respondents to state the subjective probabilities that the outcome will fall in specified intervals.

If one only wants to measure the central tendencies of subjective distributions, a particularly simple approach is to elicit subjective medians.

One need just ask a respondent to state a value of the outcome such that there is equal probability the realization will be above or below this value.



Elicitation of probabilistic forecasts in surveys has been shown to be feasible and informative.

In the realm of expert forecasting, the Survey of Professional Forecasters in the United States has long asked its panel of macroeconomists to provide probabilistic forecasts of GDP growth and inflation.

These rich data were almost ignored for many years, but they are now being analyzed more regularly.

Similar collection of probabilistic forecasts has recently been initiated in the United Kingdom by the Bank of England.

In the realm of non-expert forecasting, since the early 1990s economists engaged in survey research have accumulated substantial experience with probabilistic questioning, using it to learn how broad populations perceive their futures.

I recommend that the SPF and similar surveys should emphasize probabilistic forecasts.

I would go so far as to suggest that they should not bother asking for point predictions at all.

## **Studying the Temporal Variation of Forecasts**

To study the temporal variation of forecasts, it is common to aggregate the predictions reported by panel members at each administration of the survey and analyze the time series of the aggregated predictions.

Interpretation of the temporal variation in an aggregated prediction is problematic when forecasters are heterogeneous.

The interpretative problem is exacerbated when panel composition changes over time.

In February 2008, the Philadelphia Fed issued findings on GDP growth from the SPF administered in 1Q-2008, stating:

"The outlook for growth in the first half of 2008 looks much weaker now than it did three months ago, according to 50 forecasters surveyed by the Federal Reserve Bank of Philadelphia. . . . Growth in the current quarter is projected at an annual rate of 0.7 percent, down from the projection of 2.2 percent in last year's fourth-quarter survey."

First consider heterogeneity with a panel of fixed composition.

When the Philadelphia Fed reported that growth is projected at an annual rate of 0.7 percent, one cannot know whether this was a consensus across the 50 forecasters or whether they disagreed sharply in their predictions.

Nor can one know whether all panel members revised their beliefs downward between 4Q-2007 and 1Q-2008.

Now consider changing panel composition.

Although the Philadelphia Fed stated that 50 forecasters participated in the survey, this actually was the number of participants in the 1Q-2008 survey. The number of participants in the 4Q-2007 survey was 48, of whom only 42 participated in the 1Q-2008 survey.

Thus, 14 forecasters participated in only one of the two surveys, 6 participating only in 4Q-2007 and 8 only in 1Q-2008.

To an unknown extent, the weakening in beliefs about future growth reported in the release of findings could be an artifact of changing panel composition.

I recommend against the traditional use of the time series of aggregated SPF predictions to measure the evolution of forecasters' expectations.

I recommend study of the time series of the predictions made by individual forecasters.

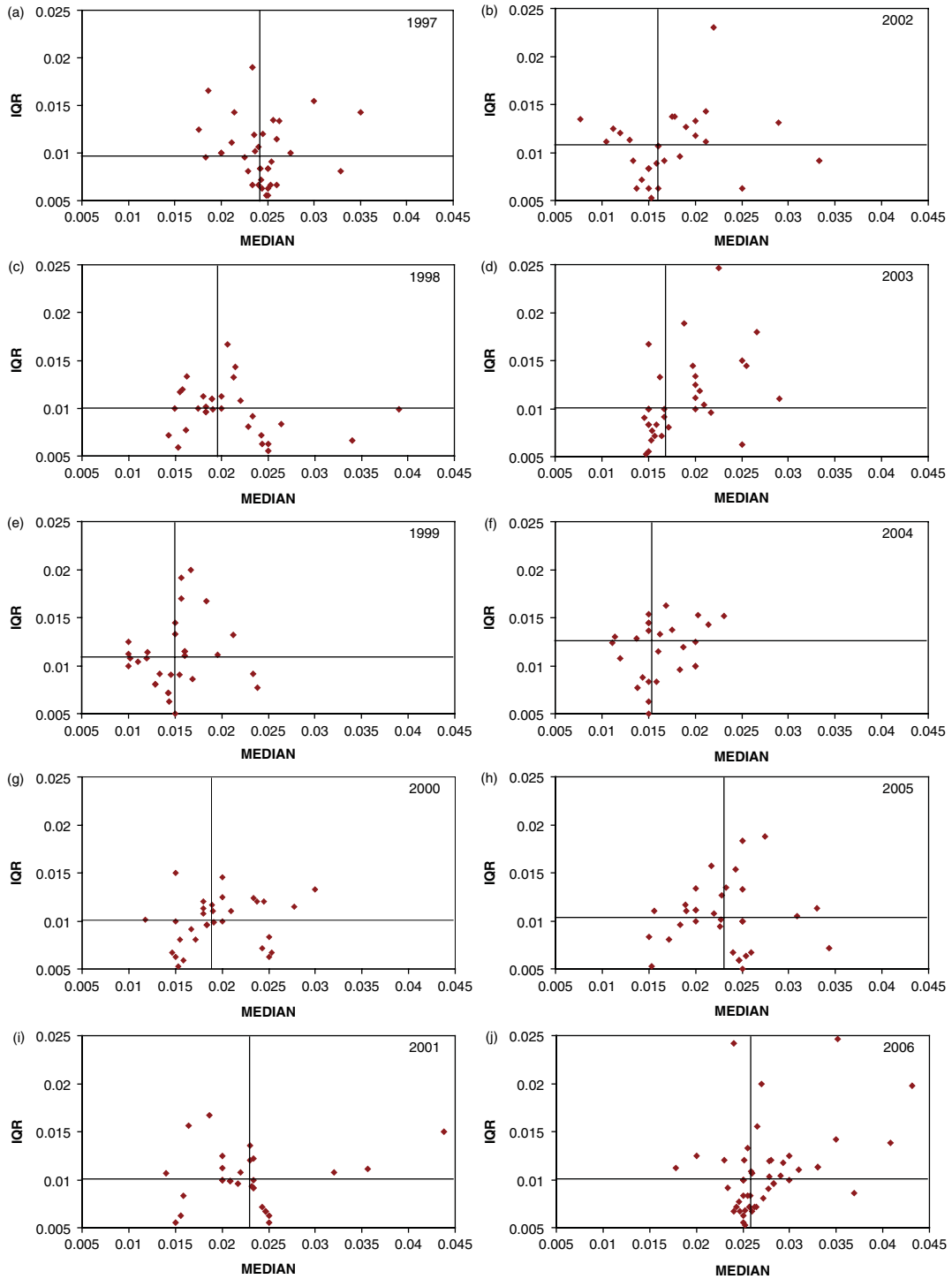


Figure 1. Median/IQR plot for four-quarter-ahead inflation forecasts 1997–2006. This figure is available in color online at [www.interscience.wiley.com/journal/jae](http://www.interscience.wiley.com/journal/jae)



and IQRs, and this persists when one variable or the other is lagged. Thus forecasters who expect higher inflation tend to be more uncertain.

Overall, Table II suggests that the cross-sectional heterogeneity evident in the plots of Figure 1 arises out of permanent differences between forecasters in the way that they form inflation expectations. We think that it would be of great interest in future research to dig deeper and try to infer the distinct processes of expectations formation that different forecasters use.

#### 4. MEASURING TIME SERIES VARIATION IN INFLATION EXPECTATIONS

##### 4.1. Tracking Individual Forecasters

A direct and transparent way to study time series variation in the inflation expectations of the SPF panel is to track the responses of individual forecasters across the quarterly surveys in which they participate. Considering each forecaster in isolation shows clearly how individual expectations evolve over time. Comparison of the time paths of the responses of different forecasters illuminates the heterogeneity of the SPF panel.

Figure 2 gives two illustrations. The top figure displays the subjective medians and IQRs for 2001 GDP growth elicited from forecasters who participated in the SPF in both 3Q2001 and 4Q2001. Thus the figure shows GDP growth expectations before and after the terrorist attacks of 11 September 2001. Each forecaster is depicted by an arrow whose tail is his 3Q2001 prediction and whose tip is his 4Q2001 prediction. The figure shows that nearly all forecasters revised their

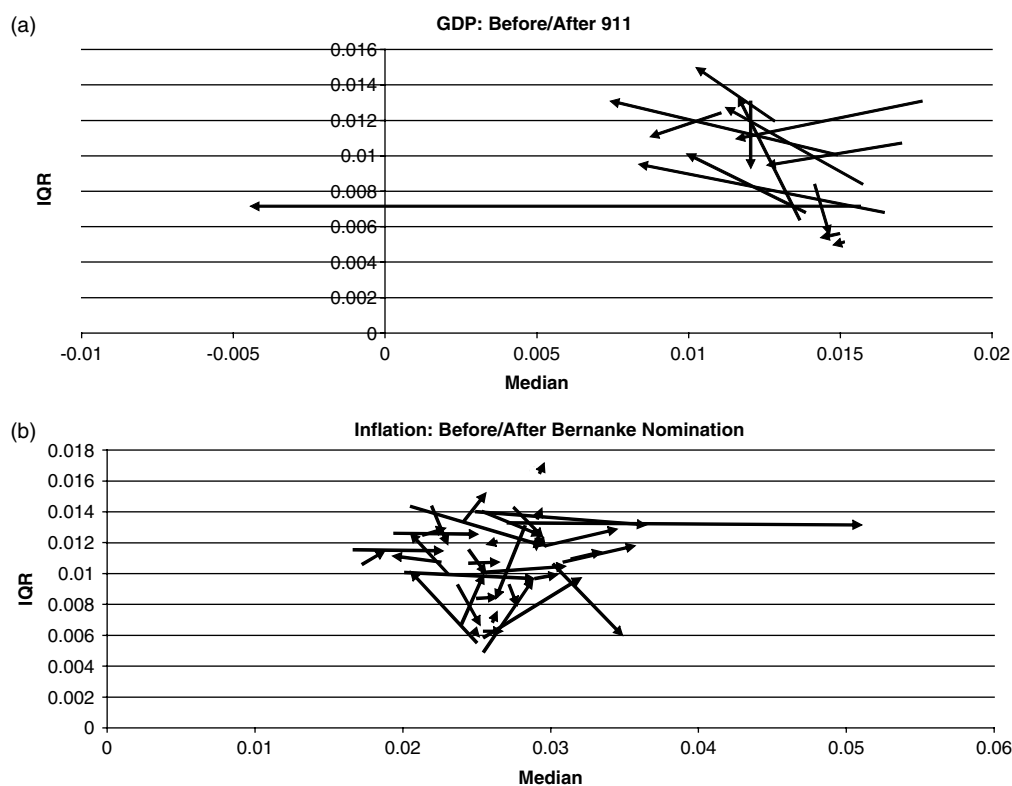


Figure 2. Change in expectations around events