The Impact of Uncertainty on Data Revision

Pei-Ju Sung
Department of Economics, College of Arts and Sciences, Western Michigan University

Western Michigan University

Motivation

- Monetary policy decisions in real-time based on evaluating current economic conditions
- Accuracy of preliminary announcements of macroeconomics variable and subsequent revisions…

Data revision of nominal GDP

Vintage	2011:M4	2011:M5	2011:M6	2011:M7	2011:M8	…	2013:M5
Date							
2010:Q4	14871.4	14871.4	14871.4	14871.4	14755	…	14735.9
2011:Q1	NA	15006.4	15010.3	15018.1	14867.8	…	14814.9
2011:Q2	NA	NA	NA	NA	15003.8	…	15003.6
.	.	.	.	.	.		.
.	.	.	.	.	.	…	.
2013:Q1	NA	NA	NA	NA	NA	…	16010.2

First release
First release
Final value

(Billions of Dollars)

- Incorrect estimates → significant impact on policy outcome (Orphanides, 2001)
- Focus of current literature:
  - Rationality: forecasts unbiased/efficient?
  - Reliability: magnitude of revisions?

Under what circumstances do initial data tend to be irrational and unreliable?

Channels for Impact of Uncertainty

Uncertainty

Sampling Error
Only sampling from large firms

Ghosal and Loungani (2000)
- Uncertainty has negative impact on investments
- Greater Impact for smaller firms

Non-sampling Error
Firms allowed to report forecasts when actual data unavailable

Trueman (1994), Hong *et al.* (2000)
- Herding behavior: market analysts' forecasts tend to be biased and inefficient during high uncertainty periods

Unreliability

Irrationality

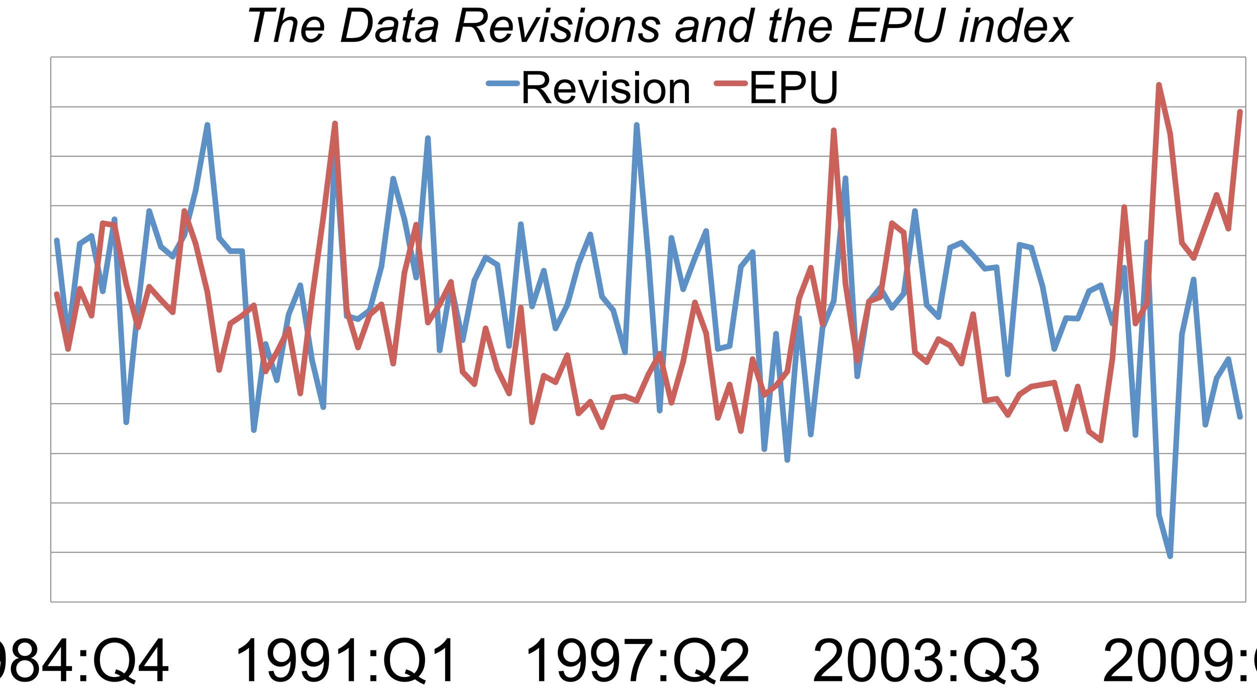
- **Greater revisions under uncertainty**
- **Irrationality in first releases under uncertainty**

Data

- U.S. real-time nominal output data
  - Source: Federal Reserve Bank of Philadelphia
  - Preliminary estimates 45 days after each quarter
  - 1st Vintage: Feb. 1985
  - Last vintage: May 2013
    - ➢ Contains fully-revised data for 1984:Q4 – 2010:Q2.
- Economic Policy Uncertainty Index (Baker *et al.*, 2013):

News-based Index Quantifies newspaper coverage of uncertainty	Federal Tax-Code Uncertainty	Forecast Disagreement: CPI	Forecast Disagreement: Govt. Expenditure

The Data Revisions and the EPU index



Method

Rationality test of initial data under uncertainty
Rationality test:
- Reporting agency used all available information at release time?
  - ➢ If so, the contemporaneous information should not have impact on final revision

Compare results during periods of high vs. low uncertainty
- If uncertainty has impact on rationality, the contemporaneous information should have…
  - ➢ Significant impact on the final revision under high uncertainty (EPU > 1)
  - ➢ No impact under low uncertainty (EPU < 1)

Test impact of uncertainty on the reliability of the initial data
- If the initial data tend to be over- *or* under-estimated under uncertainty, uncertainty should have significant impact on the final revisions.
- Also, if uncertainty leads to both over- *and* under-estimation of the first releases, uncertainty might have no impact on the final revisions but have an impact on the revision magnitudes.

Results

- Rationality test: contemporaneous information has significant impact on the final revisions only under high uncertainty (not report)
  - ➢ Contemporaneous info incl. unemployment rate, Standard and Poor's index of 500 stock prices, and Treasury bill interest rate, etc.

Uncertainty leads to the irrationality of the first releases

- Reliability test (Table 1)
  - Col. 1: Impact of uncertainty on final revisions
    - ➢ Lack of evidence / inconclusive
  - Col. 2: Impact of uncertainty on magnitude of revisions
    - ➢ Significantly greater magnitude of revisions under uncertainty

Uncertainty causes both over- and under-estimation in the initial data and leads to the unreliability of the first releases

Table1:The Rationality in the First Releases Under Uncertainty

	Revision	**| Revision |**
Uncertainty (EPU)	-0.181	0.262*
	[0.344]	[0.000]
Constant	0.21	-0.031
	[0.241]	[0.657]
Adj. R^2	0.017	

** The coefficient is significant at 1% level*

Conclusion

- Using U.S. nominal output real time data and an uncertainty measure from 1985 to 2013, this study shows that uncertainty leads to the irrationality and unreliability in the first releases
- Results imply that during times of greater uncertainty, policymakers should proceed with caution when utilizing the first releases of economic data