The Impact of Uncertainty on Data Revision
Pei-Ju Sung
Department of Economics, College of Arts and Sciences, 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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012:Q4</td>
<td>14871.4</td>
<td>14871.4</td>
<td>14871.4</td>
<td>14871.4</td>
<td>14775</td>
<td>…</td>
<td>14385.9</td>
</tr>
<tr>
<td>2011:Q2</td>
<td>15006.4</td>
<td>15010.3</td>
<td>15018.1</td>
<td>14867.8</td>
<td>14814.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2011:Q3</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>…</td>
<td>16010.2</td>
</tr>
</tbody>
</table>

- 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
- Sampling Error
  - Only sampling from large firms
- Non-sampling Error
  - Firms allowed to report forecasts when actual data unavailable

Uncertainty
- Ghosal and Loungani (2000)
  - Uncertainty has negative impact on investments
  - Greater Impact for smaller firms
- Trueman (1994), Hong et al. (2000)
  - Herding behavior: market analysts’ forecasts tend to be biased and inefficient during high uncertainty periods

Method
- 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
- Economic Policy Uncertainty Index (Baker et al., 2013):

<table>
<thead>
<tr>
<th>News-based Index</th>
<th>Federal Tax-Code Uncertainty</th>
<th>Forecast Disagreement: CPI</th>
<th>Forecast Disagreement: Govt. Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coverage of uncertainty</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Data Revisions and the EPU index


Rationality test of initial data under uncertainty
- Reporting agency used all available information at release time?
  - If so, the contemporaneous information should have no impact on final revision
  - Significant impact on the final revision under high uncertainty (EPU > 1)
  - No impact under low uncertainty (EPU < 1)

<table>
<thead>
<tr>
<th>Uncertainty (EPU)</th>
<th>Revision</th>
<th>Constant</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.181</td>
<td>0.262*</td>
<td>[0.344]</td>
<td>[0.000]</td>
</tr>
<tr>
<td>0.21</td>
<td>-0.031</td>
<td>[0.241]</td>
<td>[0.657]</td>
</tr>
<tr>
<td>0.017</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The coefficient is significant at 1% level

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

<table>
<thead>
<tr>
<th>Uncertainty (EPU)</th>
<th>Revision</th>
<th>Constant</th>
<th>Adj. R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.181</td>
<td>0.262*</td>
<td>[0.344]</td>
<td>[0.000]</td>
</tr>
<tr>
<td>0.21</td>
<td>-0.031</td>
<td>[0.241]</td>
<td>[0.657]</td>
</tr>
<tr>
<td>0.017</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* The coefficient is significant at 1% level

Table 1: The Rationality in the First Releases Under Uncertainty

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