Enhancing Public Understanding of Revisions to Preliminary Estimates

The U.S. Post-Recession Perspective on Revisions

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IARIW 32nd General Conference
Boston
August 8, 2012
Why does BEA revise its estimates?

- Improve accuracy of the estimates by incorporating the most complete and reliable source data
  - Benchmarking indicators to annual surveys
  - Replacing trends or indirect indicators with comprehensive source data
- Provide a more detailed picture of the economy
- Make improvements to methods used for preparing the estimates
Revisions are not errors

- Schedule is determined and is a commitment

- “Error correction” is a term that is reserved for true errors

- Main cause: availability of more complete and revised data
Example: Benchmarking manufacturing

- **Indicator**: Monthly M3 ("manufacturers’ shipments, inventories, and orders")
  - Voluntary reporting
  - 4,300 reporting units with more than $500 million in shipments (represents 60% of manufacturing)
  - 89 industry categories
  - No product detail

- **Benchmark**: Annual survey of manufactures
  - Mandatory reporting
  - 50,000 establishments (representing all 328,500 manufacturing establishments)
  - 471 industries
  - 1,384 product classes
Shipments - Nondefense capital goods excluding aircraft

Source: Census Bureau, July 3, 2012
Retail sales excluding motor vehicles

Source: Census Bureau, March 30, 2012
Business inventories

Source: Census Bureau, July 20, 2012
For some components of GDP and GDI, direct indicators aren’t available

- State & local government spending
  - Current data on employment and construction
  - Data on other types of spending available from Census Bureau with a 2-year lag

- Corporate profits
  - Current data on public corporations
  - Comprehensive IRS data available (including private and S corporations) with a 2-year lag

- IRS data on proprietors’ and partnership income with a 2-year lag
Revisions to the 2007–2009 recession

- Revisions were unusually large
  - Early estimates significantly understated the extent of the decline
  - Revisions exposed gaps in data used for early estimates
- Some revisions came quickly as actual data replaced assumptions and indicators were revised
  - 2008Q4 – revised from –3.8% (Jan 30, 2009) to –6.2% (Feb 27, 2009)
- Other revisions came later with annual revisions
  - In July 2011, 2008Q4 was revised to –8.9%
  - Total revision from advance to latest (5.1 percentage points) is the largest downward GDP revision on record
### Sources of revisions to 2008Q4 GDP [percentage points]

<table>
<thead>
<tr>
<th></th>
<th>Advance</th>
<th>Third Annual (Latest)</th>
<th>Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gross domestic product</strong></td>
<td>-3.8</td>
<td>-8.9</td>
<td>-5.1</td>
</tr>
<tr>
<td>Personal consumption</td>
<td>-2.47</td>
<td>-3.53</td>
<td>-1.06</td>
</tr>
<tr>
<td>Fixed investment</td>
<td>-3.12</td>
<td>-4.05</td>
<td>-0.93</td>
</tr>
<tr>
<td>Change in private inventories</td>
<td>1.32</td>
<td>-1.54</td>
<td>-2.86</td>
</tr>
<tr>
<td>Exports</td>
<td>-2.84</td>
<td>-2.97</td>
<td>-0.13</td>
</tr>
<tr>
<td>Imports</td>
<td>2.93</td>
<td>2.84</td>
<td>-0.09</td>
</tr>
<tr>
<td>Government expenditures</td>
<td>0.38</td>
<td>0.35</td>
<td>-0.03</td>
</tr>
</tbody>
</table>

- Revisions to inventory investment came in 2\(^{nd}\) estimate (Feb 2009) and in 1\(^{st}\) & 2\(^{nd}\) annual revisions (July 2009, 2010)
- Revisions to personal consumption came in 2\(^{nd}\) estimate (Feb 2009) and in 3\(^{rd}\) annual revision (July 2011)
- Revisions to fixed investment in 2\(^{nd}\) annual revision
## Revisions to GDP contraction, 2007Q4–2009Q2

<table>
<thead>
<tr>
<th>Release date</th>
<th>Cumulative percent change [not at annual rate]</th>
<th>Cumulative revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2009</td>
<td>-3.7</td>
<td>...</td>
</tr>
<tr>
<td>July 2010</td>
<td>-4.1</td>
<td>-0.4</td>
</tr>
<tr>
<td>July 2011</td>
<td>-5.1</td>
<td>-1.4</td>
</tr>
<tr>
<td>July 2012</td>
<td>-4.7</td>
<td>-1.0</td>
</tr>
</tbody>
</table>

- From first estimate for full contraction period to latest estimate, cumulative contraction in real GDP revised from –3.7 percent to –4.7 percent
- Revisions in July 2011 mostly reflected newly available annual surveys for 2009
Misperceptions about revisions

• BEA’s practice of annualizing percent changes exaggerates perceived revisions

GDP revisions

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Percent change</th>
<th>Percent change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annual rate</td>
<td>Quarterly rate</td>
</tr>
<tr>
<td></td>
<td>Advance</td>
<td>Latest</td>
</tr>
<tr>
<td>2008Q1</td>
<td>0.6</td>
<td>-1.8</td>
</tr>
<tr>
<td>2008Q2</td>
<td>1.9</td>
<td>1.3</td>
</tr>
<tr>
<td>2008Q3</td>
<td>-0.3</td>
<td>-3.7</td>
</tr>
<tr>
<td>2008Q4</td>
<td>-3.8</td>
<td>-8.9</td>
</tr>
<tr>
<td>2009Q1</td>
<td>-6.1</td>
<td>-5.3</td>
</tr>
<tr>
<td>2009Q2</td>
<td>-1.0</td>
<td>-0.3</td>
</tr>
</tbody>
</table>
Misperceptions about revisions

- Although the sequence of “advance” GDP estimates looks like a time series, it does not represent a series that BEA ever actually published
  - For example, by the time BEA published the advance GDP for 2009Q1, the estimate for 2008Q4 had already been revised from −3.8 percent to −6.3 percent
- Example from *New York Times* blog
Advance versus latest estimates
Revisions to published time series
Real GDP, 2007Q4–2009Q2

Real GDP, 2007Q4-2009Q2

Billions of chained (2005) dollars

- Advance
- Thrd
- AR 09
- AR 10
- AR 11
- AR 12

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Interaction between revisions and policy

- Analysis to answer the question: If we knew then what we know now, how would policy have been different?
- The importance of timing; revision release dates and formulation of policy
- Timing of advance 2008Q4 GDP estimate doesn’t coincide with ARRA legislation
  - ARRA formulated in December 2008
  - Passed House on January 28 (2 days before GDP)
- Estimates for 2008Q3 may have had an effect
Basic revision patterns: Frequency patterns for revisions

- The three current quarterly vintages of estimates of GDP successfully indicated the following:
  - The direction of change in GDP 97 percent of the time
  - The acceleration or deceleration of growth 72 percent of the time
  - The relative magnitude of growth—whether it was above, near, or below trend more than 80 percent of the time (near is within one standard deviation of the mean growth)
  - The cyclical peaks before 5 of the 6 recessions between 1969 and 2006
  - The cyclical troughs of 4 of the 6 recessions
  - Revisions in both current-dollar and real GDP and their major components are roughly similar to each over the 1983-2009 time period
### Average revisions to current quarterly estimates of GDP, 1983-2008 [percentage points]

<table>
<thead>
<tr>
<th></th>
<th>Mean Revision</th>
<th>Mean Absolute Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current-dollar</td>
<td>Real</td>
</tr>
<tr>
<td>Advance</td>
<td>0.31</td>
<td>0.21</td>
</tr>
<tr>
<td>Second</td>
<td>0.13</td>
<td>0.10</td>
</tr>
<tr>
<td>Third</td>
<td>0.14</td>
<td>0.12</td>
</tr>
</tbody>
</table>
Systematic Trends?

Vintage Estimates of Real GDP

Percent Change

-4.0 -3.0 -2.0 -1.0 0.0 1.0 2.0 3.0 4.0 5.0


Early annual 1st annual 2nd annual 3rd annual
Looking at the income side

- Conceptually equivalent measure of aggregate economic activity
- Differences arise from different data sources
- Source data flow not equivalent
  - There is no advance estimate of GDI
  - Second estimates exist for 3 out of 4 quarters for this vintage
### Average Revisions to Current Quarterly Estimates of GDI, 1983-2009 [percentage points]

<table>
<thead>
<tr>
<th></th>
<th>Mean Revision</th>
<th>Mean Absolute Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second/1/</td>
<td>-0.01</td>
<td>1.28</td>
</tr>
<tr>
<td>Third</td>
<td>0.02</td>
<td>1.24</td>
</tr>
<tr>
<td>Fourth/2/</td>
<td>-0.16</td>
<td>1.43</td>
</tr>
</tbody>
</table>

/1/ Beginning with 1995, there are no second estimates for the fourth quarters of years.

/2/ These estimates have been published only from 2002:Q1.
Revisions to Real GDP and Real GDI in 2008:IV
[percentage points]

<table>
<thead>
<tr>
<th>Vintage</th>
<th>Change from Previous Quarter</th>
<th>Revision From Advance Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Real GDP</td>
<td>Real GDI</td>
</tr>
<tr>
<td>Advance/1/</td>
<td>-3.8</td>
<td>(-4.3)</td>
</tr>
<tr>
<td>Second/1/</td>
<td>-6.2</td>
<td>(-6.5)</td>
</tr>
<tr>
<td>Third</td>
<td>-6.3</td>
<td>-7.5</td>
</tr>
<tr>
<td>First annual</td>
<td>-5.4</td>
<td>-7.3</td>
</tr>
<tr>
<td>Second annual</td>
<td>-6.8</td>
<td>-6.9</td>
</tr>
<tr>
<td>Third annual (latest)</td>
<td>-8.9</td>
<td>-9.8</td>
</tr>
</tbody>
</table>

/1/ Advance and second GDI estimated from GDP by holding the 2008:III statistical discrepancy constant into 2008:IV.
Recent discussion about which is “better”

- Both GDP and GDI provide information about economic activity
- A simple average of the two was used in BEA articles in the SCB
Average of real GDP and real GDI

Chart 4. Average of Real GDP and Real GDI: Latest Estimates
Chart 5. Average of Real GDP and GDI: Latest Estimates