

# Consumer Metrics Institute Members News

## February 2, 2011: Answering More Questions about the Q4-2010 GDP Report (Ad Nauseam)

We have received a number of questions about some of the more bizarre aspects of the Bureau of Economic Analysis's (BEA) "Advance Estimate" GDP report for the fourth quarter of 2010 (please also see our earlier commentary on that report). In truth, a fair share of those questions arose because the data in the report itself could be charitably described as noisy, volatile or even peculiar. But many of the questions also indicate a high level of confusion over the methods that the BEA uses to develop the report. We thought that it might be useful to go back over some of the fundamentals:

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### **BEA Methodologies**

Most "Main Street" people hear the GDP numbers and think that the BEA simply taps into all of the cash registers around the country and tallies them up to calculate the country's quarterly commerce. That would be nice, and it would certainly be far more accurate than what really happens. The BEA's current methodologies are actually just an extension of a model that they started in 1937, when the best that they could do was to sample activity at a few hundred factories and then attempt to extrapolate that small sample to the entire U.S. economy. Now, 74 years later, they have replaced snail-mailed forms with e-mailed questionnaires, and substituted spreadsheets for the old hand kept ledger books. Sample sizes may have increased to thousands of questionnaires, but the basic concept remains the same: send questionnaires to a relatively minor portion of all U.S. businesses and extrapolate the whole economy from those results.

Instead of tallying up commerce, the BEA runs what is effectively the "mother of all spreadsheets" -- containing complex formulas that try to model the vast number of interactions within the whole economy. Picture in your mind the most elaborate, convoluted and opaque spreadsheet known to man. Increase that by an order of magnitude and have it maintained by hundreds of statistical clerks -- none of whom have purview to the entire thing. Now assume that some of the inputs to this spreadsheet are dollar values from a select sample of transactions, other inputs are sampled counts of goods as they get transported or warehoused, and yet other inputs are from

independently derived price surveys. Ultimately all the inputs have to get scaled-up into the aggregate dollar value of all U.S. commerce and inventories by the formulas within the model.

This spreadsheet has thousands of line-item rows representing different parts of the economy (e.g., groceries, automobiles, housing, exported machine tools, imported oil, finished goods inventories and municipal spending). And it now has hundreds of columns, representing each of the quarters since 1947 (and a number of annual columns prior to that). At the end of each January, April, July and October a new column is added to the right hand edge of the spreadsheet containing the numbers for the most recently ended calendar quarter. The numbers are then "rolled up" for publication into spreadsheets with about 60 rows, an example of which can be [downloaded directly from the BEA](#).

### **Introducing the Adjustments**

Further assume that, as economists, the BEA staff is obligated to have multiple versions of this humongous spreadsheet: one with raw numbers, one with the "nominal" raw numbers "seasonally adjusted," and one with the numbers corrected for inflation (the so-called "real" numbers). Seasonal adjustments are meant to smooth out the varying levels of commerce for goods that don't have constant year-long consumer demand (e.g., mistletoe, bikinis or home heating oil), but they are notoriously difficult to calculate and maintain (but arguably easy to fudge). They also introduce spurious results when seasonal patterns get skewed (e.g., by non-seasonal weather patterns or one-time events like 9/11).

Inflationary corrections are handled by a series of "deflators" that convert the "nominal seasonally adjusted" current dollars into "real" or "chained" 2005 equivalent dollars. Since different types of goods are inflating at different rates at different times, unique "deflators" are used for many of the line-item rows and every column in the enormous spreadsheet. Statisticians calculating the appropriate "deflators" aren't necessarily talking to the statisticians extrapolating the "nominal" numbers, nor is it even their job to be concerned with what their "deflators" are doing to the overall spreadsheet.

The key point to remember is this: the BEA isn't actually publishing measurements of what is happening in the economy -- they are instead publishing what is happening in their humongous, convoluted and opaque spreadsheet as a consequence of keying in the latest results from their questionnaires.

### **"Deflators" Gone Wild: Part 1 - Imports**

This past quarter serves as a great example of what can happen as a consequence of one of the "deflators" going crazy. The BEA reported a 3.17% annualized "real" growth rate for the economy. But then they also reported that two of the line items in their spreadsheet had quarter-to-quarter changes that could each individually have changed that roughly 3% number by over 5% -- in one case up and in the other case down. They just happened to offset each other. At face value that observation is nothing short of alarming -- how can we trust a 3.17% overall growth number when two different line items in the detail are swinging so wildly from quarter-to-quarter that the overall number might just as well have been any been anywhere from +8% to -2%?

One of the culprits in this current example is the price of imported goods (e.g., oil) and services, which the BEA says was increasing at a 21.8% annualized rate during the fourth quarter of 2010 after **decreasing** at a 9.2% rate in the third quarter. This means that the quarter-to-quarter swing in this line-item "deflater" was 31%, enough to cause spurious (and phantom) changes to the "real" economy as purported by the BEA's spreadsheet.

Specifically, imports are generally measured in current transactional dollars. From Q3-2010 to Q4-2010 the "nominal" (in 2010 dollars) annualized value of imports actually increased from \$2,399.4 billion to \$2,416.0 billion (0.7%). When they "deflated" the latter number using the oil-spiked "deflater" (that was independently derived) they concluded that "real" imports shrank from an annualized "chained" 2005-era \$2,184.3 billion to \$2,106.1 billion (-3.58%). They then converted those dollars into presumed quantities imported, and reported that 4% fewer physical goods were brought into this country. This was a major surprise to most people tracking consumer consumption of imported goods. And in the convoluted logic of the GDP spreadsheet, it changed the contribution of imported goods and services to the overall economic growth from the third quarter's negative 2.53% to the fourth quarter's positive 2.40%, a whopping swing of +4.93% to the "headline" number reported in the press. What this means is that without the import "deflater" impact, the GDP might have been reported as contracting at a negative 1.76% annualized rate.

### **"Deflators" Gone Wild: Part 1 - Inventories**

Even more convoluted is how inventories were impacted. Inventory data is largely collected as quantities (e.g., the number of cars or barrels of oil being stored). While one might expect inventories to be valued exclusively using some variation of book-value FIFO accounting logic, they are additionally

impacted by an "inventory valuation adjustment" (or "IVA") that utilizes prices from a "Fisher formula" (that according to the BEA's notes "incorporates weights from two adjacent quarters; quarterly indexes are **adjusted for consistency** to the annual indexes before percent changes are calculated").

This is where a bizarre "deflater" can do its damage, because at the highest level the spreadsheet logic attributes any variations in the quarter-to-quarter **rates of change** in inventories to changes in production levels. So, even though the BEA reported that "nominal" inventories grew by \$5.2 billion, the quarter-to-quarter **rate of change** for "real" inventories (seasonally adjusted, of course) **dropped** by \$114.2 billion, enough to swing the contribution of inventories on overall GDP growth from the third quarter's positive 1.61% to the fourth quarter's negative 3.70% -- a gigantic swing of minus 5.31% in the overall growth rate. Without this impact the GDP might have been reported to have been growing at an astronomical +8.48% annualized rate!

This (largely phantom) inventory building "reversal" was interpreted by the talking-head pundits on TV as a sign that factories had physically drawn down inventories -- and that ultimately this could only be good news, since those inventories would have to be replenished with geared-up manufacturing sometime during the next few quarters.

### **Assessing the Damage**

How much of the above swings were caused exclusively by "deflators" run amuck? It's impossible to know for sure from the BEA publications that we have seen, and probably only the statisticians controlling those specific cells in the humongous spreadsheet know for sure. But a good educated guesstimate is that at least several percentage points +/- in the 3.17% are the result of purely statistical anomalies. And an additional percent or so might have been added to the reported growth number by the use of an almost obscenely low "deflater" for the overall economy (0.3%) -- which defies a number of other current annualized inflation readings, including the December year-over-year Consumer Price Index ("CPI") of 1.5%, the December Producer Price Index ("PPI") for finished goods numbers of 4.0%, the BEA's own "deflater" for the prior quarter at 2.1%, and (as mentioned above) the BEA's Imported Goods "deflater" for the fourth quarter of 21.8%.

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The conceptual bottom line to all of this is that the BEA is only reporting the results of a huge spreadsheet model of the U.S.

economy that collects inputs using techniques first developed in 1937 to target things that mattered to FDR's factory employed constituents. That model samples a small part of the economy and makes enormous extrapolations, seasonal adjustments and price normalizations -- all of which are subject to substantial errors, and some of which are significantly leveraged in the final numbers.

This past quarter provided an opportunity to learn how some aspects of the huge spreadsheet can be taken hostage by statistical quirks. It also painfully reminded us that on occasion the BEA's GDP report is not about the actual economy, it is instead about their model of how they think the economy should be performing. It is small wonder that people on "Main Street" don't really trust the government's data anymore, since it often doesn't agree with what they are seeing with their very own eyes.

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