

Monthly Wholesale Trade 2019 Revisions Notice

Summary of Revisions

Not adjusted estimates of monthly wholesale sales were revised for January 2016 through January 2019, as well as monthly wholesale end-of-month inventories estimates for January 2008 through January 2019. Corresponding seasonally adjusted estimates of monthly wholesale sales were revised for January 2013 through January 2019. Corresponding seasonally adjusted monthly wholesale end-of month inventories estimates were revised for January 2005 through January 2019.

Revisions to not adjusted estimates were made in two parts: First, revisions were made to prior Monthly Wholesale Trade estimates to reflect historical corrections. Then, revisions were made when benchmarking the Monthly Wholesale Trade estimates to the 2017 Annual Wholesale Trade estimates.

Revisions to seasonally adjusted estimates were made based on the revised not adjusted estimates and revised seasonal adjustment factors.

Reasons for Revisions

We revised the not adjusted estimates to:

- Reflect corrections to data for the current and part of the prior Monthly Wholesale Trade Survey (MWTS) sample. Corrections were made to replace previously reported data with more accurate data received at a later date or to replace imputed data with reported data obtained from the company.
- Introduce results from the 2017 Annual Wholesale Trade Survey (AWTS), which has been benchmarked using final results of the 2012 Economic Census.
- Link the previously published estimates from the prior MWTS sample to estimates from the current MWTS sample.

We revised the seasonally adjusted estimates to:

- Reflect revisions to the not adjusted estimates.
- Incorporate changes to the seasonal adjustment factors based on the annual review of the seasonal adjustment models.

Benchmarking to 2017 AWTS Estimates

There are several reasons for revising estimates from the Monthly Wholesale Trade Survey (MWTS) by benchmarking to the Annual Wholesale Trade Survey (AWTS):

- **Timing.** Respondents have more time to prepare their data for the annual survey than for the monthly survey. The annual responses are requested at a time when many firms have already

compiled audited book figures for their own use. This includes adjustments for returns, allowances, and other customer transactions. The timing of the annual survey is such that we are also able to obtain independent verification of the reported data from sources such as a company's annual report. On the other hand, respondents to the monthly survey have just a few weeks to provide reports of their sales and end-of-month inventories. Sometimes these data are based on incomplete or unaudited records, or the respondent may have estimated the value for a particular data item.

- **Sampling.** The annual sample is larger than the sample used to develop the estimates for any given month.
- **Response.** The annual estimates are based on more reported data than are the monthly estimates. The response to the AWTS is required by law, while the response to the MWTS is voluntary. This results in a total quantity response rate (TQRR) above 87 percent for sales and above 83 percent for inventories on the AWTS, and a rate of approximately 65-70 percent on the MWTS. An imputation process accounts for the sales and inventories data that fail edits or are missing because of nonresponse. For MWTS, this process assumes that firms which do not respond have month-to-month changes similar to responding firms of a similar size in the same industry. However, the AWTS imputation process relies heavily on administrative data and relationships of these data for each individual firm, which could result in different data being tabulated for the MWTS and AWTS for nonresponding firms.

Methodology

Not Adjusted Estimates of Monthly Wholesale Sales

Linking Current and Prior Samples

For all detailed NAICS codes, corrections are applied to the prior sample's monthly wholesale sales estimates for December 2017 through March 2018 and to the full span of the current sample's estimates.

After doing this, for each detailed NAICS code, the monthly wholesale sales estimates for January 1992 (the beginning of the series) through February 2018 are linked to the estimates derived from the current sample. This linkage is performed at each detailed NAICS level by multiplying the corrected sample-based estimates prior to March 2018 by a geometric mean. The geometric mean is computed as the square root of the product of two ratios. The numerators of the ratios are the Horvitz-Thompson sales estimates for February 2018 and March 2018 from the current sample. The denominators of the ratios are the Horvitz-Thompson estimates for February 2018 and March 2018 from the prior sample, corrected where applicable.

Benchmarking to 2017 AWTS

After performing the above linkage, the resulting sales estimates for December 2015 through January 2019 are input to the benchmarking program. The estimates for a given detailed NAICS code are revised in a manner that:

- For 2016 and 2017, constrains the sum of the 12 monthly sales estimates to equal the corresponding annual sales estimates from the 2017 AWTS.
- Minimizes the sum of the squared differences between the month-to-month changes of the input and revised estimates for December 2015 through January 2019.
- Uses the December 2015 sales estimate as a constraint, linking the revised estimates to the previously published sales estimates and resulting in no revision to the December 2015 estimate.

A mathematical result of the benchmarking methodology is that all revised estimates following the end of the last benchmark year (2017) are derived by multiplying the corresponding input estimates by the ratio of the benchmarked-to-input estimate for the last month of the last benchmark year. Therefore, for a given detailed NAICS code, a ratio of the benchmarked-to-input estimate for December 2017 is computed. Monthly sales estimates after December 2017 are multiplied by this constant ratio, which is called a carry-forward factor, to derive published monthly sales estimates. The carry-forward factor remains the same until the next benchmarking operation.

Estimates at 2- and 3-digit NAICS levels are computed by summing the revised estimates for the appropriate detailed industries comprising the aggregate.

Not Adjusted Estimates of Monthly Wholesale End-of-Month Inventories

Linking Current and Prior Samples

For all detailed NAICS codes, corrections are applied to the prior sample's monthly wholesale end-of-month inventories estimates for December 2017 through March 2018 and to the full span of the current sample's estimates.

After doing this for each detailed NAICS code, the monthly wholesale end-of-month inventories estimates for January 1992 (the beginning of the series) through February 2018 are linked to the estimates derived from the current sample. This linkage is performed at each detailed NAICS level by multiplying the corrected sample-based estimates prior to March 2018 by a geometric mean. The geometric mean is computed as the square root of the product of two ratios. The numerators of the ratios are the Horvitz-Thompson inventories estimates for February 2018 and March 2018 from the current sample. The denominators of the ratios are the Horvitz-Thompson estimates for February 2018 and March 2018 from the prior sample, corrected where applicable.

Benchmarking to 2017 AWTS

After performing the second linkage, the resulting monthly wholesale end-of-month inventory estimates for December 2007 through January 2019 are input to the benchmarking program. The estimates for a given detailed NAICS code are revised in a manner that:

- For 2007 through 2017, constrains the December end-of-month inventories estimates from MWTS to equal the end-of-year inventories estimates derived from the 2017 AWTS.

- Minimizes the sum of the squared differences between the month-to-month changes of the input and revised estimates for December 2007 through January 2019.
- Uses the December 2007 end-of-month estimate as a constraint, linking the revised estimates to the previously published end-of-month estimates and resulting in no revision to the December 2007 estimate.

For a given detailed NAICS code, end-of-month inventories estimates subsequent to December 2017 are derived by multiplying the input estimates by the ratio of the benchmarked-to-input estimate for December 2017. This ratio is the carry-forward factor for inventories, and it remains the same until the next benchmarking operation.

Estimates at 2- and 3-digit NAICS levels are computed by summing the revised estimates for the appropriate detailed industries comprising the aggregate.

Seasonally Adjusted Estimates

New seasonal, trading-day, and holiday factors are computed and used to adjust sales for January 2013 through January 2019. For inventories, new seasonal factors are computed and used to adjust inventories for January 2005 through January 2019. Revisions to adjusted estimates start three years before the revised not adjusted estimates because the revised not adjusted estimates may have a non-ignorable effect on the computation of seasonal factors as far back as three years ago. For both sales and inventories, the new seasonal factors are computed using the revised not adjusted estimates as input to the Census Bureau's X-13ARIMA-SEATS software, version 1.1 build 48.

A different seasonal adjustment model specification exists for each detailed NAICS code for both sales and inventory. All model specifications are available upon request.

In the latest annual review of the seasonal adjustment for inventories, there continues to be no significant seasonal pattern detected for end-of-month inventories between January 1998 and December 2003 for NAICS 4241 and the seasonal factors for that period will continue to be set to one.

There also continues to be no significant seasonal pattern detected in end-of-month inventories for NAICS 4246 (Chemicals and Allied Products) beginning in January 1996. Therefore, seasonal adjustment factors for end-of-month inventories are set to one starting with January 1996 for NAICS 4246.