

NOTE TO REVIEWER

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SUBJECT: Improvement in Imputation Procedures for the Quarterly Census of
Employment and Wages (QCEW)

The Bureau of Labor Statistics (BLS) implemented improvements to the methods used to impute data for missing employer reports in the Quarterly Census of Employment and Wages (QCEW) program. The OMB control number for this survey is 1220-0012 and clearance for the survey expires on 02/28/2021.

BLS informed QCEW data users in advance regarding this improvement. In addition to the public, BLS informed business register and benchmark customers within BLS, and also QCEW customers at BEA. An outreach plan is discussed below.

OVERVIEW

The former method of imputation estimated the current month's employment or current quarterly wages by applying the change from a year earlier to the previous month's reported employment and/or quarterly wages. That is, the current month's employment for a missing establishment was equal to the previous month's employment multiplied by the ratio of its over-the-month change from a year earlier; a similar procedure was applied to estimate total quarterly wages. A drawback to this procedure was that it used the data from a year earlier, which may not reflect current economic conditions.

Records were imputed for two quarters of nonresponse. After two quarters of nonresponse, BLS dropped the establishment from the universe. QCEW state staff attempt to contact large missing employers in the first quarter of nonresponse.

Usually, non-respondents account for less than five percent of QCEW employment. However, BLS anticipated that the number of non-responding employers would be substantially higher than usual in the second quarter of 2020 as a result of the business response to the coronavirus (COVID-19) pandemic. The former imputation methods would likely understate the impact of the pandemic on the US economy.

PLANNED IMPROVEMENTS

In response, BLS conducted research on three improvements to imputation methodology. This research was done using data for all quarters of 2019. The results were acceptable. More than 80% of the 2019 establishments inactivated by the new method did not have reported data for at least the two following quarters in 2019. Records that were inactivated in first quarter 2019 were tracked for three subsequent quarters. Records that were inactivated in second quarter 2019 were

tracked for two subsequent quarters. BLS implemented these improvements during its processing in October 2020 for data released on November 18, 2020.

- First, summary counts of claims for the regular state unemployment insurance benefits per employer were matched to missing employers. This match identified employers who were likely to have ceased operations. These non-responding employer records were immediately dropped from the QCEW file. These employer records otherwise would have been imputed for two quarters before being dropped.

This is a new QCEW use of claims counts, which are collected by the BLS Local Area Unemployment Statistics (LAUS) program. Most states supply these data to the LAUS program; California, Florida, and Puerto Rico are exceptions for technical reasons. Florida was able to provide a substitute file. Massachusetts declined to share a file for BLS QCEW use. BLS is unable to identify and drop employers who are likely to have ceased operations in states that do not supply usable claims files.

- Second, for employers that are expected to still be in operation, the imputation formula was modified. BLS has conducted extensive research on alternative imputation methods for both employment and wages. The findings of the research indicate that current trends reported by similar businesses should be applied to nonrespondents. BLS defines the procedure for doing so as the ratio method. According to this method, the ratio for a particular estimation cell is computed as the sum of a current month's reported employment (from similar businesses) divided by the sum of the previous month's reported employment. To impute the current month's employment for a nonrespondent, the ratio is then multiplied by the nonrespondent's previous month's employment. A similar procedure is applied to impute total quarterly wages.

For a discussion of BLS research on this topic, see <https://www.bls.gov/osmr/research-papers/2009/st090090.htm>

- Third, state QCEW staff may use unemployment insurance claims information as a supplement to their review of imputed and reported QCEW data.

BLS implemented these procedures with the first release of data for the second quarter of 2020. These changes may result in larger than usual revisions to QCEW estimates for first quarter 2020. BLS published summary tables showing the results of the ratio method and the BLS use of claims coincident with the release of second quarter data in November 2020. The impact of the state use of claims will not be available.

BLS implemented a streamlined version of the ratio method in October 2020 during its processing to support the data that was released on November 18, 2020. The complete version will be part of the QCEW state processing system, which will begin implementation in September 2021. The complete version accounts for imputation in all cases of reporting, including those in which wage data are reported but employment data are not. It has to handle for the relationship between master and worksite records for multiple worksite reporters. To deliver a product for use under a tight schedule, BLS focused on the highest value components of the complete version. BLS streamlined the immediate implementation of the ratio method to

focus on records with no data reported for any data type. Master units are not used in publication so they were a secondary concern. BLS will create masters in the future by summing the imputed worksites.

IMPACT OF NEW IMPUTATION PROCEDURES

BLS expects that the new imputation procedures will impact downstream users in a positive way. The new procedures will result in fewer imputations of positive employment to businesses that have ceased operations, and will result in imputed employment and wages to late respondents that are more accurate and more sensitive to current economic conditions. In addition to improving the accuracy of tabulations for QCEW publications and for Business Employment Dynamics, these procedures will improve the quality of QCEW data as an economic input to BEA data, and as a sampling frame and source of benchmark employment for BLS sample surveys.

OUTREACH PLAN

Public

On August 19, BLS issued the First Quarter 2020 County Employment and Wages news release. A box note was inserted in that release which announced this improvement project. Additionally, BLS created a web page that discusses QCEW imputation methodology. A link to this page was added to the Notices section of the QCEW home page. The imputation web page was updated coincident with the November 2020 QCEW news release to share the results of this project. BLS is seeking feedback through the 60-day notice for the full clearance of the QCEW program.

See https://www.bls.gov/news.release/archives/cewqtr_08192020.pdf and <https://www.bls.gov/cew/additional-resources/imputation-methodology.htm>.

States

QCEW staff have discussed this project with state partners using the Policy Council process. This communication will be ongoing. BLS QCEW management meets monthly with state representatives as joint members of the QCEW Policy Council. This project was discussed at the September and October meetings of this group. As it is an ongoing project, it will be discussed at this monthly meeting until it becomes a routine part of processing.

BEA

QCEW staff discussed this project with the QCEW contact in the Regional Economics group. BLS presented details of this project at a wider meeting of BEA staff on September 10. The QCEW program will share results with these users as the project progresses. Results were shared with BEA in mid-October.

Users at BLS

The QCEW program has notified all business register and benchmark users of QCEW data within BLS. QCEW has been in close consultation with BED, CES, and JOLTS management throughout this project.

CES staff have made some suggestions for changes that might further improve these methods. QCEW will consider these suggestions in future updates of this project.

The QCEW program will share results with BLS users as the project progresses. Results were shared in mid-October.

Sample frame users across BLS will benefit from earlier elimination of records for businesses that have ceased operations. Imputed records will more accurately report their size category.

Employment benchmark users will benefit from a more accurate measure of employment and wages, particularly around inflection points in the economy. They will benefit from more accurate measures for areas that have lower response rates after a natural disaster. More timely identification of worksite closures will improve the data provided to birth and death models.

BLS programs that utilize QCEW data include:

BLS Program	Sample Frame Use	Employment Benchmark Use	Other Use
Business Employment Dynamics	Not applicable	Not applicable	Employment dynamics measures based on longitudinally linked QCEW microdata
Current Employment Statistics	Yes	Yes	Small Domain Model, Birth/Death Model
Job Openings and Labor Turnover Survey	Yes	Yes, employment is benchmarked to CES, and thus indirectly to QCEW.	
Occupational Employment Statistics	Yes	Yes	
Occupational Safety and Health Statistics	Yes	Yes	
Local Area Unemployment Statistics	No	No	QCEW and CES employment is used to create substate employment estimates using the Handbook method.
National Compensation	Yes	Yes, employment	

Survey		weights are benchmarked to QCEW	
Industrial Prices	Yes	No	
Consumer Prices	No	No	CPI plans to refine the location and address data reported in the CE by comparing the household reported data to establishments in the Quarterly Census of Employment and Wages (QCEW) business registry.