

**Department of Commerce**  
**United States Census Bureau**  
**OMB Information Collection Request**  
**Annual Survey of Manufactures (ASM)**  
**OMB Control No. 0607-0449**

**B. Collection of Information Employing Statistical Methods**

**1. Universe and Respondent Selection**

The 2020 ASM statistics will be based on a sample that was selected for the 2019 ASM and supplemented with manufacturing births. The frame, used for selecting the 2019 sample, was assembled from the 2017 Economic Census – Manufacturing. The frame consisted of 291,600 manufacturing establishments.

In order to reduce the reporting burden on small- and medium-sized single-location companies, the frame was partitioned into two groups: establishments eligible to be mailed a questionnaire (104,900 establishments) and establishments not eligible to be mailed a questionnaire (186,700 establishments). The group of establishments that is not eligible to be mailed a questionnaire still contributes to the ASM estimates. The group of establishments that is eligible to be mailed a questionnaire is defined as the mail stratum. It is comprised of larger single-location manufacturing companies and all manufacturing establishments of multi-location companies. Of the 104,900 establishments in the mail stratum, 49,400 establishments were selected for the ASM sample using methodology similar to what was used for previous ASM samples. The initial sample was supplemented with manufacturing establishments that were newly opened in 2018 (births) to yield a sample of 52,800 establishments for the 2019 ASM. Births added to the mail stratum are large, single-location companies and new manufacturing establishments of multi-location companies. Births are added to the sample annually, but establishments also become out of scope for various reasons. The expected sample size for the 2020 ASM mail sample is 49,000 establishments.

The group of establishments that is not eligible to be mailed a questionnaire is defined as the nonmail stratum. The nonmail stratum contained the remaining 186,700 single-location companies. Although this group still contributes to the ASM estimates, no data are collected from companies in the nonmail stratum. Rather, data are imputed using administrative records of the Internal Revenue Service (IRS), the Social Security Administration (SSA), and the Bureau of Labor Statistics (BLS) or are imputed based on industry averages. This administrative information, which includes payroll, total employment, industry classification, and physical location, is obtained under conditions which safeguard the confidentiality of both tax and census records. Although the nonmail companies account for nearly two-thirds of the establishments in the universe,

they account for only about 6 percent of the manufacturing output. The nonmail stratum is supplemented annually with small manufacturing births that are not included in the mail stratum.

Two types of response rates are computed for the ASM: unit response rate (URR) and total quantity response rate (TQRR). The URR is the percentage of reporting units, based on unweighted counts, that were eligible (E) or of unknown eligibility (U) and were respondents (R) in the statistical period. Cases are assumed to be active and in scope in the absence of evidence otherwise. This includes cases that are Undeliverable as Addressed. To be considered a respondent to the ASM, a reporting unit must provide both of the key items: value of shipments and total annual payroll. The formula for calculating the URR is as follows:  $URR = [R/(E+U)] * 100$ . The URR for the 2018 ASM was 56%. This rate is lower than in previous years, due to a delayed mailout of 6 months from a typical ASM year and an abbreviated collection period.

The TQRR is defined as the percentage of the estimated (weighted) item total that is obtained from directly reported data or from sources determined to be equivalent quality to reported data. The 2018 TQRR was 60% for value of shipments, and 69% for total annual payroll.

## 2. **1Procedures for Collecting Information**

### a. Description of Reporting Questionnaires

The Census Bureau will send an initial contact letter to approximately 30,500 manufacturing establishments. The contact letter will direct respondents to report the MA-10000 online.

### b. Matching to BLS Establishment List

Incomplete industry codes can cause potentially serious errors in our coverage of new producers and in our ability to perform accurate editing and imputation. Although the SSA requests industry classification in the original application for the EI number, frequently only a 3- or 4-digit code can be assigned for a large number of the new businesses. This amounts to about 20,000 manufacturing establishments annually. In addition, a large number of newly active establishments are received from the IRS without industry classification. Classification information is requested from the BLS for both types of cases.

### c. Sampling Methodology

The 2019 ASM sample was selected from the Manufacturing Sector of the 2017 Economic Census. The sample will be supplemented annually to include new establishments in the Manufacturing Sector. This sample will be used through reference year 2023. Below is an overview of the sample

design.

The universe was partitioned into mail and nonmail strata. Within each of the 360 NAICS industries, small- and medium-sized single-location companies were identified and defined as the nonmail component. Establishments comprising the remaining portion, including all establishments of multi-location companies, were defined as the sample frame.

On the sample frame, establishments that meet specified criteria were selected in the sample with certainty.

The sampling strategy was to select an independent sample within each of the 360 NAICS industries. This allowed optimization of the probabilities of selection within each industry, which should improve the representativeness and reliability of the survey estimates. Within each industry, each establishment was initially assigned multiple probabilities. These probabilities were based on the establishment's relative importance within the industry that it was classified and its product classifications; and, the target reliability constraints defined by the survey manager. For example, an establishment that has activity in three product classes will initially be assigned a total of four probabilities (one would be industry-based and the other three would be product class based). For sample selection purposes, the establishment's maximum probability was used. The use of the maximum probability ensures that target reliability constraints will be satisfied.

d. Estimating Procedures

A primary objective of the ASM is to estimate year-to-year change between the censuses. The variances of estimated changes are always reduced when the sample overlap is high between both periods and the year-to-year correlations are positive. Since the ASM sample is selected and maintained for a period of five years and the year-to-year correlations are high for most ASM data variables, an estimator that takes advantage of both the constancy of sample and the positive correlations is highly desirable. For the ASM this is achieved via the use of the "difference estimator." Essentially, an estimate of the "difference" between the current year and the census year is derived from the sample and added to or subtracted from the corresponding census value. We are researching the effectiveness of using a difference estimator for the 2020 ASM given the impacts to businesses and the economy throughout 2020 and a possible change in the year-to-year correlations.

For a given sample size, the difference estimator generates more reliable

estimates than most estimators of totals. It also offers the attractive feature that estimates for different subgroups are additive, ensuring that estimates are arithmetically consistent.

The formula for the difference estimator is as follows:

$$Y''_{cy} = Y'_{cy} + (Y_{cen} - Y'_{cen}) + I_{cy}$$

Where  $Y''_{cy}$  is the published estimate for the current year.  $Y'_{cy}$  is the linear estimate obtained by multiplying each mail sample establishment's current year data by the corresponding establishment weight.

$I_{cy}$  is the estimate obtained from the use of administrative records and industry averages for establishments in the nonmail portion of the universe.

$Y_{cen}$  is the census value from the sampling frame.

$Y'_{cen}$  is the linear estimate of  $Y_{cen}$  from the sample selected from the sampling frame.

For selected variables with poor year-to-year correlations, estimates of total are generated as follows:

$$Y''_{cy} = Y'_{cy} + I_{cy}$$

### 13. **Methods to Maximize Response**

#### a. **Follow-up Procedures**

The contact strategies will include an initial mailing, due date reminder as the due date approaches and systematic mail follow-up for nonresponse (See Attachment J for the Letters), supplemented by telephone follow-up for selected firms. We call larger delinquent companies at the time of our processing closeout prior to the tabulation review stage. In addition, the subject matter staff contact individual establishments of these larger companies as part of the tabulation review stage.

#### b. **Estimating for Missing Data**

The procedures for handling missing data essentially are the same as the prior years. For single-establishment companies that do not respond, we obtain employment and payroll data from the IRS. We then estimate the other data items for the nonrespondent, using a combination of the prior

year establishment operational relationship and industry averages.

For establishments of multiunit companies that do not respond, we obtain operational status information from the Company Organization Survey to identify the establishments that actually are in business and, therefore, candidates for imputation. We then estimate the detailed items for the nonrespondent establishments using a combination of the prior year establishment operational relationships, industry averages, and changes in industry levels developed from data supplied by the Census Bureau's Manufacturers' Shipments, Inventories, and Orders Survey (M3) survey (inventories) and the Bureau of Labor Statistics (BLS) (employment and payroll).

c. Reliability

The estimates developed from the sample are likely to differ from the results of a complete canvassing of all eligible establishments in the population. The particular sample selected for the ASM is one of many probability samples that could have been selected under identical circumstances. Each of the samples would yield a slightly different set of results. These differences are known as sampling errors or standard errors of the estimates. Estimates of the magnitude of these sampling errors are included, in the publications, in the form of relative standard errors (the standard error divided by the corresponding estimate). At the total manufacturing level, the relative standard errors for the key data items (value of shipments, total annual payroll) were 0.1 percent for 2018. At the 3-digit subsector levels, the relative standard errors for the key items were all less than 1.6 percent for 2018.

4. **Tests of Procedures or Methods**

• a. Cognitive Testing of New Questions FY 2020

During September 2020, researchers conducted 21 interviews, for new questions for the Annual Survey of Manufactures that focused on how companies have been impacted by the coronavirus pandemic (see Attachment K for final report on coronavirus pandemic content testing). Based on the results of the interviews and suggestions in the final report, two questions were slightly revised. The final version of the coronavirus pandemic questions are available in attachments B and C.

Results from pretesting suggest that overall, the new questions are easy to answer.

- Item 7 Employment, Payroll, and Fringe Benefits: The revised order of the payroll questions works for respondents.
- Item 7 Employment, Payroll, and Fringe Benefits: Classification of production workers may vary by respondent, need to maintain the ASM statement on how to define production vs non-production workers. This statement will be available in the instruction document as well as the instrument. Most respondents can report these numbers by quarter.
- Item 22: Additional NAPCS products made sense and respondents understood why they were added.
- Item 5/28 Value of Donated Products: ‘Donate’ and ‘product’ - needed clarification on why a product was donated, related to the coronavirus pandemic or not. The question was updated to include ‘for any reason.’
- Item 28 Number of Days Establishment Closed: ‘Closed’ – caused some confusion as to its meaning. Was this stopping of production or was this total closure. The question was updated to define closed as the ceased production of goods.

b. Cognitive Testing of New Question SY2021

From October 2020 to March 2021, researchers will conduct up to 40 interviews, to determine if respondents are able to provide unfilled order data at the establishment level. If the result of these interviews is positive, the Census Bureau plans to move this collection to the Annual Survey of Manufactures and eliminate the M3UFO survey. (see Attachment F for the draft question).

c. Evaluations Supporting Continuous Quality Improvements

The Census Bureau’s Economic Programs Directorate conducts ongoing research to evaluate the performance and effectiveness of existing ASM questions, data collection instruments, and communication materials. These evaluations are intended to support timely continuous quality improvements in data collection methodology. The primary methodologies for conducting these evaluations is real-time and/or post-collection respondent interviews, along with paradata analysis, as appropriate. The Economic Programs Directorate will continue to submit requests under the Census Bureau’s generic clearance for pretesting for survey questions covering new content, not previously collected on the

ASM, and new or substantial changes in instrumentation and/or technology for data collection.

**5. Contacts for Statistical Aspects and Data Collection**

Ms. Marlo N. Thornton, Assistant Division Chief for Manufacturing, Mining, and Construction Sectors of the Economy-Wide Statistics Division serves as consultant on the collection, analysis, and the dissemination of the ASM data. She can be reached on (301) 763-7170.

Ms. Amy Newman-Smith, Methodology Director for Manufacturing, Investment, and Construction Programs of the Economic Statistical Methods Division serves as consultant on the statistical aspects of the ASM. She can be reached on (301) 763-6595.

Attachments:

- A. Legal Citation
- B. Draft 2020 MA-10000(MU) worksheet
- C. Draft 2020 MA-10000(SU) worksheet
- D. Stakeholder Feedback on Coronavirus Pandemic Content
- E. Eliminated Questions
- F. Draft M3UFO Question
- G. Key Stakeholders List for Annual Programs
- H. BEA Letter of Support
- I. Electronic Instrument Selected Screen Shots
  - 1. Welcome screen
  - 2. Burden statement
- J. Letters
- K. ASM Cognitive Report on Coronavirus Pandemic and revised Payroll and Employment Questions