Department of Commerce
United States Census Bureau
OMB Information Collection Request
2017 Economic Census
OMB Control Number 0607-0998

Part B. Collections of Information Employing Statistical Methods

1. **Universe and Respondent Selection**

The 2017 Economic Census covers 18 North American Industry Classification System
(NAICS) sectors and is a complete enumeration of business establishments located in the 50
states, the District of Columbia, and associated offshore areas with one or more paid or
leased employee (based on IRS Form 941 data). Data are either collected directly from the
establishments or obtained from administrative information reported to other federal
agencies. Table 1 below shows the sectors covered, the size of the establishment universe as
tabulated in the 2012 Economic Census, and the estimated universe size for 2017.

Table 1: Economic Census Universe Sizes (2012 Actual & 2017 Estimated)

Sector	North American Industry Classification System (NAICS) Description 2012	Establishment Counts	
		2012 Economic Census	**Estimated 2017 Universe**
NA	Unclassified [3] [4]	-	25,000
21	Mining	25,417	27,030
22	Utilities	17,595	18,125
23	Construction [2]	598,065	677,305
31-33	Manufacturing	297,239	286,315
42	Wholesale Trade	419,463	406,735
44-45	Retail Trade	1,062,083	1,050,620
48-49	Transportation and Warehousing [1]	213,809	223,280
51	Information	138,341	142,835
52	Finance and Insurance	468,183	479,320
53	Real Estate and Rental and Leasing [1]	354,106	399,260
54	Professional, Scientific and Technical Services	856,463	913,235
55	Management of Companies and Enterprises	53,765	70,365
56	Administrative & Support and Waste Management & Remediation	386,387	399,155
61	Education Services [1]	67,960	73,885
62	Health Care and Social Assistance	831,303	869,630
71	Arts, Entertainment, and Recreation	124,591	136,630
72	Accommodation and Food Services	662,489	675,980
81	Other Services (except Public Administration) [1]	529,691	534,245
Totals		7,106,950	7,408,950

Notes: (1) Some specific industries in these sectors are out-of-scope.
          (2) Counts for the 2012 Census of Construction are estimates based on a weighted sample.
          (3) Insufficient administrative information to assign to a sector.
          (4) Covered under clearance 0607-0991, 2017 Economic Census Industry Classification Report

The U.S. Census Bureau's Business Register provides the universe of establishments. As indicated above, we estimate that the size of the universe will be approximately <mark>7,408,950</mark> <mark>7,489,855</mark> establishments in 2017. While all of these establishments will be used to produce certain basic statistics (such as value of shipments/receipts/revenue/sales or payroll estimates), other industry-specific estimates (such as product lines, class of customer, etc.) will be based on the responses of just a sample of these establishments.

a. Sample Component

The sample component of the 2017 Economic Census will consist of three parts:

(1) all active operating establishments of multi-establishment firms,
(2) all ("large") single-establishment firms whose annualized payroll is above an industry-specific payroll cutoff, and
(3) a stratified sample selected from the remaining ("small") single-establishment firms.

The "Sample Component" columns of <mark>Table 2</mark> indicate the expected size of each of these three components by sector. Paragraph B.2.a, below, describes the selection procedures in more detail. Attachment B shows expected counts at the 6-digit NAICS level.

Table 2: 2017 Economic Census Estimated Sample Sizes

Sector	Sample Component			Non-Sample Component		
	Establishments of Multi-Establishment Firms (Selected w/ Certainty)	Single-Establishment Firms		Classification Information Required (1)	Not Mailed	4th Quarter Births
		"Large" (Selected w/ certainty)	"Small" (Sampled)			
NA	0	0	0	25,000	0	0
21	9,290	8,345	1,460	1,405	5,635	895
22	13,285	2,735	945	0	1,060	100
23	18,960	43,885	80,195	54,860	450,230	29,175
31	58,685	104,495	12,740	19,145	85,475	5,775
42	133,105	203,800	27,605	0	29,835	12,390
44	453,200	88,720	61,325	44,300	382,565	20,510
48	58,120	43,020	27,500	11,600	75,645	7,395
51	71,305	21,405	8,475	3,355	32,570	5,725
52	249,465	52,570	36,825	3,080	125,550	11,830
53	98,820	31,475	33,290	21,210	189,740	24,725
54	115,920	127,390	57,515	56,340	494,865	61,205
55	66,085	1,995	940	0	935	410
56	79,510	43,940	31,200	12,945	218,330	13,230
61	7,890	10,935	8,235	4,565	38,790	3,470
62	247,500	115,375	41,640	30,430	411,720	22,965
71	14,285	24,075	12,835	7,645	67,070	10,720
72	191,695	89,940	40,280	23,825	314,470	15,770
81	76,285	103,865	40,785	16,890	282,655	13,765

Notes: (1) The electronic questionnaire instrument paths used to collect classification information in sectors NA, 21, 23, and 31-33 are covered under clearance 0607-0991, 2017 Economic Census Industry Classification Report

b. Non-Sample Component

The non-sample component consists of:
(1) "Small" single-establishment firms on the Census sampling frame but not selected into the Census sample,
(2) Single-establishment firms with no classification information (sector NA in the table above), and
(3) Any single-establishment firms that started business operations so late in 2017 (mostly in the 4th quarter) that their (2017) administrative payroll will not be received by the Census Bureau until after the 2017 sample is selected – roughly 260,000 firms. These are referred to as "4th Quarter Births" in the table above.

For the non-sample component, the Economic Census will use administrative data from other Federal agencies and imputation in lieu of requiring a response from these single-establishment firms. However, some of these establishments will receive an Economic Census request for industry classification information so that we can accurately tabulate the establishment's administrative data in the correct industry. The column, "Classification Information Required" in Table 2 above indicates the expected number of single-establishment firms that will be required to provide this classification information.

c. Response Metrics

Definitions and Formulae

For the 2017 Economic Census, the Census Bureau will calculate official measures of response rates according to OMB's standards (Office and Management and Budget Standards and Guidelines for Statistical Surveys, September, 2006). For recent past economic censuses, the check-in rate was used to measure, monitor, and manage data collection and response. The check-in rate is calculated as the ratio of the number of reporting units[1] returning[2] a questionnaire to the number of reporting units mailed a request to complete a questionnaire:

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[1] A **reporting unit** is an entity from which data are collected. The economic census uses two types of reporting units. The first is the establishment, which is an economic unit usually at a single, physical location where business is conducted or where services or industrial operations are performed. Most businesses report data for the economic census at the establishment level. The second type of reporting unit employed by respondents to answer the economic census is referred to as an "Alternative Reporting Unit (ARU)." ARUs are generally a consolidation of establishments owned by the same company. ARUs are typically used by firms engaged in networked industries such as finance, insurance, or utilities to facilitate reporting of revenue and expense data.

[2] A **returned** questionnaire includes receipt of an electronic submission authorized by the respondent, receipt of an acceptable response during targeted telephone follow-up calls, or, under special circumstances, respondent-authorized submission by some other means.

$$\check{-}\textit{¿}=\frac{\textit{¿ of reporting units that returned a questionnaire}}{\textit{¿ of reporting units mailed a request ¿}}\,\textit{complete a questionnaire ¿}$$

The check-in rate is readily available in "real-time" during data collection, but does not incorporate information on the quality of the response data and the ability to consider them as respondent-reported data in summary statistics.

The OMB standards indicate that response rates must be computed using standard formulas to measure the proportion of the eligible sample that is represented by the responding units in each study, as an indicator of potential nonresponse bias. Both unweighted and weighted response rates should be calculated. Additionally, weighted response rates should incorporate the probability of selection or, in the case of establishment surveys, the proportion of key characteristics that is represented by the responding units.

The OMB Unit Response Rate (URR) calculation uses only valid responses in the numerator of the ratio, and eliminates known ineligible reporting units from the denominator:

$$URR=\frac{\textit{¿ of reporting units with valid responses}}{\textit{¿ of eligib}\le\textit{reporting units}+\textit{¿ of reporting units with unknown eligibility}}$$

The URR is the percentage of reporting units, based on unweighted counts, that provide a valid response. For the 2017 Economic Census, a valid response is defined to be a unit that reported total value of shipments/receipts/revenue/sales (i.e., value of shipments/receipts/revenue/sales $\ge$ \$0).

It is not possible to accurately measure the URR during data collection, because eligibility and response validity are frequently not determined until after collection is completed, during the editing phases. To monitor and manage response during data collection, a proxy URR will be calculated, as follows:

$$Pro\,xy\,URR=\frac{\textit{¿ of reporting units that returned a questionnaire with receipts}\ge 0}{\textit{¿ of reporting units mailed a request ¿}}\,\textit{complete a questionnaire ¿}$$

Research using 2012 Economic Census data has shown that the proxy URR appears to better reflect the URR than the check-in rate.

The OMB standards also define a weighted item response rate, where the item of interest is a quantity of primary interest for the survey. The Census Bureau defines the Quantity and Total Quantity Response Rates (QRR and TQRR) as item-level indicators of the "quality" of each estimate. Both are weighted response measures that take the size of the tabulating unit[3] into account as well as the associated sampling parameters. The QRR measures the weighted proportion of an estimate obtained directly from the respondent for the survey. The TQRR expands the rate to include data substituted from secondary sources considered to be equivalent-in-quality to reported data, such as businesses' annual reports or data provided by respondents for other Census Bureau surveys.

For a data item t, the QRR and TQRR are defined below:

$$QRR(t) = \left[\frac{\sum_{i=1}^{N_T} w_i (r_{ti}) t_i}{\sum_{i=1}^{N_T} w_i t_i} \right] \times 100$$

$$TQRR(t) = \left[\frac{\sum_{i=1}^{N_T} w_i (r_{ti} + q_{ti}) t_i}{\sum_{i=1}^{N_T} w_i t_i} \right] \times 100,$$

where

w_i is the design weight of tabulating unit i,

r_{ti} is the indicator variable for reported data for tabulating unit i and data item t,

q_{ti} is the indicator variable for equivalent quality data sources for tabulating unit i and item t,

t_i is the data value for tabulating unit i, and

N_T is the total number of eligible tabulating units.

The TQRR(t) and QRR(t) are weighted item response rates for data item t. QRRs and TQRRs will be calculated post-collection for the following data items: value of shipments/receipts/revenue/sales, payroll, and number of employees.

As with the URR, quantity response measures cannot be calculated during data

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3 The **tabulating unit** houses the data for estimation and tabulation. For the economic census, the tabulating unit is the establishment.

collection, because the final source of the tabulated data is not determined until after collection is completed, during the post-collection processing. Additionally, quantity response measures are based on tabulating units instead of reporting units. Therefore, proxy QRR and TQRR metrics that use an appropriate measure of size characteristic, such as administrative annual payroll, will be calculated periodically during data collection to monitor the proportion of total administrative payroll represented by respondents, defined according to the same criteria used for the Proxy URR.

Projections for the 2017 Economic Census

Due to major changes in data collection procedures – e.g., all-electronic Web-based collection – and the implementation of these new response metrics, it is difficult to confidently project URR and TQRRs for the 2017 Economic Census.

The 2012 Economic Census used multiple data collection modes, offering both paper questionnaires and electronic reporting options. Research using 2012 Economic Census data show preliminary estimates of response metrics, as follows:

Check-In Rate = 83.7%

Proxy URR = 77.8%

URR = 78.7%

Of those mailed a request to complete the 2012 Economic Census, nearly 48% reported electronically, and approximately 34% returned a paper questionnaire. Preliminary research using the 2012 data shows a URR based only on electronic submissions to be several percentage points higher than a URR based only on paper returns. This suggests that electronic collection and submission may provide more returns satisfying unit response criteria and improved data quality.

Thus, the Census Bureau projects a URR of approximately 80% for the 2017 Economic Census, and will manage data collection activities to achieve this goal.

2. **Sampling Methodology and Estimation Procedures**

a. Sample Selection Procedures

The Economic Census will select establishments for its sample from a frame obtained from the U.S. Census Bureau's Business Register. The Business Register contains information on the physical location of establishments, as well as payroll, employment, value of shipments/receipts/revenue/sales, and industry classification data obtained from prior censuses and surveys or obtained from the administrative records of the IRS and

SSA under special arrangements which safeguard the confidentiality of both tax and census records. Information from the Bureau of Labor Statistics on industry classifications are also used to supplement the classification information from the IRS and SSA.

To be eligible for selection into the sample, an establishment will be required to satisfy the following conditions:

(i) it must be classified into an in-scope industry;
(ii) it must be an active establishment of a multi-establishment firm, or it must be a single-establishment firm with at least one quarter of 2017 administrative payroll; and
(iii)   it must be located in one of the 50 states, associated offshore areas, or the District of Columbia.

Selection procedures differ between multi- and single-establishment firms.

(1) Multi-Establishment Firms

Any firm with more than one active establishment is included in the Economic Census with certainty and is generally expected to report for all of its establishments. Each establishment is included with certainty and assigned a sample weight of 1.

(a) Establishment Reporting Units

In most industries, multi-establishment firms are required to complete an industry-specific questionnaire for each of the establishments in their firm.

(b) Alternative Reporting Units (ARU) for Selected Industries

In selected industries, firms have difficulty reporting value of shipments/receipts/revenue/sales and related data for each of their business locations (establishments). However, they can provide firm-level industry totals with relative ease and they can report separate payroll and employment information for each business location within the industry. Table 3 below shows the industries for which an alternative questionnaire will be used and the expected number of affected firms.

If a firm has more than two establishments in an industry listed below, the firm will receive one questionnaire for each of those industries. Each questionnaire will collect consolidated, firm-level data for value of shipments/receipts/revenue/sales and related measures covering the firm's nationwide operations. A supplementary questionnaire will enumerate the firm's establishments in the industry and request payroll and employment information for each of them.

Table 3: Alternative Reporting Industries and Counts

NAICS	NAICS Description	Expected Number of Firms	Number of Affected Establishments
213111	Drilling Oil and Gas Wells	53	420
213112	Support Activities for Oil and Gas Operations	169	2,370
213113	Support Activities for Coal Mining	10	90
213114	Support Activities for Metal Mining	7	90
213115	Support Activities for Nonmetallic Minerals (except Fuels) Mining	6	25
221111	Hydroelectric power generation	23	315
221112	Fossil fuel electric power generation	83	1,365
221113	Nuclear electric power generation	11	140
221114	Solar electric power generation	5	25
221115	Wind electric power generation	13	165
221116	Geothermal electric power generation	4	25
221117	Biomass electric power generation	8	60
221118	Other electric power generation	13	240
221121	Electric bulk power transmission and control	16	210
221122	Electric power distribution	309	6,590
221210	Natural gas distribution	72	2,190
221310	Water supply and irrigation systems	40	720
221320	Sewage treatment facilities	12	330
221330	Steam and air-conditioning supply	6	65
512110	Motion picture and video production	48	495
512120	Motion picture and video distribution	0	0
512220	Integrated record production/distribution	4	100
51711010	Wired telecommunications distribution	181	25,085
51711020	Cable and other program distribution	52	6,875
51721010	Paging	8	95
51721020	Cellular and other wireless telecommunications	101	11,125
522110	Commercial banking	3,235	88,495
522120	Savings institutions	594	8,505
524113	Direct life insurance carriers	79	7,845
524114	Direct health and medical insurance carriers	108	4,520
524126	Direct property and casualty insurance carriers	212	11,640
524127	Direct title insurance carriers	42	3,085
524128	Other direct insurance (except life, health, and medical) carriers	14	160
524130	Reinsurance carriers	22	315
Total		5,560	183,775

(2) Single Establishment Firms with 2017 Payroll

The sample design for single-establishment firms begins with a study of the potential respondent universe. This study will produce a set of industry-specific payroll cutoffs that we will use to distinguish large from small single-establishment firms within

each industry. In general, these cutoffs are chosen so that the sum of the payroll of the multi-establishment firms plus the payroll of the single-establishment firms above the cutoff equals 75 – 95% of the total payroll in an industry – though there are many exceptions. In the example in Table 4 below, a payroll cutoff of $229,000 for Used Car Dealers will result in 80% of total industry payroll (32.6% + 47.4%) being contained within the 6,655 establishments (2,508 + 4,147) selected with certainty.

Table 4: Example of Certainty Payroll Cutoff: Used Car Dealers (NAICS 44112000)

Establishment Type	Number of Establishments	Payroll ($000)	% of Total Payroll
Establishments of Multi-Establishment Firms	2,508	1,475,097	32.6%
Single-establishment firms with payroll ≥ $229,000	4,147	2,144,773	47.4%
Remaining "small" single-establishment firms	17,934	904,968	20.0%
Totals	24,589	4,524,838	100.0%

The single-establishment firm sample selection has three phases: (1) identifying the "large" single-establishment firms, (2) selecting a sample of the "small" single-establishment firms, and (3) determining if we need additional classification information from the non-selected single-establishment firms.

(a) Identifying "Large" Single-Establishment Firms

All single-establishment firms with annualized administrative payroll that equals or exceeds the certainty payroll cutoff for their industry are included in the sample component of the Economic Census with certainty. Each will have a probability of selection of 1, and a sample weight of 1, which will apply only for producing industry-specific statistics where data are not available from administrative records. As shown in Table 2, we estimate that approximately 1,117,965 1,507,610 "large" single-establishment firms will be selected with certainty.

Note: "Large" is relative. In some industries, this payroll cutoff is zero and all establishments are selected into the sample.

(b) Sampling "Small" Single-Establishment Firms

The remaining single-establishment firms (those with annualized payroll below the cutoff for their industry) are stratified by industry and state and selected using a strata-specific probability of selection.

The probabilities of selection for these strata will be determined by a study of the potential respondent universe conducted shortly before sample selection operations begin. Selected small single-establishment firms will be included in the sample as non-certainty cases. Each will have a probability of selection that is

less than 1, and each will have a sample weight greater than 1 (calculated as the reciprocal of the probability of selection), which will apply only for producing industry-specific statistics where data are not available from administrative records.   We estimate that approximately 523,790 478,735 "small" single-establishment firms will be selected for this sample.

(c) Determining Which Establishments Need Classification Information

All remaining (non-sampled) single-establishment firms with payroll will be represented in the Economic Census by data from Federal administrative records and will not usually be required to report. However, in some cases, the industry classification information on the Business Register – used to tabulate the (quantitative) administrative data in the correct industry – is inadequate or outdated. The most common reasons for a deficient classification are:

(i)   Administrative classification data provided to the Census Bureau lack sufficient detail to assign an establishment to an 8-digit NAICS industry[4] in certain industries where this level of detail is required for other programs

(ii) The administrative data are not in agreement regarding an establishment's classification

(iii)   The date the establishment was last fully classified is over 15 years ago.

In these cases, we will require the firm to respond to an Economic Census classification questionnaire that collects the basic information needed to fully classify the establishment into a NAICS industry. We estimate that approximately 336,595 573,540 single-establishment firms will receive these classification questionnaires[5].

b. Estimation Procedures

(1) Basic Statistics

Economic Census tabulations for basic statistics (value of shipments/receipts/revenue/sales, payroll, employment, etc.) are simple summations of data from all in-scope establishments using reported data collected from the Economic Census, plus imputed data for non-respondents and single-unit establishments that were not selected into the Economic Census sample. The most common source of imputed data is administrative data from the IRS. For multi-establishment firms in alternative reporting industries (see Section B.2.a.(b) above),

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4   From the 2012 NAICS Manual (page 24), "NAICS agreements permit each country to designate detailed industries, below the level of a NAICS industry, to meet national needs. The United States has such industry detail in many places in the classification system..." The Census Bureau uses two additional digits to specify more detail in some industries.

5   For approximately 130,395 of these establishments (those which are unclassified or in sectors 21, 23, or 31-33), this classification information will be collected using electronic questionnaire instrument paths 99023 and 99026 which are covered under clearance 0607-0991, 2017 Economic Census Industry Classification Report.

the consolidated firm level value of shipments/receipts/revenue/sales data is first allocated to the individual establishments of the firm in the industry.

(2) Industry-Specific Statistics

Economic Census estimates for industry-specific statistics, such as product line revenue and other industry-specific special inquiries, are derived by summing weighted data, where each certainty establishment (establishments of multi-establishment firms and "large" single-establishment firms) has a weight of 1, and each non-certainty establishment has the sample weight assigned during the sample selection process (see B.2.a.(2)(b) above). Frequently these initial weighted estimates are further adjusted to ensure that these detailed estimates sum to a basic statistics total. For example, the value of shipments/receipts/revenue/sales of products within an industry (estimated from the sample) should sum to the total industry value of shipments/receipts/revenue/sales (computed from all establishments).

c. Required Accuracy

(1) Sampling Error

(a) Basic Statistics

The accuracy of basic statistics from the Economic Census is not affected by sampling error, since these statistics are based on a complete enumeration of the establishment universe. A high degree of accuracy and statistical reliability is required, because the basic statistics provide benchmarks for the national accounts; the U.S. Census Bureau's current economic surveys; and other surveys conducted by trade groups, businesses, and researchers.

(b) Industry-Specific Statistics

We minimize the sampling error of the industry-specific (sample-based) statistics in two ways.
(i) Designing the non-certainty portion of the sample at the same level as the most detailed levels used for any industry-specific series publication (8-digit NAICS by state)
(ii) Selecting the largest establishments with certainty. The largest establishments in the industry produce a disproportionately large percent of the economic activity in the industry.

Nonetheless, the accuracy of subject statistics from the Economic Census is affected by sampling error. Sampling variability occurs because subject statistics are based, in part, on estimates from a sample of establishments and not on measurement of the entire universe.

(2) Nonsampling Error

The accuracy of all Economic Census statistics is influenced by nonsampling errors, such as those affecting coverage, administrative records, questionnaire design, reporting, processing, and tabulation. Although we make no direct measurement of nonsampling errors, we take precautionary steps in all phases of planning, questionnaire development, data collection, processing, and tabulation to minimize their influence.

Nonsampling errors that specifically affect the sample selection and estimation are:

(a) The sample is designed, and the establishments selected, based on the industry classification of the establishments at the time the sample is selected. For 15% - 25% of the single-establishment firms, this is not the industry in which they will eventually be tabulated. The sample is designed, and the establishments selected, based primarily on the industry classification (i.e., NAICS) of the establishments at the time the sample is selected. For various reasons, this classification may be incomplete or inaccurate. Many establishments are births since the last Economic Census or failed to respond in the prior Economic Census, so their industry classification is based solely on administrative data. Sometimes the administrative data is not adequate to assign a complete NAICS code. In these cases, Business Register processes impute the remaining digits of the code, but these additional digits may turn out to be incorrect. In other cases, the administrative NAICS code assigned is simply incorrect. In addition, a business may have changed its primary industry since the last Economic Census (for example, a new car dealer in 2012 changed to a used car dealer in 2017). Generally, these errors in industry classification will remain unknown until an Economic Census response is received and these establishments can be fully and correctly classified. An evaluation of the 2012 Economic Census revealed that roughly 15% - 25% of the sampled single-establishment businesses were eventually tabulated in an industry different from that in which they were originally sampled (results varied by industry).

(b) The sample is designed using payroll. This may or may not result in a good design for any of the many specific quantities actually estimated from the sample. (Payroll itself is a basic statistic and is calculated using all establishments, not just the sample establishments.).

(c) The payroll measure of an establishment is computed (for sampling purposes) before all 2017 administrative payroll is available to the Census Bureau. Therefore, we may miss-categorize a "large" single-establishment firm as "small" or vice versa.

(d) For some single-establishment firms, the 2017 administrative payroll data will arrive too late for the establishment to have a chance of being selected into the sample (though its administrative data will be included in calculation of basic

statistics).

d. Problems Requiring Specialized Sampling Procedures

There are no known problems that will require specialized sampling procedures for the 2017 Economic Census.

e. Use of Periodic Data Collection to Reduce Burden

The Economic Census uses periodic (5-year) data collection, as required by Title 13 USC, Section 131.

3. **Efforts to Maximize Response**

This information collection will maximize response through the following means:

a) Redesigned collection instruments with standard formats and terminology that attempt to simplify reporting and minimize response burden;
b) Web based reporting for both multi-establishment and single-establishment firms. Multi-establishment firms will no longer use downloadable software;
c) Public awareness campaign to assist businesses and the public in understanding the importance of the 2017 Economic Census by providing news stories through trade and professional associations, chambers of commerce, and business and general media;
d) Account managers assigned to very large businesses to provide personalized assistance;
e) Mailing materials that emphasize the mandatory and confidential nature of Economic Census reports, as provided by Title 13 USC;
f) Toll-free assistance and a web-based help desk for any business that has questions about responding to the Economic Census;
g) Systematic mail follow-up for nonresponse, supplemented by telephone follow-up for selected firms;
h) Due date reminder and optimized timing of mailings based on research conducted with the 2014 Annual Retail Trade Survey; and
i) Respondent portal where respondents can obtain answers to frequently asked questions, send secure emails to Census Bureau staff, report electronically and perform other self-service options without having to pick up the phone.

Through these and other response improvement strategies, we expect to maintain or improve the 83.6 percent response rate obtained by the 2012 Economic Census. This level of response will yield accuracy and reliability that are adequate for intended uses of Economic Census data.

<u>Online Reporting</u>

For the first time, data will be collected entirely online for the 2017 Economic Census. Past economic census data collections were multi-mode – mail-out/mail-back paper questionnaires along with one of two electronic reporting options. While all businesses in the 2012 Economic Census were offered the capability to report electronically, only one of these instruments was available online and was used only for businesses with one location. To report electronically, large multi-unit companies were offered, and encouraged to use, a software application, called Surveyor, which had to be downloaded and installed onto the business' personal computers. While this software offered several burden-reducing features, such as spreadsheets, to aid reporting by businesses with many locations, a number of companies had to overcome IT security restrictions in order to download the Surveyor software application onto PCs inside their firewalls. This additional effort inhibited, and may have discouraged, response.

The Census Bureau has undertaken a major re-engineering effort for the 2017 Economic Census to eliminate paper reporting altogether, and provide online data collection to all businesses, regardless of size, industry, or number of establishments required to report. The new Web instrument, built in the Census Bureau's current corporate Web reporting software called Centurion, features design options tailored for differing needs of businesses of different sizes, types, and organizational structures. In addition, without the limitations associated with paper questionnaires, the Web instrument permits the customizing of question series according to 4- or 6-digit NAICS industries, ensuring the relevance of each data inquiry for each respondent. It is well documented in general survey research literature and texts that when respondents find survey questions pertinent to themselves, they are more likely to respond.

Single location businesses or those with very few locations will be directed within Centurion to online questionnaires designed to be driven by respondents' answers. This "response-driven design" utilizes automated skip patterns directing respondents to successive questions based on their answers to previous questions. As a result, respondents will only be asked questions relevant to their business, and questions that are not relevant will not be displayed. This burden-reducing feature serves to engage respondents and encourage their response.

The new online data collection instrument offers tailored design options for companies with multiple locations, along with a number of automated tools to aid reporting. Popular, useful features and tools from the Surveyor software have been recreated within the Centurion Web instrument. These include the ability to update lists and locations of establishments, download and upload spreadsheets for use in recording and reporting data, toggle between spreadsheets and views/windows that provide full question text and instructions, automated error checking and notifications as they occur along with a summary list prior to submission. Research and feedback from multi-unit business respondents has repeatedly indicated that spreadsheets aid gathering, recording and reporting data for the economic census. They permit "copy and paste" or populating data from other internal spreadsheet sources, and

facilitate the ability to select and extract sections of the spreadsheet to gather data from other people and sources dispersed throughout the company, and so on. These and other automated features integrate well with businesses' day-to-day processes, further easing burden and encouraging response.

Feedback from business respondents indicates their need to be able to review specific individual questions and instructions either online or offline before and during their activities to gather the requested data. This need will be met through provision of Question Preview Worksheets that may be accessed online and downloaded as electronic documents. These Worksheets aid work processes, further encouraging response.

Both single-unit and multi-unit companies will enter the online electronic reporting system through the new Respondent Portal. This portal will allow respondents to access economic surveys that they have been asked to complete. This includes the 2017 Economic Census. Initial login requires an authentication Code unique to the company, which will be provided by the Census Bureau during initial mail-out. This state-of-the-art secure information technology requires the respondent to create their own password and select their own security questions. It also permits subsequent secure delegation of survey access to others, as specified by the respondent. The enhanced security reassures respondents of Census Bureau safeguards for their data, while the delegation function offers respondents internal control of data gathering. Both features support efforts to maximize response to the 2017 Economic Census.

Contact Strategies

The contact strategies utilized for the 2017 Economic Census have been developed based on feedback gathered from focus groups and cognitive testing of respondents, results from controlled experiments testing different contact strategies, and lessons learned from the 2012 Economic Census and other economic surveys. The contact strategies will include an initial mailing, due date reminder as the due date approaches, and systematic mail follow-up for nonresponse, supplemented by telephone follow-up for selected firms. The timing of mailings has been optimized based on research conducted with the 2014 Annual Retail Trade Survey and analysis of response data from several annual economic surveys.

Focus groups, cognitive testing, and experiments conducted during the 2014 Annual Survey of Manufactures, 2014 Annual Wholesale Trade Survey, and 2015 Service Annual Survey have examined several aspects of the messaging used in mailing materials. As a result, mailing materials will emphasize the mandatory and confidential nature of Economic Census reports (as provided by Title 13 USC), electronic reporting, and the purpose and uses of the data collected.

Focus groups suggested that a later mailout and due date would ease the response burden. Respondents perceive the request to be less burdensome because the request is not coming during a time of year when they have other fiscal reporting responsibilities. Further, a later

due date would mean the response is due after they have prepared financial statements containing the type of data being requested. This strategy was utilized for collecting the 2015 Annual Survey of Manufactures and Company Organization Survey (ASM/COS), consisting of a January mailout for all units, a May due date for large multi-units, and a March due date for all others. The check-in rates were tracking above the previous collection years in terms of days past mailout. However, in terms of calendar day, the responses were coming in later for the large multi-units that had the May due date. Therefore, the 2016 ASM/COS used a January mailout and a March due date for all units.

The due date reminder experiment conducted during the 2014 Annual Retail Trade Survey found that the use of a due date reminder increased timeliness of response and reduced the need for more costly follow-up. The due date reminder reinforced the due date. Further, this second mailing appears to have reinforced the legitimacy of the survey request. Research on advance mailings have also suggested that two contacts can improve response, however a due date reminder after the initial mailing has the benefit of allowing the respondent to take action with both contacts. Based on this experiment, the due date reminder was added to several of the other annual economic surveys the following year.

Follow-up efforts for nonrespondents begin with the least expensive methods and increase intensity as time elapses past the due date. The most expensive mail contact used is a certified mailing. The certified follow-up appears to communicate the legitimacy and importance of the data collection effort. The certified follow-up experiment conducted during the 2012 Economic Census found that the certified follow-up increased response more than a standard follow-up and that it was more cost effective to use certified in later follow-ups. Therefore, certified follow-up has been used as the last mail follow-up in several of the annual economic surveys.

Telephone follow-up is the most expensive contact method; therefore, it has been reserved for the most reluctant respondents where other methods have not obtained response. An adaptive design is utilized for telephone follow-up where response monitoring data is used to target and prioritize efforts to the lowest responding groups and respondents with the most impact on data products.

The contact strategies research conducted over the past few years has provided invaluable information to improve our methods and make data-driven decisions to implement cost effective strategies to maximize response for the 2017 Economic Census. Further, we will continue to implement successful strategies across other economic programs, as appropriate.

Outreach

The Census Bureau is planning for a direct outreach effort to as many as 2,000 large companies. Economic Directorate staff will contact companies via phone to offer response assistance, beginning before initial mailout and continuing throughout the data collection timeframe.

For respondents outside the scope of this effort, we are planning for indirect outreach by providing messaging to intermediaries, such as trade associations, chambers of commerce and state and local governments. We will demonstrate the value of response to these organizations and ask them to pass along messaging to their constituents and membership, many of whom will be economic census respondents.

Adaptive Design

The U.S. Census Bureau is investigating adaptive nonresponse follow-up (NRFU) strategies for sampled single unit establishments in the 2017 Economic Census. One considered approach is the selection of a probability subsample of businesses for NRFU. An alternative approach continues NRFU for *all* originally sampled units, but targets the more expensive procedures to a probability subsample of businesses (instead of all nonresponders). The key difference between the two adaptive design approaches is that the first restricts NRFU to the subsampled units, whereas the second does not. Either reduces the overall cost. However, our objective is to improve – or at least maintain – estimate quality by reducing nonresponse bias without overly increasing sampling variance. We conducted a split panel field test in the 2015 Annual Survey of Manufactures that implements these adaptive collection designs and our research demonstrates that full NRFU with a targeted subsample of nonrespondents receiving the more expensive collection procedure reduces cost with no significant or practical reduction in response rates and no degradation of data quality in any studied variables.

The targeted nonresponse follow-up requires a probability subsample of nonrespondents at a predetermined point in the data collection cycle, with paradata (specifically current response status) determining the sampling frame (nonrespondents) and frame data (e.g., unit measure of size and industry classification) informing the sample design. Allocation approaches have been developed for the probability subsampling that utilize information on respondent sample composition and current check in rates with the objective of simultaneously selecting high proportions of sample in domains that indicate potential nonresponse bias while equalizing response rates across domains.

4. **Tests of Procedures or Methods**

Instrument Development and Design

The 2017 Economic Census will be collected completely online, using the Census Bureau's current corporate Web reporting software called Centurion. This required eliminating paper questionnaires and discontinuing the use of the legacy Census Surveyor software application that required being downloaded and installed on respondents' PCs. Re-engineering economic census data collection instruments for full implementation via the Web required a substantial multi-year, multi-method program of research, development, testing and

evaluation.

Activities included task analyses, record-keeping studies, exploratory early stage scoping interviews, cognitive testing, usability testing, analyses of electronic paradata, respondent debriefings, and field tests, along with early implementation of designs within other Census Bureau establishment surveys, such as the annual Company Organization Survey (COS aka Report of Organization) and the Annual Survey of Manufactures (ASM). Different research components, in turn, focused on different subpopulations, different instrument components, or different question(naire) content, and results and recommendations were used to aid design decisions.

Of particular note is the use of the annual ASM/COS as a testing and proving ground for many new techniques planned for the Economic Census, as these two surveys collect data at the establishment level like the Economic Census. This began by conducting debriefing interviews with 2014 ASM/COS MU respondents to identify strengths and weaknesses of the legacy Surveyor software used for electronic reporting to aid development of initial requirements for the online Centurion instrument.

The 2015 ASM provided a full-scale pilot of the new online Centurion collection instrument for SUs using the response-driven design being built for the 2017 Economic Census. Since paper questionnaires were not available, more than 95% of SU respondents reported online, while only a few reported their data by some other method, such as telephone. Additionally, respondent debriefings were conducted and Web paradata were analyzed to further evaluate the response-driven instrument and to recommend improvements.
The 2015 ASM also integrated research testing the value and effectiveness of targeted subsampling, to provide evidence for decisions about implementing an adaptive design approach in the 2017 Economic Census. (See Section 3.)

Finally, MUs in the 2016 ASM/COS are using the new online Centurion collection instrument, which features much of the functionality developed for the 2017 Economic Census, such as importing/exporting spreadsheets, the ability to toggle between "form" views and spreadsheet views of the questions, and questionnaire preview worksheets to aid data gathering. Respondent debriefings and Web paradata analysis will be conducted to further evaluate the instrument prior to conducting the 2017 Economic Census.

Results and recommendations from each component and testing activity were provided to subject matter specialists, managers and developers of data collection procedures, and software developers and programmers. Recommendations were prioritized, negotiated, and revised, as necessary, to facilitate implementation. Nevertheless, some recommendations were not fully adopted due to resource and technical limitations.

All studies are documented in internal Census Bureau reports; a few of the studies are also reported publicly in conference papers or presentations.

Components of the research and testing, along with selected highlights are summarized in Attachment K.

Testing of Contact Strategies

To aid evidence-based decisions for data collection and response improvement contact strategies, several techniques were field-tested using statistical experimental designs embedded in the 2012 Economic Census and in several of the Census Bureau's annual or quarterly economic surveys during the past three years. Another strategy evaluating alternative due dates was applied to selected units during a production survey. Evaluation of the strategies considered the effect on response rates or check-in rates, improved timeliness of value of shipments/receipts/revenue/sales, and/or potential for cost savings.

All studies are documented in internal Census Bureau reports; a few of the studies are also reported publicly in conference papers or presentations, as noted.

These field-tests and/or experiments, their outcomes, and implementation decisions are summarized in Attachment L.

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

The table below lists the names of the individuals responsible for the collection, analysis, and statistical methodology aspects of the 2017 Economic Census.

Table 5: Census Bureau Contacts for the 2017 Economic Census

Contact	Position	Phone	Responsibility
William C. Davie, Jr	Methodology Director for the Business Register, Economic Census & Related Surveys, Economic Statistical Methods Division	301-763-7182	Development of statistical methodology
Diane Willimack	Methodology Director for Methodology and Response Improvement for Economic Programs, Economic Statistical Methods Division	301-763-3538	Pretesting of data collection instruments and methods
William Samples	Assistant Survey Director for the Economic Census, Economy-Wide Statistics Division	301-763-7175	Overall supervision

Attachments

A.   Electronic Questionnaire Instrument Path Numbers, Titles, and Associated Burden Estimates

B.   Composition of the Establishment Universe and Estimated Mail Counts for the 2017 Economic Census

C.   Drafts of Initial Contact and Follow-up Letters

D.   Draft Previews of Standard, Consolidated, and Classification Questionnaires

E.   Questionnaire Information Sheets

F.   Electronic Instrument Selected Screen Shots

G.   Consultations with Federal Agencies, Trade Groups, and Trade Publications
      G-1   Letter to Persons and Organizations
      G-2   Persons and Organizations Contacted

H.   Consultations with Federal Agencies, Trade Groups, and Trade Publications: Selected Correspondence

I.   Federal Register Comments received regarding the 2017 Economic Census

J.   Summary of Changes to Standard, Consolidated, and Classification Questionnaires

K.   Instrument Development and Design Research and Testing Highlights

L.   Contact Strategies Testing