Department of Commerce
United States Census Bureau
OMB Information Collection Request
2022 Economic Census
OMB Control Number 0607-0998

Part B. Collections of Information Employing Statistical Methods

1. **Universe and Respondent Selection**

The 2022 Economic Census covers 19 North American Industry Classification System (NAICS) sectors and is a complete enumeration of business establishments located in the United States and associated offshore areas (referred to as Stateside) as well as Puerto Rico, Guam, the Commonwealth of the Northern Mariana Islands, the U.S. Virgin Islands, and American Samoa (referred to as island areas) with one or more paid or leased employees (based on Internal Revenue Service (IRS) Form 941 data). Data are either collected directly from the establishments or obtained from administrative information reported to other federal agencies. Tables 1A and 1B below show the sectors/areas covered, the size of the establishment universe as tabulated in the 2017 Economic Census, and the estimated universe size for 2022 for both the Stateside and Island Areas components.

Table 1A: Economic Census Stateside Universe Sizes (2017 Actual & 2022 Estimated)

| Sector | North American Industry Classification System (NAICS) Description 2017 | Establishment Counts | |
		2017 Economic Census	Estimated 2022 Universe
NA	Unclassified [1]	-	27,500
11	Agriculture, Forestry, Fishing and Hunting [2]	N/A	23,000
21	Mining	25,273	27,000
22	Utilities	18,913	20,500
23	Construction	715,364	821,000
31-33	Manufacturing	291,586	317,000
42	Wholesale Trade	408,333	395,000
44-45	Retail Trade	1,064,087	1,069,000
48-49	Transportation and Warehousing [2]	237,095	272,000
51	Information	153,928	164,794
52	Finance and Insurance	475,780	496,000
53	Real Estate and Rental and Leasing [2]	410,820	462,000
54	Professional, Scientific and Technical Services	913,624	1,002,000
55	Management of Companies and Enterprises	59,224	69,500
56	Administrative & Support and Waste Management & Remediation	417,259	444,000
61	Education Services [2]	77,334	88,000
62	Health Care and Social Assistance	892,245	967,000
71	Arts, Entertainment, and Recreation	142,938	157,000

72	Accommodation and Food Services	726,081	797,000
81	Other Services (except Public Administration) [2]	560,845	598,000
Totals		7,590,729	8,218,000

Notes: (1) Insufficient administrative information to assign to a sector.
(2) Some specific industries in these sectors are out-of-scope.

Table 1B: Economic Census Island Areas Universe Sizes (2017 Actual & 2022 Estimated)

Area	Establishment Counts	
	2017 Economic Census	Estimated 2022 Universe
Puerto Rico	42,559	47,300
Guam	3,508	3,550
Commonwealth of the Northern Mariana Islands	1,742	1,800
U.S. Virgin Islands	2,419	2,450
American Samoa	511	540
Totals	50,739	55,640

The U.S. Census Bureau's Business Register provides the universe of establishments. As indicated above, we estimate the size of the universe to be approximately 8.3 million establishments in 2022. 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 a sample of these establishments.

a. Sample Component

The sample component of the 2022 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 Table 2 indicate the expected size of each of these three components by sector for the Stateside component. Paragraph B.2.a, below, describes the selection procedures in more detail. Attachment B shows expected counts at the 6-digit NAICS level for the Stateside component. For the Island Areas component, all single-establishment firms with payroll will be included in the Economic Census. In other words, the sample is the same as the universe.

Table 2: 2022 Economic Census Stateside Estimated Sample Sizes

Sector	Sample Component	Non-Sample Component

	Establishments of Multi-Establishment Firms (Selected w/ certainty)	Single-Establishment Firms		Classification Information Required	Not Mailed	4th Quarter Births
		"Large" (Selected w/ certainty)	"Small" (Sampled)			
NA	0	0	0	24,000	0	3,300
11	700	21,000	0	0	0	1,200
21	8,800	7,600	350	2,100	8,100	150
22	15,500	5,100	0	0	0	60
23	21,500	67,000	81,500	71,000	572,000	7,700
31-33	63,000	115,500	5,100	31,500	101,000	1,500
42	138,000	254,000	0	0	0	2,300
44-45	433,000	216,000	36,500	35,000	343,000	5,500
48-49	62,500	83,000	13,000	15,000	96,500	2,600
51	81,000	35,500	6,000	4,900	36,000	900
52	253,000	87,500	11,000	8,900	133,000	2,300
53	110,000	42,000	24,000	22,000	259,000	4,800
54	126,000	187,000	64,000	62,000	553,000	10,000
55	65,000	4,200	0	0	0	100
56	83,500	71,000	34,500	16,000	235,000	3,800
61	8,900	15,500	6,800	5,400	50,500	850
62	289,000	157,000	32,500	38,500	445,000	4,900
71	18,000	50,000	11,500	6,200	70,000	1,700
72	211,000	163,000	28,000	63,000	328,000	4,300
81	80,500	132,000	46,500	24,000	311,000	4,700
Totals	2,069,000	1,714,000	401,000	429,000	3,542,000	63,000

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 2022 (mostly in the 4th quarter) that their (2022) administrative payroll will not be received by the Census Bureau until after the 2022 sample is selected – roughly 63,000 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 2022 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:

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

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:

$$URR=\frac{\iota\ of\ reporting\ units\ with\ valid\ responses}{\iota\ of\ eligible\ reporting\ units+\iota\ of\ reporting\ units\ with\ unknown\ eligibility}$$

The URR is the percentage of reporting units, based on unweighted counts, that provide a valid response. For the 2022 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 $\geq$ \$0).

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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.

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:

$$Proxy\ URR = \frac{\text{¿ of reporting units that returned a questionnaire with receipts} \geq 0}{\text{¿ of reporting units mailed a request ¿}} complete\ a\ questionnaire\ ¿$$

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*,

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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.

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 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.

We endeavor to maintain or improve the 2017 Economic Census unit response rate and percent check-in for the Stateside component (71.7 percent unit response rate and 75.1 percent check-in rate) and Island Areas component (71.1 percent unit response rate and 73.7 percent check-in rate).

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 2022 administrative payroll; and
(iii)   it must be located in one of the 50 states, associated offshore areas, or the District of Columbia, Puerto Rico, Guam, the Commonwealth of the Northern Mariana Islands, the U.S. Virgin Islands, or American Samoa.

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 (Stateside)

NAICS	NAICS Description	Expected Number of Firms	Number of Affected Establishments

211120	Crude petroleum extraction	90	750
211130	Natural gas extraction	50	500
213111	Drilling oil and gas wells	50	800
213112	Support activities for oil and gas operations	200	1,900
213113	Support activities for coal mining	N<15	40
213114	Support activities for metal mining	N<15	70
213115	Support activities for nonmetallic minerals (except fuels) mining	N<15	20
221111	Hydroelectric power generation	30	450
221112	Fossil fuel electric power generation	90	1,800
221113	Nuclear electric power generation	N<15	200
221114	Solar electric power generation	N<15	90
221115	Wind electric power generation	20	450
221116	Geothermal electric power generation	N<15	20
221117	Biomass electric power generation	N<15	60
221118	Other electric power generation	N<15	70
221121	Electric bulk power transmission and control	20	300
221122	Electric power distribution	300	8,000
221210	Natural gas distribution	70	2,200
221310	Water supply and irrigation systems	40	850
221320	Sewage treatment facilities	N<15	200
221330	Steam and air-conditioning supply	N<15	90
512110	Motion picture and video production	50	500
512120	Motion picture and video distribution	N<15	N<15
517311	Wired telecommunications carriers	250	27,000
517312	Wireless telecommunications carriers (except satellite)	300	22,000
522110	Commercial banking	2,900	85,500
522120	Savings institutions	450	6,700
522130	Credit unions	1,600	15,500
523110	Investment banking and securities dealing	100	1,500
523120	Securities brokerage	150	17,000
523130	Commodity contracts dealing	N<15	200
523140	Commodity contracts brokerage	20	150
523920	Portfolio management	350	17,500
523930	Investment advice	100	1,900
524113	Direct life insurance carriers	80	6,100
524114	Direct health and medical insurance carriers	100	5,500
524126	Direct property and casualty insurance carriers	200	10,000
524127	Direct title insurance carriers	40	2,800

524128	Other direct insurance (except life, health, and medical) carriers	20	150
524130	Reinsurance carriers	20	500
Total		7,800	239,000

(2) Single Establishment Firms with 2022 Payroll

For the Stateside component, 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 60-100% of the total payroll in an industry, with the cutoff for most industries at or above 85%. In the hypothetical example below in Table 4, a payroll cutoff of $250,000 for an industry will result in 80% of total industry payroll (31% + 49%) being contained within the 8,000 establishments (2,400 + 5,600) selected with certainty.

Table 4: Hypothetical Example to Demonstrate Certainty Payroll Cutoffs

Establishment Type	Number of Establishments	Payroll ($000)	% of Total Payroll
Establishments of Multi-Establishment Firms	2,400	1,550,000	31%
Single-establishment firms with payroll ≥ $250,000	5,600	2,450,000	49%
Remaining "small" single-establishment firms	16,000	1,000,000	20%
Totals	24,000	5,000,000	100%

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.

For the Island Areas component, all single-establishment firms with payroll will be included in the Economic Census sample.

(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 1,714,000 "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 401,000 "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 a 6-digit NAICS industry (or 8-digit if the Economic Census publishes estimates at that detail)[4]

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

(iii)   The date the establishment was last fully classified in 2002.

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 429,000 single-establishment firms will receive these classification

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4   From the 2017 NAICS Manual (page 18), "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.

questionnaires.

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), 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 items, 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 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 2017 changed to a used car dealer in 2022). 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 2017 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 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 2022 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 2022 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 2022 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;

c) Public awareness campaign to assist businesses and the public in understanding the importance of the 2022 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 and select medium-sized 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 telephone assistance and a web-based help desk for any business that has questions about responding to the Economic Census;

g) Systematic mail and e-mail follow-up for nonresponse, supplemented by telephone follow-up for selected firms;

h) Due date reminder and optimized timing of mailings and emails based on contact strategy research;

    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; and

    j)   Tailored messaging for respondents on their Respondent Portal dashboard and welcome emails to provide additional information about reporting.

Through these and other response improvement strategies, as mentioned previously we expect to maintain or improve upon the 2017 Economic Census unit response rate and percent check-in for the 2022 Economic Census.

Online Reporting

A respondent will enter the Centurion online electronic reporting instrument through the Respondent Portal. The Respondent Portal is secure information technology that requires the respondent to create their own account and password. The Census Bureau provides a one-time-use Authentication Code in the mailout package for the respondent to enter in the Respondent Portal to create a card in the Respondent Portal to access the economic surveys to complete in Centurion. The Respondent Portal 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 2022 Economic Census.

Centurion will provide Preview Survey PDFs of the survey questions so that respondents can review the questions and gather the requested data before starting to answer the survey questions. 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. These PDFs aid work processes and further encourage response.

Centurion's response-driven design utilizes skip patterns to take respondents to ensuing 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.

New functionality for the 2022 Economic Census in Centurion will include machine learning searches for respondents to search and select their Primary Business/Activity and natural language processing to identify NAPCS product/services to add that are not pre-listed. For the 2017 Economic Census, respondents could only provide a write-in response if a selection was not pre-listed in Centurion.

Centurion also offers automated error checking and notifications as they occur, along with an error summary list prior to submission.

Centurion provides companies with multiple locations additional functionality of downloading and uploading data spreadsheets to aid reporting. Research and feedback from multi-unit business respondents has repeatedly indicated that spreadsheets aid gathering, recording, and reporting data for the economic census. The spreadsheets permit "copy and paste" or populating data from other internal spreadsheet sources and databases and facilitate the ability to select and extract sections of the spreadsheet to gather data from other people and sources dispersed throughout the company.

Contact Strategies

The contact strategies utilized for the 2022 Economic Census have been developed based on feedback gathered from focus groups and cognitive testing of respondents, results from pilots and controlled experiments testing different contact strategies, and lessons learned from the 2017 Economic Census and other economic surveys. The contact strategies will include an initial contact, due date reminder as the due date approaches, and systematic mail and email follow-ups for nonresponse, supplemented by telephone follow-up for selected firms. The timing of mailings and emails has been optimized based on contact strategy research and analysis of response data from several annual economic surveys. Contact 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.

Our research 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. Therefore, the due date reminder was used for the 2017 Economic Census and has been used for other economic surveys as well.

Follow-up efforts for nonrespondents begin with the least expensive methods and increase intensity as time elapses past the due date. 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. The most expensive mail contact used is a certified or priority class mailing. Certified and priority class follow-up appear to communicate the legitimacy and importance of the data collection effort for more reluctant respondents. 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.

In preparing for the 2022 Economic Census, we have been researching how to incorporate new technology effectively, including the expanded use of email and customized messaging supported by the Respondent Portal. Within the Respondent Portal, we have been exploring providing customized content on the Respondent Dashboard to assist with reporting. We have also been exploring using the Respondent Portal to automatically generate emails to

respondents based on certain actions. After a respondent first accesses the survey in the Respondent Portal, it can generate an email with a customized Welcome Packet containing information on how the data are used and information to assist with reporting. After the phone center has called a respondent, the Respondent Portal can generate an email to follow-up on the call whether contact was made or a voicemail was left. After a respondent completes the survey, the Respondent Portal can generate an email to thank them for their participation, remind them they can print out their response, and provide other useful information (such as where they can find survey results).

During the 2017 Economic Census, we supplemented mail follow-ups with email follow-ups for respondents who had started but not completed the reporting process. The use of email follow-ups has been expanded to other economic surveys since then (primarily using email addresses respondents provided when they set up their Respondent Portal accounts). We conducted research on the sequence of emails in the follow-up strategy (email follow-up only, email and then mail follow-up, mail and then email follow-up, or email and mail follow-up concurrently). We also explored allowing respondents to choose email as their preferred contact method.

The shutdown of our National Processing Center due to the COVID-19 pandemic necessitated the further use of email. Even after mail operations resumed, emails proved to be useful in contacting respondents who may be working from home and not able to receive mail at their normal business locations. Email contacts were used not only for follow-up efforts but also initial contact at the beginning of the survey cycle. Expanding the use of emails has also meant exploring how emails can be shared across survey programs.

When our phone centers were shut down due to COVID-19, automated Robocalls were used to contact respondents. Given limitations with automated calls, laptops were deployed to phone center employees as quickly as possible to support remote phone operations. In a few economic surveys, we have explored the use of Robocalls when some nonrespondents are ineligible for live calls due to budget limitations. Additional tests are planned to determine the impact of robocalls and pending the results of these tests, robocalls may be used as a contact strategy for the 2022 Economic Census.

Our contact strategies research has provided invaluable information to improve our methods and make data-driven decisions to implement cost effective strategies to maximize response for the 2022 Economic Census. Further, we will continue to implement successful strategies across other economic programs, as appropriate.

Adaptive Design

The U.S. Census Bureau uses an adaptive design for telephone follow-up where response monitoring data are used to target and prioritize efforts to the lowest responding groups and respondents with the most impact on data products. We also implemented an adaptive mail follow-up strategy for sampled single unit establishments in the 2017 Economic Census that

will be employed again for 2022. All nonrespondents are included in the third mail follow-up but the more expensive procedures will be targeted to a probability subsample of businesses (instead of all nonrespondents) with the remainder receiving the less expensive mailing. Our objective is to reduce the overall cost and improve – or at least maintain – estimate quality by reducing nonresponse bias without overly increasing sampling variance.

For the 2022 Economic Census, similar to 2017, the targeted mail 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.

Outreach

The Census Bureau is planning for a direct outreach effort to as many as 2,000 large and medium-sized 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.

4. **Tests of Procedures or Methods**

Instrument Development and Design

With the exception of paper questionnaires for Island Areas' single-establishment firms, the 2022 Economic Census will be collected completely online, using the Census Bureau's current corporate Web reporting software called Centurion. Re-engineering economic census data collection instruments for full implementation of machine learning and natural language processing 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 a.k.a. Report of Organization) (OMB Control No. 0607-0444), the Annual Survey of Manufactures

(ASM) (OMB Control No. 0607-0449), and the 2021 Industry Classification (Refile) (OMB Control No. 0607-0189). 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 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 ASM/COS respondents to identify strengths and weaknesses of the online Centurion instrument.

Testing was done on the new machine learning and natural language processing searches developed for respondents to search and select their Primary Business/Activity and NAPCS product/services that are not prelisted in the 2021 Industry Classification (Refile) field test instrument mailed in October 2021. For a sample of respondents, we provided web probe questions so that the respondents could describe their experiences with the machine learning/natural language processing questions. Research staff are conducting debriefings with respondents, and we are analyzing respondent submissions and paradata. We used this research and analysis to improve the machine learning/natural language processing searches for respondents prior to their use in the 2022 Economic Census Classification mailout in October 2022 and 2022 Economic Census main mailing in January 2023.

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 J.

Testing of Contact Strategies

To aid evidence-based decisions for data collection and response improvement contact strategies, several techniques were field-tested using pilots and statistical experimental designs embedded in several of the Census Bureau's annual or quarterly economic surveys. Evaluation of the strategies considered the effect on response rates or check-in rates, improved timeliness of reported data, potential for cost savings, and/or being more responsive to and supportive of our customers.

These field-tests and/or experiments, their outcomes, and implementation decisions are

summarized in Attachment K.

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 2022 Economic Census.

Table 5: Census Bureau Contacts for the 2022 Economic Census

Contact	Position	Email	Phone	Responsibility
William C. Davie, Jr	Methodology Director for the Business Register, Economic Census & Related Surveys, Economic Statistical Methods Division	william.c.davie.jr@census.gov	301-763-7182	Development of statistical methodology
Diane Willimack	Methodology Director for Methodology and Response Improvement for Economic Programs, Economic Statistical Methods Division	diane.k.willimack@census.gov	301-763-3538	Pretesting of data collection instruments and methods
Michelle Karlsson	Assistant Division Chief for Collection Instruments and Preparation, Economic Management Division	michelle.vile.karlsson@census.gov	301-763-6769	Development of collection instruments and preparation
Theresa Riddle	Operational Director for Economic Census, Economic Management Division	theresa.riddle@census.gov	301-763-4840	Operations and respondent management
Michael Sprung	Assistant Survey Director for the Economic Census, Economy-Wide Statistics Division	michael.j.sprung@census.gov	301-763-7150	Overall coordination and 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 2022 Economic Census (Stateside only)

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

J. Instrument Development and Design Research and Testing Highlights

K. Contact Strategies Testing

L. Title 13 U.S.C. Relevant Sections

M. Public comments received in response to March 2, 2022 Federal Register Notice