

CONTENT EVALUATION OF THE ECONOMIC CENSUSES

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Introduction

Every five years the Census Bureau conducts the economic censuses, collecting information on economic activity from establishments in retail and wholesale trades, service industries, construction industries, manufacturing, transportation, and mineral industries. The census publications include tables showing total payroll, employment, and receipts or value of products shipped for establishments by geographic area and by Standard Industrial Classification (SIC). The economic census publications are the primary sources of facts about the structure and functioning of the economy. Government agencies use the data for such things as benchmarks for various measures of productivity. Businesses use the data for decisions concerning the location of new establishments, sources of materials, and markets for finished products.

The accuracy of the basic measures of activity in the census publications has largely been assumed in the past. Resource allocations for the 1977 Economic Censuses included provisions for an actual test of this assumption. The Bureau decided to evaluate the components which make up these basic measures by conducting a content evaluation. This project had two main goals. First, it would measure the quality of some of the published totals, and second, it would provide information on the effectiveness of the data collection techniques used in the censuses.

Scope of the Study

Early in the planning phase of the content evaluation, it was determined that the study should be limited to measures of payroll, employment, and sales, receipts, or value of products shipped, items which are common across the censuses. There were several reasons for this determination. First, the dollar volume estimate of major activity of the establishment is the base measure for determining the industrial classification of the establishment. Second, the necessity for specialized knowledge of accounting practices in particular industries would be reduced significantly if the common measures were studied. Third, the basic data measures are the ones used in the intercensal surveys, such as the monthly retail trade survey, the annual wholesale trade survey, and the county business patterns program. Maximum benefit to the integrated statistical system would, therefore, be gained from an evaluation of the data elements common to the economic census and the current surveys.

Objectives of the Study

The content evaluation study was undertaken to determine how successful the Bureau has been at conveying the idea of properly including or excluding the component elements of the basic data items of employment, payroll, and receipts or value of products shipped. Systematic inclusion or exclusion of particular components

on the census forms by all establishments could lead to either upward or downward bias, possibly cause erroneous classifications of the establishments, potentially affect the weight assigned in future sample selection processes or introduce erroneous level estimates or trends into the ongoing statistical systems.

The data collection technique used since the 1954 Economic Census has been one of combining records obtained by direct mail canvass with those obtained from administrative sources. The content of the basic data measures of sales/receipts, employment, and payroll, as obtained by mail are therefore intended to be the same as the operating statistics extracted from these administrative records. Administrative records include the reports on employee withholding for Social Security purposes filed each quarter on form 941, which provide employment and payroll figures, as well as the Federal Income Tax forms, which provide sales/receipts, filed by corporations, partnerships, and individual proprietors.

Over half of the establishments in the retail universe, for example, never receive a census form, with computer matching of the administrative records being used to generate a surrogate census report for the smaller establishments. Approximately 20 percent of the dollar volume measured in the retail census is obtained directly from the income tax forms. The content of the basic inquiries on the census forms, which are mailed to the other half of the universe, account for approximately 80 percent of the total dollar volume. The data received from the two halves of the universe must, of necessity, be conceptually the same.

There are at least two sources of reporting bias built into the collection of data on economic census forms. First, because of potential respondent burden, census instructions tend to be minimal, as compared to instructions for reports from which administrative records are obtained. The detailed instruction manuals and the regulatory nature of tax records tend to generate volumes of case law, accounting guidelines, etc. which spell out precisely what is to be reported on Federal income tax and 941 forms. The second source of bias is in the concept of the reporting unit. Among multi-establishment firms, tax reports are filed on a taxing unit basis, which may be an establishment, subsidiary, firm, or any combination. Since income tax returns are filed annually, and the census is conducted only quinquennially, the respondents' records are usually maintained on a taxing unit basis.

Also, the economic sophistication of the person reporting the data is a potential source of error and plays a large part in the validity of the data reported. The reporters range from the most sophisticated Certified Public Accountant with a background in marketing, to the first time entrepreneur running a bait shop at the end of the pier on Lake Podunk. Respondent perception of form size, question complexity,

erroneous visions of a government data bank, all play a part in respondent compliance with questionnaire instructions. Accountants typically want to supply the government with a final audited book figure and instructions, which allow for reasonable estimates, are generally ignored. Other businesses may supply figures which are in agreement with the tax filings but understate actual sales, even though the census form assures confidentiality. The wide range of education, economic sophistication, accounting training, personal bias (e.g. handling of the "trade-in value" instruction), all play a substantial role in respondent perception and interpretation of reporting form instructions concerning proper reporting of the components of basic data elements. A survey which would measure the effect of all of these factors on the basic activity measures was needed, it was felt, if the quality of the published totals and the effectiveness of the data collection techniques were to be properly evaluated.

To measure the quality of census published totals, we needed to determine the quality of numbers reported on census forms for a sample of individual establishments. As we have mentioned, the specific items on the census forms which were to be evaluated included numbers of employees, first quarter and annual payrolls, and sales, operating receipts, or total value of shipments. The questions we asked were designed to determine whether the reported figures were actually what we had intended to collect in the census. As we mentioned earlier, there are many reasons why reporting may not match our expectations, such as lost, unused, confusing, or misinterpreted instructions, or some respondents may have had insufficient time in which to respond accurately. Also, correct data may not have been available to the person responsible for completing the census forms. For the establishments in the sample, we tried to determine when a difference existed between the reported figure and the data called for in our instructions, and the size of the difference. The originally reported figure could then be adjusted to more accurately reflect the data the census form had requested.

Stages of the Project

A pretest was conducted from January through April, 1978 to determine the feasibility of the content evaluation. Interviews were conducted at 57 multi-unit establishments by members of the census staff from Business, Industry, and Construction Statistics Division, and by members of the Research Center for Measurement Methods. This group determined the content of the questionnaires and developed practical methods for approaching potential respondents.

From April to July of 1978, final questionnaires were designed and sampling plans were developed. Also, training materials for interviewers were assembled. Three training sessions for interviewers were held during July, August, and September, 1978.

Interviews at single-unit companies and establishments of small multi-unit companies were conducted by field interviewers from August, 1978 through August, 1979. Interviews of establishments from larger multiunits were

conducted by the Bureau's professional staff from September, 1978 through March, 1980.

From October, 1979 through September, 1980 the completed questionnaires were converted into computer data files. This process included editing, coding, keying to tape, error correction, and reformatting.

Still to be completed are the statistical analysis of the data and documentation of the general information obtained aside from answers to our questionnaires.

The Samples

The content evaluation focused on data collected in five of the censuses included in the 1977 Economic Censuses: retail trade, wholesale trade, selected service industries, construction industries, and manufactures. Technically, five separate surveys were conducted. Our universe included establishments located in all states except Alaska and Hawaii, which were excluded due to cost considerations.

The frame used for sampling was the mailing list used for the census. This list included establishments not in our universe, such as nonrespondents to the census, central administrative offices and other auxiliary establishments, and establishments in business areas, such as transportation, which were not to be included in the content evaluation. These out-of-scope establishments could not be completely identified and removed from the frame prior to sampling.

Some of the practical problems that had to be considered in the sample design included the following:

1. The sample would include some out-of-scope units, so the sample size drawn needed to be large enough to provide an expected sample size adequate for estimation purposes.
2. An area sample was required for single-unit establishments so that the number of field interviewers required could be kept small and affordable. For the same reason, one set of sample geographic primary sampling units (PSU's) would have to serve for all five samples.
3. As determined by the pretest interviews, we had no reliable way of predicting where an interview for a multi-unit establishment would take place. Although we knew the location of the establishment and the company headquarters, the person to be interviewed could be at any number of other locations, such as a regional or divisional headquarters office. Therefore, drawing an area sample of multiunits was not practical.

The sample design used involved several stages and was the same for each of the five censuses. The first stage split the universe into single-unit and multi-unit establishments. The multi-unit stratum was then split into two strata, one certainty and one noncertainty. The certainty stratum contained the largest establishments as measured by receipts reported in the census. All establishments in the

certainly multi-unit stratum became part of the sample. The noncertainty multi-unit stratum was then sorted by SIC and a systematic sample was drawn.

The single unit stratum was arranged into geographically designed PSU's, each consisting of a group of contiguous counties which could be covered by one interviewer. The PSU's were arranged in eleven strata based on the total number of establishments (all census areas) in each PSU. The stratum containing the PSU's with the largest numbers of establishments was designated a certainty stratum and all PSU's from that stratum were in the sample of PSU's. From each of the other 10 strata, two or more sample PSU's were drawn with unequal probabilities in such a manner that a PSU which was particularly important, for any of the five census areas to be studied, would have a high probability of being chosen. After sample PSU's were drawn, establishments from each of the five areas were sorted by SIC and systematic samples were drawn.

Table 1 shows the desired and attained sample sizes from each of the five census areas, within single-unit and multi-unit strata. The desired sample sizes reflect what was required for statistical purposes and what we expected to have left after out-of-scope units were eliminated from the original samples. The attained sample sizes are the actual numbers of cases from the original samples which were determined to be in-scope of the project, and include interviewed cases, refusals, and other noninterviewed cases.

The Interviews

Single-unit companies and establishments from small multi-unit companies were interviewed by the Bureau field staff located in the sample PSU's. The interviewers had previous experience with surveys of business establishments and completed a three day training session prior to conducting content evaluation interviews. Most interviewers were responsible for conducting interviews at establishments located anywhere within a 200 mile radius from their homes.

Because of the potentially greater difficulty of interviews caused by complex company structures, larger multiunits were interviewed by members of the Bureau professional staff from Business Division, Construction Statistics Division, Industry Division, and the Research Center for Measurement Methods. Establishments which had been single-unit companies during 1977 but had since become part of multi-unit companies were also interviewed by this group.

In order to avoid affecting the normal census processing, and therefore influencing the results of the Census and the content evaluation, any information obtained during the interviews was not incorporated into the census data files. Because census procedures include follow-up correspondence and telephone calls to companies, interviewing for the content evaluation was delayed until follow-up procedures were completed.

Personal visit interviews were chosen over mail survey or telephone interviews to eliminate from our survey some of the problems that create inaccuracies in the census publications. For example, respondents' difficulties in understand-

ing the census instructions could not be avoided by another mail questionnaire or by telephone interviewing.

Due to the nature of the questions to be asked, an appointment was made by telephone for each interview. This allowed the respondent time to collect company records that had been used in completing the census form. Usually, the first telephone contact with the company was with the person whose name appeared on the census form, or with the company contact, a person designated by the company to receive all inquiries from the Census Bureau. By explaining the project and asking to speak to the person responsible for completing census forms, the caller would (eventually) reach the person to be interviewed. In any case, permission was obtained to conduct the interview from the potential respondent's supervisor and other company officials.

After the interview was scheduled, a standard confirmation letter was sent to the respondent. This letter contained information about the survey and other details which we are required by law to explain to respondents prior to conducting interviews.

In single-unit companies, the respondent was usually the owner or the accountant who was often a CPA not employed directly by the company. In multiunits, the respondent was often the head of the accounting or payroll department. For a very few companies, we conducted more than one interview, such as when payroll and employment data were kept at a different location than that where receipts data were kept. Except during training interviews, only one person from the Census Bureau conducted the interview. However, many times, more than one company employee was present during the interview.

The abilities of the respondents to answer the census or content evaluation questions ranged from those who had no company records or no idea what the records contained, and therefore couldn't help us, to those who knew as well as or better than the interviewer how to accurately complete a census form, due to frequent contacts with the census staff. The attitudes of the respondents toward the content evaluation also varied widely. Some respondents were uncooperative due to the large amount of work generated by government reporting requirements. Others encouraged us to look in their files, expecting the interview to be as thorough as an audit. Since the original census report is required by law, some respondents even consulted with company lawyers prior to the interview in anticipation of our finding some illegality in their report.

The interviews usually lasted from 35 to 75 minutes, with an occasional two or three hour interview. Because we could not predict the length of the interview, we could schedule at most two interviews per day, one in the morning and one in the afternoon.

Due to the high costs associated with traveling for interviews with multi-unit establishments, we attempted to schedule all the interviews in a particular area on successive days to allow the interviewer to make only one trip to the area. This was a rare accomplishment, since out of any group of

potential respondents, there were always a few who were not available to be interviewed when we wanted to see them. Also, many interviews were held in locations where no other interviews would be held. The trips outside the Washington, D.C. area ranged in length from one day to two weeks, with the average trip 4 days long. Most traveling involved airplanes and rental cars and the traveling expenses came to an average of \$113 per interview (travel plus living expenses).

The Interview Data

Even though participation in this survey was voluntary, the overall response rate for the content evaluation interview was 94.6%. This may be due in part to the fact that we were interviewing companies concerning questionnaires that they had previously completed. Also, many of the larger companies in our sample are users of the census publications, which may have encouraged them to participate in a project that could improve the data. Many small companies were interested in being visited by a person associated with one of the government agencies responsible for all the forms they have to complete. As in any survey, we had some refusals. Among small single-unit companies, there were some establishments we could not interview because they had gone out of business or moved to a new, unknown, location. The response rate is broken down by census area in Table 2.

Even though a high percentage of our sample establishments allowed themselves to be interviewed, the response rates for individual items were somewhat lower. In many cases the respondent would know whether a particular item was included in the figure reported on the census form, but would not know the amount involved. For example, the respondent would know that employees on paid sick leave had not been included in the employment count on the census form, but would not know how many people were on paid sick leave at the time. Another reason for item nonresponse involved the timing of our interviews. As the interviews were scheduled farther from the time the census forms were completed, the respondents had more difficulty in answering our questions. In some cases, the person responsible for the census form was no longer employed by the company.

The numerical answers provided by the respondents varied in quality and were classified by the interviewers as being book figures, reliable estimates, or unconfirmed estimates. Unconfirmed estimates, such as those obtained when a respondent had only a general idea as to how large a number should be, could not be used for the study.

Analysis of the Data

For each establishment in the sample, we will be comparing the payroll, employment, and receipts that were tabulated in the census to the corresponding figures that were obtained through the content evaluation interviews. We are making the assumption that the figures resulting from the interviews reflect what the Census Bureau actually intended to collect and tabulate in the censuses. Estimates of the national totals for

employment, payroll, and receipts, within each of the five censuses, will be calculated from each of the tabulated and interview figures. The ratio of these estimates (tabulated to interview) will be used to estimate the accuracy of the national totals in the census publications.

As well as looking at the accuracy of the total employment, payroll, and receipts, we will look at the importance to the total of each of the sources of error that we have investigated. For example, for employment, we will measure the effect on the total of the exclusion from the census report of several kinds of employees who work at the establishment, and the effect of inclusion of employees who do not work at the establishment. For payroll, we will measure the effect of excluded compensation such as sick leave pay, vacation pay, severance pay, or the value of compensation in the form of merchandise. We will also measure the effect of inclusion in reported payroll of wages to employees who did not work at the establishment, or items such as employers' costs for fringe benefits, which we would prefer not to include in payroll. For the total receipts or value of shipments, we will look at the effect of the inclusion of such items as sales taxes, nonoperating income (such as interest), or receipts from operations in foreign countries. We will also look at the effect of excluding receipts from sources other than the primary activity of an establishment, such as the erroneous exclusion of retail sales at a primarily wholesale establishment.

Besides the answers to the formal content evaluation questions, we have collected a considerable amount of information about businesses in general. For example, we have found that occasionally one census form contains data for more than one establishment, reflecting the manner in which the company keeps its records. Also some establishments exist which cannot be classified into one type of business such as retail or wholesale trade, due to the variety of operations at the establishment. Administrative offices and other auxiliary establishments cannot always be identified separately from all other establishments in a company even when they occupy separate physical locations. Situations such as these are an indication of the types of company structures that complicate the task of producing the economic censuses.

Implications for Other Surveys

Most of the practical problems that have been discussed here are not unique to this project. The variety of company structures and bookkeeping practices will add complications to almost any survey of businesses. Many surveys would also be affected by the difficulties in predicting which type of employee would have the required information, which employee will be allowed to respond to the survey, and for multiunits, where that employee will be located.

TABLE 1. NUMBER OF ESTABLISHMENTS IN SAMPLE

	<u>Retail Trade</u>			<u>Wholesale Trade</u>		
	<u>Single-unit</u>	<u>Multi-unit</u>	<u>Total</u>	<u>Single-unit</u>	<u>Multi-unit</u>	<u>Total</u>
Desired Sample Size	1,000	200	1,200	400	200	600
Attained Sample Size	1,156	191	1,347	451	216	667
	<u>Services</u>			<u>Construction</u>		
	<u>Single-unit</u>	<u>Multi-unit</u>	<u>Total</u>	<u>Single-unit</u>	<u>Multi-unit</u>	<u>Total</u>
Desired Sample Size	500	150	650	500	50	550
Attained Sample Size	536	165	701	556	55	611
	<u>Manufactures</u>			<u>Total</u>	<u>Total</u>	<u>Total</u>
	<u>Single-unit</u>	<u>Multi-unit</u>	<u>Total</u>	<u>Single-unit</u>	<u>Multi-unit</u>	<u>Sample</u>
Desired Sample Size	350	250	600	2,750	850	3,600
Attained Sample Size	360	315	675	3,059	942	4,001

TABLE 2. RESPONSE RATE

	<u>Retail Trade</u>			<u>Wholesale Trade</u>		
	<u>Single-unit</u>	<u>Multi-unit</u>	<u>Total</u>	<u>Single-unit</u>	<u>Multi-unit</u>	<u>Total</u>
Number of Respondents	1,085	183	1,268	432	209	641
Number of Refusals	25	4	29	10	4	14
Number of Out-of-Business and other Noninterview	46	4	50	9	3	12
Total Noninterview	71	8	79	19	7	26
	<u>Services</u>			<u>Construction</u>		
	<u>Single-unit</u>	<u>Multi-unit</u>	<u>Total</u>	<u>Single-unit</u>	<u>Multi-unit</u>	<u>Total</u>
Number of Respondents	497	158	655	527	52	579
Number of Refusals	16	6	22	11	3	14
Number of Out-of-Business and other Noninterview	23	1	24	18	0	18
Total Noninterview	39	7	46	29	3	32
	<u>Manufactures</u>			<u>Total</u>	<u>Total</u>	
	<u>Single-unit</u>	<u>Multi-unit</u>	<u>Total</u>	<u>Single-unit</u>	<u>Multi-unit</u>	
Number of Respondents	346	296	642	2,887	898	
Number of Refusals	6	11	17	68	28	
Number of Out-of-Business and other Noninterview	8	8	16	104	16	
Total Noninterview	14	19	33	172	44	
	<u>Total Sample</u>	<u>Percent of Total Sample (4,001 Cases)</u>				
Number of Respondents	3,785	94.6%				
Number of Refusals	96	2.4%				
Number of Out-of-Business and other Noninterview	120	3.0%				
Total Noninterview	216	5.4%				