1992
Census of Manufactures

MC92-S-3

SUBJECT SERIES

Manufacturers' Shipments to Federal Government Agencies

U.S. Department of Commerce
Economics and Statistics Administration
BUREAU OF THE CENSUS

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If you have any questions concerning the statistics in this report, call 301-457-4814.

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U.S. Department of Commerce
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Economics and Statistics Administration
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Introduction to the Economic Census

PURPOSES AND USES OF THE ECONOMIC CENSUS

The economic census is the major source of facts about the structure and functioning of the Nation's economy. It provides essential information for government, business, industry, and the general public.

The economic census furnishes an important part of the framework for such composite measures as the gross domestic product, input/output measures, production and price indexes, and other statistical series that measure short-term changes in economic conditions.

Policymaking agencies of the Federal Government use the data, especially in monitoring economic activity and providing assistance to business.

State and local governments use the data to assess business activities and tax bases within their jurisdictions and to develop programs to attract business.

Trade associations study trends in their own and competing industries and keep their members informed of market changes.

Individual businesses use the data to locate potential markets and to analyze their own production and sales performance relative to industry or area averages.

AUTHORITY AND SCOPE

Title 13 of the United States Code (sections 131, 191, and 224) directs the Census Bureau to take the economic census every 5 years, covering years ending in 2 and 7. The 1992 Economic Census consists of the following eight censuses:

- Census of Retail Trade
- Census of Wholesale Trade
- Census of Service Industries
- Census of Financial, Insurance, and Real Estate Industries
- Census of Transportation, Communications, and Utilities
- Census of Manufactures
- Census of Mineral Industries
- Census of Construction Industries

Special programs also cover enterprise statistics and minority-owned and women-owned businesses. (The 1992 Census of Agriculture and 1992 Census of Governments are conducted separately.) The next economic census is scheduled to be taken in 1998 covering the year 1997.

AVAILABILITY OF THE DATA

The results of the economic census are available in printed reports for sale by the U.S. Government Printing Office and on compact discs for sale by the Census Bureau. Order forms for all types of products are available on request from Customer Services, Bureau of the Census, Washington, DC 20233-8300. A more complete description of publications being issued from this census is on the inside back cover of this document.

Census facts are also widely disseminated by trade associations, business journals, and newspapers. Volumes containing census statistics are available in most major public and college libraries. Finally, State data centers in every State as well as business and industry data centers in many States also supply economic census statistics.

WHAT'S NEW IN 1992

The 1992 Economic Census covers more of the economy than any previous census. New for 1992 are data on communications, utilities, financial, insurance, and real estate, as well as coverage of more transportation industries. The economic, agriculture, and governments censuses now collectively cover nearly 98 percent of all economic activity.

Among other changes, new 1992 definitions affect the boundaries of about a third of all metropolitan areas. Also, the Survey of Women-Owned Businesses has now been expanded to include all corporations.

HISTORICAL INFORMATION

The economic census has been taken as an integrated program at 5-year intervals since 1967 and before that for 1963, 1958, and 1954. Prior to that time, the individual subcomponents of the economic census were taken separately at varying intervals.

The economic census traces its beginnings to the 1810 Decennial Census, when questions on manufacturing were included with those for population. Coverage of economic

activities was expanded for 1840 and subsequent censuses to include mining and some commercial activities. In 1902, Congress established a permanent Census Bureau and directed that a census of manufactures be taken every 5 years. The 1905 Manufactures Census was the first time a census was taken apart from the regular every-10-year population census.

The first census of business was taken in 1930, covering 1929. Initially it covered retail and wholesale trade and construction industries, but it was broadened in 1933 to include some of the service trades.

The 1954 Economic Census was the first census to be fully integrated—providing comparable census data across economic sectors, using consistent time periods, concepts, definitions, classifications, and reporting units. It was the first census to be taken by mail, using lists of firms provided by the administrative records of other Federal agencies. Since 1963, administrative records also have been used to provide basic statistics for very small firms, reducing or eliminating the need to send them census questionnaires. The Enterprise Statistics Program, which publishes combined data from the economic census, was made possible with the implementation of the integrated census program in 1954.

The range of industries covered in the economic censuses has continued to expand. The census of construction industries began on a regular basis in 1967, and the scope of service industries was broadened in 1967, 1977, and 1987. The census of transportation began in 1963 as a set of surveys covering travel, transportation of commodities, and trucks, but expanded in 1987 to cover business establishments in several transportation industries. For 1992, these statistics are incorporated into a broadened census of transportation, communications, and utilities. Also new for 1992 is the census of financial, insurance, and real estate industries. This is part of a gradual expansion in coverage of industries previously subjected to government regulation.

The Survey of Minority-Owned Business Enterprises was first conducted as a special project in 1969 and was incorporated into the economic census in 1972 along with the Survey of Women-Owned Businesses.

An economic census has also been taken in Puerto Rico since 1909, in the Virgin Islands of the United States and Guam since 1958, and in the Commonwealth of the Northern Mariana Islands since 1982.

Statistical reports from the 1987 and earlier censuses provide historical figures for the study of long-term time series and are available in some large libraries. All of the census data published since 1967 are still available for sale on microfiche from the Census Bureau.

AVAILABILITY OF MORE FREQUENT ECONOMIC DATA

While the census provides complete enumerations every 5 years, there are many needs for more frequent data as well. The Census Bureau conducts a number of monthly, quarterly, and annual surveys, with the results appearing in publication series such as Current Business Reports (retail and wholesale trade and service industries), the Annual Survey of Manufactures, Current Industrial Reports, and the Quarterly Financial Report. Most of these surveys, while providing more frequent observations, yield less kind-of-business and geographic detail than the census. The County Business Patterns program offers annual statistics on the number of establishments, employment, and payroll classified by industry within each county.

SOURCES FOR MORE INFORMATION

More information about the scope, coverage, classification system, data items, and publications for each of the economic censuses and related surveys is published in the *Guide to the 1992 Economic Census and Related Statistics*. More information on the methodology, procedures, and history of the census will be published in the *History of the 1992 Economic Census*. Contact Customer Services for information on availability.

Manufacturers' Shipments to Federal Government Agencies

SUMMARY OF SURVEY RESULTS

The total value of shipments by private manufacturing firms in 108 selected Federal Government oriented industries was estimated at $1,447.4 billion in 1992, of which $143.9 billion or 10 percent was accounted for by shipments to the Federal Government. The Federal agency with the largest dollar volume of procurement during 1992 was the Department of Defense (DOD) with $114.3 billion, followed by the National Aeronautics and Space Administration (NASA) with $6.8 billion and the Department of Energy (DOE) with $2.9 billion. The ''other agencies'' category (i.e., agencies other than DOD, NASA, and DOE; receiving agencies not known to the manufacturer; and plants which have less than $1 million in Federal shipments) was estimated at $19.8 billion. Of the $143.9 billion of manufactured products shipped, $107.8 billion represented shipments of prime contracts, and $36.1 billion were done on indirect or subcontracts.

Total employment in all Federal Government oriented industries in 1992 was estimated to be 7.5 million, of which 1.0 million employees were engaged in work related to Government expenditures for manufactured products. By agency, DOD shipments supported an estimated .8 million employees; NASA, 53,000; DOE, 28,300; ''other agencies,'' 64,400; and ''agency not known'', 68,700.

Twenty industries shipped more than $1 billion of their products to the Federal Government. These industries were led by SIC 3812, Search and Navigation Equipment, at $26.2 billion; SIC 3721, Aircraft, at $23.0 billion; and SIC 3761, Guided Missiles and Space Vehicles, at $16.6 billion.

SOURCE OF DATA

These data are based on the results of 1992 Census of Manufactures Survey of Manufacturers' Shipments to Federal Government Agencies. The survey sample included plants in the 108 industries identified as having engaged extensively in business with the Federal Government. The majority of the 108 industries are grouped in Major Groups 34, 35, 36, 37, and 38. Appendix A provides limitations of the data and an explanation of the terms. Appendix B describes the survey sample and estimating procedure. Appendix C contains reproductions of the report form and instructions.

INDUSTRIAL CLASSIFICATION

The sample survey panel was selected to represent 108 industries as the industries were defined in the 1987 Standard Industrial Classification. See appendix A for limitations of the data.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in this publication:

–	Represents zero.
(A)	Represents value less than $.05 million ($50,000); Employees less than 50.
(D)	Withheld to avoid disclosing data for individual companies.
(NA)	Not available.
(X)	Not applicable.
DOD	Department of Defense.
DOE	Department of Energy.
NASA	National Aeronautics and Space Administration.
n.e.c.	Not elsewhere classified.
SIC	Standard Industrial Classification.

Appendix A.
Limitations of the Data and Explanation of Terms

LIMITATIONS OF THE DATA

The survey of Shipments to Federal Government Agencies was conducted to measure the extent of Government procurement in 108 manufacturing industry classifications listed in appendix B. Similar data for other manufacturing industries which may have made shipments to the Federal Government were not included in the sample. Therefore, the data at the U.S. level do not represent all Federal Government procurement, only that of the industries surveyed.

In general, shipments to the Federal Government in this report consist of finished goods or components produced to military specifications. The major portion of Government business for these industries, with the exception of the machinery industries, is subject to renegotiation and, therefore, is separately identified in the records of the respondents. Government shipments consist of products shipped to Federal agencies, their contractors, subcontractors, and suppliers. The Government total is further subdivided into shipments relating to (1) Government prime contracts and (2) other manufacturers in ultimate performance of Federal Government contracts (subcontracts).

The survey was designed primarily to measure the volume of shipments to the Federal Government made by prime contracting industries and was not intended to include all manufacturing industries that may have been engaged in subcontracting activities related to Government contracts. In interpreting the figures for subcontract work, note that these industries do not represent all ''basic materials'' industries and ''other components'' industries that are important in subcontracts. Shipments of materials and components purchased by the Government and furnished to contractors supplying finished equipment were reported as prime contracts.

Furthermore, there is no indication of the level of subcontracts (e.g., first tier, second tier, etc.). Because of the nature of the industries surveyed, it is likely that, except for a few industries such as electronic components, most of the subcontracting is first tier only, and the pyramid of shipments values from one tier to another is not large.

The particular sample selected for this survey is one of a large number of similar probability samples of the same size that could have been selected by chance, using the same sample design. Each of the possible samples would have yielded somewhat different sets of results. The sampling errors (the differences between the estimates obtained and the results theoretically obtainable from a comparable complete canvass of the same target universe) are unknown. Guides to the potential size of the sampling errors, however, are provided by the estimated relative standard errors of the estimates. These are shown in the report for total value of Government shipments for each industry. On the average, relative standard errors will be higher for the detailed figures than for the aggregates.

In conjunction with its associated estimate, the relative standard error (computed as the estimated standard error of the estimate divided by the value of the estimate itself) may be used to define confidence intervals, ranges which could be expected to include comparable complete coverage values for specified percentages of all possible samples. The complete coverage value would be included in the range:

1. From one standard error below to one standard error above the derived estimate for about two-thirds of all samples.
2. From two standard errors below to two standard errors above the derived estimate for about 19 out of 20 of all possible samples.
3. From three standard errors below to three standard errors above the derived estimate for nearly all samples.

An inference can be made that comparable complete coverage results within the indicated ranges would be correct in approximately the relative frequencies shown. Those proportions, therefore, may be interpreted as defining the confidence that the estimates shown would differ from complete coverage results by as much as one, two, or three standard errors, respectively.

For example, if an estimated total is shown as $20.0 million with an associated relative standard error of 2 percent, the standard error is $0.4 million. Then, there is approximately 67 percent confidence that the interval $19.6 million to $20.4 million includes the complete coverage total, about 95 percent confidence that the interval $19.2 million to $20.8 million includes the complete coverage total, and almost certain confidence that the interval $18.8 million to $21.2 million includes the complete coverage total.

In addition to the sampling errors, the estimates are subject to various response and operational errors: errors of collection, reporting, transcription, etc. These operational errors would also occur if a complete canvass were

to be conducted under the same conditions as this survey. Explicit measures of their effects generally are not available. However, it is believed that most of the important operational errors were detected and corrected in the course of the Census Bureau's review of the data for reasonableness and consistency.

A 1992 census mail status file was the basis for creating the sampling frame for the survey. A comparison of this file with the final census of manufactures file showed that a number of small plants were added as a result of Census Bureau processing. The adjustment of the survey estimates to final Census Bureau results for total employment and total shipments account for these adds. However, to the extent that these plants differ in their patterns of shipments to Federal agencies, the distribution estimated from the survey may be affected. We are not able to provide a measure of this difference. (See appendix B for an explanation of the estimation procedure.) In addition, changes to SIC codes occurred for several sample cases. The changes may have been to codes still in scope of the survey, or they may have been to codes not in scope. These code switches were allowed for certainty establishments since they only represent themselves. Thus, if the switch was to an out-of-scope code, the establishment was deleted from the sample. Noncertainty cases were not allowed to switch under the presumption that the cases they represented did not make the same kind of switch and probably did not switch at all. This procedure is biased, but if our presumptions are correct, the total mean squared error is lowered. We are not able to quantify the amount of bias introduced.

EXPLANATION OF TERMS

All employees. This category includes all full-time and part-time employees on the payrolls of operating manufacturing establishments who worked or received pay for any part of the pay period ending nearest the 12th of the month specified on the report form. Included are all persons on paid sick leave, paid holidays, and paid vacations during this pay period. Officers of corporations are included as employees; proprietors and partners of unincorporated firms are, however, excluded.

The report form requests a total number of employees. We estimated the number of employees by agency by adjusting the total number of employees at the establishment by the proportion of its value of shipments to the particular agency to its total value of shipments.

Value added by manufactures. This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, fuel, purchased electricity, and contract work from the value of shipments (or value of production) as well as receipts for services rendered. This figure is then adjusted by the addition of value added by merchandising operations (that is sold without further manufacture, processing, or assembly) and the net change in finished goods and work-in-process inventories between the beginning and end of the year.

Value of shipments. This item covers the received or receivable net selling values f.o.b. plant (exclusive of freight and taxes) of all products shipped, both primary and secondary, as well as all miscellaneous receipts such as receipts for contract work performed for others, installation and repair, sales of scrap, and sales of products bought and resold without further processing. It also includes all items made by or for each establishment from materials owned by it, whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

Appendix B.
Description of Survey Sample and Estimating Procedure

The estimates presented in this report are derived from a probability sample of approximately 7,800 manufacturing establishments which were selected from the 1992 Census of Manufactures excluding administrative records. The sample was restricted to 108 industry classifications. Of these, 91 represented four digit SIC levels, 14 three digit SIC levels, and 3 two digit SIC levels. The two- and three-digit SIC's excludes four-digit SIC's that were being sampled separately. These industries, based on earlier detailed studies, had been shown to be engaged extensively in business with the Federal Government. Most of the industries fall in Major Groups 34, 35, 36, 37, or 38. In addition, 65 plants not initially in the Census Bureau file but identified by the Department of Army as having significant amounts of shipments to the Federal Government, were treated as separate strata and included in the sample with certainty. These plants were subsequently located in the Census Bueau files and were classified accordingly. Because of this slight amount of duplication in the frame, a trivial amount of bias was introduced in the estimates. Any duplicate sample cases were identified and one of the duplicates deleted.

In addition to the Department of Army adds, additional establishments were identified for certainty inclusion in the panel. These included in-scope establishments of particular companies surveyed in the Census Bureau's Manufacturers' Shipments, Inventories, and Orders (M3) survey and all establishments with total employment of 500 or more. All other establishments in the frame were subsequently assigned sampling probabilities that were proportional to their total value of shipments. No establishment, regardless of its shipments, was assigned a probability less than 0.005. Establishments chosen for the survey were assigned weights equal to the reciprocal of their probabilities of selection. Individual establishment data were inflated by their sampling weights to develop the industry estimates used in the final estimation procedure.

All establishments included in the survey were instructed to report total employment, cost of materials, and value of shipments. These data were to be identical to the data reported for these items on the 1992 Census of Manufactures filed with the Census Bureau for that plant. In addition, the establishments were instructed to indicate by means of a check box inquiry the range of value of shipments made by the establishments to the Federal Government in 1992. Those establishments indicating shipments of $1 million or more to the Federal Government were asked to report the value of such shipments classified by the specific Government agency to which the products were billed. The remaining plants (those indicating value of shipments of less than $1 million to the Federal Government) were not required to complete this portion of the inquiry. In order to estimate for the latter respondents, a linear approximation to the mean value of the range (which the respondent checked) was employed. The following mean values were used to estimate shipments for establishments that shipped less than $1 million to the Federal Government:

Up to $100,000, estimated at $42,000
$100,000 to $249,999, estimated at $150,000
$250,000 to $499,999, estimated at $350,000
$500,000 to $999,999, estimated at $700,000

These estimates are included in the ''other Government agency not specifically known'' category.

Government employment by agency was derived for each plant as a straight proration of its total employment by the ratio of Government shipments data by agency total shipments. A Government employment figure is shown in the various tables.

Simple weighted estimates X'_{ai} of shipments by agency ''a'' for industry ''i'' were formed. These estimates were then adjusted as follows to provide final survey estimates X''_{ai} of shipments for agency ''a'', industry ''i'':

$$X''_{ai} = \left(\frac{Y_i}{Y'_i}\right) X'_{ai}$$

where

X''_{ai} =the estimate of Government shipments for industry ''i'' to agency ''a''.

Y'_i =the simple weighted estimate of total value of shipments for industry ''i'' obtained from the sample survey.

Y_i =the value of shipments for industry ''i'' obtained from the 1992 Census of Manufactures.

X'_{ai} =the simple weighted estimate of Government shipments for industry ''i'' to agency ''a'' obtained from the sample survey.

A similar estimation was used for employment data. The variance on an estimated total X''_{ai} was estimated as follows:

$$\sigma^2(X''_{ai}) = [Y_i/Y'_i]^2[\sigma^2(X'_{ai}) + R_i^2\sigma^2(Y'_i) - 2\,R_i\sigma(X'_{ai}, Y'_i)]$$

where

Y_i, Y_i^I and X_{ai}^I are defined as before,

$\sigma^2(X_{ai}^I)$ = the variance on the simple weighted estimate X_{ai}^I,

$\sigma^2(Y_i^I)$ = the variance on the simple weighted estimate Y_i^I,

$\sigma(X_{ai}^I, Y_i^I)$ = the covariance between X_{ai}^I and Y_i^I, and $R_i = X_{ai}^I / Y_i^I$ corresponding

The corresponding relative standard error on the estimate X_{ai}^{II} was computed as

$$V(X_{ai}^{II}) = \sigma(X_{ai}^{II}) / X_{ai}^{II}$$

Selective relative standard errors appear in the tables.

Appendix C.
Sample Report Form and Instructions

The sample report form and instructions are shown on the following pages.