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PLANNING FOR THE CENSUS BUREAU'S ANNUAL
CAPITAL EXPENDITURES SURVEY

by

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Introduction

A major concern of economic policymakers is the amount of investment in plant and equipment. Data on the amount of business expenditures for new plant and equipment and measures of the stock of existing production facilities are critical to evaluate productivity growth, the ability of U.S. businesses to compete with foreign producers, the efficient utilization of plant capacity, and measures of overall economic performance. The 1990 Economic Report of the President¹ devotes a chapter to "Investing in America's Future." The opening sentences state, "A major challenge of the 1990s will be to increase the rate at which the productive capacity of the U.S. economy grows. Increasing the rates of growth of productive capacity and living standards will require higher rates of saving and investment."

The concerns over business investment go beyond total investment levels. William Kolarik found that annual real investment in U.S. manufacturing has been generally flat during the 1980s while total U.S. investment has been rising². And Stephen Roach points out that the manufacturing sector no longer shapes the overall trend in capital spending³. In fact, during the last 25 years, the service sector's share of U.S. capital spending has grown dramatically. With this change in relative shares, the investment mix in types of equipment and buildings also has

changed. For example, the rate of investment growth in information processing technology and transportation equipment exceeds the growth rate in industrial equipment expenditures.

Because of the widely recognized need for improved data on capital stocks and business investment expenditures, the Bureau of the Census has proposed and is planning for an annual capital expenditures survey of U.S. nonfarm businesses. This paper reviews some of the background leading to the proposal and the current state of planning for the survey.

Review of Data Collection

In November 1987, the Census Bureau began a review of its data collection programs related to statistics on capital stocks and investment spending. The review included the Plant and Equipment Expenditures (P&E) survey that was transferred to the Census Bureau from the Bureau of Economic Analysis on October 1, 1988. A major goal was to evaluate how, or if, the asset and investment data collected in the several surveys and censuses could be integrated and coordinated into a comprehensive capital stocks and investment data collection program.

Our approach was to inventory the relevant characteristics of our surveys and censuses with regard to data collected on assets and expenditures. Also we met with data users from Government,

industry, and the academic community to determine their needs. As might be expected, the needs were far ranging. For example, members of the Census Advisory Committees composed of industry and academic representatives wanted us to continue to report quarterly actual and planned expenditure data. Some Government users were interested in detailed asset, and to a lesser extent, expenditure data every 5 years to benchmark data used in the national accounts.

Starting with ideas generated from the user meetings, we reviewed the surveys and censuses. In addition to the quarterly P&E survey, we reviewed the quinquennial economic censuses, the annual survey of manufactures (ASM), the annual pollution abatement costs and expenditures (PACE) survey, the monthly value of new construction put-in-place (VIP) survey, the quarterly financial report (QFR), and the quinquennial assets and expenditures (A&E) survey of service industries.

The most comprehensive single program in terms of industry coverage is the P&E survey. It covers assets (annually), and equipment and building expenditures (quarterly) for all nonfarm businesses. Also, planned expenditures are collected quarterly. Each of the other censuses and surveys collects some assets and/or expenditures data; but each tends to concentrate on a specific industry, firms above a given size in selected industries, corporations in selected industries, or construction

expenditures. In other words, major changes and additions to the existing programs would be necessary to develop a comprehensive program that meets the needs of the various user groups.

The conclusion drawn from the review was that major efforts are needed in three areas:

1. An annual probability-based survey covering the nonfarm sectors of the economy to make statistically defensible estimates of actual and planned investment.
2. Expanded industry coverage and value of asset detail collected in conjunction with the 5-year economic censuses.
3. A data collection program for use in estimating the productive life of equipment and structures.

Several factors weighed heavily in our decision to begin with the annual capital expenditures survey. The decision to transfer the P&E survey to the Census Bureau, prompted by concerns over the quality of that survey by Government users and the Office of Management and Budget, were major factors that contributed to the decision to propose the annual survey. The P&E survey is a Principal Federal Economic Indicator; therefore, it is important that we report the highest quality statistics possible. Yet the

survey is not based on a probability sample, and there is no well defined sampling frame. A new annual survey is not necessary to correct these problems, but it can help in additional ways. The investment levels reported in the P&E are derived by estimating the quarterly percentage change from respondent data and applying the change to the previously reported level. These levels are benchmarked only at 5-year intervals. We plan to be able to make statistically defensible estimates of investment levels from the annual survey that can be used to benchmark the P&E every year. In addition, the annual estimates of building and structures can be used to benchmark components of estimates from the value of new construction put-in-place (VIP) survey. The VIP, based on a sample of construction projects, has been criticized for underestimating the value of construction, and it is not benchmarked. Also, we are planning to further test collection of enough detail in the annual survey to report investment by divisions within diversified companies. This would allow us to report investment more accurately for manufacturing, wholesale and retail trade, services, and other sectors of the economy.

We postponed consideration of collecting detailed information on asset stocks because of the large additional burden that likely would be imposed on respondents to the 5-year economic censuses. Also, we were concerned that respondents would not be able to value the assets in a useful way, i.e., original cost less depreciation, economic present value, replacement value, or other

concepts. We did determine from a recordkeeping practices survey, that I will discuss later, that more than 85 percent of the respondents could not give us replacement value of the existing stock of capital. Nearly all said that they could report an aggregate value of the original cost of depreciable assets, but we have no information on the availability of asset detail. These problems caused us to postpone proposing to expand asset detail collected in the 1992 economic censuses.

Although information on the productive life of equipment and structures is getting dated, we thought that more study of the data needed should be undertaken before a data collection program is planned. Perhaps more important, the Office of Depreciation Analysis in the Treasury Department briefed us on their plans to measure the lifetimes of depreciable assets. With this effort already underway, we thought that we should concentrate on the annual capital expenditures survey.

The Annual Capital Expenditures Survey

The several considerations leading to our decision to concentrate on an annual capital expenditures survey gave us a starting point in developing the survey plans. The purpose of the survey is to report national-level estimates for broad business categories in all sectors of the economy except public administration and agriculture, forestry, and fishing. This is consistent with the

scope of the P&E survey. We have not determined the exact level of industry detail that will be published, but our plans are to report expenditures for selected 2- and 3-digit Standard Industrial Classification detail, depending on the reliability of the estimates.

The survey will be based on a probability sample drawn from our Standard Statistical Establishment List (SSEL). The sampling frame will allow us to draw a new sample periodically as the composition of industries change, and to convert the P&E survey to a probability sample. Also, we will be able to report the reliability of published estimates.

The unit of observation in the survey has been a difficult issue. There are arguments for establishment, for company, and at some level in between (e.g., division). In fact, our preference is to have data reported by, or at least for, the company division. There is both logical and empirical evidence that supports going to the company, or divisions within a company, for planned capital expenditures, especially for construction of new buildings. Investment planning decisions generally are made at the company or division level. On the other hand, we have had success in getting data on actual equipment and building expenditures at the establishment level in the Annual Survey of Manufactures. This may not hold true, however, for some of the service industries such as financial institutions. As for

division-level reporting, we have had some success in the Manufacturers' Shipments, Inventories, and Orders survey.

Division-level reporting could help to rectify a frequent criticism of the P&E survey. The criticism is that data reported for company-level classification are often contaminated by grouping capital expenditures for very different business activities (e.g., manufacturing and wholesale) into only one classification such as manufacturing. There are some major concerns, however, with attempting to use company divisions as the sampling unit:

1. Can we maintain a good sampling frame of company divisions from our SSEL?
2. Do company divisions maintain records of asset and capital expenditures information?
3. If we cannot get division reporting, can companies report data by major kinds of business activities (divisions) in the organization?

As the name implies, the SSEL is a list of business establishments. But we have the capability to link establishments to the company through our company organization survey. The challenge will be to maintain accurate company organization information

because of acquisitions, divestiture, mergers, and so forth.

In an attempt to help determine if we can get division-level reporting, we are reviewing the results of a recently completed recordkeeping practices survey. The Census Bureau conducted a company-level recordkeeping practices survey in 1989 and early 1990. A probability sample of approximately 2,600 companies was surveyed to determine recordkeeping practices that were followed by the respondents to ascertain the availability of data items. The response rate was 83 percent.

One section of the survey was devoted to assets and capital expenditures (Appendix A). The respondents were asked if information on the listed capital expenditure categories is available from records presently maintained or from estimates that can be developed by their companies, and to indicate the organizational level for which the information is available.

At this time, we have completed only very preliminary analysis of the responses. Although the respondents were asked to indicate if the information was available at multiple locations (company, establishment, and other), only one location was tabulated in this preliminary analysis according to the following hierarchy:

1. Establishment
2. Other
3. Company

Therefore if "company" was tabulated, we can assume that the information was said to not be available at the "establishment" or "other" level. If the respondent marked "establishment," he or she may also have marked "other" and/or "company."

The preliminary results of the recordkeeping survey show that the company level, as opposed to establishment, is more likely to have expenditure information for the specific expenditure categories (Table 1). Although one-fourth to one-third said that information was available at the establishment level, a larger percentage said the information was available only at the company level. And we assume that if it is available for the establishment, the information could be assembled and reported from company headquarters.

We are not able to determine from the recordkeeping survey if companies can give us division-level reporting. This is especially important for multiestablishment companies that have activities in more than one SIC division, e.g., manufacturing and wholesale trade. It seems logical that those companies which reported availability of specific expenditure category information at the establishment level also can provide division-

Table 1. Availability of Capital Expenditures Data
by Location in Business Organization
(Preliminary, Percent of Respondents)

<u>Data Item</u>	<u>Available From</u>		<u>Not Available</u>
	<u>Establishment</u> ¹	<u>Company</u> ²	
Equipment	(Percent)	(Percent)	(Percent)
Information Processing	24.7	71.2	4.1
Industrial	35.0	52.0	13.0
Factory Automation	31.4	38.0	30.6
Other Industrial	33.2	46.5	20.3
Transportation	29.7	65.4	4.9
Agriculture, Construction and Mining	27.2	45.5	27.3
Other	27.2	45.5	27.3
Buildings/Structures			
Industrial	33.7	50.1	16.2
Warehouse	33.7	53.3	13.0
Office	29.4	64.2	6.4
Other Nonresidential	31.1	50.1	18.8
Public Utility	21.6	49.6	28.8
Mining Shafts and Wells	19.1	25.8	55.1
Other	24.5	49.2	26.3

¹ Responses were tabulated for only one organizational location. If respondent indicated data were available from "establishment" and "company," only "establishment" was tabulated. Includes responses from only multiestablishment companies.

² Includes single-establishment companies.

Source: Recordkeeping Practices Survey
Bureau of the Census, 1989/90

level reports. The same is true for single-establishment companies, but several of the survey respondents do not fit either category.

At a later date, we will tabulate the recordkeeping practices information by principal activity of the respondent in order to help us understand variations in the availability of information among industries. We did not collect the information necessary to analyze the availability of asset and expenditure data by divisions within multiestablishment companies (e.g., manufacturing only, manufacturing and wholesaling, wholesaling and retailing, and so forth). We will have to do additional research at the time of survey pretest for a more definitive answer about division-level reporting.

Data Items

The data items that we plan to report from the annual investment survey are gross value of depreciable assets, actual annual expenditures for the reporting year, and planned expenditures for the following year. In addition, we hope to be able to publish actual expenditures in the following detail at the all industry, manufacturing and nonmanufacturing, and selected SIC division and major group levels:

- o Equipment

- Information processing
 - Industrial
 - Factory automation
 - Other industrial
 - Transportation and related
 - Agriculture, construction, and mining
 - Other, including furniture and fixtures
- o Buildings/Structures
- Industrial
 - Warehouse
 - Office
 - Other nonresidential
 - Public utilities
 - Mining exploration shafts and wells
 - Other

These expenditure categories were developed chiefly to be consistent with items reported in the nonresidential fixed investment component of the national income and product accounts. Because these categories require more detailed reporting than the existing surveys, we were curious if respondents could report the information. For the answer, we again turned to the recordkeeping practices survey. Results from preliminary tabulations of the responses show that the availability of data for specific categories ranged from a high of almost 96 percent

of respondents for information processing equipment and transportation equipment to a low of about 45 percent for expenditure data on mining shafts and wells (Table 1). Seventy percent or more of the respondents, after deleting those that indicated the category was "not applicable," could report the level of capital expenditures in every category except mining shafts and wells. We think that a 70 percent response rate for specific expenditure categories is adequate to keep the planned detail items on a pretest questionnaire.

The number of expenditure categories that we are considering will increase respondent burden compared to the items on our current surveys, but there are many fewer categories than Statistics Canada asks in their Survey on Capital and Repair Expenditures. They have 69 categories for construction and 31 for machinery and equipment (Appendix B). Since they have had their survey in operation for several years, we plan to discuss their successes and problems before we finalize our plans.

The expenditure categories discussed to this point are basic to understanding investment changes taking place in the U.S. economy. But there are additional areas for which related information would enhance the value of the survey. We are considering asking for information about the following areas in the annual survey:

1. Changes in capacity and capacity utilization,
2. Intangible investments in items such as training and software,
3. Pollution abatement capital expenditures,
4. Expenditures for selected kinds of automation equipment,
5. Sources of equipment purchased (domestic vs. foreign), and
6. Reasons for capital expenditures.

The annual capacity utilization survey that the Census Bureau had conducted for many years was dropped this year for budget reasons, not lack of user interest. The Federal Reserve, Department of Defense, and the Federal Emergency Management Administration have argued that capacity utilization data are necessary for national defense, emergency preparedness, and monitoring economic performance. Although we probably would not be able to collect as much information related to capacity in the annual capital expenditures survey as was collected in the capacity utilization survey, the subject is a natural extension of capital expenditures.

Statistics Canada surveys establishments with its capital expenditures survey and asks one question about manufacturing capacity, "For the year, this plant operated at what percentage of its capacity?" Our capacity utilization survey also was directed to manufacturing establishments, but we collected

information on production, full production capability related to current production, national emergency capability, and questions related to changes in capability and reasons for not operating at full capacity. If we included capacity questions on the annual capital expenditures survey, the response likely would have to be for manufacturing within a company. The Federal Reserve is conducting research into measurement concepts, definitions, and the data needed to expand capacity utilization beyond manufacturing; but until many of these issues are resolved, we will concentrate on the manufacturing sector.

Although division-level reporting is a more aggregate level of observation than we were using in the capacity utilization survey, it resolves one of the criticisms of that survey, namely the difficulty of adequately accounting for interdependencies among plants within a company. It is argued that this results in the underestimation of effective capacity utilization rates. Nevertheless, a shortcoming of collecting capacity utilization data on the capital expenditures survey is that we likely would not be able to publish the same 4-digit SIC manufacturing level detail because divisions within a company may include more than one 4-digit activity. For this level of industry detail, we would have to consider adding capacity utilization questions on the annual survey of manufactures. The issue comes down to trade-offs between industry detail and probable underestimates of capacity utilization.

Another area of interest that is not covered very well in U.S. statistics is investment in intangibles such as training and computer software. Almost three-fourths of the respondents in the recordkeeping practices survey said that they could report expenditures for software purchases, but only about 60 percent could report investment in training. The importance of investment in intangibles is well documented. Our major question about including this category of expenditures concerns how much detail is needed, if respondents can give us the detail, and if we can develop adequate definitions that will give useful information.

We currently collect pollution abatement operating costs and capital expenditures data annually from manufacturing establishments and capital expenditures data from petroleum, mining, and electric utility companies. With the current interest about the environment, we think that it is desirable to maintain and even expand the ongoing survey program. However, we should make some distinction between capital expenditures for pollution abatement and control and expenditures for production or service output increasing assets. We are considering the addition of a "pollution abatement and control" category under equipment and structures expenditures or asking what percent of total expenditures are for pollution control.

Although we are planning to ask for expenditures for factory automation equipment, the Automation Forum has suggested that additional detail is greatly needed to determine where automation technology and equipment is being applied across the various industries. Statistics Canada asks for expenditures for four robotized/computerized-assisted process machinery and equipment in the following areas: (1) material handling, (2) the production process, (3) communication systems, and (4) other. Even this amount of additional detail does not satisfy the needs of some users. For example, a Census Bureau study of the use of manufacturing technology in 1988 was designed to measure the prevalence of 17 advanced technologies used by establishments in SIC Major Groups 34-38. This is the level of detail wanted by industry. Obviously, we will have to be much more restrictive in the annual capital expenditures survey. To resolve this issue, we will continue discussions with data users, respondents, and Statistics Canada.

When we first talked with the Census Bureau Advisory Committees about a survey of capital expenditures, they suggested that we should determine the percentage of equipment purchases from domestic versus foreign sources. We asked in the recordkeeping practices survey if they could "distinguish between capital expenditures for equipment produced in the U.S. versus equipment produced overseas." The response was very disappointing. Eighty-six percent of the respondents said that they could not

distinguish a difference from their records. With such a high negative response, we likely will drop this question.

One additional area that we are considering is information on the reasons for capital expenditures. I have said that we are considering asking about capacity utilization and pollution abatement expenditures in the annual survey. A small section of the questionnaire could be used to ask what percent of the total construction and total equipment expenditures are used for such items as:

- o Capacity expansion,
- o Replacement or modernization,
- o Pollution abatement and control, and
- o Improved working conditions.

Information of this kind could help to analyze how the investment dollars are being used by businesses.

Implementation Schedule

I have discussed the characteristics and data categories of the proposed annual capital expenditures survey. I now want to briefly discuss when we plan to complete the phases of work, but first it is important to understand that this annual survey and the time schedule are dependent on receiving funds. The

following time schedule assumes that we will receive funding starting in October 1990.

Remainder of Fiscal Year 1990

Our highest priority for the remainder of the year will be to develop the questionnaire. This will include wording the specific questions and developing respondent instructions that include item definitions. We have been discussing some item definitions with users. For example, we are discussing what expenditures should be included for buildings and structures with the Bureau of Economic Analysis (BEA) and the Business Roundtable. The Business Roundtable has proposed that we measure expenditures for construction which includes not only the cost of erecting the building but also the value of equipment that is put in place by a construction crew. The BEA needs a measure of building expenditures that includes only equipment that is an integral part of the structure (e.g., elevators). Other equipment expenditures would be reported in the relevant equipment category. The overriding consideration in the definitions is that we are consistent across all of our surveys and censuses.

Fiscal Year 1991

Next year we plan to conduct a pilot survey and begin a response analysis study. This will give us an opportunity to see how well respondents can give us the information requested. We hope to discover any problems with definitions, availability of detail requested, and other data collection problems that affect response rates and quality of data. We also will learn about any survey design, estimation, and processing issues that must be addressed prior to the full-scale survey scheduled for 1993.

Fiscal Year 1992

The response analysis study is expected to be completed in early 1992, and we hope to have enough information to analyze, evaluate, and revise the questionnaire. During 1992, we will make any other changes in the survey process that caused problems. In the meantime, our plans are to repeat the pilot survey with some possible enhancements for a second year, and if there are no significant problems, to report aggregate investment data.

Fiscal Year 1993

The full-scale survey is scheduled for collecting calendar year 1992 data in early 1993. We plan to publish a complete set of

data from the survey and to prepare benchmark tabulations for the Plant and Equipment (P&E) Expenditures survey and the value of new construction put-in-place survey.

Conclusions

The annual capital expenditures survey will be based on a probability sample of a universe of more than 7 million companies in order to provide an annual snapshot of business investment decisions. It will be the most comprehensive measure of investment expenditures and plans reported by businesses ever developed in the United States.

When the annual survey is in place, we will need to revisit the content of several of our other surveys in relation to this base program of investment expenditures. The first priority will be to rethink the P&E survey. Several questions quickly come to mind. Should the P&E survey continue on a quarterly schedule or is a semi-annual indicator adequate? Should we ask respondents to report levels of expenditures and plans or simple percentage changes from their last report? In that connection, should the P&E survey be based on a subsample of the annual capital expenditures survey sample? These are only a few of the questions that we will need to answer.

There are similar issues that will need to be resolved concerning

the quinquennial assets and expenditures survey of service industries. Should that survey continue? For the annual survey of manufactures, we will review how much detail on assets and capital expenditures are needed. It does provide more manufacturing SIC and geographic detail than we will get from the annual capital expenditures survey, but we need to think about the relationship of the two programs.

We already have made some evaluation of ways to integrate the P&E survey and the value of new construction put-in-place survey with the proposed annual survey, but there will continue to be questions about the relationship with the censuses that will be reviewed over the next few years. Nevertheless, we think that the annual capital expenditures survey is an important first step in developing a comprehensive, integrated investment statistics program at the Census Bureau.

References

1. "Investing in America's Future," Economic Report of the President, February 1990.
2. Kolarik, William F., "Investment in U.S. Manufacturing: Less Than Meets the Eye," Technical Paper No. 1, International Economics Division, U.S. Department of Commerce, December 1989.
3. Roach, Stephen S., "Hope for Capital Spending," Economic Perspectives, Morgan Stanley and Company, Inc., New York, New York, February 1990.

Part 1 – ALL COMPANIES – Continued

Section D – ASSETS/CAPITAL EXPENDITURES

1. For each item, please indicate if the information is available from RECORDS presently maintained or from ESTIMATES which can be developed by your company, and indicate the organizational level for which the information is available.

Mark with an (X) all that apply

Records (book value)				Estimates				Not applicable (i)
Company (a)	Establishment (b)	Other (c)	Not available (d)	Company (e)	Establishment (f)	Other (g)	Not available (h)	
a. Original cost of depreciable assets:								
(1) Machinery and equipment								
(2) Buildings and structures (excluding land)								
b. Annual depreciation charges								

2. Could you value the assets listed above in the following manner?

- a. Replacement value** Yes No
b. Original cost less accumulated depreciation Yes No

3. The following are the kinds of capital expenditure (spending) categories used in calculating the Gross National Product. For each item, please indicate if the information is available from RECORDS presently maintained or from ESTIMATES which can be developed by your company, and indicate the organizational level for which the information is available.

Mark with an (X) all that apply

Records (book value)				Estimates				Not applicable (i)
Company (a)	Establishment (b)	Other (c)	Not available (d)	Company (e)	Establishment (f)	Other (g)	Not available (h)	
a. Equipment expenditures:								
(1) Information processing equipment (computer hardware, capitalized software, peripheral data processing equipment)								
(2) Industrial equipment, total								
(a) Factory automation equipment								
(b) Other industrial equipment								
(3) Transportation and related equipment (e.g., highway vehicles, including trucks, autos, trailers, and special purpose vehicles)								
(4) Agricultural, construction, and mining equipment								
(5) Other equipment, including furniture and fixtures								
b. Buildings/structures expenditures:								
(1) Industrial								
(2) Warehouse								
(3) Office								
(4) Other nonresidential								
(5) Public utilities								
(6) Mining exploration shafts and wells								
(7) Other								

Part 1 – ALL COMPANIES – Continued

Section D – ASSETS/CAPITAL EXPENDITURES – Continued

4. Are data available quarterly on the categories listed in question 3?

- Yes
 No

5. Are equipment expenditures detail available separately for new and used equipment?

- Yes
 No

6. Can you report buildings/structures expenditures separately for the following?

a. New construction

- Yes No

b. Reconstruction (e.g., additions, alterations, and major replacements)

- Yes No

c. Purchase of existing buildings/structures

- Yes No

7. Can your records distinguish between capital expenditures for equipment produced in the U.S. versus equipment produced overseas?

- Yes
 No

8. Is the cost of intangible investments (generally nondepreciable) reportable for the following? For each item, please indicate if the information is available from RECORDS presently maintained or from ESTIMATES which can be developed by your company, and indicate the organizational level for which the information is available.

Mark with an (X) all that apply

	Records (book value)				Estimates				Not applicable (i)
	Company (a)	Establishment (b)	Other (c)	Not available (d)	Company (e)	Establishment (f)	Other (g)	Not available (h)	
	a. Training								
b. Software									
c. Research and development									

Section E – INVENTORIES

1. Are the inventories reported to the Census Bureau based on Section 263A of the Internal Revenue Service code?

- Yes – *SKIP to section F*
 No

2. Do you have any plans to convert your method of reporting inventories to the Census Bureau to match those reported for tax purposes?

- Yes
 No

Remarks

