Volume Title: Measurement of Business Inventories

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Volume Publisher: U.S. Census Bureau

Volume ISBN: 3024029227

Volume URL: http://www.nber.org/books/foss81-1

Publication Date: 1981

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Chapter URL: http://www.nber.org/chapters/c11089

Chapter pages in book: (p. 124 - 131)

11. ACCOUNTING FOR LONG-TERM PRODUCTION CONTRACTS

Accounting and statistical methods generally are geared to measuring products produced in relatively short rather than long periods. Most manufactured products fall into the short-period category. Some are produced in a matter of days in an assembly line process or a series of assembly line processes. Materials entering production will often be on hand for some time in advance, but once production commences the product is completed promptly. These goods are produced in large volume and any specification differences are minor.

There is, however, a range of products that are made to specifications of purchasers, may involve substantial engineering or planning lead time, are often made one at a time or in very small numbers, and generally are costly and physically large. Because of these characteristics, they take a long time to produce and present special and difficult accounting and statistical measurement problems.

The types of products usually involved in long-term production contracts include ships, aerospace items, ordnance, and machinery and machine tools. Construction projects (factories, hotels, etc.) also have similar accounting problems, but they are covered separately in chapter 12 because of statistical sources and issues unique to such construction.

Further, this discussion is confined to long-term production contracts, although long-term service contracts sometimes have similar characteristics (for example, computer software or engineering studies where the customer receives results after a long time period).

Accounting and statistical problems arise with long-term production items because it is necessary for firms to provide periodic (annual) accounting of their activities and financial condition to stockholders, procurement agencies, tax authorities and the like. The focus of this chapter is on annual data, but clearly accounting and statistical difficulties are compounded when periods of less than a year are considered.

TWO TYPES OF LONG-TERM PRODUCTION CONTRACTS

Broadly speaking there are two main types of long-term production contracts: fixed-price and cost-reimbursement. Data on Department of Defense (DOD) contract awards, by type, made in 1975 and 1976 are shown in table 11.1.[1] The major concern in this section is with fixed-price contracts, which have comprised some three-fourths of the value of DOD contract awards in recent years. However, a few characteristics of cost-reimbursement contracts are also worth noting.

Cost-Reimbursement Contracts

Cost-reimbursement contracts generally relate to projects that involve advanced technology or risks that sellers are unwilling to assume. In cost-type contracts, purchasers, often the U.S. Government, assume the risk. Accounting for cost-reimbursement contracts is fairly straightforward and there are few options or major complexities. Sellers are reimbursed by purchasers promptly—monthly or more frequently. Material, labor and other costs charged to projects become the property of purchasers as costs are incurred. Sales or revenue recognition by producing firms follows costs promptly. Instead of long build-ups of inventories, which may then be liquidated when sales are made, there either are no inventories or only negligible amounts of inventories on balance sheets. In practice, small amounts of inventories may be recorded because of lags between receipts of goods from vendors and their assignment to specific contracts. Since lags of this kind have the effect of postponing cash flow, it is in firms' interests to see that costs are charged to contracts promptly. Delays in payment by purchasers because of invoice processing time, or because of retainage[2] are properly carried on balance sheets as accounts receivable rather than as inventories. A balance sheet for a cost reimbursement type contract might include the following entries as components of accounts receivable:

Cost-Type Contract

Unbilled costs
Billings not yet collected
Retainages

Unbilled costs are those incurred but for which bills have not yet been presented. "Billings not yet collected" covers bills which have been submitted, but for which payments, less applicable retainage, have not yet been received. Both of these entries reflect, essentially, paperwork processing lags.

[1] Similar contracts are placed by other Federal agencies, like the National Aeronautics and Space Administration, as well as by State and local governments and by private companies.

[2] Retainage is the term applied to funds held back by a Government purchaser from a producing firm to help insure that the contract will be completed. Retainage in cost-type contracts is usually small, amounting to some 2–4 percent of billings.

Table 11.1. **DEPARTMENT OF DEFENSE CONTRACT AWARDS BY TYPE OF CONTRACT, FY 1975 AND 1976**

(Billions of dollars)

Type of Contract	1976	1975
Total[1]	36.3	36.0
Fixed price contracts	26.7	26.1
Firm	15.4	14.8
Redeterminable	.5	.4
Incentive type	6.4	6.4
Escalation provided	4.4	4.5
Cost reimbursement type contracts	9.5	9.8
Cost—no fee	1.0	1.0
Cost plus fixed fee	4.0	3.8
Cost plus incentive fee	3.8	4.3
Cost plus award fee	.6	.6

[1] These data exclude contracts of $10,000 or less which in aggregate amounted to more than $4 billion in each of these years.

Source: Department of Defense, Office of Secretary of Defense, Directorate for Information and Operations, *Military Prime Contract Awards 1976*, p. 59.

Fixed-Price Contracts

The following is a partial listing of fixed-price contracts used by the U.S. Government:

Firm fixed-price contract—A contract in which the price is not subject to any adjustment by reason of the cost experience of the contractor or his performance under the contract.

Fixed-price contract with economic price adjustment—A contract which provides for upward or downward revision of contract price upon the occurrence of specifically defined contingencies, such as increases or decreases in material prices or labor wage-rates.

Fixed-price contract providing for prospective periodic redetermination of price—A contract which provides a firm fixed-price for an initial number of unit deliveries or for an initial period of performance and for prospective price redeterminations either upward or downward at stated intervals during the remaining period of performance under the contract.

Fixed-price contract providing for retroactive redetermination of price—A contract which provides for a ceiling price and retroactive price redetermination (within the ceiling price) after the completion of the contract, based on costs incurred with consideration being given to management ingenuity and effectiveness during performance.

Fixed-price contract providing for performance incentives—A contract which incorporates an incentive to the contractor to surpass stated performance targets by providing for increases in the profit to the extent that such targets are surpassed and for decreases to the extent that such targets are not met.[3]

These variations of fixed-price contracts are attempts by the Government to encourage and to share in productivity gains, to avoid unrealistically high cost estimates, to provide for cost escalation unanticipated by producing firms, or to avoid excessive profits.

THE TIMING OF REVENUE RECOGNITION UNDER FIXED-PRICE CONTRACTS

There are three ways by which revenues, or sales, may be recorded for long-term, fixed-price production contracts in financial reporting: (1) completed contract method, (2) percentage completion method, and (3) unit-of-delivery method.

Completed Contract Method

Under this method, revenue or sales are recognized only after delivery is made. Any further costs to be incurred would be trivial. This procedure essentially conforms to accounting for ordinary products whose production periods are short. Estimating is negligible because revenue is not recognized until production and earning processes are complete and all basic information about the project is known.

Although negligible, there is always some estimating in accounting for contracts of this type. In particular, when a firm recognizes or estimates that it will incur a loss on a contract, the loss is taken in the accounting period in which it is recognized; it is not deferred until the contract has been completed. This is accomplished by writing down the value of inventory to net realizable value and charging cost of goods sold for the amount of writedown. Recognizing losses promptly is standard accounting practice in all circumstances and in all three procedures described in this section.

This method has a disadvantage in that pronounced fluctuations in the recording of net income are permitted, even in periods when very little production has occurred. For example, a large contract that takes two years to complete may have production spread over three accounting years, but all profits will be shown in the third year. On the other hand, there are tax advantages associated with this accounting method since tax liabilities on earnings are postponed until the third year.

[3] American Institute of Certified Public Accountants, *Audits of Government Contracts 1975*, p. 3.

Long-term, fixed-price contracts generally will include provisions for progress payments. There is no standard way to record such payments, but the most common procedure in financial statements is presentation of inventory in balance sheets along the following lines:

Inventory
- Finished goods
- Work in process
- Long-term contracts in process
- Less: progress payments received
- Total inventory

A more complex arrangement is sometimes used when the Government provides financing that exceeds expenditures. In such instances, the recording may remove entries from assets and list them as liabilities:

Liabilities
- Advances and progress payments
- Less: expenditures on contracts in process
- Net liabilities

Under this arrangement, physical inventories held on such contracts are not listed under inventories.

Percentage Completion Method

In the percentage completion method, sales or recognition of revenues earned are recorded in the income statement as work progresses. Firms either estimate percentages of work completed, in which case those percentages multiplied by contract values determine sales, or they record all direct and indirect costs incurred, plus appropriate allocations of general and administrative costs and a proportion of contract profits. This method is the same as the value-of-work-done method.

Under percentage completion, revenues (or sales) and net income are recognized on a relatively current basis and inventories are small. However, firms often apply the method so that revenues are not recognized until sufficient work has been done to permit reliable estimates of the percentage completed. Thus, until perhaps 20 or even 25 percent of the work is finished, the costs incurred are recorded in inventory. In the next accounting period when reliable estimates can be made, revenues, costs and profits are recorded, and the initial 20 percent or so of production treated as a reduction in inventories. As a practical matter, therefore, firms may have small amounts of inventory.

The percentage completion method is preferred by accounting authorities when the seller has a sound cost accounting system and the ability to estimate remaining costs reliably. AICPA in its Accounting Research Bulletin No. 45 and in Accounting Principles Board Statement No. 4 suggests percentage completion as the preferred method because net income is recognized on a current basis rather than only in periods when contracts are completed.

Unit-of-Delivery Method

The unit-of-delivery method is a compromise between the completed contract method and the percentage completion method. It is used widely when it can be adapted to the type of products involved. Assume a fixed-price contract to produce 10 airplanes for $50 million. The producer accumulates costs in inventory and receives progress payments as work progresses, but there is no recording of sales before planes are delivered to the customer. When deliveries begin, sales will be recorded at a rate of $5 million per plane. Sales will be matched with an estimate of the unit cost over the life of the contract.

Production of complex, technical products often involves high start-up costs and increasing efficiencies as work progresses. This generally is described by reference to a "learning curve." Under the assumption above, after two airplanes are produced, experience and an analysis of the contract may show that the remaining eight planes could be produced at lower unit costs. Profits could be an estimated $2 million (4 percent) over the life of the $50 million contract. Assume that when the first two planes are delivered, the firm has charged $12 million to the contract, and has received progress payments of $10.8 million. The components of the income statement for this contract are:

Sales (2 planes)	$10,000,000
Cost of goods sold	9,600,000
Profit	400,000

The balance sheet could be presented:

Accounts receivable	
Retainage relating to cost of goods sold	$960,000
Other government receivables	400,000
Inventory	
Costs, less cost of goods sold	2,400,000
Less, outstanding progress payments	1,200,000

In this illustration, costs incurred (including indirect costs and general administrative expense, are allocated between cost of goods sold ($9.6 million) and inventory ($2.4 million). Progress payments are also allocated between those applicable to the two planes delivered ($9.6 million) and inventory ($1.2 million).

This is merely an illustration of how these transactions may be recorded in financial accounts of firms; variations are possible. The important point is that in the unit-of-delivery method, an excess of costs over sales remains in inventory. In this case, the value of inventory represents acquired know-how that will later be reflected in lower actual unit costs for the eight planes still to be produced.

Loss Recognition and Inventory Valuation

As noted earlier, when firms anticipate that losses will be incurred, such losses are to be recognized immediately with

all three methods. Because of the many types of fixed-price contracts and frequent specification changes, there will sometimes be disputes between producing firms and the Government over sums involved. The typical accounting practice is that firms estimated the disputed amounts they expect to recover and carry them either as accounts receivable or components of inventories.

This method of valuing inventories for fixed-price contracts generally is called "specific" or "actual." Large firms may use this method of valuation in combination with others. It provides for accumulation of costs charged to specific contracts. For example, often a firm will value its inventory associated with regular business at LIFO and its inventory associated with long-term contract production at actual cost. Using LIFO for long-term contracts is impractical because each large contract would have to be treated as a separate LIFO pool, which is typically depleted in full within a few years. There are no significant tax or other advantages associated with adoption of LIFO for such production.

IRS Regulations

With some restrictions, IRS regulations permit use of all three methods of revenue recognition. Once a firm adopts one method for its long-term contracts, it must use the same method for other contracts of the same type. This restriction is intended to prevent firms from deferring tax liabilities on profitable contracts through the completed contract method and taking early losses on unprofitable contracts through the percentage completion method.

There is, however, some flexibility in defining "same type." Generally it relates to the duration of the contract. A firm may use one method for contracts of two years' duration and another method for contracts of less than one year's duration. However, once the decision is made on which method to use, succeeding contracts of the same type cannot be switched to another method. It is important to note that a firm may use one of the three methods for its internal or external reporting and another method for reporting to IRS. Some firms use this option because it allows the timing of tax liabilities to be delayed.

COST ACCOUNTING STANDARDS BOARD

The Cost Accounting Standards Board (CASB) was mandated by the U.S. Congress to achieve uniformity and consistency in (1) the ways Government contractors account for costs in preparing bids on negotiated contracts and (2) the ways costs are accumulated and reported as production progresses under contracts. CASB functions as part of the legislative branch of Government.

Over the past few years, CASB has issued a number of detailed standards on proper cost accounting for a number of major cost items. This represents an attempt at standardization in a field characterized by a diversity of practices. As the kinds of production involved in long-term contracts often are highly technical and are produced by large, complex corporations and their subcontractors, attempts to provide guidelines for application of particular cost accounting practices are much needed. In addition to providing accounting techniques for preparation of contractor estimates, standards encompass bases for billing the Government for progress payments. Whereas fixed-price contractors have options relating to cost escalation, incentives, renegotiation or the like, the contractors' cost accounting systems provide source data needed for determining the amounts involved in such settlements. Certain qualifying contractors must file very detailed disclosure statements (required by Public Law 91-379) delineating accounting treatments of various cost elements, including many areas where options are available.

In recording costs, contractors are required to allocate all costs including indirect, general and administrative expenses. The regulations permit some latitude and provide criteria for selecting alternatives in particular circumstances. For example, while the regulation on the service lives of depreciated assets appears to be exacting, contractors may use accelerated depreciation methods under appropriate circumstances. Similarly, in accounting for pension costs, actuarial costs for past services of older employees may not be expensed over a few years; instead contractors must amortize such pension costs over periods of 15 to 30 years.

While CASB has established allocation rules and criteria under which specific allocation methods are permitted, its regulations say nothing about timing of revenue recognition and related recording of inventories. A contractor may use one set of methods for financial reporting and other methods, within limits of standard IRS regulations, for income tax purposes. A firm may maintain a cost accounting system solely for internal management purposes for the same contracts, employing allocation methods different from those established by CASB, although this probably is rare. In table 11.2, extracted from the 1976 CASB report to Congress, it is shown how procedures vary with respect to treatment of depreciation. In the table, reference to "same practice" under part A means that the CASB cost accounting regulations are the same as those used in firms' financial accounts; "same practice" under part B means the same as reporting for tax purposes.

Table 11.2. **COST ACCOUNTING DEPRECIATION PRACTICES COMPARED WITH FINANCIAL ACCOUNTING AND INCOME TAX PRACTICES**

Practices	Number of Reporting Units	Same Practice—Percent of Units	Different Practice—Percent of Units
A. Financial			
Depreciation methods . .	860	95	5
Useful lives of assets . . .	860	96	4
B. Income tax			
Depreciation methods . .	860	44	56
Useful lives of assets . . .	860	56	44

Source: Cost Accounting Standards Board, *Progress Report to the Congress 1976*, Table 18, p. 52. This is done of several tables made from disclosure statements filed with CASB.

In the table it is shown that depreciation methods and service lives over which assets are depreciated for Government contracts are substantially the same for financial accounts of a firm as under CASB regulations. However, substantial differences are apparent in comparison to tax accounting.

PRICE WATERHOUSE STUDY

Price Waterhouse & Company conducted a study of accounting practices of Government contractors primarily for the information of its own staff. Because of widespread interest in the subject, the firm published its results.[4] The study is based on financial reports of 50 large firms, and covers both Government and private sector long-term contracts. It is an analysis of disclosures of accounting methods in annual reports to stockholders and in 10K reports filed for 1975 with the Securities and Exchange Commission. The 50 companies were selected from a Department of Defense listing of the 100 largest military prime contract awards in 1975. Researchers did not request additional information from the firms, but confined themselves to studying disclosures in annual reports or 10K's.

The main body of the report consists of several tables giving counts of the methods used for various matters by the 50 firms. Following each table, there are illustrative statements for a few firms, extracted from their annual reports, relating to the subject of the table.

Although the study is based on information available to the public, worksheets relating to the tables were not available for public distribution; consequently, knowledge of how Price Waterhouse made certain classifications, which would have been useful and interesting for this study, were not obtainable. Some of the points in question are discussed below.

Table 11.3. TIMING OF REVENUE RECOGNITION BY CONTRACTORS IN PRICE WATERHOUSE STUDY

Accounting Methods	Number of Firms
Percentage of completion and unit of delivery method	27
Percentage completion only	16
Unit of delivery only	1
Percentage of completion and completed contract	2
No disclosure by firm	4
Total	50

Source: Price Waterhouse & Company, *1976 Survey of Financial Reporting and Accounting Practices of Government Contractors* (New York: Price Waterhouse & Co., 1976), p. 10.

[4] Price Waterhouse & Company, *1976 Survey of Financial Reporting and Accounting Practices of Government Contractors* (New York: Price Waterhouse & Company, 1976).

What would be useful for interpreting results in table 11.3 is disaggregation of the 27 firms designated as using both percentage completion and units of delivery into a cross classification by cost-type contracts and fixed-price-type contracts, and a breakdown of fixed-price contracts into the components of percentage completion and units of delivery. A reasonable assumption is that for all cost-type contracts firms used the percentage completion method.

Table 11.4 indicates that a substantial number of firms shift to different methods for tax purposes.

Table 11.4. TIMING DIFFERENCES RELATING TO REVENUE RECOGNITION: BOOK V. TAX METHODS

Method	Book method	Tax method	Number or firms
1. Tax method same as book method	-	-	26
2. Tax method different from book method	-	-	16
Percentage completion and unit of delivery	-	-	-
Completed contract	-	13	-
Percentage completion	-	-	-
Unit of delivery	-	2	-
Completed contract	-	-	-
Percentage completion	-	1	-
3. No disclosure	-	-	8
Total	-	-	50

Source: Price Waterhouse and Company, 1976 Survey of Financial Reporting and Accounting Practices of Government Contractors (New York: Price Waterhouse and Company, 1976), p. 37.

It would have been helpful if the 26 firms using the same methods for financial reporting and tax reporting had been further disaggregated to show the methods actually used. In the second group, 15 firms reporting taxes shifted to a method that postpones tax liabilities, but one firm seemed to reverse the process by using a method for tax purposes that recognizes revenues earlier. A similar tally for construction firms, presented in chapter 12, also shows a fairly large proportion of firms using one method of revenue recognition for tax accounting and another for financial statements.

The Price Waterhouse survey also found differential treatment of general and administrative expense (table 11.5).

A number of firms (14) apparently inventory their General and Administrative costs in reporting to the Government as required by CASB regulations. This permits them to draw progress payments against such expenses. But, they treat such expenses as

Table 11.5. GENERAL AND ADMINISTRATIVE (G&A) EXPENSES INCLUDED IN YEAREND INVENTORY

Inventory	Number of Companies
G&A expenses included in inventory	
Amount disclosed	11
Amount not disclosed	6
G&A expenses not included in inventory	14
No disclosure whether G&A included or not included	19
Total	50

Source: Price Waterhouse & Company, *1976 Survey of Financial Reporting and Accounting Practices of Government Contractors* (New York: Price Waterhouse & Company, 1976), p. 28.

period costs in their financial and tax returns as a tax saving procedure.

TREATMENT OF LONG-TERM CONTRACT PRODUCTION IN THE NATIONAL ACCOUNTS

In measuring GNP and its various components, the Bureau of Economic Analysis faces problems similar to those discussed above for private business firms. In some respects this is merely a matter of whether production is recognized in the inventory change component of GNP or in some other expenditure component, such as defense purchases.

Assume, for example, that work is proceeding under a Government defense contract. If a value-of-work-done concept is used, production under this contract will be recorded in the national accounts as Government defense purchases. If the alternative—a delivery concept—were used, production would be recorded in the inventory change component of the GNP, and could not be identified as defense production. Further timing differences may occur under the delivery concept. If the firm uses conventional accounting for general and administrative expenses and profits, these amounts would not be recognized as production until delivery. This delivery method of defense purchase accounting becomes the same as accounting for ordinary production.

BEA procedures for treating production under long-term contracts in national income accounts at the present time are as follows: For construction—houses, office buildings, hospitals, etc.—the value-of-work-done concept is used. (This is discussed in chapter 12.) Similarly, ship construction for both Government and private customers is recorded on a value-of-work-done basis. All other production on long-term, fixed-price contracts is recorded in the accounts on a delivery basis. Generally speaking, the delivery basis is the same as the completed contract method (when one large product is involved) and the unit-of-delivery method (when the contract covers products which are delivered a few at a time—airplanes, missiles, engines, electronic systems, etc.).

The delivery method of measuring Government purchases of goods and services requires that inventory change be recorded in the accounts on what generally is referred to as a gross basis. That is, private sector inventory should be measured by procedures that complement the completed contract or unit-of-delivery method of recognizing sales and before any reduction for progress payments. This requires that inventory should be gross of progress payments.

The common use of the percentage completion method by business engaged in long-term contracts is inconsistent with procedures used by BEA to estimate the GNP, except in the case of shipbuilding. At this point, it is difficult to say whether BEA's decision years ago to treat defense purchases as it does was based on practical or theoretical considerations. The former was probably more important.

The source of data on Federal Government expenditures is the Monthly Treasury Statement (MTS), which is essentially a tally of checks issued by the Government. In the case of long-term, fixed-price contracts, it is the checks issued as progress payments that are recorded in the MTS. This reflects neither the value-of-work-done concept nor the delivery concept. However, auxiliary data available in Department of Defense (DOD) records and in Federal Trade Commission (FTC) tabulations of balance sheets in the Quarterly Financial Report (QFR) make it possible to estimate deliveries on the following basis:

Item	Source
1. Checks issued	MTS
2. *Less* increase in progress payments	DOD
3. *Plus* increase in accounts receivable from the Government	FTC
4. *Equals* deliveries	

If 100 worth of work is done, but no deliveries are made and if there are progress payments of 90 and retainage of 10, BEA derives zero deliveries by the formula (90 − 90 + 0 = 0). Another example illustrates line 3 above. Suppose deliveries of an ordinary product, say shoes or uniforms, are made during a period. A bill of 100 for the goods is submitted by the contractor, but the Government has not paid the bill by the close of the accounting period. The same formula used for adjusting progress payments to a delivery basis can be used to adjust for these routine goods as well.

Checks issued	0
Less increase in progress payments	0
Plus increase in receivables from the Government	100
Equals deliveries	100

Although statistical consistency can be achieved by adjusting the MTS data in the manner described, the delivery concept has a major shortcoming: use of the method can give a misleading view of the impacts of defense production on the economy. For example, such a critical period occurred in 1965 and 1966 during the buildup of military production for Vietnam. Application of the delivery concept treats defense production as a com-

ponent of private business inventory change until deliveries are made, and, therefore, obscures the impact of defense production on economic activity for months, or even as long as a year.

REPORTING OF LONG-TERM PRODUCTION CONTRACTS IN CENSUS BUREAU SURVEYS

In recent years, Census Bureau staff have clarified instructions for reporting long-term contracts. In earlier years, there was some inconsistency between Census instructions and definitions required for the national income accounts. In general, Census Bureau instructions for long-term contracts now are consistent in principle with concepts used in the national income accounts. Basically, shipments are to be reported on a delivery basis while unshipped production is to be recorded as inventory. Inventory is defined as gross of progress payments.

There are, however, some difficulties with the Census application. The major problem is that instructions relating to reporting of inventories concentrate on aircraft and missiles. It is not clear to respondents if the instruction also is meant to relate to electronics, radar systems, generators and other types of products covered by long-term contracts. For example, an ASM instruction on inventories begins:

> Inventories
> Aircraft, missiles, etc. . .

Presumably the "etc." is meant to cover the broad range of products other than aircraft and missiles, but if so, the reference is vague. Large Government contractors, such as General Electric, United Technologies, Litton, Rockwell, Raytheon, Westinghouse, Chrysler, Western Electric and others, need to recognize easily that the instruction applies to them as well as to airframe producers.

To some extent, this ambiguity is carried over to the monthly M3 survey, where there is an "aircraft, missiles, etc." sentence in one section under a title relating to producers of complete aircraft and missiles. However, in another part of the Census M3 survey instruction manual, where inventories in general are discussed, there is an instruction which reads: "Inventories should be reported gross of progress or partial payments."[5]

In this case, firms are being asked to report their inventories in ways that are fundamentally different from their own methods of financial accounting. For firms using the percentage completion method in their financial accounts, for example, the difference may be drastic. Such firms include the value of work done in sales on a current basis, before delivery is made, and have little inventory from this source in their financial reports. Under this Census reporting procedure, firms are being asked to restructure their accounts in a fairly substantial way, so that shipments are reported on a delivery basis and inventories are valued gross of such deliveries.

Firms using a unit-of-delivery method of completed contract method report their inventories net of progress payments in their own financial statements. But, the Census Bureau requests inventories gross of such payments. A typical balance sheet for such firms might have the following entries:

Assets	Liabilities
1. Inventory	5. Advances and prepayments on long-term contracts
2. Subtotal	
3. Less Progress payments	6. Less costs incurred
4. Total inventory	7. Net liabilities

Census asks firms to report values of inventories gross of progress payments, which is the sum of lines 2 and 6. It may well be that some firms are not reporting properly because of unfamiliarity with this way of accounting for such inventories.

Shipbuilding

In the case of shipbuilding, the concept followed by BEA is to measure ship construction (both civilian and Government) on the value-of-work-done basis and to measure inventories net of value of work done. Thus, inventory should consist only of materials not yet counted as value of work done. The monthly M3 survey and the annual survey of manufactures conform to this concept.

Comparison of Reported Inventories

As part of this research, the Census Bureau undertook a comparison of inventory values reported to Census with data appearing in annual reports of a number of large firms. Definitive tabulations could not be made because of time limitations and the need to solicit additional information from respondents to clarify their reporting. Comparisons were often impossible because of the inclusion of foreign activities in annual reports, dissimilar methods of evaluation, incomplete reporting in the M3 and inclusion of nonmanufacturing divisions in annual reports. Many cases are so complex that reconciling the various values is difficult and burdensome. Despite these difficulties, there are serious doubts whether the Census Bureau, in its surveys, is in fact obtaining the kind of inventory values requested and that are needed for GNP measurement.

An additional point on profits data used by BEA in the national accounts should be noted. Obviously, profits estimates, which ultimately are based on IRS tabulations of income tax returns, should be synchronized with the inventory and delivery concepts discussed above. When tax returns reflect revenues using the percentage completion method for fixed-price contracts, resulting profits are on a timing basis different from the delivery-gross inventory timing for these components on the product side of the national accounts. Similarly, if shipbuilding firms use delivery of completed contract methods in income tax reporting, the timing of profits will be inconsistent with measurement of value of work done on ship construction.

[5]Bureau of the Census, "Instruction Manual for Reporting on Form M3 for 1978," p. 7 and p. 6.

RECOMMENDATIONS

1. Research is needed to determine exactly what methods firms use to report to the Census Bureau on shipments and inventory for long-term production contracts. Instructions on forms in various Census surveys should be expanded, improved and made consistent with one another. Accomplishing this probably will require visits with individual firms, or at least conferences with groups of firms.
2. Somewhat less pressing is the need to clarify what is reported as profits for firms involved in long-term, fixed-price production contracts. Procedures should be developed by which profits figures entering the accounts may be adjusted to match required concepts. This work is so sensitive that recourse to companies is not feasible. Basically, firms using the percentage completion method must be identified and the timing of profits shifted somewhat.
3. In the long run, measurement of production under long-term, fixed-price contracts should be to the value-of-work-done concept as is now the case with shipbuilding and construction. It is feasible to undertake such a fundamental change only in the long-term. It would involve careful planning, modifications of surveys, and coordinated efforts by BEA, the Census Bureau, and other agencies and therefore is unpractical as a short term effort.

A somewhat similar recommendation was made a decade ago relating primarily to the U.S. budget. Because of many shortcomings in the budget recording process in the 1950's and early 1960's, a Presidential Commission on Budget Concepts was appointed to review the situation. The report of this commission led to the new unified budget concept, which remains the vehicle for recording U.S. receipts and expenditures to this day.[6]

Among the recommendations were the following:

> From the standpoint of determining fiscal policy, expenditures on an accrual basis probably represent the best measure of the economic impact of the budget. This is the point in time at which the Government actually incurs a liability requiring immediate or eventual payment, including constructive delivery in the case of construction put in place and work performed by contractors on specific order.[7]

The "constructive delivery" concept referred to above is the same as the value-of-work-done referred to in this study.

> In the case of goods and services acquired under contract, as in construction and defense hard goods procurement, the accrual basis will result in reporting expenditures at the time of constructive delivery; that is, as the work is actually performed to Government specifications. When the Government acquires mass-produced items, the liability occurs—and accrued expenditures are recorded—at the time of physical delivery.
>
> The Commission considers this recommendation to be an extremely important and valuable contribution to improved budget presentation. It is a normal, natural, and straightforward concept of expenditures which should be easily understandable. The discrepancies between cash disbursements and accruals become particularly significant in periods where there is a rapid increase or decrease in outstanding Government orders for long leadtime procurement items, as in a defense build-up or demobilization period. Under the accrual approach, the difference between costs incurred by a contractor and progress payments made to him will be properly recorded as an accrued liability of the Government.[8]

The timing difference in the national income accounts is even greater than described above because the accounts are on a delivery basis. Progress payments that are included as an expenditure in the budget are removed from Government purchases in the national income accounts.

> The Commission believes that if the Federal budget itself were on an accrued expenditure basis a similar basis for the Federal sector of the national income and product accounts would be highly desirable and advantageous. Therefore, the Commission recommends that the Bureau of the Budget and the Office of Business Economics pursue this objective while the conversion of the budget to the accrued expenditure basis is being developed. In order to do this, the Office of Business Economics would need certain additional data not now available. The Commission also recommends, therefore, that the Department of Defense, the Bureau of the Census, and the Treasury Department lend all possible assistance to the Office of Business Economics in deriving the necessary information.[9]

Most of the Presidential Commission's recommendations were implemented with the adoption of the unified budget. Constructive delivery was studied for some years by Department of Defense, Treasury, and Budget Bureau teams, but was never implemented. It is not clear why the change was not introduced in the unified budget, but the problem should be reviewed before there is another period of large timing difference, such as occurred in the Vietnam years.

The value-of-work-done concept should be adopted in place of the delivery concept presently embodied in the national accounts and Census surveys. This is not to suggest that such a substitution would be free of problems. In chapter 10 the establishment of an interagency committee was recommended to address problems concerning inventory data collection and related statistics. Review of this recommended change in concepts should be one of the major tasks of such a committee.

[6] Recommendations of this group were presented in *Report of the President's Commission on Budget Concepts* (U.S. Government Printing Office, October, 1967).
[7] *Ibid.*, p. 37.
[8] *Ibid.*, p. 39.
[9] *Ibid.*, p. 40.