

This PDF is a selection from an out-of-print volume from the National Bureau of Economic Research

Volume Title: Measuring the Nation's Wealth

Volume Author/Editor: Wealth Inventory Planning Study

Volume Publisher: U.S. Government Printing Office

Volume ISBN: 0-870-14185-6

Volume URL: <http://www.nber.org/books/unkn64-3>

Publication Date: 1964

Chapter Title: Valuation - Major Classes of Assets

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Chapter URL: <http://www.nber.org/chapters/c5193>

Chapter pages in book: (p. 77 - 90)

CHAPTER 7

VALUATION—MAJOR CLASSES OF ASSETS

Problems of applying the general principles of valuation discussed in chapter 6 differ somewhat depending on the class of asset. In this chapter, we discuss the various problems in terms of the five major asset classes.

DEPRECIABLE ASSETS

Before proceeding to the use of depreciated replacement cost, every effort should be made to obtain direct estimates of market values of structures, machinery, and equipment. In some cases, respondents have a good notion of what their fixed assets would bring under normal market conditions. In the 1960 Census of Housing, homeowners estimated the market values of their dwellings. Many consumers also have a fair idea of the secondhand value of their automobiles, and possibly some other major durables. Producers may also know the approximate resale values of their real estate, and some of their equipment (where markets exist). To a broader degree, they probably know the replacement costs of their tangibles, particularly if they have fire insurance and keep valuations up to date for this purpose.

For the types of equipment with active secondhand markets and available price data, by model—such as automobiles, trucks, farm tractors and machinery, certain types of metalworking machinery, and some major consumer durables—the statistical agency could estimate market values from physical-unit data, by type and age. The latter type of data should be collected, and the matching price data assembled.

But for many reproducibles, the statistical agency will have to estimate depreciated replacement cost. Even when market values are available, the alternative estimates should be prepared. Not only does this provide a check, but it produces estimates of gross replacement cost which are desirable in their own right. Further, it provides the basis for continuing perpetual inventory estimates beyond the benchmark.

Estimating depreciated replacement cost involves three main sets of statistical requirements: book-value or cost data in a form suitable for further processing; adequate price indexes for revaluation; and suitable information as background for depreciation estimates.

COST-DATA REQUIREMENTS

In order to revalue and depreciate the capital outlays of prior periods, the basic inventory data on gross book values or original costs of surviving assets (even if no longer carried on the books) will have to be obtained and distributed by years or periods of acquisition, by type

of item. The more detail in which the composition of fixed asset inventories is obtained, the better the estimating job can be. It will be recalled that the Japanese wealth survey of 1955 obtained complete inventories from the firms and other units in the samples. The detail permits revaluation by narrow price indexes corresponding to the types of wealth, and application of appropriate depreciation rates. Broader categories could be used but the application of broader composite price indexes and depreciation rates would result in somewhat less accuracy.

Most of the working groups favored obtaining data on those broad classes of assets in the full census or survey for which book-value data were readily available for most firms. They would then get the detail for a select sample by narrow classifications (up to seven-digit Standard Commodity Classifications, as amended by conferences with industry representatives, in some cases) by recent years and earlier periods of acquisitions. The distributions from the small samples would then be applied to the data for broad classes gotten across-the-board for further processing by the estimating agency. The sample designs would be developed by experts to be consistent with existing samples used in current surveys and censuses. It is clear from the structure of American industry, however, that since a small proportion of multi-industry firms owns a large proportion of assets, most of the larger establishments would be included, while a small sample of the smaller establishments representing the smaller single-industry firms should suffice.

One problem involved in distributing book values by age is that some fixed assets on the books will have been purchased secondhand, or acquired by merger, etc. If possible, the respondent should indicate the periods of original purchase when new of these assets so that even if original costs were not available, they could be reconstructed. If original date of purchase were not available, the estimating agency could apply a conventional age adjustment to the period of acquisition by the last purchaser. Firms that no longer carry written-off assets on the books should be requested to report these separately if they continue in use. Reporting of small items below a certain value should not be required.

Pilot studies, or pretests, would be needed to determine that the necessary detail, by type and by age, could be obtained from a sufficient number of establishments in the various industries. It is apparent that the forms would run many pages, and require much effort from the respondents. This underscores the need for sufficient orientation work in advance to obtain the necessary cooperation. Possibly, if disclosure problems were overcome, detailed tabulations for the industry would be made available to respondents so that they might compare the composition of their fixed capital with that of the industry as represented in the sample. The fact that the detailed inventory would be gotten on a one-time basis should help reduce objections.

In industries for which required detail by establishment were not available, or if sufficient cooperation were not forthcoming, the age distribution of fixed assets still on the books could be roughly estimated from capital expenditure data for earlier years to which composite survival curves were applied. This method has been used by

Creamer and others, but it is to be hoped that a wealth inventory could develop more refined estimates based on more detailed data.

Since most households do not keep formal books, and in the absence of original costs, the numbers of units of various types of durable goods could be reported, by age. The estimating agency could then multiply out by average unit-values at the times of acquisition, and at the time of the survey, in order to arrive at original and replacement costs.

PRICE INDEXES FOR FIXED ASSETS

For revaluation, time series on prices of the various depreciable assets should extend at least as far back in time as the lengths-of-life of the items. The BLS wholesale price index (WPI) began incorporating prices of automobiles and farm equipment in 1912 or 1913 and commercial furniture in 1926. But the major expansion in pricing of machinery and equipment came in the 1952 revisions of the index when many new indexes were added, often retroactively to 1947. Some component detail and specially computed indexes go back to 1939 for machine tools, construction machinery, and general auxiliary machinery.

All in all, the Bureau now prices commodities which account for almost 40 percent of new investment in producers' durable equipment; price changes for the remaining 60 percent are imputed to the priced items. The "producer finished goods" category of the WPI constitutes over 600 commodities carrying about 11 percent of the total weight of the index. Coverage of consumers durable goods in the Consumer Price Index is even higher.

While total coverage of producers equipment in the WPI is not bad, it is quite spotty in relation to the various groupings. (See table 1 in app. I, pt. J, by Allan Searle which shows percentage coverage of 1958 value added in the four-digit capital goods industries.) Much special industry machinery and equipment, for example, has little or no price coverage. Some of the groups are covered by price indexes that originate in other agencies—notably, railroad equipment (also structures and general machinery and equipment used by railroads) priced annually since 1910 by the Section of Valuation of the Interstate Commerce Commission. The National Income Division of OBE has assembled most of the existing equipment price indexes—BLS and others, including some private indexes such as those for telephone apparatus and equipment prepared by the Western Electric Co.—in order to deflate current outlays for producers durable equipment.

Even after assembling all available data, however, some types of equipment are represented poorly, if at all. It will obviously be desirable for the BLS to continue its efforts to expand coverage in this important area. When price indexes for new types of equipment are added, it would be desirable, if feasible, to have reporters supply data for at least several prior years (longer if possible), since revaluations require indexes that cover as many years as the lifespan of the item. Some important firms have constructed historical indexes of the prices of their outputs. It would also be desirable if the Division of Prices of the BLS provided technical advice to other governmental agencies collecting price data (such as ICC) to insure appropriate and consistent method.

The BLS Division of Prices employs specification pricing. It compares the payment (or receipt) for one unit of an item or service with the payment for an identical unit at another time, specifying the unit with respect to physical characteristics and as many of the terms of the transaction as can readily be determined. The indexes are not adjusted for changes in quality (efficiency or utility) unless—

* * * accompanied by physical specification changes which can be "costed out" and then only when in the judgment of the commodity specialists they do not involve purely subjective factors * * *. In practice, the Bureau often obtains from reporters the cost of added (or deleted) features on machinery, autos, trucks, and a variety of other goods and makes an appropriate adjustment by adding (or subtracting) the cost to the price of the earlier model to obtain price comparability with the new model. Where this is not possible, a judgment is made and either a direct price comparison or a link is taken depending on whether the reported price change is deemed mostly due to genuine price change or to quality change. (App. I, pt. J, pp. 362-63, 364.

This accords with the procedure which the Wealth Study recommends.

The BLS price indexes have been criticized for failing to take account of certain changes in true transactions prices, such as those involved in special "deals" or other discounts that may become widespread in times of severe competition. Since BLS has found reporters generally unwilling to report deviations of net realized prices from quoted list prices less the usual standard discounts, it is drafting plans to investigate buyers' prices as an approach to true transactions prices. The Wealth Study would encourage these efforts, particularly with respect to durable goods.

For deflating new construction outlays, the OBE has assembled all available and relevant construction cost indexes from both governmental and private sources. These cover all the major types of buildings and other structures, but unfortunately the quality of some of these indexes is not good. Some of the indexes are merely weighted averages of construction materials prices and wage rates, and even the relative weights may be out of date. They fail to reflect variations in overhead and profit margins per unit of output, and more importantly, they neglect the changes in productivity that may be taking place in the construction industry. (Notable exceptions are the price indexes for a composite mile of highway by the Bureau of Public Roads, and the ICC series for railroads and pipelines.) OBE has attempted to adjust the indexes for changing profit margins, but not for changing productivity.

Mr. Searle in appendix I, part J, reports on progress being made by the Bureau of the Census in developing more adequate price indexes for family houses built for sale, and for a segment of the apartment house market. Preliminary results suggest that the productivity factor is being reflected in these indexes. It is important for revaluation of wealth in the form of buildings and structures that progress continue to be made along these lines. Similar recommendations were made by the Price Statistics Review Committee in its report to the Bureau of the Budget in 1961 with respect to asset prices.¹ This is probably the largest single potential source of error in the revaluations required for wealth estimates in current prices. While coverage of

¹ "The Price Statistics of the Federal Government: Review, Appraisal, and Recommendations," National Bureau of Economic Research, 1961.

the capital goods price indexes could be improved as indicated, it is unlikely that the expanded composites for major types of durable goods would show greatly different movements from those now available. Accuracy of revaluation for the more detailed types would, of course, be heightened.

Finally, it may be noted that the same price indexes used for revaluation can be used for deflation of wealth estimates, by type, on successive dates. The importance of obtaining adequate price data for revaluation purposes is enhanced by their use also in deflating value time-series.

DEPRECIATION

Although gross replacement values are useful for some types of analyses, it is clear that depreciation on durables and depreciated replacement value must be estimated as an approximation to market value. Depreciation inevitably occurs as durable goods age and their remaining service-lives shorten, their physical efficiency diminishes to a greater or lesser extent, and they are subject to technological obsolescence. These forces reduce the remaining net income stream that can be expected, and thus their present value (assuming no offset from rising prices).

Depreciation rates are calculated ideally to approximate the patterns of decline in market value of durable goods as they age. To obtain realistic depreciation rates, it is necessary to establish (1) the average service-life and mortality dispersion for each type of durable good, and (2) typical depreciation curves over the lifetimes of durables.

Book depreciation cannot now be relied on as an accurate approximation to loss of value. Some methods of charging depreciation, such as the straight-line, appear to be less realistic than others (see below). Further, methods are sometimes changed because of changes in tax laws or other reasons. For example, accelerated depreciation was allowed on new defense facilities during the Korean conflict; and the Revenue Act of 1962 permitted new methods of charging depreciation which have been widely adopted.

In order to avoid temporal inconsistencies in depreciation and net book-value estimates, it is desirable for the estimating agency to compute depreciation on the gross original cost and replacement cost of fixed assets still in use.

Service-lives of the various types of durable goods can be determined by special studies. The Treasury Department sponsored engineering studies of producers durable equipment and structures in the late 1930's and in 1942 published Bulletin F to guide businessmen with respect to reasonable depreciation deductions for tax purposes. Supposedly, the lengths-of-life published in Bulletin F represented the averages determined by the studies, minus 15 percent. Businessmen were free to deviate from Bulletin F lives for reason, however.

In preparation for a revision in depreciation guidelines and rules in 1962, the Treasury Department undertook two surveys of service-lives actually used by companies relating to the tax year 1959-60. The primary source of the longer LDA (Life of Depreciable Assets) survey was schedule G of the corporation income-tax return, with ex-

tensive followups on incomplete returns being required. The shorter TDS (Treasury Depreciation Study), which collected data directly from respondents on a special questionnaire, was initiated when it became apparent that the LDA study would not be completed in time to plan the guideline reform.² Coverage of the corporation universe in terms of asset-size classes by the two projects is shown in the following table.

TABLE 3.—Coverage of the corporation universe by two Treasury surveys

Depreciable asset size classes	Corporation universe		LDA			TDS		
	Returns	Depreciable assets	Returns represented	Depreciable assets		Returns	Depreciable assets	
				Amount	Percent of class		Amount	Percent of class
Total.....	<i>Thousands</i> 1,074.1	<i>Billions</i> \$397.2	<i>Thousands</i> 556.8	<i>Billions</i> \$281.2	70.8	<i>Thousands</i> 1.9	<i>Billions</i> \$231.5	58.3
Under \$1,000,000.....	1,010.2	58.6	539.3	21.0	35.8	-----	-----	-----
\$1,000,000, under								
\$25,000,000.....	59.6	64.8	15.0	9.0	13.9	.6	4.8	7.3
\$25,000,000 and over..	4.3	273.8	2.5	251.3	91.8	1.4	226.7	82.8

In the LDA study, when schedule G was found to be 90 percent complete, needed data were simply abstracted. Schedules less than 90 percent complete from taxpayers with less than \$50 million of total assets were subjected to analysis and imputation of missing detail or, when this was not possible, only summary data were abstracted. Incomplete returns from firms with \$50 million or more of total assets were followed up by the appropriate district field office when it was not possible to impute detail. In some cases the taxpayer could not supply required detail.

Analysis of IRS experience in collecting data on depreciable assets indicates that schedule G was a less-than-adequate source document. Nearly one-half of the returns of small corporations (under \$1 million of assets) representing almost two-thirds of assets in that size-class did not have usable data. Three-quarters of the returns of medium-size companies (over \$1 million-under \$25 million) representing almost 90 percent of assets in the size-class were unusable. More than two-thirds of the returns of very large corporations (over \$100 million in assets) provided required data, but they accounted for a lesser proportion of the assets in the size-class.

The IRS experience suggests that direct contact with the respondent by means of a sample survey may be a needed complement to a data collection program involving tax returns (which apparently necessitates a field followup in many cases.)

The TDS special questionnaire involved less than 2,000 firms but developed information on 60 percent of corporation depreciables. The LDA, which developed data on an additional 10 percent of corporate depreciables, required extraction of data from the tax records of an additional 50,000 firms.

² See Internal Revenue Service, "Depreciation Guidelines and Rules," 1962.

The LDA was partially successful in the attempt to collect depreciable assets by some 250 types of which about 25 were used for a particular industry. When detailed classification was impossible, assets were assigned to a limited number of major asset-classes. Some 30 asset types were established for the TDS of which only about 15 were used for a particular industry.

The LDA, but not the TDS, attempted to collect asset data by year of acquisition. In the end, the LDA classified assets into one of two acquisition periods, i.e., post-1953 and pre-1954, the same periods used by the TDS. Despite the cooperativeness of respondents, data by year of acquisition (except for very recent years) often could not be obtained either because the necessary records did not exist or because of the high cost of retrieving the information.

The LDA classified assets by 60 major IRS industries. In the case of multiindustry companies, the principal business activity governed the classification. Principal business activity also governed the classification of TDS assets into 60 industries. In addition, multi-industry respondents were asked to break out those assets used outside the industry of principal business activity.³

The LDA estimates of useful lives were based on data found in schedule G "Depreciation," which asks for rate of depreciation or number of years of life. Useful-life data provided a measure of the extent to which current depreciation practices had departed from Bulletin F lives. LDA included data on fully depreciated assets only to the extent that these assets were reported in schedule G. On the other hand, the TDS questionnaire specifically called for information on fully depreciated assets.

While more up to date than the old Bulletin F information, the Treasury studies have been criticized on the grounds that service lives used for tax purposes are not necessarily realistic; indeed, they are often "negotiated" and may deviate considerably from actual economic lives. (See comments by Mr. Terborgh in app. I, pt. K.) It is possible that the reserve ratio test under the 1962 Depreciation Guidelines will reduce this problem.

There obviously is need for additional and more intensive service-life studies prior to, or possibly in conjunction with, the wealth inventories. In addition to obtaining average lives for various classes of equipment, it would also be desirable to obtain survival curves. There is some difference of opinion whether depreciation should be calculated on the mean life of a depreciable asset category, or against a probable survivorship pattern (see app. I, pt. K). If categories are finely subdivided, apparently it does not make too much difference in the final result. But for purposes of estimating retirements and gross stocks, survivorship (or mortality) distributions would be desirable to have. A study in the 1930's by Robley Winfrey, based on 117 items for which data were available, is still the latest broad study of dispersion of mortality of producers durables.

Since the economic lives of capital goods probably change over time, existing data on those types for which age distributions are available should be restudied. In addition, special studies should be undertaken on a sample basis. Two types of study have been suggested.

³ Internal Revenue Service, "Corporation Income Tax Returns With Accounting Periods Ended July 1959-June 1960," table P, pp. 18-20.

By one approach, respondents are queried concerning the various types of equipment and structures retired during the previous year, and their ages. This method was followed by Jean Pennock in a study of consumer durable goods (see app. II, pt. C).

A different approach has been suggested by Mr. Wasson in appendix I, part K. From the respondents in the sample, two bits of information would be required, by asset type: (1) the value existing as of the end of the given year, including assets in use but no longer carried in the balance sheet, by year of purchase, and (2) total amounts originally purchased, by year. Wasson believes the evidence indicates that enough firms could give the desired information (possibly 20 to 25 percent) to permit computation of useful mortality tables. Terborgh also states that many companies have their assets sorted out by period of acquisition, or age. Since point (1) is the type of information we have recommended obtaining for revaluation purposes, by adding (2) for those respondents able and willing to supply it, the necessary service-life information could be gotten as part of the wealth inventories.

At what rates do depreciable assets lose value over their lifetimes? Studies were made of market prices of those types of used equipment for which resale price data are available by the Machinery and Allied Products Institute (MAPI).⁴ The evidence suggested that the straight-line depreciation method, which then predominated, was a retarded method, and that a substantial degree of acceleration in the writeoff is realistic. The studies yielded the general result that about two-thirds of the original value of producers durable goods is lost in the first one-half of their lives—somewhat less for long-lived items such as buildings (see app. I, pt. K).

Studies by Prof. Zvi Griliches of resale values of tractors and farm machines indicate that, after the first year, a fairly constant percentage decline in value is experienced. This supports the conclusions of MAPI that double-declining balance or sum-of-the-digits methods of depreciation (which give similar results) are preferable to straight-line depreciation.

Additional studies of capital goods resale values would clearly be desirable, using such additional data as may be available, and more recent data for those durables studied by Griliches, Terborgh, and others.

No matter how good the studies, however, it must be recognized that a depreciation curve is a smoothed and stylized pattern which reality approaches only imperfectly even for groups of assets. By its very nature, depreciated replacement cost is not a perfect substitute for market price. Our chief concern is that enough of the existing information be assembled on new and resale prices of durable goods that calculations of depreciated replacement value can provide a reasonable approximation to market value.

INVENTORIES

It is an ideal situation when quantity data are available for the various types of goods held in inventory stocks, together with corresponding market-price or unit-value data. This is the situation in

⁴ "Realistic Depreciation Policy," (1954).

agricultural statistics. Market values of inventories of crops and livestock, by detailed types, are estimated by multiplying numbers by unit values on a regional basis, and summing to national totals. Universal coverage is provided quinquennially by the census of agriculture, with sample survey data used for interpolation and extrapolation. Marked seasonal variations in farm inventories require adjustment.

A somewhat analogous procedure is followed by the Department of Defense, which accounts for the bulk of Federal Government inventories. Numbers of units are multiplied by "standard unit costs" which reflect the most recent prices paid for volume purchases of the inventory items.

For private industry, IRS and Census data on book values of inventories are quite extensive, but the required revaluations pose some difficult problems. Inventories are carried on the books at cost, when lower than market (prices paid in the case of supplies, and materials purchased for further processing; and embodied costs in the case of inprocess or finished goods inventories). The appropriate revaluation techniques depend on the costing procedures used to charge goods to cost of sales and to inventories, respectively. The National Income Division of OBE has developed elaborate methods to revalue book values of business inventories to constant prices (the same data could be used to get current period-end values) as a step in estimating the current value of the net change in business inventories and the inventory valuation adjustment. We shall briefly describe the OBE procedure as a basis for pointing out the additional information needed to increase the accuracy of the revaluations.

OBE first divides inventory book values between those based on LIFO methods, and those on FIFO and related methods, using such information as is available. LIFO inventories are presumed to incorporate near-current prices at the time of adopting this costing procedure, plus prices prevailing at the time of inventory increases. The average prices of FIFO inventories depend on the turnover period of the inventory (gotten from the ratio of inventories to sales), which determines the number of months to use for a moving average of relevant price indexes centered on the final month end. The lag is lengthened by OBE to take account of the presumed effect of non-FIFO methods. The price index components and their weights depend on the composition of the industry inventories, not now precisely known. Prices of goods sold are used to revalue in-process and finished goods inventories, although these are carried at cost, and different firms use different methods of estimating cost.

To the extent practicable, the following additional information and data should be gotten from a small but representative sample of firms and their establishments at the time of the wealth surveys in order to improve estimates of inventories at market values.

(a) Values of inventories of establishments in multi-industry firms not yet covered by the Census Bureau.

(b) Information on the type of inventory-accounting methods used by the respondents, and the proportion of inventories to which they apply if more than one type is used.

(c) Estimates by the respondent of the current market value of the inventories (apparently estimated by many firms).

(*d*) A breakdown of the major classes of inventories—purchased, in-process, and finished goods—by at least the major types of component goods. This helps in the selection of appropriate price indexes and their weights for revaluation purposes. For major types, physical-unit data would be useful.

(*e*) Further expansion of coverage of the WPI to help improve the revaluation process. It has also been suggested that the BLS itself could weight out special purpose reflators for purchased-goods inventories, by industry.

MANMADE NONREPRODUCIBLE GOODS

This class of wealth comprises collections of items such as stamps, coins, antique furniture, etc., which are no longer produced (the reproductions representing a different species). Paintings and other objects of art are usually unique productions. Collections are found in both public and private galleries and museums, in households, and even in business establishments. They are probably best classed as consumer durables, yielding direct satisfaction to the viewers, except for those items intended for sale as part of business inventories.

Relatively little attention has been paid to manmade nonreproducible goods in the theoretical literature, and most wealth estimates have omitted them, presumably because of data and valuation problems. In terms of the primary uses of wealth data recited in chapter 2, this class would seem to have relatively low priority. Yet in magnitude and interest it is far from inconsequential, and we have given some thought to its possible treatment. (See especially the annex and exhibits to app. II, pt. N, on the service industries, which include galleries and museums.)

Some types of collectors items, such as stamps and coins, are traded in relatively large and active markets. The largest dealers issue catalogs with pricelists (although transaction prices generally average below catalog prices). Owners of these collections generally have a fair idea of their value, or they or qualified appraisers could readily prepare value estimates.

Even in the case of unique productions, of which the leading category is paintings, auctions and other sales take place frequently enough that appraisers and dealers can generally estimate with reasonable accuracy what a group of paintings will bring. Price indexes for paintings of various schools have been prepared, which conceivably could be used for revaluing from cost (given the date of acquisition) to current value.⁵ About one-third of the galleries responding to a questionnaire sent out by the American Association of Museums on behalf of the Wealth Study said they could provide data on the original cost and/or present market value of their collections. Presumably, for the others appraisers could at least roughly estimate their values if the cooperation of the museums and galleries were obtained. Dealers would certainly be able to report the value of their inventories, since they are intended for sale.

Some galleries present estimates of the value of their collections in their annual reports. Managements of others are reluctant to place a

⁵ See Richard Rush, "Art as an Investment," and Mr. Rush's statement for the Wealth Study, app. II, pt. N, annex A, exhibit C.

price tag on their treasures. In a sense, it is of course true that art has a value that cannot be captured in monetary terms; on the other hand, it is continually being traded, which opens the way for its valuation when the occasion warrants. We believe it would be of considerable interest to see the level and trend in value of collectors items, by type, relative to other consumer durable goods, public and private, and in relation to total national wealth, by region. Further exploration of the potentialities of measurement in this field is definitely indicated. It is to be hoped that the museums would lend assistance, and possibly leadership, to this endeavor.

VALUATION OF NATURAL RESOURCES

There are three important aspects which enter into the valuation of natural resources. First, they are nonreproducible, at least for long periods of time. Second, the supply is not quite as fixed as would appear from the first statement, mainly because some resources which exist, but are unknown, can be discovered, and because poorer quality reserves can be made useful through investment of capital and labor. Both of these factors contribute to changes in marketable or usable supply, although the naturally endowed supply is fixed. Third, at some point in time, these gifts of nature were acquired at no cost by the first taker.

The relative, and in some cases perfect, inelasticity of supply of natural resources, makes demand shifts largely responsible for changes in the prices of natural resources. As a result, frequent shifts in the demand for some natural resources have contributed to volatile price movements. These price movements, in turn, can influence the supply. High demand and associated high relative prices can lead to investment in exploration for new sources of supply, in additional refining needed to make poorer grade resources satisfactory for use, and in overhead capital required to provide access to remotely located supplies.

While the theory of natural resource value is clear, the measurement of this value is difficult. Some holdings of resources, primarily those owned by Government, are basically not for sale. Other natural resource sites may contain several distinct types of resources. Land, for example, may be used for grazing, contain growing timber, and serve as a watershed. Some natural resources may be inseparably associated in use with items of tangible capital. Roads and mine shafts are two examples.

Despite the seeming difficulties which arise in any attempt to value natural resources, two basic possibilities exist if one is willing to make various assumptions. The two possibilities are discounting expected future returns at appropriate rates of interest, and using market price data either directly (which under ideal circumstances should give the same number as the discounting approach), or through appraisals, which would employ various types of relevant data to establish "shadow prices." The approach through the cost side, applicable to depreciables, cannot be used for natural resources.

The discounting approach embodies too much speculation about the future to merit consideration as a primary method. It is used by the Department of Interior to value Federal mineral holdings, includ-

ing oil deposits in the Continental Shelf, mainly because the reserves are not being used at present. The discounting formula is applied to expected earnings over 25 years. A variant of discounting which can prove useful in some instances is simply to capitalize the revenues received for the use of certain types of resources. Government-owned parks and grazing lands are examples where this approach might be practicable. The market price approach suffers first from the absence of markets for many types of resources. Growing timber cannot be separated from the land. Certain Government-owned natural resources are not for sale, nor are watersheds, rivers, and the like.

The use of appraisal techniques to establish proxies for market prices is practicable for properties infrequently or never offered for sale. Since the appraisal would be based on a variety of data such as selling prices of comparable properties and fees paid for using the property, it is important to establish guidelines for weighting the various factors to insure consistency and comparability.

If all appraised valuations were centrally established there would be no problem from the standpoint of consistency and comparability. However, appraisal is essentially an exercise performed in the field and guidelines would be necessary. Where appraisal is the recommended valuation technique, it could be performed at various levels, from regional appraisal boards to appraisals by the owners themselves. The level at which this valuation is established would depend in large measure on the natural resources to be valued.

The foregoing discussion has set forth the various methods which could be used to value natural resources. The specific methods to be used for each major resource type are set forth in the report of the Working Group on Natural Resources (app. II, pt. F), and are summarized in chapter 10 of this report.

VALUATION OF FINANCIAL CLAIMS

GENERAL APPROACH

Market value is the appropriate measure of financial claims. It provides a consistent basis for intersectoral analysis. However, market values are not available for many important types of financial claims. For many short-term claims, book values are good approximations of market values. For longer term claims, market value estimates could be made in many cases by capitalizing at rates obtaining for similar claims which are publicly traded. But, this would involve making assumptions about the similarity between claims publicly traded and those privately held. Further study is needed to resolve this issue. If desired, market value estimates should not be requested from respondents; they should be estimated by appropriate central agencies after careful study, first, of the desirability of such estimates and, second, of the alternative methods which could be used to derive them.

Book values of financial claims represent the hard-core data which should be obtained from respondents in any event. These should be accompanied by footnotes describing the actual method of valuation embodied in the book-value data reported, so that the agency responsible for wealth estimates would know what adjustments were needed to accomplish the revaluation to market, if market values are con-

sidered after study, to be desirable. Regardless of the outcome on the question of desirability, market value data should be requested for publicly traded financial assets, since the additional burden on respondents would not be great. These data—book and market value for publicly traded issues—would be useful per se, and in any attempt to revalue other issues. Publicly traded liabilities should be valued at market, also, but these data need not be collected from debtors, since they could be readily computed by a central agency. The two alternatives should be costed, however, before a final decision is made.

The deflation of financial claims for purposes of time-series analysis is not recommended, since it is not clear what the underlying units, in constant dollars, represent.

SPECIAL VALUATION PROBLEMS

Securities of subsidiaries and affiliates.—The degree of consolidation reflected in company balance sheets varies widely. A standard for consolidation, such as a requirement that all subsidiaries more than 50-percent owned should be consolidated, is desirable but was not considered practicable by the Business Financial Claims Working Group. Since present consolidation practices can not be standardized easily, it should be recognized that an inconsistency will occur in the balance sheets.

As to valuation, securities of nonconsolidated subsidiaries and affiliates fall into two classes, wholly owned and partially owned. The securities of wholly owned subsidiaries cannot be revalued through use of actual market prices since none exist. In the case of less than wholly owned subsidiaries, shares of which are traded publicly, it would be possible to impute a market value to the parent company's holdings of securities of the subsidiary. The imputation may not be rigidly defensible on theoretical grounds, or feasible in view of the additional data it would require. However, such imputation would serve to provide for consistency between the valuation of securities of the subsidiary held by the parent company and others and the market value of these securities as reported by the nonconsolidated subsidiary itself.

Whether or not securities of less than wholly owned subsidiaries are revalued to market whenever possible, parent companies should be requested to report their equity in nonconsolidated subsidiaries, distinguishing between domestic and foreign companies. The book value of investment in subsidiaries often is quite useless analytically since it can bear little relationship to their present worth. While equity is still a book-value figure, it reflects more the present picture of a subsidiary than does the book value of, perhaps, a small and one-time investment, made quite far in the past. This equity figure is important enough to appear currently in the footnotes of many published corporation reports.

The determination of market values for publicly traded securities.—In obtaining market values for publicly traded securities included in annual balance sheets, the question arises of which price is appropriate. The price on the last trading day of the year for which the balance sheet has been prepared has the disadvantage of being too temporal and subject to speculative considerations. For companies whose fiscal yearends coincide with the calendar year, the use of December 31 prices

might reflect considerations apart from valuation of the security itself, such as those motivated by income tax laws. These objections are usually met by the defense that a price on any day reflects the valuation on that day based on a complete appraisal of economic conditions as well as institutional factors. Those who object to yearend price offer average daily price for the year, an average of highest and lowest prices for the year, some other alternative, or argue that values should not be attached at all. The problem is one appropriate for university research.

Goodwill.—The book value of goodwill should be obtained in order to insure that the respondents report balanced totals for assets, liabilities, and net worth. For presentation purposes, sectoral balance sheets should exclude goodwill, or encompass it in the overall revaluation accounts discussed in chapter 6.

Claims of the Federal Government on foreigners.—Certain long-term claims of the Federal Government pose special problems. Loans to foreigners at special (subsidy) rates of interest could be revalued based on a capitalization at the current rate of the interest received. Selection of the proper current rate would require study. Loans repayable in foreign "soft" currency present an even more complicated problem and should be shown at face value in a footnote, together with the face value of unpaid, but not formally repudiated, World War I debts.

Life insurance and pension plans.—An important source of wealth, primarily to the household sector, is the value of life insurance and pension plans, including OASI. There are four methods of valuing life insurance claims: (1) Net premiums (premiums less benefits); (2) cash surrendered values; (3) total assets of insurance funds; and (4) policy reserves on the books of insurers. The latter has been selected for use in the flow of funds; a discussion of all four methods is found in the Federal Reserve Bulletin (August 1959, p. 837). The discussion sets forth the basis for the selection of the last of the four methods mentioned above for the flow of funds accounts. The advantage of the fourth is that the difference between policy reserves and total assets of insurance companies reflects the savings and investment of the companies themselves. This is extremely important in building an integrated set of national economic accounts.

The treatment of pension plans raises another problem. The saving by both employees and employers in these funds does not reflect potential claims in the same manner as it does for life insurance. The flow of funds accounts handle insured pension plans in the same way as life insurance policy reserves are treated as assets in the consumer sector. For noninsured pension funds, Government employee retirement funds and the railroad retirement fund, the total asset value is included in the consumer sector. Flow of funds treats payments for OASI as current transactions, and the OASI assets—holdings of Federal Government bonds—as an offset to the Federal debt. This is done because it is felt that the asset value of the potential claims will be paid irrespective of the asset position of OASI. From a practical point of view these treatments are sound, although OASI assets should be shown as a memo item in a national balance sheet. The general topic of the valuation of potential pension-type claims should be the subject of further research.