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## CHAPTER 6

### Reliability of the Estimates

THE assessment of the reliability of economic statistics, specifically statistics derived from a system of national accounts, and the estimation of the margins of error to which they are subject are notoriously difficult, both conceptually and practically. As a result it is extremely rare to find estimates of the probable or possible error accompanying calculations of national product, investment, saving, national wealth, and similar magnitudes notwithstanding the obvious advantages that such specifications would have to the user of the figures.

In the absence of a theoretical framework or of practicable methods that would permit a systematic assessment of the margins of error in such estimates, the minimum that readers may ask for is the comparison of the results of a specific estimation or measurement with the results of other measurements of the same magnitude. Such a comparison, of course, will not give information on the direction or size of the error, because the margin of error in the measurements used for comparison is also unknown. In addition, it cannot be assumed that the true value of a sought-for magnitude can be obtained by applying to the various estimates of the same object the natural science techniques which presuppose repeated measurement of the same, or a generically equal, object by the same method or instrument. In a field such as national wealth, where many of the basic data and the estimates derived for them are unavoidably weak, comparison of the results obtained by different methods or by using different basic data is particularly important.

Since we have defined our measure of national wealth as the market value, or the nearest approximation to it, of tangible assets, and since we have derived our estimates of national wealth for most types of reproducible assets by the perpetual inventory method (i.e., by cumulating gross capital expenditures, depreciating them, and adjusting them for price changes), we must look for purposes of checking and comparison to bodies of data which reflect the market value of various types of tangible assets that are not derived by the perpetual inventory method. Similar checks can also be used to compare our estimates of the value of land insofar as they are linked to the perpetual inventory estimates of the value of structures.

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Unfortunately, a comparison of this type is possible only for two, though very important, types of reproducible assets, residential real estate and commercial and industrial real estate combined. For several other important types of tangible assets, particularly plant and equipment of business corporations and of the federal government, a less satisfactory though still valuable comparison is possible. For these assets we may compare the original cost, depreciated or undepreciated, as calculated by the perpetual inventory method with the figures shown in the books of the owners. This comparison will give us a clue as to whether the figures for gross capital expenditures used and the assumptions made regarding the length of life of the different types of tangible assets are reasonably close to actual capital expenditures as entered on the owners' books and the depreciation rates applied by them. We are thus left without the possibility of effective comparison for consumer durables, the tangible assets of state and local governments, and a few types of assets of quantitatively less importance, such as standing timber and subsoil assets. We also have no check on the figures used for farm land, inventories, and monetary metals, but this is not a serious defect, since the figures used in our estimates are based on comprehensive data of an official character, which may be regarded as being very close to the market values of the assets in question.

### *Residential Real Estate*

In this field there are two sets of figures against which the perpetual inventory estimates can be checked. The first are the data on value of residential real estate in the *Census of Housing, 1950*; the second, the estimates of the value of residential real estate in 1956 derived on the basis of assessed valuations in the *Census of Government, 1957*.

#### CENSUS OF HOUSING, 1950

Table 18 permits a comparison of the estimates of the value of residential real estate in 1950 used in this report with three other estimates, one of which is based, like our figures, on the perpetual inventory estimate, while the two others are derived from data in the *Census of Housing*. It is, of course, the latter bench mark which provides an effective test of the figures used here.

For April 1950, the date of the housing census, the structure value of residential real estate as used in this study may be estimated at approximately \$250 billion, a figure derived by interpolation between

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TABLE 18

COMPARISON OF ESTIMATES OF VALUE OF NONFARM RESIDENTIAL REAL ESTATE,  
BASED ON CENSUS AND PERPETUAL INVENTORY FIGURES, 1950 AND 1956  
(billions of dollars)

|   | Total | Structures | Land |
|---|-------|------------|------|
| Based on Census of Housing, 1950 <sup>a</sup>   |       |            |      |
| Grebler and associates <sup>b</sup>             | 260.0 |            |      |
| Reid <sup>c</sup>                               | 274.1 |            |      |
| Based on perpetual inventory, 1950 <sup>d</sup> |       |            |      |
| Grebler and associates <sup>b</sup>             | 212.5 | 173.6      | 38.9 |
| NBER <sup>e</sup>                               | 249.2 | 215.0      | 34.2 |
| Based on assessed valuations, 1956              |       |            |      |
| Census <sup>f</sup>                             | 355.9 |            |      |
| NBER <sup>e, g</sup>                            | 380.0 | 328.2      | 51.8 |

<sup>a</sup> As of April 1950.

<sup>b</sup> Grebler, Blank, and Winnick (see footnote 1, p. 82), p. 370.

<sup>c</sup> Reid, *loc.cit.*

<sup>d</sup> As of end of 1949.

<sup>e</sup> Excludes public housing.

<sup>f</sup> Communication from Bureau of the Census, Government Division (Oct. 19, 1959).

<sup>g</sup> As of end of 1955.

the calculated values for the ends of 1949 and 1950. This compares with two independent estimates of \$260 and \$274 billion, respectively, which were derived from the information on the number of dwellings and the average value of owner occupied dwellings provided by the census. The average value of tenant occupied dwellings must be estimated, primarily from information on rent payments, since it is not reported in the census. Differences in this item are partly responsible for the variations between the two aggregate bench-mark estimates.

The estimate used in this report is thus 4 per cent, or 10 per cent below the bench mark derived from the housing census, depending whether the aggregate bench-mark estimate of Grebler and associates or of Reid is accepted. The difference in either case is not unduly high, given the many estimates that must be used in developing the figures, among them, the step-up of reported construction expenditures, particularly in the earlier years; the assumption of an eighty-year life of residential structures adopted in the calculation; and the estimates of the relation of land to structure values. While the level of the estimates of residential real estate used in this report thus appear to be compatible with census figures for the one date for which comparison is possible, judgment about the acceptability of the perpetual inventory

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method in this field, particularly in the measurement of trends rather than levels, must wait until similar comparisons can be made for the year 1960 for which census data will again be available.<sup>1</sup>

### CENSUS OF GOVERNMENT, 1956

As a part of the 1956 census of government, the Census Bureau determined the assessed value of all locally assessed residential real estate (including vacant lots) and used these figures as the basis of an estimate of the market value of residential real estate. The bridge between assessed and market values was the ratio between these two values determined from a random sample of nearly 700,000 properties made during the first six months of 1956.

On the basis of this approach the market value of residential structures, including the land underlying them (but excluding vacant lots), may be estimated at \$356 billion.<sup>2</sup> This estimate may be regarded as referring to early 1956 and may therefore be compared with an average of the perpetual inventory estimates for the ends of 1955 and 1956, which comes to \$380 billion. While an entirely satisfactory comparison would call for small adjustments of the perpetual inventory estimate in order to make it fully comparable with the census figure, the comparison of the unadjusted figures is sufficient here. On that basis, the difference between the two estimates is fairly small—\$24 billion or 6 per cent—so that the census estimate may be taken as a corroboration of the order of magnitude of the perpetual inventory estimate used here.

### *Commercial and Industrial Real Estate*

Comparison of the census estimates for "commercial and industrial real estate" derived from assessed valuations with relevant figures in our national wealth estimates is very difficult. In principle, the census figures include all locally assessed privately owned commercial and

<sup>1</sup> For a comparison of estimates based on perpetual inventory and census figures of the value of residential real estate for earlier bench-mark years, see R. W. Goldsmith, *A Study of Saving in the United States*, Vol. II, Princeton University Press, 1955, pp. 391ff.; Leo Grebler, David M. Blank, and Louis Winnick, *Capital Formation in Residential Real Estate: Trends and Prospects*, Princeton for NBER, 1956, pp. 368ff.; Margaret G. Reid, "Capital Formation in Residential Real Estate," *Journal of Political Economy*, April 1958, p. 147. The relevant figures will also be found in *Historical Statistics of the United States*, 2nd ed., 1960, p. 388, with comments, p. 383.

<sup>2</sup> The original source (*Census of Government, 1956*, Vol. V, p. 81) shows only a combined estimate for all locally assessed real estate (\$690 billion). The breakdown, including the separate estimate for nonfarm nonresidential real estate, was kindly provided by the Government Division of the Bureau of the Census.

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industrial property. This concept undoubtedly includes land and structures, but it is unfortunately not known whether or to what extent it also covers equipment. It is probable that most types of equipment are excluded, but there is a definite possibility that, at least in some states, fixed equipment is included.

It is thus impossible to match the census figure with an exactly corresponding estimate from our national wealth calculation. The best that can be done is to compare the census estimate of \$142 billion with our estimates of commercial, industrial, and private social and recreational structures and the land underlying them, excluding public utilities since most of their property is state assessed and hence not included in the census totals. We then obtain a figure of \$129 billion which can be compared with the census estimate of \$142 billion. Thus the census estimate is considerably but not radically above ours (\$13 billion or 10 per cent). Whether the difference can be accounted for by machinery that is included in the census estimates is uncertain, but it is certainly not impossible. Another part of the difference may well be due to the minor part of public utility property that is locally assessed. (Local assessment of about one-tenth of public utility property would suffice to account for the entire difference.)

### *Corporate Depreciable Assets*

For corporate depreciable assets (structures and equipment), comparisons between the estimates presented in this study and independent measures can be made only on the basis of original cost rather than of current market values. This comparison is possible because *Statistics of Income* tabulates annually the gross and net book value of the depreciable assets of all corporations submitting balance sheets as part of their tax returns—figures accounting by size of assets for very close to 100 per cent of all corporations. While the book value of depreciable assets as shown in corporate balance sheets submitted to the Treasury is not identical with original cost, because of occasional write-ups and write-downs of properties particularly in connection with mergers and similar operations, the two values are sufficiently close conceptually to justify the comparison.

Table 19 compares for each year of the postwar period the gross and net book value of the depreciable assets of all nonagricultural corporations, as reported in tax returns, with the gross and net original cost of structures and equipment derived by cumulation and, for net assets, depreciation of expenditures on structures and equipment.

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TABLE 19

COMPARISON OF ORIGINAL COST OF CORPORATE DEPRECIABLE ASSETS,  
 NBER ESTIMATES AND TAX RETURNS, 1945-57  
 (billions of dollars)

|      | GROSS VALUE       |       |       |                  | NET VALUE <sup>a</sup> |       |       |                  |
|------|-------------------|-------|-------|------------------|------------------------|-------|-------|------------------|
|      | <i>Difference</i> |       |       |                  | <i>Difference</i>      |       |       |                  |
|      | NBER <sup>b</sup> | IRSc  | Level | Annual<br>Change | NBER <sup>d</sup>      | IRSc  | Level | Annual<br>Change |
| (1)  | (2)               | (3)   | (4)   | (5)              | (6)                    | (7)   | (8)   |                  |
| 1945 | 140.4             | 132.5 | 7.9   |                  | 74.2                   | 80.2  | -6.0  |                  |
| 1946 | 147.7             | 142.5 | 5.2   | -2.7             | 81.6                   | 87.6  | -6.0  | 0                |
| 1947 | 160.0             | 156.6 | 3.4   | -1.8             | 93.4                   | 98.6  | -5.2  | 0.8              |
| 1948 | 175.6             | 172.7 | 2.9   | -0.5             | 106.9                  | 111.3 | -4.4  | 0.8              |
| 1949 | 189.2             | 186.6 | 2.6   | -0.3             | 117.3                  | 120.6 | -3.3  | 1.1              |
| 1950 | 205.6             | 199.8 | 5.8   | 3.2              | 129.3                  | 128.9 | 0.4   | 3.7              |
| 1951 | 224.9             | 218.0 | 6.9   | 1.1              | 142.8                  | 142.7 | 1.1   | 0.7              |
| 1952 | 244.6             | 233.3 | 11.3  | 4.4              | 157.8                  | 152.7 | 5.1   | 4.0              |
| 1953 | 264.2             | 249.2 | 15.0  | 3.7              | 172.3                  | 162.7 | 9.6   | 4.5              |
| 1954 | 283.2             | 265.6 | 17.6  | 2.6              | 184.6                  | 172.9 | 11.7  | 2.1              |
| 1955 | 302.0             | 287.2 | 14.8  | -2.8             | 197.5                  | 185.1 | 12.4  | 0.7              |
| 1956 | 325.4             | 314.2 | 11.2  | -3.6             | 215.2                  | 202.5 | 12.7  | 0.3              |
| 1957 |                   | 342.5 |       |                  |                        | 219.8 |       |                  |

NOTE: Corporations in agriculture, forestry, and fishery are excluded.

<sup>a</sup> Gross value less depreciation.

<sup>b</sup> Original cost values from Tables B-14, B-42, B-121, B-126, and B-127, minus original cost values from Tables B-16, B-43, B-54, B-55B, B-56, and B-58.

<sup>c</sup> *Statistics of Income*, various issues. Since the figures include up to 1953 depletable and intangible assets, the figures reported for 1945 through 1953 have been reduced by 3.8 per cent, the ratio of depletable and intangible total capital assets shown by the statistics for 1954.

<sup>d</sup> Cumulated original cost expenditures from Tables B-5, B-7, B-8, B-46, B-99, B-101, B-102, B-103, B-104, B-107, B-108, B-109, and B-119, minus those from Tables B-15, B-40, B-45, B-49, B-50, B-52, B-53.

For gross value of the stock of depreciable assets, the two estimates are quite close. While the figures derived by the perpetual inventory method are in every year slightly above those reported in corporate tax returns, the difference does not exceed 7 per cent in any year. Moreover, the increase in the gross value of depreciable assets for the post-war decade as a whole or for its two halves is virtually identical in the two series, notwithstanding some substantial differences in a few individual years. This close similarity between the gross value of corporate plant and equipment derived by the perpetual inventory method and reported in corporate tax balance sheets must mean one of two things. First, it may mean that the capital expenditures on plant and equipment underlying the perpetual inventory estimates are very close to the

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capital expenditures entered by corporations in their own books (or, more correctly, the set of books they keep for tax purposes); and that the estimates of the length of life of the different types of reproducible assets used in the perpetual inventory method are close to those employed by corporations in their own accounts. Or, second, it may mean that, insofar as there are deviations between the figures underlying the perpetual inventory method and those used in the corporation's own accounts—and undoubtedly there are—those deviations happen to cancel out, not only for the entire decade but for most individual years, when all nonagricultural corporations and all types of depreciable assets are combined. It is unfortunately not possible to determine whether the satisfactory correspondence in the aggregate series is the effect of only moderate discrepancies for individual industries and individual types of assets, or whether it is the result of very wide but fortuitously offsetting deviations.

The correspondence between the perpetual inventory and the Internal Revenue Service series is not as satisfactory for net (depreciated) values. Here the level of the perpetual inventory estimates is slightly (7.5 per cent) below the IRS figures at the end of World War II, but slightly (6.3 per cent) above it in 1956. As a result, the increase in the net value of corporate plant and equipment during the postwar decade is considerably smaller in the IRS series (\$123 billion) than in the perpetual inventory estimates (\$141 billion). Since the rise in gross value was almost identical in both series, the difference in the movement of the net values must reflect higher depreciation accumulation in the IRS series: the increase in depreciation reserves (the difference between gross and net values) is \$61 billion for the IRS series compared with \$44 billion for the perpetual inventory estimate.

The difference is in the expected direction. The perpetual inventory figures are derived on the assumption of constant straight-line rates of depreciation for a given type of asset. In contrast, the rates underlying the IRS figures have varied, and it is reasonable to assume that, as a result of both relaxations in tax legislation and changes in corporate accounting practices, there has been a general tendency toward increasing rates of depreciation on comparable assets, particularly by taking advantage of provisions for accelerated depreciation offered at several times throughout the postwar decade, and, near the end of the period, by a partial shift to declining balance depreciation. There is, however, no evidence that the length of useful life of comparable types of structures and equipment has generally shortened—and sharply so after



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1954, if the tax returns are accepted. It may be claimed, therefore, that the perpetual inventory estimates reflect economically relevant changes in the stock of plant and equipment of corporations more accurately than do the corporate balance sheets submitted to the Treasury, and that the difference between the increase in the depreciation reserves is a measure—at least a rough one—of the excessive depreciation taken in tax returns.<sup>3</sup>

### *Farm Machinery*

An additional check is possible for farm machinery against an independent, as yet unpublished, estimate developed by Zvi Griliches on the basis of the number of farm implements of different types and their current prices around the end of 1956. These estimates indicate a gross value of total farm machinery and equipment of \$33.2 billion (of which \$12.4 billion is accounted for by tractors) against a figure of \$29.1 billion in our estimates. Griliches' figures thus are about 10 per cent higher for total machinery and equipment, most of the difference occurring in tractors. On a net basis, his estimates at \$14.9 billion (of which \$5.8 billion is accounted for by tractors) are only slightly below ours (\$15.2 billion, of which \$5.4 billion is for tractors).

### *Private Land*

After completion of our calculations, a bench-mark estimate of the value of private noninstitutional land in 1956 became available, which had been derived by splitting estimates of the value of total real estate into structure and land values on the basis of assessed valuations for

<sup>3</sup> The discrepancy between depreciation accruals calculated according to the perpetual inventory method and those reported in corporate tax returns is particularly pronounced in the years 1955-56 after the liberalization in the Revenue Act of 1954. In these two years, tax depreciation was on the average about \$3.7 billion above the perpetual inventory figures. An estimate by the Machinery and Allied Products Institute (*Statistical Notes to Capital Goods Review*, No. 38, May 1959, p. 3) puts the 1955-56 additional depreciation allowances claimed—in comparison with straight-line depreciation, the method used also in the perpetual inventory estimates—at an annual average of \$3.3 billion, thus providing an explanation for most of the difference between allowances in that period. For the years 1950 through 1954 the MAPI adjustments, then primarily on account of accelerated amortization, averaged \$0.7 billion per year. For this period, however, there is no difference between depreciation accruals under the perpetual inventory method and those reported in tax returns.

The discussion here, it should be emphasized, is in terms of original cost. No allowance is made, therefore, for the underdepreciation that may be involved in basing depreciation allowances on original rather than replacement cost.

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the two types.<sup>4</sup> This estimate puts the value of land in 1956 at \$243 billion with a range, reflecting sampling error, of \$227 to \$272 billion.<sup>5</sup> The most nearly comparable figure from our estimates is \$207 billion,<sup>6</sup> or about one-seventh less than the mid-point of the range, though less than one-tenth below its lower boundary. Since the alternative estimate is available only as an aggregate for all private land, it is not possible to be certain where the differences lie or to venture a guess as to which estimate is likely to be closer to the true value—if such a term may be used at all in so complicated a conceptual and statistical situation.

### *State and Local Highways, Roads, and Streets*

A comparison of the estimates for the gross and net value of state and local highways, roads, and streets utilized in this report with two independent estimates may be worthwhile, although the other estimates are also derived by the perpetual inventory method.<sup>7</sup>

The estimates of Farrell and Paterick (which were unavailable when the original estimates were made for *A Study of Saving in the United States*, and which were discovered only after the estimates had been revised and brought up to date) and ours differ in the following respects: (1) Farrell and Paterick make no allowance for expenditures before 1914. Since our estimates assume a life of thirty years, this fact cannot account for any difference in the estimates after 1939. (2) Farrell and Paterick use an annual expenditure series developed by the Bureau of Public Roads (which includes actual payments for right of way excluded in our figures), while we utilize figures derived from the Census Bureau's *Financial Statistics of State and Local Governments*. The difference between the two expenditure series, both of which, in turn, are not entirely identical with the figures for cost of construction of state and local highways in *Construction Statistics*, are relatively small for longer periods. (3) The deflators applied to the original expenditure series differ slightly. (4) While our estimates are based

<sup>4</sup> J. S. Keiper, E. Kurnow, C. D. Clark, and H. H. Segal, *Theory and Measurement of Rent*, Philadelphia, Chilton, 1961.

<sup>5</sup> *Ibid.*, pp. 244-245.

<sup>6</sup> This is the sum of the estimates for residential land (\$55 billion), vacant lots (\$21 billion), private nonresidential land (\$42 billion), farm land (\$74 billion), and forest land (\$15 billion).

<sup>7</sup> F. B. Farrell and H. P. Paterick, "The Capital Investment in Highways," *Proceedings of the Thirty-Second Annual Meeting of the Highways Research Board*, January 1953; and J. E. Reeve, et al., "Government Component in the National Wealth," *Studies in Income and Wealth*, Vol. 12, New York, NBER, 1950, p. 520.

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throughout on a length of life of thirty years, Farrell and Paterick use separate estimates for the main components of expenditures which, when averaged, increase over the period from somewhat over twenty-five years in 1914-19 to about thirty-five years in 1947-52. For this reason Farrell and Paterick's estimates for 1952 should be above those developed here, disregarding other differences, and the discrepancy should increase with time.

Reeve's estimate, the derivation of which is not known in the same detail, also uses basic series and assumptions which differ slightly from those utilized in our estimate. For example, depreciation is set at 3 per cent for the first twenty-two years and 0.67 per cent for the next fifty-one years, but he follows the same basic approach.

The comparison of the actual estimates presented in Table 20 shows that the Farrell-Paterick estimates are virtually identical with those used here for gross stock and are moderately above those for net stock and slightly more so in 1952 than in 1945, both these differences being in the expected direction. The Reeve estimate, which is available only on a net basis, is practically the same as the Farrell-Paterick figure for 1939, but is somewhat above the other two estimates in 1945.

#### *Reproducible Tangible Wealth of the Federal Government*

Comparison is possible here also only on the basis of original cost; moreover it can be made only for gross rather than net values. The basis for comparison is provided by the Federal Property Inventory, which has been compiled for the last few years and which, in the case of reproducible tangible assets, is in principle based on original cost of acquisition to the federal government. This should make the figures conceptually comparable with the original cost estimates derived by the perpetual inventory method, at least for structures and equipment.

Table 21 shows that, for total reproducible assets of the federal government as well as for structures and equipment, the perpetual inventory estimates used in this study are slightly above the figures of the Federal Property Inventory. For structures and equipment together, the difference at the end of 1956 amounts to about \$13 billion, or 8 per cent. The relatively small difference between the two figures, considering the numerous possible sources of discrepancy, may be taken to indicate that the perpetual inventory method has in the past allocated approximately the correct amounts to capital expenditures by the federal government. It indicates, too, that the assumptions about

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TABLE 20

COMPARISON OF ESTIMATES OF GROSS AND NET STRUCTURE VALUE OF STATE AND LOCAL HIGHWAYS, ROADS, AND STREETS, SELECTED YEARS, 1929-52  
(billions of dollars; replacement cost)

| Year | Gross Value |                             |                 | Net Value   |                             |                   |                 |                 |
|------|-------------|-----------------------------|-----------------|-------------|-----------------------------|-------------------|-----------------|-----------------|
|      | NBER<br>(1) | Farrell-<br>Paterick<br>(2) | (1): (2)<br>(3) | NBER<br>(4) | Farrell-<br>Paterick<br>(5) | Reeve<br>(6)      | (4): (5)<br>(7) | (4): (6)<br>(8) |
| 1929 |             | 8.0                         |                 |             | 6.5                         |                   |                 |                 |
| 1939 |             | 19.0                        |                 |             | 14.0                        | 14.3              |                 |                 |
| 1945 | 34.0        | 35.0                        | 0.97            | 18.9        | 22.0                        | 25.7 <sup>a</sup> | 0.86            | 0.74            |
| 1949 | 46.9        | 45.0                        | 1.04            | 23.6        | 28.5                        |                   | 0.83            |                 |
| 1952 | 59.7        | 60.7                        | 0.98            | 30.5        | 36.9                        |                   | 0.83            |                 |

SOURCE, BY COLUMN

- (1 and 4) 1929-39: From worksheets for *A Study of Saving . . .*  
1945-52: Gross values from cumulation of constant (1947-49) expenditures for highway construction, Table B-138; original expenditures, Tables B-136 and B-140, converted to constant (1947-49) values by applying annual average highway index from Table B-143. Replacement cost then derived by multiplying cumulative gross values in constant prices by year-end deflation from Table B-143.  
Net values from Table B-138 and from state and local portion of Table B-150, less value of "other construction" from statistical worksheets.
- (2 and 5) 1929-45: Values in 1953 prices read off from Figure 4 of Farrell and Paterick, *op.cit.*, and adjusted to current prices by construction cost index in its Table 1.  
1952: *Ibid.*, pp. 7 and 10.  
These figures exclude expenditures made before 1914 which are included in cols. 1 and 4.
- (6) J. E. Reeve, *et al.*, *op.cit.*, p. 487.

<sup>a</sup> 1946.

length of life of the different types of assets made in applying the perpetual inventory method correspond roughly to the actual lives, since the federal inventory includes—at full undepreciated original cost—all items of structure and equipment not actually discarded.

The reasonably good correspondence in the aggregate figure may, of course, hide offsetting differences of considerable size for different types of assets. Table 21 indicates that this is so, even when only a few broad categories of assets are distinguished. The correspondence remains satisfactory for military equipment, the item for which a substantial discrepancy would have been the least surprising. For both civilian and military structures, however, the perpetual inventory estimates are considerably higher—by about one-half and one-fourth respectively—than the Federal Property Inventory figures. The dis-

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TABLE 21

COMPARISON OF NBER AND FEDERAL PROPERTY INVENTORY ESTIMATES OF FEDERAL REPRODUCIBLE ASSETS, 1956

(billions of dollars; original undepreciated cost)

|                  | Federal<br>Property Inventory<br>(1) | Hubbell<br>(2) | NBER<br>(3)  |
|------------------|--------------------------------------|----------------|--------------|
| <b>Civiliana</b> |                                      |                |              |
| Structures       | 16.5                                 | } 29.0         | 25.1         |
| Equipment        | 10.6                                 |                | 5.8          |
| Inventories      | 14.5                                 |                | 6.1          |
| <b>Total</b>     | <b>41.6</b>                          | <b>35.1</b>    | <b>43.5</b>  |
| <b>Military</b>  |                                      |                |              |
| Structures       | 21.8                                 | 22.9           | 26.7         |
| Equipment        | } 109.5                              | 97.2           | 107.6        |
| Inventories      |                                      | 6.3            | 5.9          |
| <b>Total</b>     | <b>131.3</b>                         | <b>126.4</b>   | <b>140.2</b> |
| <b>Total</b>     | <b>173.1</b>                         | <b>161.5</b>   | <b>183.7</b> |

SOURCE, BY COLUMN

- (1) Averages of figures for June 30, 1957 and 1956 from *Federal Real and Personal Property Inventory Report . . . as of June 30, 1958* (Committee on Government Operations, U.S. Congress, 1959), pp. 11 and 139. Structures outside the U.S. are excluded.
- (2) Robert Hubbell, unpublished estimates.
- (3) Civilian: Cumulation of original cost gross expenditures from Tables B-158 to B-162, and B-165, plus AEC gross stock from Table B-172A, plus inventories from Tables B-156 and B-173.  
Military: Table B-172A.

<sup>a</sup> Including government corporations and the Atomic Energy Commission.

crepancy may be due to an overestimation in our calculations of either capital expenditures made by the federal government or the length of life of structures or of both. On the other hand, the perpetual inventory estimate of civilian equipment is considerably lower—by about two-fifths—than the Federal Property Inventory figure. This may reflect an underallocation of the proportion of total produced equipment that is bought by the federal government, or an underestimation of its actual life. The fact that the combined totals for civilian structures and equipment are considerably closer in the two estimates than the totals are for either of the two components suggests that the definitions of structures and equipment in the two series may differ considerably.

The comparison of the perpetual inventory estimates of federal reproducible assets with the bench mark provided by the federal inventory thus suggests that, while the estimates for structures and

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equipment together seem to be of the correct order of magnitude, great care must be taken in using the perpetual inventory estimates for any one of the components of federal reproducible assets. The Federal Property Inventory figures are not yet complete, refined, and reliable enough for us to be sure that they are in all respects superior to the estimates derived by the perpetual inventory method, but the substantial differences between the two series undoubtedly suggest caution in the use of the latter.<sup>8</sup>

Since the fiscal year 1952, an alternate estimate of the capital expenditures of the federal government (excluding stockpiles but including acquisition of land and structures) has been available from the Census Bureau.<sup>9</sup> These figures are in the aggregate slightly above the estimates used in this report. For the entire period from 1952 to 1957 the excess amounts to about 6 per cent. However, the census figures are considerably above ours for construction—which accounts for only about one-fifth of the total capital expenditures of the federal government—and exceed them for 1952-57 by almost one-fifth. On the other hand, the census figures for other capital expenditures, mostly military equipment, are about one-tenth below our estimates, probably because of some differences in classification. Differences for individual years, of course, are sometimes substantially larger. Since the census figures are not given in sufficient detail to permit the application of the perpetual inventory method, since they are provided only for fiscal years and are not available before 1952, they have not been used in the derivation of our estimates. The effect, if used, on our estimates of the stock of structures and equipment of the federal government between 1952 and 1958 would be small, particularly in the case of the net stock.

### *Conclusion*

For all assets examined, the available bench-mark figures corroborate the order of magnitude of the perpetual inventory estimates used in this study, at least for broad asset categories. This gives some assur-

<sup>8</sup> A third estimate (Table 21, col. 2), which came to our attention only after the calculations were completed, is in the aggregate slightly (7 per cent) below the Federal Property Inventory figures and somewhat more (15 per cent) below our own estimates. This is a result chiefly of higher estimates on our part for civilian inventories and military structures. Hubbell's and our figures are almost identical for civilian structures and equipment, and are only 12 per cent apart for the largest item, military equipment.

<sup>9</sup> See *Census of Government, 1957*, Vol. IV, 3, p. 14; and *Annual Summary of Government Finances* (Bureau of the Census), various issues.

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ance that the perpetual inventory method can be used to derive such estimates, and that no large-scale mistakes have been made in its application to the national wealth of the United States in the postwar period—provided we accept the census data used here for comparison as sufficiently accurate. We do not yet have satisfactory bench-mark figures for either narrower asset categories, or for holdings of tangible assets cross-classified by sectors. Even here, however, the comparisons that can be made do not clearly point to a distortion, at least, in the perpetual inventory estimates.