

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

Volume Title: Studies in Income and Wealth

Volume Author/Editor: Conference on Research in Income and Wealth.

Volume Publisher: UMI

Volume ISBN: 0-870-14163-5

Volume URL: <http://www.nber.org/books/unkn46-2>

Publication Date: 1946

Chapter Title: PART ONE: Taxes, Government Expenditures, and National Income

Chapter Author: Gottfried Haberler, Everett B. Hagen

Chapter URL: <http://www.nber.org/chapters/c5692>

Chapter pages in book: (p. 1 - 32)

PART I

Taxes,  
Government Expenditures,  
and National Income

GOTTFRIED HABERLER

*Professor of Economics, Harvard University*

and

EVERETT E. HAGEN

*Office of War Mobilization and Reconversion*

This paper was written during the winter of 1943-44 and was slightly revised in the light of the discussion at the Conference.



The national dividend equals the "sum total of things and services produced" (Alfred Marshall, *Economics of Industry*, Macmillan, 1901, p. 235).

"It is better frankly to exclude taxes from the income of taxpayers and to include benefits from public expenditure, in so far as they can be estimated, in the income of the beneficiaries" (Hugh Dalton, *The Inequality of Incomes*; Dutton, 1920, p. 166).

From Marshall's simple formulation to Dalton's was a major step in national income computation. It was by no means the last step toward a correct treatment of government revenues and expenditures; nor were all implications of Dalton's statement seen immediately. Vigorous discussion during the succeeding twenty-five years has led to general agreement on many points, but not on all.

The tremendous increase in governmental economic activities and in the percentage of national income used by governments for communal purposes, already begun before the war, makes it absolutely essential in theory and practice to devise a proper treatment of taxes and government services, expenditures and borrowing in the calculation of national income or national product. Several papers prepared for preceding Income Conferences present what seem to us elements of a correct theory.<sup>1</sup> Certain European discussions also offer concepts we regard as correct.<sup>2</sup> However, the reasons for the adoption of particular concepts have not been analyzed adequately. Moreover, what to us is the correct theory is not accepted generally, and the uses to which national income estimates have been put in wartime bring up some new problems. We feel also that the actual practices in several countries do not live up to theoretical standards. All this seems sufficient justification for going over the whole issue again.

We are concerned exclusively with questions of definition and measurement, not with questions of cause and effect; e.g., we do

<sup>1</sup> *Studies in Income and Wealth*, Vol. One, Part Two, by Clark Warburton; Part Five, by Gerhard Colm; Vol. Two, Part Three, by Gottfried Haberler, Part Six, by G. C. Means, with Lauchlin Currie and R. R. Nathan concurring; and Vol. Six, Part One, by John Lindeman. The similarity of some of our conclusions to principles advocated in one or another of these papers is obvious.

<sup>2</sup> See especially *Einzelchriften zur Statistik des Deutschen Reiches*, Nr. 24: *Das deutsche Volkseinkommen vor und nach dem Kriege* (Statistisches Reichsamts, 1932), and Erik Lindahl *et al.*, *National Income of Sweden, 1861-1930* (King, London, 1937), Part One, Ch. I.

not discuss the influence of government expenditure on national income through the operation of the multiplier or the acceleration principle.

## 1 NATIONAL INCOME AND NATIONAL PRODUCT: TWO SIDES OF AN EQUATION

National income can be defined and measured in terms of either production or income.<sup>3</sup> It equals national product or output.<sup>4</sup> (Unless otherwise stated we use these terms in the *net* sense.) Since all output can be allocated to individual economic units national income is the sum of individual incomes. It is convenient to understand by 'individuals' not only 'natural persons' (which in any case would have to be defined as 'households' rather than as persons), but also legal persons, public and private corporations, societies, etc., making suitable provisions for the elimination of double counting (e.g., in the case of dividend payments and undistributed profits of corporations). A possible alternative would be to allocate all income of such collectivities to their members (shareholders or, in the case of public bodies, the citizens). But in many cases it is more convenient to list the undivided income of these collectivities and to attribute it to the corporation or society as such.

Conceptually, the approach from the real, production, side is easier. National income defined as the money value of output is a good guide through the intricacies of the other approach. The sum of individual incomes must equal the money value of net output, which is the same as total expenditures on net output.

<sup>3</sup>For a more comprehensive statement of this point see the excellent paper by Ta-Chung Liu and Shan-Kwei Fong, *International Comparisons of National Income*, Part IV.

<sup>4</sup>This convention seems rather generally accepted in the literature. Occasional deviations are due to carelessness in defining terms or to differences in the coverage of the data (income data cover a larger area than production figures). A. G. Hart seems to be an exception. He wishes, as he said at the Income Conference, to make a sharp distinction between 'national income' and 'national product', restricting 'national income' to the sum of individuals' incomes whose size is a determinant of their expenditures ('income payments to individuals'), while 'national product' would cover additional items, such as government output not sold on the market. We do not wish to argue purely terminological questions. Suffice it to say, even if we make the distinction Hart proposes, both totals could be approached either from the income or from the production side.

J. R. Hicks distinguishes between National Income and National Output by including income from foreign investment in the former but not in the latter. (*The Social Framework*, Oxford, 1942, p. 121). He feels that calling income

## 2 A TEST OF INVARIANCE

An important corollary of the postulate that national income is the sum of individual incomes and is equal to the money value of the net national product is the often violated rule that the measure of national income should be invariant to purely monetary, financial, and institutional changes that do not change real output or its money value.

To be more specific, the measure of *real* (i.e., deflated) national income should be invariant to all purely institutional, monetary, and price changes. For example, a method of measurement that indicates a change in real income if the government takes over certain activities and the individuals pay for them in taxes rather than in prices in the market; or a measure that indicates a change if the government changes its method of financing (substitution of taxes for borrowing or direct for indirect taxes) cannot be correct; for it would show a change even if all quantities of goods and services produced remained unchanged.<sup>5</sup>

The measure of *money* national income (i.e., undeflated income in current dollars) can, of course, not be invariant to changes in money prices. But it should be invariant to purely institutional changes that may leave prices and quantities unchanged. A substitution of borrowing for taxes is a case in point. If people are handed government bonds instead of tax receipts, prices and quantities of goods and services may remain unchanged.<sup>6</sup> Hence all methods of measurement for which merely institutional and financial changes make a difference are ruled out as incorrect by our test.

True, our invariance test is only negative. It definitely rules out certain methods, but a method that meets it may still have to be rejected, if deficient in other respects. It is, however, a

---

from foreign investment part of current output (as Meade and Stone do in Tables of National Income, etc., *Economic Journal*, Vol. 51, June-Sept., 1941) would stretch the term 'output' too much.

<sup>5</sup> An example of the invariance test from another field, with which we are not here concerned, is provided by Pigou's remark that national income should not be said to change when a bachelor marries his cook (*The Economics of Welfare*, 4th ed; Macmillan, London, 1932; p. 33).

<sup>6</sup> It is not argued that such a change in the method of financing *does* not make any 'real' difference. It is only argued that it *may* not make any difference and that a correct income measure should register a change in income only when, and to the extent that, it makes a difference to prices and for quantities.

sufficient basis for rejecting certain of the currently used methods.

### 3 SEVEN EQUIVALENT DEFINITIONS OF NATIONAL INCOME

We now proceed to formulate several alternative but equivalent definitions of national income, most of which have been used at one time or another in the theoretical or statistical literature. But their equivalence has not always been made clear or even realized.

The first and second definitions relate national income to output and production, while the remaining ones run in terms of income.

- 1) National income *equals* privately produced consumption goods and services  
     *plus* private net investment (i.e., the value of the increment in privately held capital stocks)  
     *plus* government services to consumers  
     *plus* government net investment.

This formula is simply the familiar one, income equals consumption plus net investment, with the right hand side divided into a private and a government part. On the government side, the distinction between consumption and investment, between gross and net investment, and the correlated distinctions between consumable services or services to consumers and intermediate or cost services, are in both theory and practice extremely difficult to make. But we are convinced that they are necessary and we discuss some of the specific problems below.

In formula (1) intermediate governmental services to private business are not shown separately, because they are included in private output. (Similarly public output contains intermediate services received from private enterprise.) In formula (2) intermediate governmental services appear separately:

- 2) National income *equals* privately produced consumption goods and services  
     *plus* private net investment  
     *plus* total government output  
     *minus* government intermediate services.

Viewing the private part of the economy from the income side, we derive several alternative formulas. We define 'individual income' (which includes undistributed corporate profits because 'individuals' include legal persons) to mean income *after* all taxes, indirect as well as direct.<sup>7</sup> Let us assume that the govern-  
<sup>7</sup> 'Indirect taxes' is used in the sense of business taxes covering all taxes, fees,

ment finances itself entirely by taxes. Then privately produced consumption commodities and services plus private net investment equals individual incomes,<sup>8</sup> and our formula becomes:

- 3) National income *equals* individual incomes  
     *plus* government services to consumers  
     *plus* government net investment.

If individual incomes were defined so as to include government services rendered to consumers, the second item would not appear.

Now suppose the method of financing were changed from taxing to borrowing, everything else remaining the same. Instead of a tax receipt the individual receives a government bond, or a bank receives the bond and the individual receives a deposit. Individual income now equals expenditures for consumption plus private investment plus borrowing by the government; i.e., expenditure on consumption plus private investment equals individual income minus government borrowing. The formula now becomes:

- 4) National income *equals* individual incomes  
     *plus* government services to consumers  
     *plus* government net investment  
     *minus* government borrowing.

Failure to deduct government borrowing would violate the rule that our measure of national income must be invariant to purely financial changes. Suppose borrowing is substituted for taxes. Since we define individual incomes as after taxes, they are larger by the amount of taxes displaced by borrowing. If borrowing were not deducted, national income would be greater than formerly.

Government and private borrowing must be treated differently. Private borrowing, since it increases the borrower's liability, is taken into account in determining the borrower's income. Hence it need not be deducted from the sum of individual incomes. We could, of course, treat government in the same way as a private enterprise, defining government income as consumable services rendered by public agencies plus increments in assets

---

etc. paid to the government by business enterprises, e.g., corporate income tax and sales taxes. Direct taxes are all others.

<sup>8</sup>It should be remembered that individuals include also government officials, functionaries, etc.



and liabilities; then no separate allowance would need to be made for government borrowing.<sup>9</sup> But as this is never done, we would be counting double if we did not deduct borrowing.

All net borrowing by government, not just borrowing from banks, must be deducted, because all is offset by an increase in individual saving. The income of any individual is defined as consumption plus saving, and saving (positive or negative) as the value of increments in assets and liabilities.<sup>10</sup> Assets can be subdivided into real assets (real goods of all descriptions, plus foreign claims) and claims (domestic securities, loans, money and bank deposits but excluding foreign currency, gold and foreign securities). If we add individual incomes, claims and liabilities cancel, except claims on the government (and except foreign claims, which we list together with real goods). Individuals other than banks hold government securities and cash originating from government expenditures financed by borrowing from banks. The cash, deposits, and notes held by individuals are a liability of the banks, against which the banks hold government bonds. Therefore the sum of individual incomes equals expenditure for consumption plus private investment plus borrowing by the government; i.e., expenditure on consumption plus private investment equals individual incomes minus government borrowing.

To elucidate further: Suppose the government borrows one billion dollars from the banks and pays employees who perform services to consumers. If the income period ends before the officials spend the money on consumption, the corresponding real income is the value of these services; i.e., one billion dollars. But if we did not deduct government borrowing, we would get a national income of two billion: the income of the officials plus the value of the services they render to consumers. If the income period ends after the government officials have consumed their income, national income is greater by the amount of their expenditures, but since someone else holds the money we still over-

<sup>9</sup> This would be true only if we assume that government services are worth the government outlay for them. Concerning this equivalence, see below.

<sup>10</sup> We might define saving as the change in net worth during the period under consideration. Unless appropriately qualified, this formulation would, however, include changes in net worth due to changes in the prices of assets held (capital gains). Since we want to exclude them, the formula in the text is correct. If anyone wants to include this item, he is, of course, free to do so.

estimate national income by one billion dollars if we add all incomes plus the value of government services to consumers, and do not deduct government borrowing.

For reasons stated below, we believe that the value of government services to consumers or to business enterprises and of government net investment can be measured only by their cost, that is, by government outlays for these purposes. Total government outlays other than transfer payments may be classified, by purpose, as outlays for services to consumers, for investment (whether replacement or new), and for intermediate services. Services rendered by existing capital must be allocated among the three purposes, and depreciation subtracted from investment. If we include in outlay imputed payment to existing capital for its services in production we get:

Government outlay for services to consumers, for net investment, and for intermediate services *equals* government payments to factors or to private enterprises for goods and services used in producing current services for consumers  
*plus* government payments to factors or to private enterprises for goods and services used in producing intermediate services  
*plus* government payments to factors or to private enterprises for goods and services used in making (gross) additions to government-owned capital  
*minus* depreciation.

If we eliminate the second term on the right (since intermediate services are included in the value of private output) and substitute the remaining three terms for the second and third terms on the right side of formula (3), we obtain the following alternative definition:

5) National income *equals* individual incomes  
*plus* government payments to factors or to private enterprises for goods and services used in producing current services for consumers  
*plus* government payments to factors or to private enterprises for goods and services used in making (gross) additions to government-owned capital  
*minus* depreciation  
*minus* government borrowing.<sup>11</sup>

<sup>11</sup> Whereas we regard government output as equal to government payments to factors, Kuznets would subtract from those payments government 'dissaving' (the

It should be remembered that in formulations (3), (4), and (5), individual income is defined as income after taxes. If we define income before taxes, we get the following formulae:

- 6) National income *equals* the sum of all individual and undistributed corporate incomes, before direct taxes  
*minus* transfer payments of the government  
*plus* indirect taxes  
*minus* government intermediate services.
- 7) National income *equals* total payments to factors before taxes  
*plus* indirect taxes  
*minus* government intermediate services.

Formula (7) is equivalent to (6) because payments to factors automatically eliminates transfer payments. (Transfer payments are not made for productive services, i.e., not to individuals *qua* factors.)

It should be emphasized once more that all seven expressions for national income are, by definition, equivalent to one another in the sense that they necessarily add up to the same total.

#### 4 FORMULATIONS OF OTHER ECONOMISTS

To bring into relief certain differences in concepts we now compare our basic definitions of national income with other formulations. All writers cited apparently accept the convention that national income is equal to the sum total of goods and services produced; differences in treatment arise from disagreement concerning the correct monetary equivalent of the flow of goods and services.

J. C. Stamp, writing in 1916, concluded that "when all the different concepts have been studied, we come back to the fact that the sum total of wages, salaries, profits, and interest presents

*Note 11 concluded:*

excess of government borrowing over public net capital formation). We discuss Kuznets' theory in some detail below (Sec. 6), but it may be noted at this early point that his procedure is not equivalent or similar in effect to our subtraction of government borrowing from the private component when we view it from the income side, but is a further subtraction. Kuznets treats a government deficit on current account—i.e., a deficit before covering expenses of net capital formation—as equivalent to a loss of a private enterprise. Accordingly, he would subtract the deficit on current account (the difference between the total deficit and public net capital formation) from payments to factors. Similarly, if there is a surplus on current account he would add it as government saving to payments to factors. Thus our formulae (5), (6), and (7) may be converted into Kuznets' formulation by introducing a further term: 'plus government saving' or 'minus government dis-saving'.

a fairly comprehensible idea, free from important ambiguities, for ordinary comparative purposes".<sup>12</sup>

Edwin Cannan, three years later, recognized that production paid for by the state out of indirect taxes is not recorded in incomes of individuals. He excluded it from national income, but because of a palpable error—failure to distinguish between an increase in real income and in money income. He argued that to include public income from indirect taxes in national income must be wrong, since substitution of indirect for direct taxes causes an apparent increase in national income without any change in real output. He failed to realize that when money national income increases, prices rise by an equal percentage, so that deflation of the money income figures indicates, as it should, unchanged real income.<sup>13</sup>

Dalton's proposal for treating government output is quoted at the beginning of this paper. Aside from his ignoring government borrowing, his position is one all schools would agree with. His suggestion for measuring government-produced income is, however, to include it only when the benefit received by a specific individual can be measured.

A. L. Bowley, writing in 1922, pointed out the necessity of eliminating transfers from total individual incomes, and noted Cannan's error in failing to convert money into real income.<sup>14</sup> Strangely enough, however, he did not see clearly the problem Cannan and Dalton had posed. Instead, confusing income and expenditure flows, he concluded that it would be consistent with Dalton's principle to include direct taxes but to exclude income received from government, and proposed as the measure of national income the sum of individual incomes before taxes, minus transfers. The effect would be to exclude completely benefits flowing from government.

In *The Economics of Welfare* A. C. Pigou originated an opposing tradition by arguing that the correct measure is individual incomes before taxes, minus transfers, *plus indirect taxes*. His reason was that since indirect taxes push up prices by nearly their amount, and since money income is deflated by indexes based upon prices, indirect taxes must be included in the monetary

<sup>12</sup> *British Incomes and Property* (King, London, 1916), p. 416.

<sup>13</sup> *Wealth* (King, London, 1919), pp. 156-60. See also Sec. 9 below.

<sup>14</sup> The Definition of National Income, *Economic Journal*, March 1922, pp. 7-11.

measure if the deflated measure is correctly to represent real income. Colin Clark first fell into Cannan's error, then accepted Pigou's argument.<sup>15</sup> The more fundamental reason for including indirect taxes, recently advanced by J. C. Hicks,<sup>16</sup> is discussed below.

British and American official estimates of national product reflect the differences of view stated briefly above. *National income at factor cost*, as used in the British White Papers, equals total payments to factors<sup>17</sup> (excluding interest on the national debt). This is avowedly a measure of the factor cost of national product. Assuming for the moment that the interest on local public debt correctly measures the net services of government-owned durable goods (see Sec. 6), this measure differs from national income as we define it by the amount of the difference between indirect taxes and the intermediate services of government. *National income at market prices* equals national income at factor cost *plus* indirect taxes, thereby (if the net services of government-owned durable goods are correctly measured) exceeding our net national product by the amount of the intermediate services of government.

*National income* as defined by the United States Department of Commerce equals total payments to factors (including all public interest payments), but differs from 'national income at factor cost' in several items of inclusion or exclusion. It is difficult to say whether the Department of Commerce concept, when formulated, was regarded as a measure of factor costs or of output at market prices in which indirect taxes are subtracted out as equal to the intermediate output of government.

*Gross national product* or expenditure, as defined by the Department of Commerce, adds to national income not only indirect taxes but also business charges to depreciation, depletion, and other reserve accounts. Gross national product exceeds national income as we define it because of the treatment of depreciation, etc. (with which we are not concerned here), and also by the

<sup>15</sup>*The National Income, 1924-1931* (Macmillan, 1932), p. 2; *National Income and Outlay* (Macmillan, 1937), pp. 11-2.

<sup>16</sup>Valuation of Social Income, *Economica*, May 1940. See Sec. 9 below.

<sup>17</sup>It should be recalled that 'payments to factors' is used to mean payments for services (thus excluding mere transfers) before deduction of direct taxes, just as income of individuals, unless otherwise specified, is used to mean income after direct taxes.

amount of government intermediate output *plus* the transfer payments included in public interest payments.

Except possibly for the Department of Commerce national income concept, none of the four concepts purports to measure the market value of final products (consumption plus investment); for in neither national income at market prices nor gross national product is there any deduction for the intermediate services of government, presumably because of the difficulty of measuring them rather than because of failure to recognize their existence.

Kuznets proposes to measure government intermediate services by indirect taxes. His national income (at market prices), payments to factors *minus* government expenditures financed by borrowing *plus* net government investment, differs from the measure we propose not only in the measurement of government intermediate product but also in that it measures the total value of government current services by tax receipts rather than by government payments to factors. His gross national product equals his national income plus business charges to depreciation, depletion, and other reserve accounts. The 'grossness' is thus of a sort not relevant to the present discussion.

Some writers have proposed to differentiate government net investment and government services to consumers from government intermediate services by examining directly the nature of government activities. Gerhard Colm, Clark Warburton, and R. W. Nelson and Donald Jackson have presented such allocations of government expenditure in the United States in preceding volumes of *Studies in Income and Wealth*.<sup>18</sup> Official national income statistics of prewar Germany rely upon the same sort of allocation, as do national income data for Sweden prepared by the Institute for Social Sciences in the University of Stockholm.<sup>19</sup>

## 5 MARKET PRICES OR FACTOR COSTS

National income equals net national product, i.e., consumption

<sup>18</sup> Public Revenue and Public Expenditure in National Income, Vol. One, pp. 175-221; Three Estimates of the Value of the Nation's Output of Commodities and Services; A Comparison, Vol. Three, pp. 319 ff; Allocation of Benefits from Government Expenditures, Vol. Two, pp. 317 ff.

<sup>19</sup> See *Einzelchriften zur Statistik des Deutschen Reiches*, No. 24; *Statistisches Jahrbuch für das Deutsche Reich*, successive volumes for 1931-38; and *National Income of Sweden, 1861-1930*.

plus investment. At least as far as consumption goes, the modern theory of index numbers and of welfare economics has provided us with the basis for a rational solution of the index number problem involved in converting money income into real terms:<sup>20</sup> the various products entering national income should be valued at the prices paid by final consumers ('market price'), not as the sum of payments to factors incurred in producing them ('factor cost').<sup>21</sup> Clark and Pigou suggest that to compare real incomes in two periods national product at market prices must be used. But their reason, absence of indexes of prices ex-taxes, is not the fundamental one. Even if both sets of price indexes were available, it would be necessary, as Hicks points out, to use the prices of products cum-tax, and to deflate by indexes that reflect the same prices. In the equation

$$\frac{\text{Real Income of Second Period}}{\text{Real Income of First Period}} = \frac{p' q'}{p' q} \quad \text{or} \quad = \frac{pq'}{pq}, \text{ or a}$$

combination of the two, the  $p$ 's must be prices that confront ultimate users and hence are relevant to their choices.

Not all writers have realized that the use of market prices or factor costs in measuring national income and the effect of the imposition of excise taxes upon the distribution of output are two different questions. The imposition of excise taxes, of course, causes a shift in the allocation of resources, which entails some social loss. The taxed article is produced in 'too small' quantities. Weighting by prices, including the tax, attributes to the taxed commodity a total importance greater than, equal to, or less than the importance it would have if no tax were imposed according as the price elasticity of the commodity is less than, equal to, or greater than unity over the relevant price range. But this is the importance consumers' choices actually give the commodity once the tax has been imposed. Ignoring the tax in the weighting will not accord the commodity the importance it would have without

<sup>20</sup>For a brief but incisive discussion and references to the literature see the article by Hicks.

<sup>21</sup>There is a theoretical difficulty here we do not discuss: the rationale of using market prices is that they indicate marginal rates of substitution. Under monopolistic conditions, prices do not necessarily reflect the marginal rate of substitution. In evaluating these difficulties it should be remembered, however, that what matters here is monopoly on the buyer's side, i.e., 'monopsony' of the consumer. Monopolistic selling prices do not impair the applicability of the theory. A more serious impairment occurs under rationing (see below).

the tax; the commodity will merely be underweighted. In any case, what is wanted is not the importance the commodity would have under some 'ideal' condition; it is the importance the commodity actually does have. To measure that, we must include the tax in the weighting factor.

Hicks points out that when goods are rationed and their prices controlled—in other words, when the market price does not represent the full value to consumers—market prices are not the correct measure of the values of items entering net national product. The only alternative to using market prices, however, is to raise the prices of rationed goods to a level estimated to indicate the marginal rate of substitution between them and other goods. This would introduce a subjective element into the calculation. Perhaps the least objectionable course is to use market prices, recognizing that they are defective as a measure of marginal rates of substitution when goods are rationed as well as at other times in a world that is never in stable equilibrium.

The principle that market prices should be used suggests that goods whose production is subsidized should be included at their market value, not at that value plus the subsidy, but only if the price of the subsidized goods is a price in a free market. If the good is rationed (and price-controlled), the use of the market price plus the subsidy may be justifiable. In this case the price index used for purposes of deflation must reflect the prices of the subsidized item plus the share of the subsidy per unit.

Services paid for out of revenues derived from indirect taxes are furnished to consumers without cost, other than the costs that have already entered into the value of other services.<sup>22</sup> Bowley has suggested that, for purposes of national income computations, the price of such services should be regarded as zero.<sup>23</sup> Hicks' reply is that since these services are not furnished in unlimited quantities, they are not free goods in the economic sense. Rather they are rationed goods, and the price at which they are offered on the market therefore does not reflect the marginal rate of substitution between them and other goods. But although Bowley's argument is incorrect, the reason Hicks gives is certainly

<sup>22</sup> This assumes that there are services furnished to consumers financed by indirect taxes; concerning this, see Sec. 7.

<sup>23</sup> *The Measurement of Real Income*, *The Manchester School*, April 1940.



not the right one. Even if government furnished services in such abundance that to consumers they were free goods, they would still yield a utility that should be included in national income. The confusion arises from the tacit assumption that free goods yield no satisfaction to consumers. While in measuring national income it seems impossible to avoid the anomalies that arise from disregarding goods offered free by nature, the anomalous treatment need not be extended to products of government simply because they are not sold for a per unit price.<sup>24</sup>

The distinction between national income at market prices and at factor cost has been made popular in recent years by the British White Papers on War Finance.<sup>25</sup> National income at factor cost is defined as national income at market prices *minus* indirect taxes. Many British economists seem to have a vague feeling that national income at factor cost is a more 'fundamental' or more 'real' measure. We do not share this view. On the contrary, national income at factor cost is decidedly inferior. It cannot meet our invariance test, for it will indicate a change in real as well as in money national income when purely financial changes occur.<sup>26</sup> Suppose that a sales tax is replaced by an income tax, that all prices and quantities of goods and services (including public services) remain the same, and that wages and salaries rise by the full amount of the tax;<sup>27</sup> national income at factor cost would be larger by the amount of the tax.

<sup>24</sup> The difficulty caused by failure to include in income the services of free goods has attracted little attention, perhaps because the main purpose to which national income estimates have so far been put has been to measure the change over time in income received (or produced) in a given area. For such a purpose, the services of free goods may safely be left in the *ceteris paribus* category; since they remain substantially constant from one year to another, ignoring them does not lead to serious error. However, it would not be valid to compare income per capita in Maine with that in Mississippi, or income in Norway with that in Italy, without allowing for the expenditure of resources in Norway or Maine on keeping warm, which is unnecessary in the more temperate climate because the services are freely furnished by nature.

<sup>25</sup> Cmd. 6261/1941, 6347/1942, 6438/1943 and 6520/1944. All have been reprinted in Federal Reserve *Bulletins*, for July 1941, August 1942, June 1943, and July 1944. Unfortunately, the reprint in the July 1944 issue of the *Bulletin* omits data for 1939 presented in Cmd. 6520.

<sup>26</sup> Unless a 'deflator' is designed specifically to compensate for the aberration in the measurement of national income in current dollars. Resort to this procedure would constitute an admission of the inappropriateness of measuring national income 'at factor cost'.

<sup>27</sup> The only difference is that the sums business enterprises heretofore paid as sales taxes to the government they now pay as wages and salaries to 'factors', and

Contrary to the impression that may be created by the phrase 'in terms of factor cost', the total so designated is in no sense a measure, or an approximation to a measure, of real (factor) *input*, in contrast to the *output* of finished goods.<sup>28</sup>

#### 6 TAX REVENUES OR PAYMENTS TO FACTORS AS A MEASURE OF PUBLIC PRODUCT

The principle to be followed in evaluating governmental services is not as clear as that for evaluating private output. For the purpose of arriving at a single national income total, the evaluation should be such that public and private output can be added; but in view of the fundamental difference between private and public output there are strong objections to adding them. The private economy is a market economy. Purchases on the private market are determined by the choice of individuals (or of groups), and the desirability of each good is weighed against its price. Business enterprises furnishing goods for the market may be assumed to be motivated primarily by the hope of reaping profits. So far as the disposal of its final products is concerned, the public economy is not a market economy. In wartime means other than price inducements are used to procure the services of factors, and even in peacetime the government's relations with its employees are affected more largely than in the private market by the realization that its employees are also consumers and voters. Not least important among the differences between the public and private economy is the fact that services are rendered by government for the specific reason that it is felt improper to permit them to be furnished by private enterprise for a price, or because private enterprise will not produce them to meet private demand. Among public services are those the individual who is

---

the latter pay them to the government as income taxes. It is, of course, not contended that this is likely to be the sole effect of such a modification in the methods of financing. But the actual effect should be measured through the impact of the financial changes on prices and quantities.

<sup>28</sup> Nor can it become such a measure if deflated by an index of factor prices, assuming that such an index could be constructed. Volume of factor input (in physical or value terms) is a very vague term, much more so than volume of output. In any case it would have to be constructed by aggregating quantities or values of individual factors. If an attempt were made to convert a volume of output into a volume of input, allowance would have to be made for changes in the efficiency of factors.

forced to support them would not purchase on the market simply because if he didn't the services would be furnished anyway, and if they were furnished, he would benefit without paying the price asked; e.g., military protection or street lighting. Some public services are forced upon the consumer because though he would not choose to buy them, his refusal to accept them would harm others; e.g., public health services.

Despite these incommensurabilities of public and private output, a measure that combines them is needed for various purposes. Some empirical compromise is the only way out. In a mixed system where the enterprise of the market is dominant it seems reasonable to apply market methods of measurement in some fashion or other to the public sphere. For example, Kuznets regards government tax revenues minus transfer payments as the sales price of services currently furnished by government.<sup>29</sup> But Kuznets' analogy with the market is by no means the only possible or plausible one. The value of the services of a private enterprise can be measured not only by the total sales price but also by its total payments to factors, if taxes are regarded as indirect payments to factors. Analogously, the value of governmental services too can be measured by payments to factors, thus becoming equal to tax revenues plus public borrowing minus transfer payments. Total payments to factors by government as a measure for the value of public services may be indicated also by still another analogy. In measuring private output, the value of current products not placed on the market is taken as equal to their cost. Since government products are not placed on the market for sale, analogy would suggest measuring their value by their cost. Finally, government may be regarded as an association of consumers purchasing services as a group, instead of as an industry or an enterprise.<sup>30</sup> For certain government units and activities, this is clearly the appropriate analogy. If adopted as a guide to the measurement of the value of services produced in the public sector, the appropriate measure will clearly be their cost to the association of individuals, i.e., to the government.

Whatever analogy is applied, the measure is either government

<sup>29</sup>*National Income and Its Composition, 1919-1938* (National Bureau of Economic Research, 1941), I, 31-4.

<sup>30</sup>This analogy is suggested by G. C. Means; see note 33.

tax revenues minus transfer payments or government payments to factors for the services in question, i.e., government tax revenues plus public borrowing minus transfer payments.<sup>31</sup>

We believe that, for purposes of national income measurement, payments to factors is preferable to tax revenues minus transfer payments as a measure of the value of public output ('value added' by government). This does not imply acceptance of any one or more of the analogies suggested above as the proper one. In view of the noncomparability of public and private output, analogy cannot be a completely sound basis for decision. Our reasons are stated below in the discussion of other proposed methods. The use of payments to factors as a measure implies that government uses and refrains from using resources in such a way as to maximize public welfare. Admittedly this is not entirely accurate. Government often acts under group pressures, which may cause government expenditures to fall short of, or to exceed, the proper margin. Particularly is the former true when expansion in public services is lagging behind changes in the economic-social conditions that cause the expansion. It is true also that because of both group pressures and a feeling that the government should be an ideal employer, labor may cost the government more than it does private employers. On the other hand, the value placed upon the output of private enterprise often includes indirect taxes in addition to payments to factors; no comparable element enters into the valuation of governmental services.

The outstanding proponent of the use of tax revenues minus transfer payments as the measure of the value of the current services of government is of course Kuznets. His argument is essentially an appeal to the analogy with the sales price of private output.

"When . . . viewed in application to the whole complex of governmental services the payment-price approach gives more reasonable results and has certain other advantages over the cost basis. The piling up of deficits during depressions, which allows the market value of governmental services to fall below the cost value, is obviously in response to the changed market situation, and may be interpreted as reflecting a

<sup>31</sup>It is assumed here that all government expenditures are either payments to factors or transfer payments. But the discussion does not apply to government enterprises that sell their output on the market. They do not raise any special problems and can be treated like private enterprises.

lower current valuation placed by society on governmental services. The case seems to be parallel to that of business corporations whose costs also tend to exceed returns during depressions, indicating that the valuation placed by society upon their products has declined compared with that implied in the past outlay. The difference is that whereas services of corporations are evaluated by the large body of consumers acting separately through private and free markets, the services of governments are evaluated by political agencies whose basic function is to express the consensus of opinion of the body social. But this difference does not seem to justify the adoption of the cost principle of valuation."<sup>32</sup>

"As to the decision of people to finance a part of government services by borrowing, it is difficult to see how it alters the case. Such decisions are only a roundabout indication of the people's opinion that the price of the needed government services would be too high if covered completely by taxation. This is clearly suggested by the terms in which taxation and government expenditures are discussed in legislative bodies. The constant reference to tax burdens is but another way of weighing prices of government services and setting a valuation upon them that is more flexible, more responsive to current economic conditions than are the costs of these services."<sup>33</sup>

Kuznets' procedure in *National Income and Its Composition* follows the principles set forth in these quotations. His argument is perhaps most plausible when applied to the transition from prosperity to depression, or vice versa. When a country enters a depression the receipts of private enterprise as a group from sales of products fall faster than reductions in wage and interest costs can be effected. Consequently, profits decline, and the value of private output as measured by aggregate sales declines more than costs other than profits. The method of valuation of government services we propose is roughly analogous to valuing by costs other than profits. The indicated value of public output may increase relative to that of private output when the country enters a depression. This rise may be a distortion of the true value relation between public and private output.

<sup>32</sup> *Op. cit.*, I, 33-4.

<sup>33</sup> *Studies in Income and Wealth*, Vol. Two, pp. 299-300. G. C. Means (with Lauchlin Currie and R. R. Nathan concurring) has attacked Kuznets' position in the same volume (pp. 267-91 and 306-13). So far as the attack rests upon accounting analogies it seems to us inadequate, since an accounting analogy may be drawn as readily for the one procedure as for the other. Other points of attack, specifically, the argument that government borrowing to finance the production of current services is analogous to borrowing by a family to finance current consumptions, rather than to operation at a loss by a corporation, and that the public sanctions expenditures and indicates its belief in their value by permitting government to pay for them, as well as by permitting taxation, seem to us sound.

But as public output does not contract under the influence of a given fall in tax revenues as much as private output under the influence of a corresponding fall in revenues from sales, the use of tax revenues to measure current public services exaggerates the fall in their value. Moreover, it is by no means necessarily true that the government incurs a deficit merely because of a lag in the adjustment to smaller revenue, for it may continue to furnish the same volume of services throughout the depression and to finance them by borrowing. This may well be done for a reason completely divorced from the problem of valuation, namely, the opinion that imposition of additional taxes or curtailment of government expenditure would depress national income further. It does not demonstrate "that the price of the needed government services would be too high if covered completely by taxation". Rather it indicates willingness to borrow in order to pay for services that are worth what they cost—just as a family borrows to pay for medical care. The avowed hope is that when prosperity returns, it will be possible to tax heavily enough to create a surplus with which to pay off the debt. The levying of taxes during prosperity to pay off the debt does not indicate social agreement that the value of services currently furnished by government is higher than the factor cost of furnishing them. Rather, heavy taxes are imposed merely because it seems desirable to pay off the debt. If there were no debt to pay off, or if it seemed undesirable to reduce the debt, taxes would probably be lower. In fact, when a heavy debt exists in prosperity, taxes may be higher and services fewer.

Kuznets' procedure violates the fundamental postulate that the income measure should be invariant to purely financial or institutional changes. Suppose the method of financing public services is changed from indirect taxes to borrowing, or vice versa. If the real magnitudes (services performed measured directly or by number of man hours or employees) remain the same, a correct measure of real national income would not register a change. Kuznets' measure would.

It seems apparent that government services, whose production is motivated by influences far different from those which influence private enterprises, cannot properly be measured by public revenues. Taxes cannot be regarded as the equivalent of receipts

from sales of private output. Among imperfect measures of government output, factor cost seems the best.

## 7. INTEREST ON PUBLIC DEBT

If public output is to be measured by public payments to factors, the line between them and transfer payments must be clearly drawn. The conspicuous source of disagreement here concerns interest payments by government. There seems little reason for disagreement on theoretical grounds. Interest should be included only so far as it represents payment for the current *use* of a factor. And the factor must be *physical* capital (for certainly the convention is universally accepted that investment in human capital, e.g., in education or health, is not to be separated out from consumption expenditure). But public interest payments are obviously not such a measure of the net services of public capital.<sup>34</sup> If public works have been paid for out of tax funds, or if the debt incurred for their construction is amortized faster than the physical capital wears out, services not represented by any (overt) interest flow may issue from the capital. On the other hand, the taxing power permits government to incur debts for purposes other than capital formation, e.g., debts due to deficit expenditures for purposes of fighting a depression or war. The interest payments thus created have no counterpart in any flow of services.<sup>35</sup> It may be conceded that depression expenditures

<sup>34</sup> Reflection on how interest on private debts is treated in national income computation may clarify the issue somewhat. As far as interest paid by business ('producer credit') is concerned, it does not matter whether it is regarded as a payment for services of capital or as a transfer. In either case interest paid constitutes income of the recipient (lender, bondholder, etc.). If it is regarded as a transfer, there is an offset on the debtor's side. If it is regarded as a payment for services, these services are in the nature of intermediate goods and their value is automatically embodied in the debtor's income or net output and therefore must not be separately allowed for.

Only when consumer debt is incurred for the purchase of consumer durable goods could interest conceivably be regarded as a measure of the value of the services of the durable goods and added as a separate item in the computation of national income. This is not done for the good reason that only under exceptional circumstances can a close correspondence between these interest payments and the flow of services be assumed.

There is no reason to believe that in the case of interest payments by government the correspondence between the interest and service flow would be closer.

<sup>35</sup> As similar discrepancies occur between interest payments by private enterprises and the services of physical capital, the difference presumably appears as a (positive or negative) component of profits, or of other factorial shares.

may prevent human wastage and build human capital. But so far as the human capacities thereby created or preserved contribute later to production, that contribution will be adequately measured by a wage-flow; to include the interest flow is double-counting. Similarly, war may preserve the physical capital or the economic system of a country; but so far as that system produces in later years, the output will be measured by other income flows; interest on war debt must not be added to those flows.

Interest payments on public debt are thus not a valid measure of the net services of public capital. The logical method is to estimate these services directly. For lack of relevant data, some monetary interest flow may have to be accepted as a substitute, but total interest on the public debt is not appropriate for the United States for a period including the years both before and after this war. It would seem that the increase in the interest on the public debt must force a revision of American practice after this war.

To recommend evaluating the net services of public capital by direct examination of the benefits flowing from it would be a counsel of perfection. Whatever its conceptual superiority, evaluation by this method is clearly out of the question for much, probably for most, public capital in the United States. A possible alternative is to assess the cost of the capital and to apply an appropriate interest rate, presumably the rate currently paid by government. In justification it might be argued that on the average the services of public capital are equal in value to interest upon its cost, even though those of each unit are not. We shall not use space here to discuss the considerations underlying this proposal and various modifications of it. In the present state of public capital accounting its justification is doubtful; it remains a theoretical proposal.

The services of public capital can be roughly estimated by the British convention that central government debts have been unproductively used, while local debts are embodied in productive capital. Interest on the national debt is therefore a transfer payment, whereas interest payments by local units of government are payments to factors. Since most local debts (including, in the United States, state debts) are incurred largely to finance capital construction, and such debt is likely to be increasing when public



capital is increasing, the procedure is not unreasonable. However, during periods of large federal grants for public works, the movement of state and local debt will not parallel that of public capital, nor, presumably, will the movement of state and local interest payments parallel that of the services rendered by public capital.<sup>36</sup>

It might be less misleading to confess that the services of public capital cannot be measured satisfactorily, and to omit them. The effect upon the movement of national income as a whole would be the same as if the net services of public capital remained a constant percentage of the total. So long as the services of public capital remain small relative to total national income, little distortion will be introduced by not measuring them. Use of total public interest payments as a measure, however, would introduce a significant error into a comparison of national income in the United States in (say) 1940 and 1948.

The discussion so far has been in terms of the *net* services of public capital. Ignoring net services is tantamount to assuming that current consumable services merely equal depreciation on the capital, not that they do not exist. For depreciation is a deduction from current output, and to measure total current output by public payments to factors (not including public interest payments) is tantamount to assuming that depreciation on public capital is balanced by the current services of that capital, so that the two cancel.

## 8 INTERMEDIATE AND FINAL SERVICES WAR EXPENDITURE

Once the total value of governmental services has been estimated the next step is to decide what share of them is intermediate services furnished to private enterprises and included in the value of the final output of private enterprises, and what share is final output of government. In our opinion no financial flow can be used to indicate the dividing line, and the proper method is to allocate services between consumers and enterprises according to the nature of each service. For many public services, of course,

<sup>36</sup> Changes in interest rates, of course, affect interest payments as well, but because most state and local obligations are fairly long term, the change occurs rather slowly.

allocation must be arbitrary, but they are fewer than is commonly supposed; for the intermediate products of government include only government activities that from the viewpoint of private enterprises are *inputs* used up in the production of goods or services, not those which in some vague and general way are held to be of benefit to private enterprise. For example, the services of the court system in settling business disputes or in enforcing contracts should be counted as intermediate products, as should the services of the navy so far as it in effect convoys shiploads of raw materials or of finished products. But war costs in general cannot be regarded as for intermediate products; for they are not inputs in the sense that raw materials or road maintenance services are. Similarly education, though in a real sense investment in human capacities, is always classed as a consumption expenditure.

Of course a very wide range of services remains in which allocations must be more or less arbitrary. The methods of cost accountants are no less arbitrary, yet they are extremely useful. Yardsticks as objective as those cost accountants use in allocating joint costs among various outputs can be developed to allocate public services between consumers and business enterprises. For example, a sum of truck ton miles can be set against a sum of passenger automobile miles by means of some weighting factor, and used as an indicator to divide the services yielded by roads and streets between consumer and business use.<sup>37</sup> If definite, reasonable principles are established and followed consistently, the comparison between periods—the significant thing—will be valid.<sup>38</sup>

To treat war output as other than final output leads to the anomaly that when the economic system is running at full tilt, under forced draft, a large decline in output is shown to have occurred, and after the war's end, when effort is relaxed, hours shortened, and workers released from the labor force, output may turn out to have risen. The maximum potential of the economic

<sup>37</sup> Of course part of total passenger automobile miles must be allocated to business use.

<sup>38</sup> See Lindahl *et al.*, *op. cit.*, Part I, p. 12. Naturally, over a long period, the series used as an indicator may lose its validity because a service that once served business enterprises may without change in nature become a service to consumers, and vice versa. The indicator must then be adjusted. The problem of comparison between countries is similar; see Sec. 9.

system is obviously not properly registered if war output is not recorded together with other final output.

Though war costs cannot properly be classed as investment or as intermediate services, it is not fully satisfactory to class them as consumption. To do so would imply a paradox; namely, that when the living standard is declining, current consumption is soaring. Yet war *is* after all a use of current output the people as a group have chosen. It is perhaps not unreasonable to insist that people's choices reflect their valuations of ends, and that if they place war high in their scale of choices, that indication of their preference must be taken at its face value. However, conventional ideas of what consumption includes are left more intact if we regard war as akin to consumption in that it is a final product, as it obviously is, but place it in a subcategory of its own.

Kuznets would make the differentiation between consumable and intermediate services of government in peacetime on a basis consistent with his use of total taxes to measure total government services: he would measure governmental services to business by indirect taxes and services to consumers by direct.<sup>39</sup> The Department of Commerce follows the even less defensible practice of treating indirect taxes as the measure of government intermediate services even though its measure of total government services is payments to factors, not taxes.

Kuznets' procedure is ingenious, but we do not think it sound. Like his use of total taxes to measure total government services, it runs counter to the criterion that the measure of national income should be invariant to purely monetary and financial changes. Under it, if an indirect tax were substituted for a direct, without change in the quantity or nature of either public or private output, both the money and the real value of national income would decline. The opposite change in taxation would cause a rise in the indicated level of national income.

In answer to this objection, it may be asserted that legislatures do not in fact shift from direct to indirect taxes, or the reverse, unless the composition of public output as between final and intermediate services has shifted. However, indirect taxes are not intended by legislatures as a means of getting compensation

<sup>39</sup> Kuznets of course recognizes the arbitrariness of his procedure; *National Income and Its Composition*, I, 43-6.

from business enterprises for services rendered, in contradistinction to direct taxes levied upon consumers as a means of getting compensation for services to them. When during the depression sales taxes were substituted in many states for property taxes, the motivation does not seem to have been to substitute a tax paid wholly by business enterprises for one paid partly by consumers, on the ground that business enterprises were not paying adequately for services received. The motivation was rather to help the farmers who were in dire distress and could not pay the property taxes. When the processing tax provisions of the Agricultural Adjustment Act were declared unconstitutional, similar expenses were financed from the general federal revenues. Though the services rendered were the same, there was no avowal of any attempt to adjust the tax structure so that the same amount or proportion of revenues as before would come from indirect taxes. Taxes upon individual incomes have been used more and more to finance public expenditures because it was thought that the graduated income tax is an equitable means of distributing the cost of government, not because it was thought that individuals rather than business enterprises should bear the tax burden owing to the nature of the services rendered. Corporate excess profits taxes have become a large source of war finance during this war because of social pressures for a more equitable distribution of income, not to pay for services to business rather than to consumers. So far as we know, the division of taxes between business enterprises and consumers as a means of paying fairly for services to each is not discussed in the entire literature of public finance. Furthermore, many types of excises do not in any real sense get from business enterprises payment for services rendered them; rather their chief effect is a different distribution of the tax burden among consumers than direct taxes would yield. Nor is there any reason to suppose that the tax system as a whole achieves an effect that specific taxes do not, and that legislatures have not planned. There is no 'invisible hand' guiding the distribution of taxes as between direct and indirect. We believe that the use of indirect taxes as a measure of intermediate products furnished by government to business enterprises is entirely indefensible and should be abandoned.

In *National Product, War and Prewar*, Kuznets no longer uses

direct and indirect taxes to measure government final and intermediate output during a war or total taxes to measure total government output.<sup>40</sup> Instead he holds government final services to consumers constant at the prewar level, values government investment and war output at its cost to government, and by implication calculates the value of government intermediate services as the residual left after subtracting the items mentioned above from total government expenditures for goods and services. This procedure, it seems to us, is evidence that Kuznets' previous methods were weak. For though war and peace output are different types of final product, the fiscal exigencies of war are different only in degree from those of some peacetime periods. If in wartime taxes are an inadequate measure of government output, and tax levies indicate inadequately the composition of government output, then their use is only less inadequate in peacetime.

Abandoning indirect taxes as a measure of government intermediate product means that part of the financial cost of producing a good (i.e., indirect taxes) is a cost that does not constitute a payment for the services of a productive agent. Even under conditions of equilibrium and of pure and perfect competition, the price of a good, or of final output as a whole, cannot be considered as made up of the factor costs of producing the good or goods. But this means merely that we explicitly abandon the labor-cost theory of value and modifications of it, and recognize that the value of a good to the user, even in equilibrium, is not necessarily its cost of production.

## 9 DEFLATING THE VALUE OF GOVERNMENT OUTPUT

The problem of comparing real income in different periods is rendered much more complex because, in addition to the usual index number problems, that of deflating the value of government output enters. Obviously the 'price per unit' of governmental services may vary just as does the price of private output. In measuring real income therefore the value of government output should be deflated by some index. Since government output is measured at cost, not at market price, a 'real cost index' should be the deflator. The appropriate deflator is not, however,

<sup>40</sup>National Bureau *Occasional Paper 17* (Feb. 1944).

merely an index of the price of each factor, e.g., wages per man hour, even though it is weighted to allow for changes in the composition of the labor employed. Instead an index of 'efficiency wages' is wanted, i.e., an index that records not only changes in costs due to variations in labor cost per man hour but also those due to variations in efficiency. These observations apply to other factors as well as to labor, of course. Because it is difficult to construct such an index, perhaps the best that can be done is to use an index of the 'price' of government output derived by adjusting an index of the prices of privately produced services believed comparable for differences between the movement of public and private wage and interest rates.

Pigou and Colm suggest that indirect taxes also complicate the problem of deflation. They advance the idea that when the imposition of indirect taxes causes prices to rise less than the amount of the taxes, only the amount by which prices rise should be recorded in nominal national income; for otherwise the increase in nominal national income will not be fully deflated out, and indicated real income will show a spurious increase.<sup>41</sup> This conclusion is surely due to an erroneous *ceteris paribus* assumption. The error may be illustrated by two examples.

Suppose first that an indirect tax of 100 is substituted for a tax on individual incomes, and that the aggregate price of the taxed goods rises 80. Removal of the income tax will free 100 of individual incomes. But the imposition of the indirect tax will cause a reduction of 20 in factor incomes, so that the net increase in disposable income and the increase in nominal national income will each be 80, with no change in output. Deflating by a price index will then yield the same real income as before, which is correct. No adjustment need be made for the failure of the indirect tax to be reflected fully in a price rise.

Suppose instead that the indirect tax is new, imposed to finance a new public service. The price of the taxed goods rises 80, as before. Then imposition of the tax will reduce nominal individual incomes 20, and will increase prices 80, so that total purchases on the private market fall 100. This 100 is balanced by the new

<sup>41</sup>*The Economics of Welfare*, p. 41, and *Studies in Income and Wealth*, Vol. One, pp. 191-4. Pigou makes the assertion indirectly, by suggesting that since we may assume that indirect taxes cause an almost equivalent price rise, adding in the taxes will not introduce any great error.

flow of public services. Thus real income remains the same, just as deflation of the value of goods and services produced will indicate. Again, no adjustment is necessary.

Since in both examples the shift in incomes may have further repercussions upon prices or production, of course nominal income alone or both nominal and real income may vary further. If they do, however, deflation of the nominal data will correctly indicate it.

#### 10 INTERNATIONAL COMPARISONS OF NATIONAL INCOME

We propose that for international comparisons, the treatment of taxes, government borrowing, expenditures, and services in each country's national income calculations be brought into conformity with the principles stated above, except in one respect. As noted, the arbitrary character of the allocation of many public services between final and intermediate services does not interfere seriously with its usefulness for purposes of temporal comparisons. However, differences in principles followed in allocating government output between consumers and enterprises may affect the estimated relative levels of national incomes at any given time, and may conceivably affect the relative trends. Since the proper allocation between consumers and business enterprises of even an identical service will vary between countries, a comparable allocation is difficult. In computing Swedish national income, Lindahl allocated to business enterprises one-half of all nontransfer government expenditures other than public construction and local expenditures for ecclesiastical purposes, poor relief, child welfare, public health, and old-age pensions;<sup>42</sup> but it is not at all certain that this 50 percent rule for the allocation of services not specifically allocable would be appropriate for all countries. As public output rises relative to total national output, the share of public output that serves consumers would probably increase in general. Whether specifically allocable services increase so that a 50-50 allocation of other services would continue to be appropriate is uncertain.

The German Statistical Office, in calculating *Volkseinkommen*, allocated all government expenditure by type. Outlays for "public services of a consumption type (for instance, public construction and welfare)", and for reparation payments were

<sup>42</sup> *Op. cit.*, Part I, p. 226.

included in national income; outlays for war and for roads, courts, police, etc., were not.<sup>43</sup> The allocation of road construction and maintenance entirely to business enterprises illustrates the difficulty of comparability between countries. Such an allocation seems improper even for Germany; however that may be, the service rendered consumers by roads probably constitutes a much larger share of the total services of roads in the United States than in Germany.

Because of these problems, it may be desirable in international comparisons to make no deduction for intermediate services of government. This would be equivalent to assuming that regardless of the size of national output and the volume of public services in each country, intermediate services furnished business enterprises by government form the same fraction of total output without deduction for intermediate services, so that their inclusion overstates output in each country by the same percentage. Unless contrary conclusions are indicated by intensive study of the nature of government services in each country, a first approximation based on the above assumption seems reasonable.

To adjust the official national income series of the United States, Germany, and the figures of Lindahl *et al.* for Sweden to the basis suggested above would require the following additions and subtractions.<sup>44</sup> 'National output at market prices' of the United Kingdom would require no adjustments.

United States: gross national product  
           *minus* federal debt interest  
           *minus* depreciation, depletion, and capital outlay charged to current expense.

Germany: *Volkseinkommen*  
           *minus* 'taxes not included in private income'  
           *plus* individual and corporate income taxes, property taxes, and inheritance taxes  
           *minus* interest on the national debt.

Sweden: national income  
           *plus* government 'debt items'.

<sup>43</sup>*Statistisches Jahrbuch für das Deutsche Reich* (1938), p. 501, note 12.

<sup>44</sup>The adjustments are (aside from the subtraction of depreciation, etc., from the United States gross national product) only those needed to remove major discrepancies in the public sector. For complete comparability other adjustments are needed, such as the addition of imputed rent on owner-occupied houses to the United States total, and the subtraction of services rendered by consumer durables other than houses from the Swedish total. In addition, there are several minor differences in treatment.



