

## REASONS FOR PREFERRING NET TO GROSS FIGURES OF INCOME AND PRODUCT (AND VICE VERSA)

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For the first time, a systematic discussion is presented of the choice between gross and net national accounting figures of value added, product and income for alternative purposes. Some traditional arguments for preferring gross to net figures are challenged and several historical reasons are given for the present popularity of gross figures. The quantitative importance of the issue ("what does it matter in practice?") is also assessed.

### 1. INTRODUCTION

In the National Accounts of most countries, net as well as gross figures of product and income, e.g. figures on net and gross value added by economic activity or figures on Net National Income (NNI) and Gross National Income (GNI), are frequently presented side by side. In most other instances, net and gross figures can be obtained easily by either deducting capital consumption from the gross figures or by adding capital consumption to the net figures. As a consequence, for alternative types of analysis, the National Accounts offers a choice between the use of gross and net figures on product and income.

This paper provides a systematic discussion of the choice between gross and net figures for alternative types of analysis. The types of analysis are divided into those related to production (section 2.2), those related to income distribution (section 2.3) and those related to income expenditure (section 2.4). A look at the history of national accounting is revealing in this discussion. At present, it seems to be common practice to prefer gross figures for most purposes, but before the Second World War net figures were generally preferred. In our discussion, several explanations for this shift in popularity are given.

A quantitative assessment of the importance of the issue ("what does it matter in practice?") is presented in section 3. Examples are given of the type and size of biases that occur when gross figures are used instead of net figures. Conclusions are drawn in section 4.

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## 2. THE CHOICE BETWEEN NET AND GROSS FIGURES FOR ALTERNATIVE TYPES OF ANALYSIS

### 2.1. *The Logic of Gross and Net Concepts of Product and Income*

The distinction between gross and net product (income) originates from the need to account for capital formation and capital consumption. In principle, accounting for production and consumption is possible by employing just the concepts of output, intermediate consumption and final consumption. However, in practice clearly not all output is used within the same period. So, for proper assessment of income over periods, the concepts of capital formation and capital consumption must be introduced. The concept of capital formation serves to register part of output *not* as intermediate or final consumption in the period in which it is produced. The concept of capital consumption performs the function of specifying the allocation of the *use* of this output over several accounting periods. Both concepts must be regarded as unseparable twins, because accounting for capital formation without accounting for capital consumption is like making a pudding without eating it.

The character of the concept of gross value added is perhaps best revealed by drawing an analogy with cost accounting. For some purposes, not accounting for the indirect costs of production and sale of a product makes sense and could be revealing. However, in the end, profitability of a product can only be judged when its indirect costs are also taken into account.

In a similar way, the concepts of net value added, Net Domestic Product and Net National Income are to be preferred for most purposes. The reason is that capital consumption is a cost of production just like intermediate consumption. As a matter of fact, often the use of durable goods is registered as intermediate consumption, e.g. when leasing an office or computers. Denison states: "insofar as a large output is a proper goal of society and objective of policy, it is net product that measures the degree of success in achieving this goal. Gross product is larger by the value of capital consumption. There is no more reason to wish to maximize capital consumption—the quantity of capital goods used up in production—than there is to maximize the quantity of any other intermediate product used up in production, such as, say, the metal used machine tools used up in production, that is the objective of the production process" (Denison, 1972, p. 2).

It might be added that the term "gross value added" already indicates that some *double-counting* is involved and that the figures searched for should be net. Gross value added amounts to double-counting, because the production of capital goods is counted as output while no deduction is made for the use of capital goods.

The above expounded basic national accounting logic has been ignored on a wide variety of grounds, ranging from theoretical arguments about the proper concepts of capital consumption and income to practical arguments about the (un)reliability of capital consumption estimates. Most arguments refer to a specific type of analysis. The arguments will therefore be discussed successively by type of analysis (sections 2.2, 2.3 and 2.4). The argument about the unreliability of

capital consumption estimates does not refer to one type of analysis in particular. It will therefore be discussed in a separate section (section 2.5).

## 2.2. *Analyses of the Generation of Income*

In this section, we will discuss three specific arguments for preferring gross figures:

- gross figures are especially useful in a wartime period;
- gross figures are preferable for the analysis of productivity;
- gross figures are preferable for the analysis of economic growth.

According to Studenski (1958, p. 153), the shift in emphasis from net to gross product figures was especially due to the specific war circumstances: “This change . . . was an outgrowth of the government budgetmakers’ attempt to achieve a closer connection between the government’s budget and the national income estimates. Inasmuch as amortization or replacement of worn-out private capital was being deferred until the postwar period so that the private funds and resources that would ordinarily have been used for that purpose could be diverted to current wartime production, it was important to present the national income figures gross of this item.” Considering the specific purpose due to the specific circumstances, the neglect of capital consumption as a cost, i.e. the preference for gross figures, seems to be valid. However, as the Second World War belongs to the past for decades now, this specific purpose has lost its importance for most countries.

In the national accounts, the concept of capital consumption refers to economic obsolescence. For the *analysis of productivity*, several authors (e.g. Maddison, 1987 and Ruggles, 1952) think that net value added calculated on the basis of *technological obsolescence* is more appropriate as a measure of output than the national accounting concept of net value added. Assuming that capital consumption due to technological obsolescence is much smaller than capital consumption due to economic obsolescence, they prefer gross figures on value added to net figures based on economic obsolescence. This argument for preferring gross figures has three major flaws.

Firstly, the costs of leasing capital goods include the costs of economic obsolescence. As a consequence, comparability and aggregation of figures on enterprises owning capital goods and those on enterprises renting capital goods is only attained by the use of the net national accounting concept. For the nation as a whole or for economic activities in which leasing is relatively unimportant, this objection does not hold.

Secondly, if the efficiency of capital intensive and capital extensive producing economic activities (nations) is compared on the basis of gross figures, a main part of the costs of capital intensive production, i.e. the costs of economic obsolescence, is totally ignored. Similarly, in calculating value added per economic activity, the inputs and outputs of capital intensive and capital extensive producing enterprises are to be added up. Aggregation and comparison only makes sense if all costs relevant in the competition between capital intensive and capital extensive enterprises are included. Clearly, the costs of economic obsolescence is one of these costs.

The famous imaginary case of Hayek may illustrate the flaw of preferring technical obsolescence: "Assume two entrepreneurs, X... [and Y], invest at the same time in equipment of different kinds but of the same cost and the same potential physical duration, say ten years. X expects to be able to use his machine continuously throughout the period of its physical 'life.' Y, who produces some fashion article, knows that at the end of one year his machine will have no more than its scrap value." (Hayek, 1941, p. 276). Should the efficiency of these enterprises be compared by taking account of only technical obsolescence? I think definitely not.

Achieving comparability between enterprises differing in capital intensity is also important viewed from the notion that *capital intensity is partly a construction by national accountants*: they have chosen the concept of capital formation and they decide in practice on the many troublesome borderline cases between intermediate consumption and capital formation. An example of the latter is the difference between expenditure on "normal" maintenance and on "substantial" improvement of capital goods. Country practice may differ widely in this respect. In order to be relatively insensitive to such constructed differences, the national accountant's concept of net value added should be preferred.

Thirdly, the convention that value added of non-market production is to be measured by adding up costs, implies that in these instances gross value added figures are constructed by adding capital consumption to net value added. Those who prefer capital consumption based on technological obsolescence, should then prefer the net figures in the national accounts and not the gross figures! At the national level, this implies that preferring Gross Domestic Product figures to Net Domestic Product figures is an *inconsistent* choice: consistency requires that they employ Domestic Product figures that partly consists of net figures and partly of gross figures.

Recently, Scott (1991) has advocated gross figures for analyzing economic growth. His arguments refer only to figures at a national or world level and not to the choice between gross and net figures at the level of economic activities or sectors. He assumes that economic obsolescence at the national (world) level is mainly caused by technological progress and argues that income should be a forward-looking Hicksian concept. Capital consumption due to economic obsolescence is to be regarded as the costs needed to achieve a higher level of income. It is therefore irrelevant in calculating the level of (future) income.

It should be realized that Scott's purpose deviates in important respects from the purposes of conventional national accounting. He is looking for a measure of welfare, he employs a forward-looking concept of income and he is not interested in analyzing product (or income) per economic activity (or sector). In contrast, in conventional national accounting, a measure of welfare is explicitly not intended (see Bos, 1991), income is mainly backward-looking and describing the national economy at a meso level is a major purpose. Scott acknowledges that his use of GDP-figures is unwarranted even considering his own specific purpose, as he does not make adjustments for (future) environmental damage (Scott, 1991, p. 32) and changes in the size and age structure of the population (Scott, 1991, p. 36).

### 2.3. *Analysis of the Distribution of Income*

In analyzing the distribution of income by type of income (compensation of employees, interest, operating surplus, etc.), the argument that gross figures are to be preferred for theoretical reasons is not heard.

### 2.4. *Analysis of Income Expenditure*

The Keynesian revolution had an enormous impact on national accounting. One of the consequences was that it affected the popularity of gross versus net figures after the Second World War: in order to establish a closer linkage between national income and various categories of expenditure, net national income at factor costs was more and more replaced by gross national income at market prices. For Keynesian types of demand analysis in which *short* run considerations are predominant, ignoring capital consumption as a cost makes indeed sense. Kuznets clearly explains why:

“If . . . we wish to understand short term variations in the flow of durable capital, we should measure it gross rather than net, since short term decisions, whether of private or public entrepreneurs, are more likely to be in terms of replacement and additional demand combined than between capital for replacement and capital for new additions. Likewise, the effect of entrepreneurial decisions on short term variations in volume of activity is clearer when we deal with a total that includes its determining component, i.e., gross rather than net capital formation” (Kuznets, 1946, p. 118).

### 2.5. *Unreliable Capital Consumption Figures*

The unreliability of capital consumption estimates in the National Accounts has also frequently been used as an argument for preferring gross figures of value added and income (see e.g. Stone, 1974, para 57). This argument deserves several qualifications.

Firstly, it may be questioned whether the argument is still valid. The origin of this argument dates namely back to the time where capital consumption estimates were a “mixed bag of components,” consisting of historical cost values that reflect “whatever service lives and depreciation patterns are allowed at a particular time by tax laws and regulation and by accountants” (Denison, 1971, p. 41). At present, in most countries capital consumption is estimated on the basis of the Perpetual Inventory-method (PI-method).<sup>1</sup> Although the PI-method is no guarantee for reliable estimates (e.g. often no reliable data on life-times are

<sup>1</sup>Usher argued that only gross value added figures can be transformed in a meaningful way in constant prices, because “the practice in the national accounts is to measure depreciation in current dollars as capital cost allowance assessed for tax purposes” (Usher, 1980, p. 104). However, as the practice has changed, it is no longer difficult to find an appropriate deflator. If capital consumption is defined on the basis of the replacement value of capital stock, deriving a deflator is straight-forward: capital stock should be deflated on the basis of the prices relating to the replacement of capital stock, and therefore this applies as well to capital consumption.

available), the reliability and consistency of the estimates has probably greatly improved during the last decades.<sup>2</sup>

Secondly, if the objective is to arrive at reliable net figures, gross figures are only one of the possible estimates of net figures. For example, for short-term indicators even assuming a constant growth rate of capital consumption might yield a better estimate of net growth.

Thirdly, it is rather peculiar to note that all calculations made by national accountants in constructing net domestic product and income figures are accepted by the users, except the capital consumption estimates. For example, figures on own-account production, imputations for owner-occupied dwellings, etc. are commonly taken at face value. In addition, attention is seldomly paid to differences in general estimation procedures among countries, even though these differences may also be quite substantial.

Fourthly, the consequences of measurement errors in capital consumption figures can be minor for various reasons.<sup>3</sup> For example, when measurement errors are fairly stable (e.g. due to employing systematically too long life-times), this hardly affects comparisons over time. Another case in point are measurement errors which cancel out, so that the measurement error in total capital consumption can be quite low despite large measurement errors at a lower level of aggregation. In the case of a stationary economy, employing wrong life-times in the PI-method even results in good estimates of capital consumption. The more a national economy or economic activity approaches a situation of stationarity, the less likely are measurement errors.

Finally, national accounting concepts are operational concepts, which deviate from theoretical constructs for reasons of measurability. In devising operational concepts, National Accountants should have taken the reliability of estimates into account.<sup>4</sup> If the quality of capital consumption estimates is severely doubted, this implies that a more restricted concept of capital formation should have been chosen. In general: if the capital consumption of some items of capital formation can not be estimated reliably, the expenditure on these items should not be accounted for as capital formation, but as intermediate consumption. In that case, they are treated on a par with expenditure on human capital and other intangible assets.

Following this logic, if capital consumption estimates are judged as being too unreliable in general, the consequence should be to discard the whole notion of capital formation in national accounting. Preference for gross figures of value added and income can be regarded as enhancing another extreme: preferring the assumption of zero capital consumption to an unreliable estimate of capital consumption. At the aggregate level of Domestic Product and National Income, preference for gross figures is even somewhat ambiguous: on the one hand, capital consumption figures for the government are accepted, while—on the other hand—the capital consumption figures for enterprises are rejected.

<sup>2</sup>For a discussion of the reliability of the capital consumption estimates, see Bos (1990, pp. 17-27).

<sup>3</sup>See also Bos (1990, pp. 17-27).

<sup>4</sup>For a general discussion on the interaction between national accounting concepts and reliability, see Bos (1989, pp. 23-27). For the concepts of capital formation and capital consumption, a more specific discussion can be found in Bos (1990, pp. 4-6).

### 3. THE CONSEQUENCES OF USING GROSS INSTEAD OF NET FIGURES (OR VICE VERSA)

#### 3.1. *In Theory*

The basic consequence of employing gross instead of net figures is that differences in capital intensity are not taken account of. This may result in biased comparisons and erroneous conclusions. Some examples may illustrate the issue.

In *international comparisons of product and income*, countries with a capital intensive mode of production are judged too favourable, because they have a relatively high level of capital consumption. In using GNI (GNP) as a basis for contributions to international organizations like the UN and the EC, capital-intensive countries will be "overtaxed" and capital-extensive countries "undertaxed." Similarly, by employing GNI (per capita) as a kind of welfare measure, differences in welfare between developed country and developing countries seem to be larger than they really are, since most developed countries are more capital-intensive.

Similarly, *comparisons over time* can be biased by employing gross figures. An economic policy favouring capital-intensive production (like Russia in the thirties) may seem to be very successful when judged by changes in the level of gross domestic product, but is less successful when judged by net domestic product. By employing gross measures, a kind of self-fulfilling prophecy is introduced: *ceteris paribus* (i.e. assuming net product does not change) all capital formation will increase future gross product by amount of future capital consumption. This feature may seriously invalidate business cycle analyses: after each capital formation boom, capital consumption and therefore gross product will gradually rise without concomittant increases in "income." For the same reason, a massive postponement of capital formation will after a while show a more drastic fall in GDP than in NDP. So, the volatility of the business cycle may be exaggerated by looking at GDP instead of NDP.<sup>5</sup>

If capital consumption's growth rates are structurally higher (lower) than those of GDP, NDP growth rates are structurally lower (higher) than those of GDP. Capital consumption's growth rates may exceed those of GDP substantially, even over longer periods of time, when capital formation has increased substantially and the increase in output lags somewhat behind. A case in point could be a country such as Japan during the sixties and seventies. Trends towards more capital-intensive (roundabout) production could be another reason for structural differences between gross and net growth rates. Such a trend might be induced by changes in technology, changes in demand or changes in relative prices (e.g. the raising of oil prices by OPEC in 1973 substantially increased the economic obsolescence of energy intensive capital goods).

<sup>5</sup>It must be remarked that the time lag between capital consumption and capital formation can reduce this effect substantially. In addition, in calculating relative changes this effect might also be mitigated by the fact that NDP is, by definition, smaller than GDP and capital consumption is most probably fairly constant in time: relative changes in NDP may therefore even exceed those in GDP.

### 3.2. In Practice

In this section, our theoretical suggestions are put to a test by comparing gross and net national accounting figures for six OECD-countries. These countries are the U.S.A., Japan, the U.K., West Germany, Sweden and the Netherlands.

Concerning these six countries, the amount of capital consumption in Gross Domestic Product<sup>6</sup> at market prices<sup>7</sup> varies between 8.8 (the minimum value of the Netherlands) and 14.2 percent (the maximum value of the U.S.A.) in the period 1975-87 (see Table 1). These differences imply e.g. that comparing either their GDP/capita or their NDP/capita may lead to differences up to 5 percent. World-wide the amount of capital consumption in GDP fluctuates between, roughly speaking, 5 percent (e.g. Indonesia) and 25 percent (e.g. Finland and the Republic of Korea) (UN, 1982). So, in some extreme cases, comparing GDP per capita instead of NDP per capita can even lead to differences of 20 percent. Analogous differences result when using GNP instead of NNP in determining the contributions of countries to international organizations like the UN and the EEC.

Figures on Domestic Product and National Income are also frequently used as a reference value. Examples are the expression of government debts, government deficits, external account deficits and collective revenues (taxes and social premiums) as a percentage of National Income. For our six OECD-countries, employing GDP figures as a reference value can result in a bias of maximum 14.2 percent in terms of GDP. If only the change in, e.g., the value of exports

<sup>6</sup>Figures show that for most countries, in using the absolute figures the difference between Domestic Product and National Income figures (both at market prices or factor costs) is usually negligible. For example, for our six OECD-countries during 1975-87 the difference between GDP and GNI, both at market prices, is always less than 2 percent. A rare exception to this "stylized fact" can be found in Luxemburg where the difference between GDP and GNI amounts to, e.g., 35 percent of GDP in 1987. An implication of this stylized fact is that comparing Gross and Net National Income figures will usually yield results of the similar magnitude and direction as comparing Gross and Net Domestic Product figures. For example, when the difference between GDP and NDP is 10 percent of GDP, the difference between GNI and NNI will also be approximately 10 percent. If the GDP growth rate is 2 percent and the NDP growth rate is 3 percent, the difference between the growth rates of GNI and NNI will in general also be approximately 1 percent (e.g. GNI is equal to 3 percent and NNI is 4 percent).

In order to avoid misunderstanding, it might be added that, unlike the absolute figures of GDP and GNI, the growth rates of GDP and GNI can differ substantially. This is due to the fact that the difference between Domestic Product and National Income is a *net* item (net primary income received from abroad), which is therefore relatively very volatile. For example, a change in net primary income received from abroad of 100 percent is no rare exception. A 100 percent change in an item which is only 2 percent of the total, affects the total approximately 2 percent. This is very substantial compared to the annual growth rates of most countries.

<sup>7</sup>Investigating the consequences of employing GDP instead of NDP gives somewhat different results for comparing at market prices than at factor costs does. For our six OECD-countries in the period 1975-87, GDP at market prices exceeds GDP at factor costs by roughly 10 percent. Therefore, capital consumption as a percentage of GDP at market prices is somewhat lower than at factor costs, i.e. the relative difference between Gross and Net Domestic Product is at factor costs somewhat larger. Similarly, the growth rate of NDP at factor costs is also somewhat more affected by the growth rate of capital consumption. With these two minor modifications in mind, only Gross and Net Domestic Product figures at market prices need to be discussed, because the results obtained (the differences between absolute figures and between growth rates for gross and net Domestic product) apply also, to a somewhat increased extent, to the comparison at factor costs. An analogous argument on market prices versus factor costs probably also holds at the more disaggregated level of sectors and economic activities.



TABLE 1  
GROSS AND NET DOMESTIC PRODUCT FOR SIX OECD-COUNTRIES, 1975-87

	Netherlands	West Germany	U.S.A.	Japan <sup>a</sup>	UK <sup>b</sup>	Sweden
1. Capital consumption as a percentage of GDP at mp						
average	9.8	12.0	12.8	13.2	11.8	11.4
minimum	8.8	11.1	12.0	12.2	11.2	10.3
maximum	10.4	12.7	14.1	14.2	12.5	12.0
2. Growth rates						
GDP at mp <sup>c</sup> )	1.8	2.2	3.1	4.3	2.0	1.6
NDP at mp <sup>c</sup> )	1.7	2.1	2.9	3.9	1.8	1.4
Average difference	0.1 (6%) <sup>d</sup>	0.1 (5%)	0.3 (9%)	0.3 (8%)	0.2 (11%)	0.2 (11%)
Maximum difference	0.4 (26%) <sup>d</sup>	0.5 (26%)	1.0 (35%)	1.0 (25%)	0.7 (38%)	0.6 (40%)
Coeff. of determination	1.00	1.00	0.98	0.95	1.00	1.00
3. Volatility of growth rates						
std GDP growth rate	1.6	1.6	2.4	0.9	1.9	1.5
std NDP growth rate	1.8	1.8	2.7	1.2	2.1	1.7

*Note:* Figures calculated on the basis of OECD, 1989a.

<sup>a</sup>Capital consumption is based on historical costs taken from enterprise accounts. See also note 9.

<sup>b</sup>Period: 1975-86.

<sup>c</sup>Average of yearly growth rates. The yearly growth rates are calculated from OECD-figures using base year weights. Calculation on the basis of chain indexes would have been preferable (see Al *et al.*, 1985). The latter procedure is used in the tables 4 and 5, in which only Dutch data are used as a source.

<sup>d</sup>Difference expressed as a percentage of NDP average growth rate.

as a percentage of Domestic Product matters, the bias is in general negligible. The reason is that capital consumption as a share of GDP is fairly constant over time for most countries.

For the six countries during the period 1975–87, the growth rates of GDP are all *higher* than those of NDP, the difference being 0.1 to 0.3 percentage points. In terms of NDP's average growth rates, the range is between 5 and 11 percent. The maximum differences between GDP and NDP vary between 0.4 and 1.0 percentage points (between 25 and 40 percent of NDP's average growth rates). Such differences may be of substantial importance for economic policy (e.g. in wage negotiations or in all kinds of indexes, pensions, fringe benefits, government debt). For modelling purposes, it is the co-variation which matters. The coefficients of determination between both variables for the six countries are very high (between  $R^2 = 0.95$  and 1.00). So, choosing GDP instead of NDP growth rates (or vice versa) hardly affects the fit of an econometric model.

In analysing business cycles, the timing of the peaks and troughs and the volatility of Domestic Product are important. Graphs (not shown) reveal that the peaks and troughs in the growth rates of GDP and NDP seem to have the same timing. This finding is not very surprising considering e.g. the coefficients of determination. The standard deviation of NDP growth rates is structurally higher than that of GDP growth rates: the business cycle is up to 25 percent more volatile than suggested by GDP.<sup>8</sup>

In calculating the *relative shares* of economic activities in Domestic Product, the situation may be different. It seems reasonable to assume that in general the range of fluctuations in the percentage of capital consumption is much larger at a more disaggregated level. Table 2 shows that for the Netherlands, capital consumption as a percentage of gross value added ranges from 0 percent for Defence (by definition) and 1.6 percent for Banking, Finance and Insurance, to 36.7 percent for Public Utilities. The consequences of such differences for relative shares in terms of Domestic Product are quite substantial. For example, in 1985 the gross share of Defence is 11 percent lower than its net share and for Public Utilities the gross share exceeds its net share by 41 percent (last column in Table 2).

#### 4. CONCLUSIONS

Intermediate consumption can be regarded as the costs of using up non-durables in production. In this regard, capital consumption can be regarded as the costs of using durables. By employing gross figures of value added, product and income, capital consumption is ignored as a category of cost, i.e. the use of durables is not counted as costs. For most purposes, like international and

<sup>8</sup>The standard deviation of the deviations from the trend in the absolute figures is also often used as an indicator of volatility (see, e.g. Balke and Gordon, 1989). The precise content of this indicator is up to much choice, because it depends upon the way the trend is calculated (regression-curve, moving averages, "sketching by hand," etc.) and the period considered (including or excluding an excentric starting year might result into significant differences). For these reasons, and because the purpose of this paper is not a study of various measures of volatility, calculations have been restricted to the standard deviations of the growth rates.

TABLE 2  
CAPITAL CONSUMPTION AS A PERCENTAGE OF GROSS VALUE ADDED AT MARKET PRICES (EXCLUDING VAT ON FINAL EXPENDITURE AND SIR-LEVY,  
AN INDIRECT TAX ON CAPITAL FORMATION) IN THE NETHERLANDS

	1970	1975	1980	1985	1988	Share 1985		Gross Share/ Net Share
						Gross	Net	
Agriculture, hunting, forestry, fishing	8.4	10.9	15.4;	14.4	15.9	4.4	4.2	1.04
Mining and quarrying	9.0	4.3	4.1	3.8	11.8	9.0	9.7	0.93
Manufacturing	9.0	11.5	13.8	14.7	13.1	19.2	18.4	1.04
Chemical, rubber and artificial material processing industry	14.2	19.8	26.7	22.6	n.a.	3.1	2.7	1.15
Public Utilities	28.8	31.6	33.6	36.7	35.7	2.2	1.5	1.41
Construction	3.3	4.1	4.6	6.6	5.4	5.4	5.7	0.95
Trade, hotels, cafés, restaurants, repair of consumer goods	5.7	6.0	6.6	6.7	7.1	15.9	16.7	0.95
Transport, storage and communication	20.7	22.0	21.9	24.7	22.5	6.7	5.7	1.18
Other services and n.e.c.	7.4	7.2	7.6	7.9	8.2	41.4	42.8	0.97
Banking, finance and insurance	1.7	1.6	1.6	1.6	1.8	5.6	6.2	0.91
Operation of dwellings	29.0	29.2	30.5	25.2	24.3	6.6	5.6	1.19
General government	5.5	5.1	4.9	5.2	6.0	13.4	14.2	0.94
Defence	0.0	0.0	0.0	0.0	0.0	1.9	2.1	0.89
Total gross value added	8.9	9.6	10.3	10.9	11.3	100.0	100.0	1.00

*Note:* Figures calculated on the basis of Netherlands CBS, 1989.

intertemporal comparisons of product and income, a net concept is therefore to be preferred, at least in theory.

During the Second World War, popularity has shifted from net to gross figures of Domestic Product and National Income. For war-time planning, Gross Domestic Product and Gross National Income were preferred as they showed better than net concepts the annually available resources that could be diverted to war production. Replacement of private capital stock was postponed until after the war. The Keynesian revolution further stimulated the use of gross concepts. The short-run interactions between expenditure, income and employment came to be emphasized and capital consumption could be ignored for that purpose.

Immediately after the war, capital consumption estimates were also frequently judged as unreliable and inconsistent as they were mostly based on tax or business accounts data. In the last decades, this situation has changed by the widespread use of the Perpetual Inventory-method for estimating capital consumption.<sup>9</sup>

Employing gross instead of net figures may lead to biased comparisons in favour of the capital intensive producers. For six OECD-countries in the period 1975-87, the bias in the GDP-growth rates varied between 0.1 and 0.3 percentage points. The bias in GDP/capita comparisons was up to 5 percent. In comparing developed and developing countries, a bias of 20 percent is even possible.

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<sup>9</sup>In the National Income and Product Accounts of the United States (United States Department of Commerce/BEA, 1986, e.g. Table 1.16), capital consumption according to the National Accounts ("Capital consumption allowances with capital consumption adjustment") as well as its difference with capital consumption as recorded in the business accounts ("Capital consumption adjustment") are presented. This capital consumption adjustment is in general smaller than 10 percent. The explanation for this relatively small difference might be that there are two opposing forces: valuation at historical costs tend to make capital consumption in business accounts smaller than in the national accounts, while government policy to stimulate capital formation by taxing on the basis of unrealistically high mortality rates has usually a countervailing effect.

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