VALUATION PRINCIPLES IN SUPPLY AND USE TABLES

AND IN THE SECTORAL ACCOUNTS

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Abstract

In many instances, the valuation of transactions in goods and services in the complete system of national accounts poses a problem. The main reason is that the price paid by the purchaser deviates from the price received by the producer, due to the existence of trade and transport costs and indirect taxes or subsidies.

A System of National Accounts should therefore provide clear guidelines for the valuation principles to be used in supply and use tables and in the sectoral accounts. Since not all parts of the system serve the same aims, there is no need for a uniform valuation throughout the whole set of accounts and tables. For example, supply and use tables mainly serve the purpose of production and demand analysis, while the sectoral accounts are especially useful for an analysis of income distribution and financing mechanisms.

Although valuation methods may differ between various parts of the system, it is obvious that a coherent set of valuations must be selected such that the linkages, e.g. between the supply and use tables on the one hand and the sectoral accounts on the other hand, are maintained. Essentially, we propose:

a) to register commodity use at purchasers' values (i.e. including VAT if applicable) in the use tables and in the goods and services accounts; the same valuation applies to intermediate consumption in the production accounts;

b) to register output at basic values in the supply tables and in the production (and goods and services) accounts;

c) to register value added (and Gross Domestic Product) at basic prices in the supply and use system and in the sectoral accounts (value added at factor costs can appear as a subtotal in the use table and in the sectoral accounts, while total GDP at purchasers' prices might be presented in a supplementary table); and

d) to book net taxes <u>on products</u> directly from the goods and services accounts to the appropriation of primary income accounts, and to book net other taxes <u>on production</u> from the income generation accounts to the appropriation of income accounts, such that net primary income (and Net National Income) are registered 'at market values'.

The advantages of this proposal are set out in the paper. Moreover, an example of such a coherent set of supply and use tables and sectoral accounts is presented.

Contents

1. Introduction

One of the still outstanding issues in the process of reviewing the 1968
System of National Accounts (SNA) concerns the valuation principles to
be applied both in supply and use tables and in the sectoral accounts.
This problem mainly concerns the valuation of various transactions in
goods and services. Basically, there exist three complications when
recording these transactions.[1] First, produced goods often pass through
various trade channels and are transported over substantial distances
before they arrive at their destination. Secondly, the government
imposes all kinds of taxes on the production, sale and utilization of
goods and services. Both phenomena entail that the prices paid by the
purchaser may not agree with the prices received by the producer. As a
consequence, one ends up with a different valuation of a transaction
depending on the angle from which it is considered.

Thirdly, every set of national accounts adds up transactions which
have taken place at different points in time. Since a different value is
usually attached to obtaining a commodity tomorrow than to having to
wait for it for six months, this means essentially that, even in the
absence of inflation or seasonal price fluctuations, those transactions
(in the same goods and services) are not strictly compatible. In the
national accounting practice, this problem mainly plays a role in
attaching a value to changes in stocks and work-in-progress. Naturally,
an inflationary situation poses additional problems with regard to the
valuation of income, e.g. from the possession of financial assets (cf.
Van der Laan and Van Tuinen, 1985). Here, we skip over these problems
and discuss only the first and the second problem.

The first problem is in fact not difficult to solve in theory. It is
clear that, *from an economic point of view*, a piece of fruit on a tree
in a far-away country is as different from that fruit on our dinner-
table as it is from a home-grown fruit of a different kind on that same
table. Analogously, even if various ingredients to our meals are all
available at nearby fields, it is still quite convenient that we only
have to visit one shop for obtaining them. Consequently, it is

conceivable that we would distinguish different commodities not only on the basis of their physical appearance but also depending on their location. In that case, it would be possible to record all transactions as they actually occur at the prices which are actually paid. However, it is obvious that this would lead to an unmanageable number of commodities.

Another alternative is a gross registration of the inputs and outputs of the production activities trade and transport. That would show most goods as intermediate inputs of these service industries, so that their gross output swells enormously. Again, all transactions can be recorded as they actually occur at the prices which are actually paid. Unfortunately, the analytical usefulness of such accounts and tables would be very limited, if only because a distinction between the 'real' intermediate inputs in trade and transport on the one hand and the goods which are traded and transported on the other hand, gets lost.

So it seems that there is no other solution than to accept a divergence between the price paid by the purchaser and the price received by the producer in many instances. The same applies to the case of (net) indirect taxes: part of the price paid ends up in the public purse and not in the hands of the seller, or, reversely, part of the price is actually paid by the public purse and not by the buyer.

Before we turn to a discussion of the most suitable valuation principle in each account and table, it is perhaps expedient to review concisely various valuation principles which can be used.

The first type of price is the *purchasers' price*, also called *market price* or *invoice price*. This is so to say the actual price of a transaction. If a value added tax system is in force, the purchasers' price is not equal to all users; a good or service costs less when it is bought as an input in a production process which is itself liable to VAT. So in case that one aims at somewhat more uniformity of the price paid by each purchaser, it might be considered to value transactions at *purchasers' prices excluding VAT*.

Next, the *producers' price* is equal to the purchasers' price excluding trade and transport margins. Notice that some consumers may have picked up the product at the factory and in that case the producers' price and the purchasers' price coincide. This example may illustrate that even if one works with a very detailed commodity classification, a uniform purchasers' price does not exist. In fact, all prices used to arrive at macro-economic statistics are some sort of average and one may only hope that the relative prices of the constituent elements of a 'commodity basket' change less than the relative prices among these commodity baskets. In this respect, combining potatoes and cabbage in one commodity is not fundamentally different from considering potatoes at the farm gate and potatoes at the consumers' homes as the same product.[2]

Evidently, the producers' price is not what the producer really gets for his products. Typically, the government imposes various kinds of taxes which are collected from the producers or the traders. In addition, some products are subsidized for one reason or another. It is quite important to distinguish between various types of duties depending on the way they are levied. First, production costs are influenced by various types of *direct taxes* (taxes on income, profits and capital gains, payroll taxes and social security contributions). These taxes are probably also reflected in the output price. Nevertheless, it is generally thought that (net) indirect taxes exert a more straightforward influence on the output price. These levies can be subdivided into *taxes on products* and *other taxes on production*.[3] The former refer to taxes on sale, transfer, leasing and delivery of goods and rendering of services, as they are labeled in the OECD classification of taxes, and the latter concern taxes on possession or utilization of goods, or on permission to use goods or to perform activities.

Subtracting (net) taxes on products from the producers' price, one arrives at the *basic price*.[4] Finally, a valuation *at factor costs* agrees with the basic price minus net other taxes on production.

In addition to the prices mentioned above, foreign trade is usually

valued with the help of specific concepts, namely a *free on board*
(f.o.b.) price which is applied to exports and sometimes to imports as
well, and a so-called *cost, insurance, freight (c.i.f.) price* which is
applied to imports only. These prices are supposed to register the value
of a commodity at the port of exit from a country and the port of entry
into a country respectively. They are mainly used as a basis for export
taxes (and subsidies) and import duties. The peculiar aspect of these
prices is that they do not reflect the value of an actual transaction.
In fact, it is questionable whether the transport costs from the place
of origin to the border on the one hand, and from the border to the
place of destination on the other hand are split up correctly in most
cases.

This finishes our review of various types of prices. Since an ideal
registration method does not exist even in the most simple economy, one
has to opt for a coherent second-best solution both in supply and use
tables and in the sectoral accounts. This will be discussed in the next
section.

2. A coherent proposal

The best way to start the discussion on this issue is to follow Hicks (1940) and to "..enquire into the whole *rationale* of valuation in National Income calculations. When we do this it seems to transpire that the right system of weights to be used for valuing the National Income depends upon the purpose for which the calculation is to be used. As National Income calculations are used for all sorts of purposes, we may have to be prepared to use more than one system of weights." (p. 106)

Hicks distinguishes two main uses of national income calculations: first, measuring economic welfare, and secondly estimating productivity. This topic has been reconsidered by Bos (1989) who adds a few other objectives, among which: establishing the financial strength of a nation (e.g. as a basis for assessing a fair contribution to international organizations). Disregarding for the moment all problems involved in using national income concepts for any of these uses, one may put the case that the first and the third application are best served with Net National Income (NNI) as measuring rod, while for the second one Gross Domestic Product (GDP) is the most suitable aggregate indicator.[5]

Starting with the valuation of Gross Domestic Product, some of the points made by Nicholson (1955) are quite illuminating. He demonstrates that, if we accept that the marginal product of each input is proportional to its price - a precondition in productivity calculations, this price must be the price paid by the purchaser and not the price received by the seller. This implies that intermediate inputs ought to be valued at purchasers' prices in the national accounts. Concerning the valuation of output, the situation is less clear-cut, however. Here, the degree to which various taxes can be passed on to the purchaser of the product enters the picture.

In this regard, three types of taxes (and subsidies) are distinguished in the national accounts: a) direct taxes (on primary inputs), b) (indirect) taxes on products, and c) other (indirect) taxes linked to production. Both value added taxes and all taxes on imports

belong to the second category. This subdivision is indeed quite useful when an optimal valuation principle for GDP has to be selected. To give an example: a producer of tobacco products (50% cigars, 50% cigarettes) may react differently if the excise tax rate on cigarettes is increased (without changing the tax on cigars), than when the government decides to impose a higher levy on account of the nuisance act. In the former case, the increase will typically apply as well to imported cigarettes. As a consequence, a general price increase of cigarettes is likely to occur. In the latter case, the price of the imported product will not change. What the domestic producer will do, depends on a number of factors. Also in the long term, the reaction may differ (a shift to other products and a shift to another production process respectively).

A recent document of Eurostat (1990) dealing with this issue seems to disagree with the distinction made here: "Both are charges chargeable as an expense and can be passed on." (foot note 6). In our view this argument is not very convincing, since even direct taxes on e.g. labour inputs can be passed on if competitive conditions permit. Moreover, the above example shows that it is in fact quite likely that taxes on products are passed on to a much larger extent than other taxes on production.

The lack of clarity regarding the valuation of value added is also evident from the discussion paper containing a survey of outstanding issues in the SNA review process (Inter-Secretariat Working Group on National Accounts, 1990). This paper recommends the 'mixed valuation method' (i.e. outputs at basic prices and inputs at purchasers' prices), but only "..on practical grounds". Nevertheless, it is also stated that "..experts groups have noted that certain product taxes cannot be allocated to supply and therefore cannot be considered as income of domestic producers. This was true in the 1968 SNA for import duties, but is equally true for value-added type taxes." (paragraph 74)

Ideally, the same valuation concept should be selected for the macro aggregate as for value added by production activity and by sector, so that the contribution of each branch or sector can be established

exactly. Since net taxes on *products* (particularly value added taxes and import duties) cannot be meaningfully assigned to a *production activity* or a *sector*, this rules out a valuation of GDP at purchasers' prices.

In addition, it is questionable whether one gets a correct impression of the contribution of e.g. the cigarette industry to GDP if value added is measured including excise taxes.[6] Finally, since taxes on domestic products are typically not higher than taxes on the same kind of imports, the 'value' which is thus created cannot really be regarded as a product (i.e. an achievement) of inland manufacturers.

Things are slightly different with respect to taxes (and subsidies) on production processes, like various kinds of licenses. These seem a borderline case; they may not affect all producers to the same extent, so that it becomes more difficult to pass them on to the customer. Moreover, for example a levy on the discharge of oxygen-demanding materials into surface water is basically just as much a tax on the use of (collective) inputs as a social security premium paid on behalf of the employees. As a consequence, a suitable GDP concept may refer to a valuation at basic prices, that is, factor costs plus net taxes on production, but excluding taxes on the (output of) products. An additional advantage is that the computation of a constant price value added estimate with the help of the double deflation method is more straightforward if value added is measured at basic prices, since a meaningful 'volume' indicator of net other taxes on production is not always easy to come up with.[7]

At the moment, GDP at factor costs is more commonly known than GDP at basic prices and therefore it is perhaps expedient to show this balancing item as a subtotal in the use table and in the sectoral accounts. Total GDP at purchasers' prices may then be presented in a supplementary table.

Simultaneously, National *Income* (NI) should evidently be measured at 'market' prices. Whereas GDP serves to analyze value added by domestic producers, NI is more oriented towards the measurement of living

standards.[8] A different purpose calls for a different valuation
principle in this case. How this can be incorporated in a single
framework will be shown in the next section.

For the moment, our proposals can be summarized as follows:
- to register in the use tables: all categories of use at purchasers'
  prices, total input at basic prices, and value added at basic prices
  as well as at factor costs;
- to register in the supply tables: output at basic prices, adding
  separate tables on imports, trade and transport margins, and net taxes
  on products, to arrive at total supply at purchasers' prices;
- to register in the goods and services (flows) accounts: again total
  output at basic prices, adding a separate item net taxes on products
  at the left-hand side, such that the total of uses and resources is
  given at purchasers' prices;
- to register in the production accounts: total output at basic prices,
  intermediate inputs at purchasers' prices, and thus value added (and
  Gross Domestic Product) at basic prices (with GDP at factor costs as
  a subtotal);
- to register in the generation of income accounts: the components of
  value added at basic prices; and
- to register in the appropriation of primary income accounts:
  compensation of employees, net mixed income and operating surplus, net
  taxes on products, net other taxes on production, and property income
  as resources, such that the balancing item, net primary income (and
  Net National Income) is shown at 'market' prices.[9]

It may be stressed again that this proposal refers to the valuation
principles for a complete system of national accounts, that is a system
in which supply and use tables and sectoral accounts have been
integrated. In addition, it may be useful to use different valuations
for *specific* purposes. For instance, if one wants a (somewhat) more
uniform valuation in each row of the use matrix, for statistical or
analytical purposes, purchasers' prices excluding VAT or producers'
prices excluding VAT may be applied. Similarly, an input-output analysis
making use of the assumption of constant coefficients is sometimes

served by a valuation of both inputs and outputs at basic prices (refer
also to the proposals by Greenfield and Fell (1979)).

3. An example of a set of supply and use tables and sectoral accounts

This section illustrates how our proposals affect the presentation of value added in supply and use tables and in sectoral accounts. Table 1 contains a system of supply and use tables.[10]

The first set of rows and columns contains the supply of goods and services. By way of illustration, three industries (labeled 1, 2, and trade & transport) and three types of goods and services (1, 2, and trade & transport services) are distinguished. The first block shows the make matrix. In this stylized example, each industry produces some by-products. Total output at basic prices equals 760 billion guilders. Adding imports (at prices before taxes), net taxes on products (sales tax, excise tax, VAT, import duties etc.), and trade and transport margins, we arrive at total supply at purchasers' prices (1010 billion guilders). It is obvious that the conversion of output at basic prices to output at purchasers' prices implies a considerable reduction of the output value of trade and transport services. At the macro-level, inclusion or exclusion of trade and transport margins does not make any difference.

The upper part of the use table presents various categories of demand for commodities, irrespective of their origin. All these transactions are recorded at purchasers' prices and total uses equal total supply at purchasers' prices (cf. the supply table). The industry columns of the use table add up to total inputs at basic prices, and this is then equal to total outputs by industry as shown in the supply table. As a consequence, gross value added is shown at basic prices (or: at mixed prices, as it is sometimes called). This balancing item is split into net other taxes on production and gross value added at factor costs. The latter is then subdivided into compensation of (various categories of) employees, net mixed income of the self-employed, net operating surplus of corporate enterprise, and consumption of fixed capital.

The same valuation principles are also applied in the sectoral

... Disaggregated Supply and Use Tables for the Netherlands, fictitious data based on 1987 estimates (billions of guilders)

RESOURCES	Industries 1	2	Trade& Transp	Sub-Total	Imports	Net Taxes on Products	Trade and Transport Margins	TOTAL SUPPLY (Purchasers' Prices)
GOODS AND SERVICES	Output basic prices				Imports c.i.f. pr			Supply purch.prices
Commodity 1	200	100	0	300	113	25	101	540
Commodity 2	0	225	20	245	100	11	84	440
Trade & Transp. Serv	25	0	190	215	0	0	-185	30
T O T A L	225	325	210	760	213	36	0	1010

USES	Industries 1	2	Trade& Transp	Sub-total	Final consumption expenditure	Gross capital formation	Exports	Subtotal	TOTAL USES (Purchasers' Prices)
GOODS AND SERVICES	Interm. Consumption purchasers' prices				Final Demand purchasers' prices				Uses purch.prices
Commodity 1	25	81	40	146	204	10	180	394	540
Commodity 2	80	93	47	220	101	72	47	220	440
Trade & Transp. Serv	0	0	0	0	30	0	0	30	30
Total Uses (Purchasers' Prices)	105	174	87	366	335	82	227	644	1010
GROSS VALUE ADDED (GDP)	Gross Value Added basic prices								
Net other taxes on production	1	1	2	4					
Gross value added factor costs	119	150	121	390					
T o t a l	120	151	123	394					
TOTAL INPUT (Basic Prices)	225	325	210	760					

accounts. Table 2 gives the goods and services account for the national economy. In this account, output is valued at basic prices, while all demand categories and total supply are shown at purchasers' prices. In the production account (table 3), value added is given at basic prices (and at factor costs), while total input and output are valued at basic prices. Consequently, the income generation accounts (table 4) for the institutional sectors record gross value added at basic prices as well as the break-down to each of the value added categories. Finally, the appropriation of primary income accounts (table 5) contain the second entry for net taxes on products (cf. table 2) and net other taxes on production (cf. table 4), so that the balancing item on the left-hand side, net primary income (equal to NNI for the national economy), is again valued at 'market' prices.

The examples may have demonstrated that it is indeed possible to apply different valuation principles to different parts of the system, in accordance with the range of purposes the system should serve, and without distorting its internal coherence.

Table 2: Goods and services account for the Netherlands, 1987 (billions of guilders)

RESOURCES

National Economy	Transactions
759.8	Output (at basic prices)
213.3	Imports (at prices before taxes)
36.4	Net Taxes on Products
34.2	Value Added Tax
2.3	Other Taxes on Products and Imports, Net
0.0	Trade and Transport Margins
1009.5	T O T A L (at purchasers' prices)

USES

Transactions	National Economy
Intermediate Consumption (at purchasers' prices)	366.0
Final Consumption Expenditure (at purchasers' prices)	334.5
Gross Capital Formation (at purchasers' prices)	82.3
Gross Fixed Capital Formation	87.1
Changes in Stocks	-4.8
Exports (at purchasers' prices)	226.7
T O T A L (at purchasers' prices)	1009.5

Table 3: Production account for the Netherlands, 1987 (billions of guilders)

USES

National Economy	Transactions and balancing items
366.0	Intermediate Consumption (at purchasers' prices)
393.7	Gross Value Added (at basic prices)
4.1	Net Other Taxes on Production
389.6	Gross Value Added (at factor costs)
232.1	Compensation of Employees
45.5	Consumption of Fixed Capital
112.0	Net Operating Surplus and Mixed Income
759.8	T O T A L (at basic prices)

RESOURCES

Transactions and balancing items	National Economy
Output (at basic prices)	759.8
T O T A L (at basic prices)	759.8

Table 4: Income generation account for the Netherlands, 1987 (billions of guilders)

		USES				RESOURCES				
Nonfinancial Corporations & Households	Financial Corporations	General Government	National Economy	Transactions and balancing items	Transactions and balancing items	National Economy	General Government	Financial Corporations	Nonfinancial Corporations & Households
171.9	11.7	48.5	232.1	Compensation of Employees	Gross Value Added (at basic prices)	393.7	52.0	5.1	336.6
42.0	0.4	3.0	45.5	Consumption of Fixed Capital					
119.3	-7.3	0.0	112.0	Net Operating Surplus and Mixed Income					
3.4	0.3	0.5	4.1	Net Other Taxes on Production					
336.6	5.1	52.0	393.7	T O T A L (at basic prices)	T O T A L (at basic prices)	393.7	52.0	5.1	336.6

Table 5: Income appropriation account for the Netherlands, 1987 (billions of guilders)

			USES			RESOURCES					
Households	Nonfinancial Corporations	Financial Corporations	General Government	National Economy	Transactions and balancing items	Transactions and balancing items	National Economy	General Government	Financial Corporations	Nonfinancial Corporations	Households
1.7	72.7	75.0	26.5	175.9	Property Income	Compensation of Employees	232.2	0.0	0.0	0.0	232.2
322.5	23.4	7.4	30.6	384.0	Primary Income, Net (at market prices)	Net Operating Surplus & Mixed Income	112.0	0.0	-7.3	83.8	35.5
						Net Taxes on Production and Imports	40.6	40.6	0.0	0.0	0.0
324.2	96.2	82.4	57.1	559.9	T O T A L	Value Added Tax	34.2	34.2			
						Net Other Taxes on Products & Imports	2.3	2.3			
						Net Other Taxes on Production	4.1	4.1			
						Property Income	175.1	16.5	89.7	12.4	56.6
						T O T A L	559.9	57.1	82.4	96.2	324.2

Notes

1) In this paper, we will not dwell upon the statistical difficulties of splitting the value of a transaction into a price and a volume component. Among other things, this means that issues as the measurement of quality change and an assessment of the volume of transactions in services are not addressed here.

2) In case that there exist several, separated markets for the same product, it may in fact be economically more meaningful to classify products by the type of market on which they are traded than by their physical appearance. Especially in many (Central and Eastern European) countries in transition, both the price per unit and the relative change of prices over time may be more similar for sugar and eggs in an official store when compared to the same products in a more informal market place, than when one combines the seemingly homogeneous products in one commodity basket. Refer also to Pyatt (1985) on this issue.

3) Actually, the term *taxes on products*, adopted in the concept for the next SNA is not a very fortunate one, since a tax on the utilization of a product, like a motor vehicle tax, does not belong to this category, although it is, strictly speaking, a tax on a product (namely the vehicle). What is meant by *taxes on products* is actually taxes on the *transaction* of products, while *other taxes on production* refer, among other things, to taxes on the *utilization* of products.

4) In the present SNA (United Nations, 1968), this price is dubbed the *approximate basic price*, while the term (true) basic price is reserved for an abstract, analytical construct in which all accumulated product taxes on direct and indirect intermediate inputs have been removed. The relevance of that value concept is very limited, and the more so as direct taxes on the primary inputs in the production process may exert a far greater influence on the output price than the indirect taxes paid on intermediate inputs. It has been wisely decided to drop that ('true') basic price concept in the

next SNA.

5) GDP is mentioned here because it is such a popular aggregate
   indicator of economic activity. In fact, productivity measurement
   will be more accurate if Net Domestic Product (NDP) is used instead
   (cf. Bos, 1990; Keuning, 1990a).

6) This has also been demonstrated by Nicholson (1955).

7) In productivity calculations, it is then possible to view indirect
   taxes as a mark-up on the input value, just like non-produced capital
   costs (cf. Keuning, 1990a).

8) The argument that GDP at purchasers' prices is needed for
   international comparisons is not very convincing, since NNI is a more
   suitable indicator for the financial strength of nations than GDP.
   Using NNI as the key variable for international comparisons also
   obviates the need for a forced registration of some interest receipts
   from and to abroad in the production accounts (cf. Keuning, 1990b).

9) In practice, total taxes on products paid by the users may surpass
   the amount received by the government, due to time lags, bankrupties
   etc. The difference is in fact a subsidy to industries (and thus not
   a subsidy on products!) and can be treated in the supply and use
   tables and in the accounts as follows:
   - in the value added block of the use table appears a row with
     negative figures (possibly combined with 'other' subsidies on
     production), such that the value added at factor costs is
     equivalently higher;
   - in the production accounts, this implicit subsidy appears on the
     right-hand side, or as a negative item on the left-hand side
     (depending on the registration of 'other' subsidies on production);
   - in the income appropriation accounts (of the government), it
     appears on the right-hand side or as a negative item on the left-
     hand side.

10) In fact, the presentation of supply and use tables can easily be embedded in a coherent, general matrix presentation of the complete system of accounts (cf. Keuning, 1991).

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This paper studies the influence of fraud on macro-economic statistics, especially GDP. The term "fraud" is used as meaning unreporting or underreporting income (e.g. to the tax authorities). The conclusion of the analysis of growth figures is that a bias in the growth of GDP of more than 0.5% is very unlikely.

NA/03 Secondary activities and the National Accounts: Aspects of the Dutch measurement practice and its effects on the unofficial economy, Van Eck, R. (1985).
In the process of estimating national product and other variables in the National Accounts a number of methods is used to obtain initial estimates for each economic activity. These methods are described and for each method various possibilities for distortion are considered.

NA/04 Comparability of input-output tables in time, Al, P.G. and G.A.A.M. Broesterhuizen (1985).
It is argued that the comparability in time of statistics, and input-output tables in particular, can be filled in in various ways. The way in which it is filled depends on the structure and object of the statistics concerned. In this respect it is important to differentiate between coordinated input-output tables, in which groups of units (industries) are divided into rows and columns, and analytical input-output tables, in which the rows and columns refer to homogeneous activities.

NA/05 The use of chain indices for deflating the National Accounts, Al, P.G., B.M. Balk, S. de Boer and G.P. den Bakker (1985).
This paper is devoted to the problem of deflating National Accounts and input-output tables. This problem is approached from the theoretical as well as from the practical side. Although the theoretical argument favors the use of chained Vartia-I indices, the current practice of compilating National Accounts restricts to using chained Paasche and Laspeyres indices. Various possible objections to the use of chained indices are discussed and rejected.

NA/06 Revision of the system of National Accounts: the case for flexibility, Van Bochove, C.A. and H.K. van Tuinen (1985).
It is argued that the structure of the SNA should be made more flexible. This can be achieved by means of a system of a general purpose core supplemented with special modules. This core is a fully fledged, detailed system of National Accounts with a greater institutional content than the present SNA and a more elaborate description of the economy at the meso-level. The modules are more analytic and reflect special purposes and specific theoretical views.

NA/07 Integration of input-output tables and sector accounts; a possible solution, Van den Bos, C. (1985).
The establishment-enterprise problem is tackled by taking the institutional sectors to which the establishments belong into account during the construction of input-output tables. The extra burden on the construction of input-output tables resulting from this approach is examined for the Dutch situation. An adapted sectoring of institutional units is proposed for the construction of input-output tables.

NA/08 A note on Dutch National Accounting data 1900-1984, Van Bochove, C.A. (1985).
This note provides a brief survey of Dutch national accounting data for 1900-1984, concentrating on national income. It indicates where these data can be found and what the major discontinuities are. The note concludes that estimates of the level of national income may contain inaccuracies; that its growth rate is measured accurately for the period since 1948; and that the real income growth rate series for 1900-1984 may contain a systematic bias.

NA/09 The structure of the next SNA: review of the basic options, Van
Bochove, C.A. and A.M. Bloem (1985).
There are two basic issues with respect to the structure of the next
version of the UN System of National Accounts. The first is its 'size':
reviewing this issue, it can be concluded that the next SNA should con-
tain an integrated meso-economic statistical system. It is essential
that the next SNA contains an institutional system without the imputa-
tions and attributions that pollute the present SNA. This can be
achieved by distinguishing, in the central system of the next SNA, a
core (the institutional system), a standard module for non-market
production and a standard module describing attributed income and
consumption of the household sector.

NA/10 Dual sectoring in National Accounts, Al, P.G. (1985).
Following a conceptual explanation of dual sectoring, an outline is
given of a statistical system with complete dual sectoring in which the
linkages are also defined and worked out. It is shown that the SNA 1968
is incomplete and obscure with respect to the links between the two
sub-processes.

**NA/11 Backward and forward linkages with an application to the Dutch agro-
industrial complex**, Harthoorn, R. (1985).
Some industries induce production in other industries. An elegant
method is developed for calculating forward and backward linkages avoi-
ding double counting. For 1981 these methods have been applied to
determine the influence of Dutch agriculture in the Dutch economy in
terms of value added and labour force.

NA/12 Production chains, Harthoorn, R. (1986).
This paper introduces the notion of production chains as a measure of
the hierarchy of industries in the production process. Production
chains are sequences of transformation of products by successive indus-
tries. It is possible to calculate forward transformations as well as
backward ones.

**NA/13 The simultaneous compilation of current price and deflated input-
output tables**, De Boer, S. and G.A.A.M. Broesterhuizen (1986).
A few years ago the method of compiling input-output tables underwent
in the Netherlands an essential revision. The most significant impro-
vement is that during the entire statistical process, from the proces-
sing and analysis of the basic data up to and including the phase of
balancing the tables, data in current prices and deflated data are
obtained simultaneously and in consistency with each other.

NA/14 A proposal for the synoptic structure of the next SNA, Al, P.G. and
C.A. van Bochove (1986).

NA/15 Features of the hidden economy in the Netherlands, Van Eck, R. and
B. Kazemier (1986).
This paper presents survey results on the size and structure of the
hidden labour market in the Netherlands.

NA/16 Uncovering hidden income distributions: the Dutch approach, Van
Bochove, C.A. (1987).

NA/17 Main national accounting series 1900-1986, Van Bochove, C.A. and T.A.
Huitker (1987).
The main national accounting series for the Netherlands, 1900-1986, are
provided, along with a brief explanation.

**NA/18 The Dutch economy, 1921-1939 and 1969-1985. A comparison based on
revised macro-economic data for the interwar period**, Den Bakker, G.P.,
T.A. Huitker and C.A. van Bochove (1987).
A set of macro-economic time series for the Netherlands 1921-1939 is
presented. The new series differ considerably from the data that had
been published before. They are also more comprehensive, more detailed,
and conceptually consistent with the modern National Accounts. The
macro-economic developments that are shown by the new series are dis-
cussed. It turns out that the traditional economic-historical view of
the Dutch economy has to be reversed.

**NA/19 Constant wealth national income: accounting for war damage with an ap-
plication to the Netherlands, 1940-1945**, Van Bochove, C.A. and W. van
Sorge (1987).

NA/20 The micro-meso-macro linkage for business in an SNA-compatible system of economic statistics, Van Bochove, C.A. (1987).

NA/21 Micro-macro link for government, Bloem, A.M. (1987).
This paper describes the way the link between the statistics on government finance and national accounts is provided for in the Dutch government finance statistics.

NA/22 Some extensions of the static open Leontief model, Harthoorn, R.(1987).
The results of input-output analysis are invariant for a transformation of the system of units. Such transformation can be used to derive the Leontief price model, for forecasting input-output tables and for the calculation of cumulative factor costs. Finally the series expansion of the Leontief inverse is used to describe how certain economic processes are spread out over time.

NA/23 Compilation of household sector accounts in the Netherlands National Accounts, Van der Laan, P. (1987).
This paper provides a concise description of the way in which household sector accounts are compiled within the Netherlands National Accounts. Special attention is paid to differences with the recommendations in the United Nations System of National Accounts (SNA).

NA/24 On the adjustment of tables with Lagrange multipliers, Harthoorn, R. and J. van Dalen (1987).
An efficient variant of the Lagrange method is given, which uses no more computer time and central memory then the widely used RAS method. Also some special cases are discussed: the adjustment of row sums and column sums, additional restraints, mutual connections between tables and three dimensional tables.

NA/25 The methodology of the Dutch system of quarterly accounts, Janssen, R.J.A. and S.B. Algera (1988).
In this paper a description is given of the Dutch system of quarterly national accounts. The backbone of the method is the compilation of a quarterly input-output table by integrating short-term economic statistics.

NA/26 Imputations and re-routeings in the National Accounts, Gorter, Cor N. (1988).
Starting out from a definition of 'actual' transactions an inventory of all imputations and re-routeings in the SNA is made. It is discussed which of those should be retained in the core of a flexible system of National Accounts. Conceptual and practical questions of presentation are brought up. Numerical examples are given.

NA/27 Registration of trade in services and market valuation of imports and exports in the National Accounts, Bos, Frits (1988).
The registration of external trade transactions in the main tables of the National Accounts should be based on invoice value; this is not only conceptually very attractive, but also suitable for data collection purposes.

NA/28 The institutional sector classification, Van den Bos, C. (1988).
A background paper on the conceptual side of the grouping of financing units. A limited number of criteria are formulated.

NA/29 The concept of (transactor-)units in the National Accounts and in the basic system of economic statistics, Bloem, Adriaan M. (1989).
Units in legal-administrative reality are often not suitable as statistical units in describing economic processes. Some transformation of legal-administrative units into economic statistical units is needed. This paper examines this transformation and furnishes definitions of economic statistical units. Proper definitions are especially important because of the forthcoming revision of the SNA.

NA/30 Regional income concepts, Bloem, Adriaan M. and Bas De Vet (1989).
In this paper, the conceptual and statistical problems involved in the regionalization of national accounting variables are discussed. Examples are the regionalization of Gross Domestic Product, Gross National Income, Disposable National Income and Total Income of the Population.

NA/31 The use of tendency surveys in extrapolating National Accounts, Oudde-
ken, Frank and Gerrit Zijlmans (1989).
This paper discusses the feasibility of the use of tendency survey data
in the compilation of very timely Quarterly Accounts. Some preliminary
estimates of relations between tendency survey data and regular Quar-
terly Accounts-indicators are also presented.

**NA/32 An economic core system and the socio-economic accounts module for the
Netherlands**, Gorter, Cor N. and Paul van der Laan (1989).
A discussion of the core and various types of modules in an overall
system of economy related statistics. Special attention is paid to the
Dutch Socio-economic Accounts. Tables and figures for the Netherlands
are added.

NA/33 A systems view on concepts of income in the National Accounts, Bos,
Frits (1989).
In this paper, concepts of income are explicitly linked to the purposes
of use and to actual circumstances. Main choices in defining income are
presented in a general system. The National Accounts is a multi-purpose
framework. It should therefore contain several concepts of income, e.g.
differing with respect to the production boundary. Furthermore, con-
cepts of national income do not necessarily constitute an aggregation
of income at a micro-level.

NA/34 How to treat borrowing and leasing in the next SNA, Keuning, Steven J.
(1990).
The use of services related to borrowing money, leasing capital goods,
and renting land should not be considered as intermediate inputs into
specific production processes. It is argued that the way of recording
the use of financial services in the present SNA should remain largely
intact.

**NA/35 A summary description of sources and methods used in compiling the
final estimates of Dutch National Income 1986**, Gorter, Cor N. and
others (1990).
Translation of the inventory report submitted to the GNP Management
Committee of the European Communities.

**NA/36 The registration of processing in make and use tables and input-output
tables**, Bloem, Adriaan M., Sake De Boer and Pieter Wind (1990,
forthcoming).
The registration of processing is discussed primarily with regard to
its effects on input-output-type tables and input-output quotes. Links
between National Accounts and basic statistics, user demands and inter-
national guidelines are examined.

**NA/37 A proposal for a SAM which fits into the next System of National
Accounts**, Keuning, Steven J. (1990).
This paper shows that all flow accounts which may become part of the
next System of National Accounts can be embedded easily in a Social
Accounting Matrix (SAM). In fact, for many purposes a SAM format may be
preferred to the traditional T-accounts for the institutional sectors,
since it allows for more flexibility in selecting relevant classifica-
tions and valuation principles.

NA/38 Net versus gross National Income, Bos, Frits (1990).
In practice, gross figures of Domestic Product, National Product and
National Income are most often preferred to net figures. In this paper,
this practice is challenged. Conceptual issues and the reliability of
capital consumption estimates are discussed.

**NA/39 Concealed interest income of households in the Netherlands; 1977, 1979
and 1981**, Kazemier, Brugt (1990).
The major problem in estimating the size of hidden income is that total
income, reported plus unreported, is unknown. However, this is not the
case with total interest income of households in the Netherlands. This
makes it possible to estimate at least the order of magnitude of this
part of hidden income. In this paper it will be shown that in 1977,
1979 and 1981 almost 50% of total interest received by households was
concealed.

NA/40 Who came off worst: Structural change of Dutch value added and employ-- ment during the interwar period, Den Bakker, Gert P. and Jan de Gijt (1990).
In this paper new data for the interwar period are presented. The distribution of value added over industries and a break-down of value added into components is given. Employment by industry is estimated as well. Moreover, structural changes during the interwar years and in the more recent past are juxtaposed.

NA/41 The supply of hidden labour in the Netherlands: a model, Kazemier, Brugt and Rob van Eck (1990).
This paper presents a model of the supply of hidden labour in the Netherlands. Model simulations show that the supply of hidden labour is not very sensitive to cyclical fluctuations. A tax exempt of 1500 guilders for second jobs and a higher probability of detection, however, may substantially decrease the magnitude of the hidden labour market.

NA/42 Benefits from productivity growth and the distribution of income, Keuning, Steven J. (1990).
This paper contains a discussion on the measurement of multifactor productivity and sketches a framework for analyzing the relation between productivity changes and changes in the average factor remuneration rate by industry. Subsequently, the effects on the average wage rate by labour category and the household primary income distribution are studied.

NA/43 Valuation principles in supply and use tables and in the sectoral accounts, Keuning, Steven J. (1991).
In many instances, the valuation of transactions in goods and services in the national accounts poses a problem. The main reason is that the price paid by the purchaser deviates from the price received by the producers. The paper discusses these problems and demonstrates that different valuations should be used in the supply and use tables and in the sectoral accounts.

NA/44 The choice of index number formulae and weights in the National Accounts. A sensitivity analysis based on macro-economic data for the interwar period, Bakker, Gert P. den (1991).
The sensitivity of growth estimates to variations in index number formulae and weighting procedures is discussed. The calculations concern the macro-economic variables for the interwar period in the Netherlands. It appears, that the use of different formulae and weights yields large differences in growth rates. Comparisons of Gross Domestic Product growth rates among countries are presently obscured by the use of different deflation methods. There exists an urgent need for standardization of deflation methods at the international level.

NA/45 Volume measurement of government output in the Netherlands; some alternatives, Kazemier, Brugt (1991).
This paper discusses three alternative methods for the measurement of the production volume of government. All methods yield almost similar results: the average annual increase in the last two decades of government labour productivity is about 0.7 percent per full-time worker equivalent. The implementation of either one of these methods would have led to circa 0.1 percentage points higher estimates of economic growth in the Netherlands.

NA/46 An environmental module and the complete system of national accounts, Boo, Abram J. De, Peter R. Bosch, Cor N. Gorter and Steven J. Keuning (1991).
A linkage between environmental data and the National Accounts is often limited to the production accounts. This paper argues that the consequences of economic actions on ecosystems and vice versa should be considered in terms of the complete System of National Accounts (SNA). One should begin with relating volume flows of environmental matter to the standard economic accounts. For this purpose, a so-called National Acccounting Matrix including Environmental Accounts (NAMEA) is proposed. This is illustrated with an example.

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