NA-092

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Verklaring der tekens

.	= gegevens ontbreken
*	= voorlopig cijfer
x	= geheim
-	= nihil
-	= (indien voorkomend tussen twee getallen) tot en met
0 (00)	= het getal is minder dan de helft van de gekozen eenheid
niets (blank)	= een cijfer kan op logische gronden niet voorkomen
1998-1999	= 1998 tot en met 1999
1998/1999	= het gemiddelde over de jaren 1998 tot en met 1999
1998/'99	= oogstjaar boekjaar schooljaar enz. beginnend in 1998 en eindigend in 1999
1988/'89-1998/'99	= boekjaar enz. 1988/'89 tot en met 1998/'99

In geval van afronding kan het voorkomen dat de totalen niet geheel overeenstemmen met de som der opgetelde getallen.
Verbeterde cijfers in staten en tabellen zijn niet als zodanig gekenmerkt.

Explanation of symbols

	= data not available
*	= provisional figure
x	= publication prohibited (confidential figure)
-	= nil
-	= (between two figures) inclusive
0 (00)	= less than half of unit employed
a blank	= category not applicable
1998-1999	= 1998 to 1999 inclusive
1998/1999	= average for the years 1998 up to and including 1999
1998/'99	= crop year financial year school year etc. beginning in 1998 and terminating in 1999
1988/'89-1998/'99	= book year etc. 1988/'89 up to and including 1998/'99

Detailed items in tables do not necessarily add to totals because of rounding.
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Abstract

Fifteen years ago, Statistics Netherlands started experimenting compiling simultaneously input/output tables in both current and constant prices. The first tables (of the industry by industry type) were rather limited of scale (200 x 100). Five years later, the system developed into a full-fledged set of supply and use tables describing 250 industries by 800 products.

This system has a maximum of transparency as it makes optimal use of the data available. The main advantages of a simultaneous compilation of current prices and volume data is the use that can be made of the interrelation between the two. During the entire statistical process - from the processing and analysis of the basic data up to the balancing of the supply and use tables - data in current prices and deflated data are obtained simultaneously and in consistency with each other.

This paper concentrates on the ten years experience in compiling supply and use tables in The Netherlands. It focuses on the features that have become the main elements of the Dutch system. Three subjects can be distinguished here: the simultaneous compilation in current prices and constant prices; the column-row-column working procedures; and the transformation of supply and use tables into an industry by industry I/O-table.

Secondly, attention is paid to the solution of some practical problems such as the treatment of trade and transport margins. These examples are illustrative of the often bold assumptions that must be made to compile a full and consistent set of data with the relatively limited information that can be obtained from the reporting units in the economy.

Finally, the authors will draw some conclusions on the advantages and disadvantages of a system of supply and use tables in an economy that is becoming more and more difficult to describe. Two parallel developments seem to be universal: the structure of the economy is becoming more complex (globalisation, take-overs, outsourcing, to name only some key words) on the one hand and strong political pressure to reduce the statistical burden to a minimum on the other.

Keywords: national accounts - simultaneous compilation - constant prices - supply and use tables

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1. Introduction

In the Netherlands, the compilation of industry by industry Input-Output tables as part of the regular national accounts data go back to the 'fifties. From 1980 onwards, I/O tables in constant prices, next to tables in current prices, became standard procedure. More than fifteen years ago, in the early eighties, the decision was made to set up a new integration system, based on supply and use tables both in current and constant prices. The superiority of the supply and use tables as an integration framework was the main reason for this move. Contrary to I/O tables, supply and use make optimal use of available sources. Production statistics, foreign trade statistics, data on consumption and capital formation all contain information on products. Therefore, the 1986/'87 revision of the Dutch national accounts not only introduced a great number of improved estimates but it also was the starting point of a new way of national accounts integration.

Ten years later, it can be concluded that the introduction of supply and use tables has improved the quality of the estimates. A closer link with source statistics on supply and use in current prices and - maybe even more important - with price statistics sums up the main reason for this improvement.

Over the last years, the National Accounts Department of Statistics Netherlands has witnessed an increasing number of visits and written enquiries from a great number of colleagues. Their questions have been one of the major inspirations for this paper.

1.1 Simultaneous compilation of current and constant price tables

Volume changes of macro-economic indicators are by far the most important data that national accountants produce. GDP growth is the measure stick of the success of economic policy: one percent more or less growth of GDP normally makes the headlines of the national newspapers.

By contrast, this emphasis on the volume changes of the economy by main users of the national accounts is only partially reflected in the main sources statisticians use to compile their data. In most cases, *current* price information on business accounts, consumer and government spending and foreign trade are at the basis of the national accounts calculations. More extensive surveying by adding questions on *quantities* is not very popular as it raises the administrative burden of enterprises. So national accountants are faced with the challenge to make good estimates on the basis of incomplete and sometimes even poor source data.

Up until the early 'eighties, the integration of national accounts data at Statistics Netherlands was performed in current prices with a rough deflating procedure afterwards to establish volume changes. With the final estimate of the year 1981, Statistics Netherlands started experimenting compiling simultaneously I/O tables in both current and constant prices. The first tables (of the industry by industry type) were of a rather limited scale (200 x 100), but the method proved nevertheless to be an effective way to estimate good quality volume and current price changes.

One of the main problems in this compilation process was the lack of homogeneity in a industry by industry I/O table. By implication this means that in principle each cell has to be broken down into its main products to calculate correct deflators and thus correct volume measures. As a result, the second improvement swiftly followed the first: with the revision of 1987, the system developed into a full-fledged set of supply and use tables describing 250 industries by 800 products. This set became the main integration framework with the traditional industry by industry Input/Output tables as an important side product.

A major advantage of compiling price and volume measures within an accounting framework as the supply and use tables, is that a check is provided on the

numerical consistency and plausibility of the set of measures as a whole. Another advantage is that price and volume measures for the important balancing items can be derived. In particular, gross value added can measured at constant prices by subtracting intermediate consumption at constant prices from output at constant prices, the so called “double deflation” method. Double deflation may be used at the level of an individual enterprise, industry or sector, or for the total economy as a whole by subtracting imports at constant prices from total final expenditure at constant prices.

More information on the simultaneous compilation of supply and use tables in current and constant prices can be found in De Boer and Broesterhuizen (1986).

1.2 Timing and content of Dutch national accounts

At Statistics Netherlands every year three estimates of the National accounts data are compiled[1]. The planning of these estimates is as follows:

- T + 6 months: first estimate (“provisional”)
- T + 17 months: second estimate (“improved provisional”)
- T + 27 months: third estimate (“final”)

These estimates contain a complete set of NA data:

- supply and use tables in current prices and in prices of the preceding year;
- I/O-tables (industry-by-industry) in current prices and in prices of the preceding year - in producers’ prices and basic value;
- sector accounts for all main sectors including financial accounts.

Social Accounting Matrices (SAM) and National Accounting Matrices including Environmental Accounts (NAMEA) are compiled for the “final” year. Balance sheets are currently only compiled on an experimental basis; the same holds for homogeneous or product-by-product I/O-tables.

The final estimate of the supply and use table consists of around 250 industries by 800 product groups. Due to confidentiality not all data can be published for a broad public. After application of the Dutch confidentiality rules a supply and use table of some 150 activities and 600 product groups is publicly available. The corresponding activity by activity I/O-table is available at around 150 activities.

The provisional estimates are made with 100 industries and 250 product groups. This is very close to the publication level of the supply and use table and I/O-table.

1.3 Content of the paper

This paper gives an overview of our experiences during the past fifteen years. Its main purpose is to give an insight into the practical workings of the integration process of supply and use tables in both current and constant prices. The theoretical background of the type of indices and the use of chain indices can be found in other papers by Statistics Netherlands (see references).

The second paragraph dicusses some features of the system design: classification of industries and product groups; choice of index number formulae; sources and statistical units; working procedures and automation. In the third paragraph data collection and adjustment of data to national accounts standards are discussed. A description of the balancing procedure and a real life example of a simultaneously balanced set of data can be found in paragraph 4. Next, the fifth paragraph discusses the transformation of the supply and use tables into I/O tables of the type industry by industry. Paragraph 6 focuses on some practical

[1] On the basis of the Quarterly Accounts three more annual estimates are available for only a limited number of macro-economic variables (T + 0 months, T + 2 months, and T + 4 months).

problems: the balancing of taxes and subsidies on products and trade and transport margins; the treatment of VAT; and the use of price indices in the system.

Although we are confident of the quality of the current working procedures, some important improvements are still possible. These improvements relate to the differences between deflated values and actual volume information (paragraph 7). The last paragraph contains some concluding remarks.

2. The system design

2.1 Classification of industries and product groups

A difficult problem to be solved in implementing a supply and use framework is to find a balance between detail and overview. In other words, how to decide on an optimal number of columns (imports, output and use by domestic activities and final expenditure) and rows (product groups).

The choice of the number of *product groups* should at least be based on six important criteria:

- a good match with international product classifications (HN for data on international trade and CPA for European data dissemination);
- homogeneity of VAT and other taxes;
- availability of data of sufficient quality;
- sufficient “magnitude”;
- homogeneity of price changes;
- the homogeneity in destination (intermediate consumption or final expenditure).

The reasoning behind these six criteria is mostly self-evident. An important factor is the European Union. Not only is all data dissemination to the European Union standardised by European law (CPA), national accounts data has also become an important measuring stick for contributions from member states to the EU. This explains the importance of homogeneity with respect to VAT and other taxes. VAT calculations are used to determine the contribution according to the Third Resource of the financing of the European Union.

Although the criterion of availability of good quality data and the homogeneity with respect to the destination of the goods seem quite straightforward in its implementation, it is in fact rather more “subtle”. In the Netherlands - as in most countries -, the information on supply and use is not evenly balanced. Data for foreign trade and domestic output are available in far more detail than most data on the use side of the economy. The item “other costs” on the profit and loss account of enterprises is a well known example of the lack in detail on the use side.

So it would seem that the level of detail on the use side would be the easiest choice as a standard. This, however, will in many cases lead to a great loss of information. For example, in the case of the construction industry it is very difficult to obtain detailed data on the consumption of building materials. However, the output of the manufacturing industry of building materials can be measured in great detail. Most of its output is destined for the construction industry; only a small fraction is consumption of households. It is clear that the choice for more detail in the classification of building materials will highly improve the quality of the estimates of intermediate consumption by the construction industry. In fact, the composition of the intermediate consumption by construction is mainly derived from the composition of the output of the manufacturing of building material. Estimates on consumption of households both in current and constant prices are also improved, because in a detailed description most building material product groups can be safely assumed as to be only relevant to construction industry input.

Of course, no classification can completely satisfy all these features. This would imply a table of several thousands of products. So, a seventh criterion comes into play: overview. The integration process should be as efficient as possible: the number of product groups used in the integration process should not surpass

"normal human capabilities". In the Dutch case several revisions of the product group classification have in all cases led to a number of around 800.

The classification of domestic *industries* and of final expenditure is mostly limited by the availability of data and the impossibility to compile a consistent and detailed description of very small activities. In the Dutch supply and use tables 1 million guilders is the smallest value accepted. It is evident that use categories which are included in e.g. "other business costs" will either turn out to be zero or will "forever" be estimated as 1 or 2 million.

In the Dutch case this has led to a choice of some 250 activities. As information on manufacturing industry is more detailed than data on most services industries, information on manufacturing in the supply and use tables is somewhat more specific. Another reason for this amount of detail lies in the fact that in manufacturing even closely related activities (according to official classifications) can produce very different products with very different input structures.

2.2 The choice of index number formulae

Part of the design of the system is the choice of index formulae to be used in the integration framework. From a practical point of view, two requirements should be imposed on the index number formulae to be used in compiling constant price data:

- additive consistency
- value index = price index * volume index (factor reversal)

In an accounting framework like the supply and use table, additivety simplifies the balancing of the system. All consistency checks which are valid in current prices hold also at constant prices.

The factor reversal requirement means that the value index is completely split up in a volume part and price part. Nothing is lost.

The SNA'93 favours Fisher's Ideal Index, because of its close approximation of the theoretical superlative index formulae like the Tornqvist en Vartia. Disadvantage of the Fisher is that it is demanding in its data requirements, and that its results are not easy to be interpreted and, last but not least, not additively consistent. This means that the Fisher index is not applicable in an accounting framework where additivety is an important issue. A way out is the use of a combination of Paasche price indices and Laspeyres volume indices. It can easily be proved that this combination of indices fulfils the requirements mentioned above.

Another issue in constant price estimation is the choice of the base year. The SNA'93 favours the use of a moving base year. In practice this means that t-1 will be the base year. The advantages are clear:

- an actual weighting scheme provides better estimates of growth rates;
- introduction of new goods will be simplified;
- disappearance of goods will be simplified;
- no burdensome rebasing of time series.

Applying several types of index number formulae using the detailed supply and use data of the Netherlands, shows that Paasche and Laspeyres chain volume indices in general provide a close approximation of Fisher's Ideal Index (see De Boer et al., 1998).

In case of a moving base year, the index formulae used, are:

Paasche price index

$$PI_{t,t-1} = \frac{\sum P_t * Q_t}{\sum P_{t-1} * Q_t}$$

Laspeyres volume index

$$VI_{t,t-1} = \frac{\sum P_{t-1} * Q_t}{\sum P_{t-1} * Q_{t-1}}$$

2.3 Sources and units

At Statistics Netherlands, all source statistics for the supply and use tables are "institutional statistics". This means basically, Statistics Netherlands surveys enterprises as they present themselves to e.g. the tax authorities. Main exception to this rule are the bigger enterprises that are often structured in a complex or diverse way. In these cases enterprises are asked to create special statistical units which often correspond to their business units. This implies that an industry classification in S&U and I/O-tables in the Netherlands should be interpreted in the institutional way: they describe establishments that are as homogeneous as possible within the limits of what is reasonably possible from a surveying point of view. As a result, in Dutch S&U tables output of most industries consists of a main product (or products) and some other products that are not always directly related to the main product.

2.4 Working procedures

The working procedures of the compilation of supply and use tables at Statistics Netherlands can (chronologically) be summed up as a column - row - column scheme.

A. Columns: Input from specialists

The data received from source statistics is made complete and consistent with the level of detail of the reporting year. This work is done by NA-experts (referred to as "specialists") that are each specialised in a group of industries. They are responsible for the necessary adjustments to meet NA-definitions and to estimate the "white spots" not covered by source statistics. Furthermore, specialists are responsible for a number of additional estimates, as the source statistics do not contain all the necessary details. An example would be the splitting up of the headings "other products" and "other costs" that are often found in annual production statistics.

Outputs and inputs are separately deflated by using prices from a central prices database in which price data are stored on foreign trade, producers' prices and consumer prices. Where services are concerned prices of inputs or other indicators are often used for output prices. These prices are compiled by NA specialists.

The input from specialists (on production and uses by industry, on final use components and on foreign trade) in the main automated integration system are the columns of the supply and use tables. After the introduction of the data in the system the data are then checked again by the specialists.

B. Rows: The integration process

At the start of the integration process, the automated integration system contains a full description at product and activity level of the year under compilation in current prices and in prices of the year before (800 product groups and 250 industries in the final estimate). The data set also includes the corresponding set of data of the year before in current prices.

The integration process is based on the balancing of the rows of the supply and use tables. During the process, data can only be approached row wise; the columns are "locked". Product groups are aggregated into about 200 "statistical groups" of related product groups. These statistical groups are attributed to an

integrator (i.e. balancing specialist); only this person is allowed to change the data of his statistical groups and the underlying product groups.

The integrator now balances manually every product group by making supply and use (or better: sales and purchases, in order to avoid valuation problems with changes of stocks) equal - both in current prices and prices of the previous year. Large discrepancies between supply and demand of a product are analysed and subject to discussions between the integrator and the most concerned specialists.

The programme allows for automatic balancing of a product group. This facility is mainly used for the elimination of small discrepancies. No statistical discrepancy between supply and demand is left after balancing. The integrator normally does not change data on domestic output, but finds solutions by altering data on imports or intermediate and final uses (including stocks). This integration method implies that GDP according to the production method and GDP according to the expenditure method are made equal by balancing the underlying data.

One of the consequences of this method is that value added by industry or total imports/exports or final uses can and will be changed from the data that were used as input from specialists. Wherever this leads to “unacceptable” changes to the data that were used as inputs, a third step is necessary.

C. Columns: Checks and “repairs”

As value added and the input structure of industries can be changed in the second step, the results are checked by the specialists to see if the results are acceptable. If not, data are changed to accommodate the wishes of the specialists. In most cases, these changes are only of minor importance.

Although the description of the integration process may lead to the assumption that it is a very lengthy and labour intensive operation, this is not the case. The balancing of the final estimate (S&U- and I/O-tables) takes about two and a half months and involves six to seven people full-time. The other two estimates are finished within four to six weeks each. The preparation of the inputs by specialists takes about the same time per estimate. Inside the National Accounts Department, approximately twenty people are involved.

2.5 On the automation of the system

Last but not least, the automation of the system is essential. The computer plays a number of different roles. First, it should produce a quick and clear overview to detect the major integration problems. Secondly, it should allow a deep and efficient search into the details of the system to find the cause of these problems and possible solutions.

Moreover, many calculations involved in a rather detailed system have to be performed automatically; for example the calculation of trade and transport margins by user to calculate an industry by industry Input/Output table or VAT by product etc., etc.

Provisional estimates are compiled in the same supply and use framework as the final estimates. Though at the more at aggregated level of 100 industries by 250 product groups much of the data has to be automatically generated. Intermediate consumption by product groups is the classic example.

In this context it is not possible to give a full description of the automation of the integration system. Only some main elements are touched upon.

The central database is an Oracle database on a Windows NT server. The database is “virtually” split up into bundles of product groups called statistical groups (= a bundle of rows of the supply and use tables). Thus only small parts of the database are addressed in a standard PC network environment by the integrator to whom these statistical groups have been attributed (see par. 2.4). In this way possible conflicts between integrators when changing data are evaded and the efficiency of working procedures is greatly improved.

This solution of “virtually” splitting up the database with the option to balance the product groups manually, is the result of a negative experience in the ’seventies and early ’eighties. In this period, Statistics Netherlands tried to develop an integration system that would automatically perform most of the integration work. The quality of the inputs was evaluated by putting a different weight on each item of the supply and use tables. As these weights were considered to be indication of possible correction margins, it was thought possible to balance the whole supply and use table in one automated procedure. This work was abandoned because the results were fairly unpredictable.

This negative experience has led us to the conclusion that a balaincing system must be as simple in its operation as possible. The current procedures which rely on the manual integration of small parts (= a limited number of rows) of the supply and use tables at a time seem to be a very workable solution. This explains why automatic balancing procedures in the compilation of supply and use tables are seldomly used.

The most complex part of the integration system is the component where industry-by-industry I/O-tables are compiled. Here again, heavy use is made of Lagrangian type of automatic adjustment procedures. But experience over the last few years has learnt us that that the current way of compiling I/O-tables can be simplified by making I/O-tables not at the level of 800 product groups but at the level of 250 clusters of product groups. After ESA revision the system has been be changed accordingly.

3. Introduction of the data in the system

3.1 Data collection

Available data in the Netherlands does not basically differ from data in many other OECD countries.

The main source for industry output estimates are annual production statistics. These give rather detailed information on the products sold. In manufacturing this data is even surveyed on a quarterly basis. The information on intermediate consumption differs largely between activities: data on the manufacturing industry being far more detailed than most other industries. Most of this information is in current prices.

Some elements of the economy are not covered by annual statistics; these activities are estimated in an alternative way - for example by gathering data on employment, compensation of employees or data from professional associations. In these cases, the use side of their accounts has to be estimated by using data from comparable activities.

A special example is agriculture. Here, the compilation process starts from volume data. As one of the consequences of European agricultural policy, measurement of volume data is far more developed than that of financial data.

Information on foreign trade of goods according to international regulation is abundant, but because of European unification less reliable than in the past. International trade of services is a terrain on which statistics are rapidly developing.

Data on gross fixed capital formation and consumption are most often in current prices mostly. Surveys on gross fixed capital formation give information by economic sectors. Statistics on manufacturing industries are rather detailed and even give some information on the capital stock. Household budget surveys and retail sales statistics are important sources for the consumption estimate.

Available price data include consumer prices, producers' prices of goods and foreign trade unit values and prices. Price information on services is - as in most countries - currently part of discussion and research.

3.2 Adjusting to national accounts standards

Inside the National Accounts Department the source data is transformed to be usable in a supply and use framework. The main transformations in current prices are adjustments for incomplete surveys, for the black economy, for continuity, for definition differences between commercial and national accounts bookkeeping, and, finally, for the classifications of the supply and use table.

An important step in this transformation procedure is the estimation of data in prices of the previous year. These constant price estimates are in most cases based on the deflating the current price information.

Data on the production of goods can be fairly easily deflated by using the available information on producers' prices. Price data on services has been under discussion for some years now. Currently, Statistics Netherlands is undertaking a major operation to improve these data - partly in co-operation with Eurostat. The deflation of imports is also somewhat more hazardous; unit values that come with foreign trade statistics are only of limited use. In the Netherlands, use can be made of a separate survey on the price of imports.

On the use side of the economy, consumer price information is abundantly available. Constant price intermediate consumption is calculated by using weighted output prices. Deflation of fixed capital formation, exports and government consumption is performed likewise.

At the end of this segment of the estimation procedure, a complete picture is available for every column of the supply and use table. All activities, outputs and intermediate uses are described in terms of the 800 product groups of the integration framework; not only in current prices but also in prices of the previous year. The same holds for imports and final expenditure.

For every entry in the supply and use table, the information can be presented in the following scheme:

Scheme 1. Available data

description		*data*	
t at current prices	price index	215	102.4
t at prices of *t-1*	volume index	210	105.0
t-1 at prices of *t-1*	value index	200	107.5

This set of data allows the national accountant to double-check the data on consistency: even if the results in current prices look plausible, analysis of the volume and price data can show largeproblems. E.g. by comparing changes in the volume of output by industry with that of its intermediate consumption and value added. It is quite evident that analysis in real terms is far superior when prices are changing rapidly. This value-price-volume analysis can lead to corrections on either of the estimated variables.

In some cases, these data can be checked with real volume data. For example, in the Netherlands, we can make use of abundant volume data on the supply and use of energy products and to some less extent of the volume of sales by product of manufacturing industry. Another example, already mentioned, is agriculture.

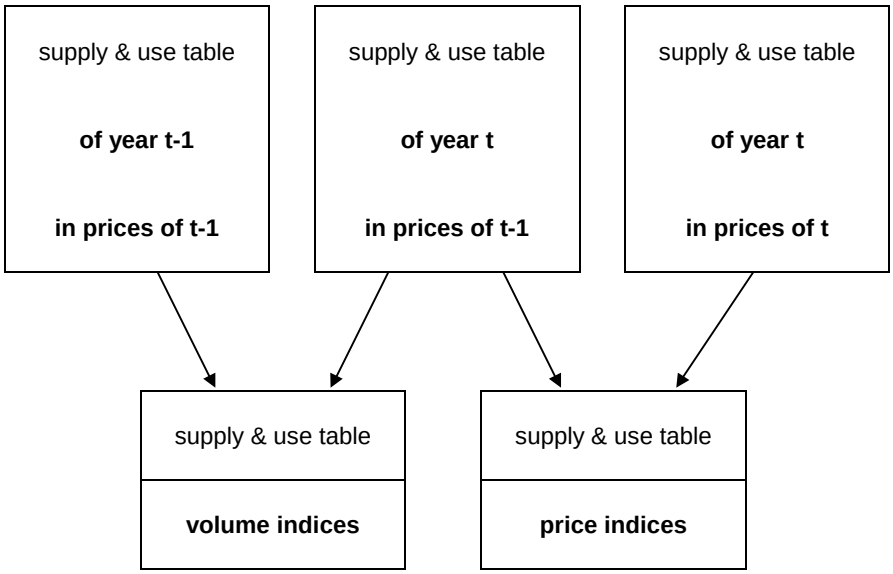
4. Balancing

4.1 General features

The end product of the transformation process that was described in the previous paragraph is a data set that can be balanced in a supply and use framework. Just as was the case in the preceding phases of the statistical process, the balancing takes place simultaneously for the data in current prices, the data in constant prices, volume indices and price indices (scheme 2).

Differences between the estimates of the supply and the use of a product group are eliminated by adjusting elements in either the use table or the supply table. If a figure in current prices is adjusted the consequences for the corresponding figures in prices of the previous year, the volume index and the price index are examined. If a figure in constant prices is adjusted, a similar procedure takes place. In this way the plausibility of an intended correction is checked.

Scheme 2 Simultaneous balancing of a supply and use table



Price indices that are found in the various columns of the use table and the supply table for one product group are a good starting point for the analysis of the differences. These were determined independently from each other in the previous phases of the statistical process. Now they are compared and their consistency is checked. The checks can point out where corrections should be made. Some corrections will also mean corrections on important aggregates such as total output or total intermediate consumption of an industry. As a consequence, value added as determined in the stages before may also change.

Simultaneous correction of data in current and constant prices makes it possible to analyse the consequences for operating surplus and for the volume change of value added at the same time; the same holds for intended corrections on final demand. If, according to the statistical experts, intended corrections on value added or final demand in either current prices or volume give improbable results, alternative ways should be found to eliminate the difference. It is possible that simultaneously balancing in current and constant prices will result in a different allocation of corrections than the balancing in only current prices.

When the balancing phase has been completed, the user of the national accounts has at his disposal a system of tables containing consistent and detailed data on values, volume changes and price changes of goods and services. In addition, this system comprises detailed information on levels and trends in primary incomes and final demand in both nominal and real terms.

4.2 Simultaneous balancing in practice

The annex of this paper shows a real life example of the balancing procedure. The first table shows the data on the fertiliser industry in 1996. The set is taken from a provisional estimate in which around 200 product groups and 100 activities are distinguished - in stead of the 800 by 250 table when estimating final data. Rather extensive descriptions of the compilation process can be found in Bos and Gorter (1993).

The first three columns contain the starting set (Cu-p = current prices; Cn-p = constant prices; and Cu-p T-1 = current prices in year T-1), the second three columns the balancing corrections, and the third three columns the balanced results. The last three columns contain index information on volume, price and value changes.

The second set of tables gives same full information on the product fertiliser in the Dutch economy.

In this case no spectacular corrections were necessary. Output of fertiliser by the fertiliser industry was corrected upwards with a bit over 1%; its intermediate use by around 3%.

The imbalance in the row of the product fertiliser (demand exceeding supply by 83 million guilders in current prices) is solved by augmenting supply by 41 million guilders and decreasing demand by 42 million. Data in prices of the previous year are corrected accordingly.

5. Compiling Input/Output tables

Balanced S&U tables give information about value added per industry, the input-output structure per industry in terms of products and, of course the major macro-economic figures such as GDP, consumption etc..

S&U tables, however, do not give information on the input-output structure of the economy in terms of industry by industry. One of our main users, the forecasting agency of the Dutch government (Netherlands Bureau for Economic Policy Analysis), uses these I/O-tables of the industry-by-industry type in their forecasting models.

These industry-by-industry I/O-tables are derived from the S&U-tables in the following way. To start with, for each product group an complete I/O-table is compiled. As only limited information is available on the relation between producing units/imports and the users (intermediate or final) in many cases a proportional distribution is used. Of course when information is available this is used a starting point. In general, there is no manual balancing process; the matrix is adjusted by applying a mathematical program based on a Lagrangian adjustment method.

This procedure results into 800 I/O-tables (namely 1 for each product group). Adding them up gives the national industry-by-industry I/O-table.

6. *Some practical aspects of balancing supply and use tables*

In this paragraph three practical themes will be discussed: the balancing of trade and transport margins; the treatment of VAT; and, finally, an outline is given as regard to the availability of price indices in the Dutch situation.

6.1 Trade and transport margins in supply and use tables

In an elaborated system of supply and use tables the registration as well as the balancing of taxes and subsidies on products and trade and transport margins are of great importance. First, the registration in the system will be explained. After that the balancing procedures in relation to the margins are treated.

A. Registration in the system

Valuation complicates the framework to a great extent: supply is regularly valued at basic prices and use at purchasers' prices. The bridge between the valuation of both tables is included in the supply table. The registration of margins is illustrated in Scheme 3. For the sake of simplicity, only three columns are distinguished: taxes and subsidies on products, transport margins and trade margins.

In practice, the system has about twenty valuation layers for taxes and subsidies, while margins are split up in transport margins, wholesale trade and retail trade margins. After the ESA'95 revision, source data allow us to split up wholesale margins further into margins on export and other wholesale margins.

Scheme 3 Supply table

	industries	imports	taxes / subsidies on products	transport margins	trade margins	total supply
products Food • • • Cars • Construction • Government	A	B	C	D	E	F
Transp. marg.				-Σ		zero
Trade margins					-Σ	zero
Total output	G	H	I	J	K	L

Explanation of symbols:
A = output of domestic producers by industry and product group at basic prices
B = imports of goods and services by product groups at CIF-value
C = taxes and subsidies on products by product group
D = transport margins
E = trade margins
F = total supply at purchasers prices (row sums of A - E)
G = total output per industry at basic prices
H = total imports at CIF-prices
I = total taxes minus subsidies on products
J = zero
K = zero
L = total supply at purchasers prices (column total)

B. Balancing the margins

Trade and transport margins are registered twice in the supply table. First, as output of, mainly, trade and transport industries. Secondly, as a layer in the valuation bridge between supply at basic prices and use at purchaser's prices.

In the columns of trade and transport margins the total is included with a minus sign which implies that both the row totals of the product groups trade and transport margins and the column totals are equal to zero. This registration provides a check on produced and used margins. When J and K and the row totals for trade and transport margins are zero, the margins are balanced.

Before the start of the balancing process, the total of produced and used margins are equal. During the balancing adjustments are made on the margins per product group. This means that the cells of the column margins in scheme 3 are changed. At the end of this part of the procedure, when all product groups are balanced, the total of the margin column (= the used margins) can be calculated. The next step is to make an adjustment on the supply side in order to balance supply and demand. In practice, this often means that the output of the wholesale trade industry is adjusted.

C. Relation with the I/O-table: margin matrices

In ten years of compiling supply and use as well as I/O-tables one can distinguish two periods. From 1986 to 1992, I/O-tables were only compiled when the work on the supply and use tables was finished. In some cases, errors that resulted from the balancing of supply and use tables were discovered during the compilation of the I/O- table. Feedback to the supply and use outcomes was at that stage of the process in many cases too difficult and time consuming. An example of such an error is where the value of re-export exceeds the import value of said product.

Since 1993, the balancing of supply and use tables and compiling a I/O-table has become a simultaneous process. In practice, this means that immediately after supply and use of a product group have been balanced, two operations are performed:

1. Trade and transport margins - in fact all valuation layers - are divided over the users (intermediate consumption, export, final consumption, etc.). This entails the estimation of four margin matrices and not just four columns as suggested in Scheme 3. Currently, the distribution in the base year determines the distribution in the reporting year. After the ESA'95 revision margins will be distributed proportionally over the users in the reporting year.

2. For all product groups a distribution by origin and by destination must be made. We refer to paragraph 5.

6.2 Treatment of VAT

In supply and use tables only non-deductible VAT is recorded: VAT on purchases by households, VAT on fixed capital formation and by VAT-exempt enterprises.

VAT-exempt enterprises do not charge VAT when they sell their products. This

implies that they can not settle paid VAT on their purchases of intermediate and capital goods with VAT received on their sales. For this reason VAT paid by VAT-exempt enterprises is considered a final levy. In the use table (Scheme 4) this appears on the row non-deductible VAT in the column of the VAT-exempt industries. Imputed VAT differs from VAT actually paid to the government. This is due to acquittals, bad debts, fines, regulations for small entrepreneurs and VAT evasion. The difference between imputed and paid VAT is registered in a dummy column and not distributed over industries. (In scheme 4 the difference is -1789 mln)

Scheme 4 Treatment of VAT in Use table

(mln gld)

products	VAT-exempt industries	other industries	final consumption	paid minus imputed VAT	total
non-deductable VAT	8523	0	34874	-1789	41608
				-Σ	-Σ

VAT-exempt sales	160000	> exempt rate = 0.4
other sales	240000	

Imputed VAT is calculated by taking the relevant goods and service transactions and applying the statuary percentages to them. Not all sales of a certain industry are necessarily exempt from VAT. An example: within communications services postal services are VAT-exempt and telecommunications are not. Currently, estimates for these activities are made either by assuming the total output to be VAT-exempt or by imputing a mixed VAT-percentage. After the ESA'95 revision the calculation method has been changed: first the exempt rate is calculated for each industry; then, this rate is used to calculate VAT on the purchases of the industry as the product of exempt rate times statuary percentage per good.

6.3 The use of price indices in the system

An important purpose of the compilation of national accounts is measuring changes in economic variables. Changes in the production and use of goods and services are caused by a combination of two factors: a change in price and a change in quantity and quality (in national accounts often denoted as: volume change).

Part of the work on national accounts is the decomposition of value changes into volume changes and price changes. The most important purpose is the estimate of real growth rates (volume indices). The second goal is the estimate of price changes (deflators).

An important characteristic of this work when imbedded in a national accounts framework is that volume indices and deflators of various variables and at different levels of aggregation are interrelated in a systematic way. This is achieved by using supply and use tables or input-output tables as an integrating and balancing framework.

Price and volume indices of aggregates are always compiled from price and volume indices of individual goods and services. Direct observation of price and volume changes of aggregates is - by definition - impossible. Nearly all items in the national accounts are aggregates or aggregates of aggregates. Examples of the latter are total household consumption expenditure, total imports and total exports, but also total output and total intermediate consumption of industries. So the question rises how price and volume changes of individual goods can be added to price and volume changes of aggregates. Various methods are available to solve this problem.

Different index formulae are available with different weighting schemes, as explained in paragraph 2.2.

As regard to the availability of source material a difference must be made between goods and services. Price indices of goods are taken from Price statistics. Producer's prices, export prices, import prices and consumer prices are available. If necessary, the unit-value prices from the foreign trade statistics can be used. The latter depends on homogeneity of the goods. In general it can be concluded that indices on output and input of the manufacturing industries are reasonable. In those cases price and volume indices of value added can be calculated as the difference between output and input.

In the case of the services the outlook is not so bright. Price indices are only available for a limited number of service industries. For some industries the consumer price index can be used as an approximation for the output deflator. However, in many cases no high quality index is available. In those cases the last resource would be to deflate output with a wage rate. In some cases volume index of output is derived from input. Such is currently the case for insurance, health service and public administration. However, recently major projects have started to improve the quality of volume measurement in the services sector. For banking a direct output volume indicator is estimated from quantity data on partial activities of banks (see: De Boer 1999).

7. Possible improvements: deflated data, quantities and volume changes

Although simultaneous balancing of current and constant prices has many advantages, some attention must be paid to its possible weaknesses. The most important of these is the possible neglect of the difference between deflated data and actually measured volume data.

Most data that underlie the national accounts data are in current prices. These data are transformed into volume information by deflating the data with price indices. This procedure implies that the assumption that prices are representatively measured: a statistically correct sample of enterprises or persons have been surveyed to obtain information on the prices of a set of goods or services that experience the same price changes as the product group(s) in the supply and use tables. In some cases, sales and price fluctuation during the year make correct price measurement very difficult (high inflation, seasonal fluctuations, etc.). Without additional checks, these well known weaknesses in price measurement may easily enter the supply and use tables.

In cases where the measurement of prices is inexact, these prices have an enormous impact on the volume estimates. Actual quantity information (even for not completely homogeneous products; even with only provisional repair work for quality changes) can be a good alternative or at least a valuable check. In the Dutch situation, there are two main examples: agriculture and energy. In the first case quantity estimates are mainly based on kilograms, litres and numbers sold; price and value information are calculated in conjunction. For energy products, balanced statistics exist that give an overview of supply and use in terms of quantity measures (litres, kilograms) and energy contents (PJ). This data is checked with the supply and use set.

The importance of checking the data of the supply and use table with independent quantity data can also be illustrated by the following example. Table 1 shows what happens if the rules of simultaneous balancing are applied in a situation of price discrimination. Here, applying the correct deflators the equation supply = use will not always hold consistently for both current and constant prices.

In table 1 the value column contains information in current prices. Average prices can be found in the second column. The third column is calculated from the first two by correcting the value data for price changes. The data for total use are calculated by simple adding up domestic expenditure and exports. In the “before balancing” columns price indices and deflated values of domestic use and export are correctly calculated, but the resulting deflated value estimate for supply does not match the corresponding estimate for total use.

The fourth column contains quantity information on this (presumably) homogeneous good.

The three last columns give the result after balancing under the assumptions that current price data and all data on supply should not be changed and that the difference in the deflated value column should be proportionally divided over domestic use and exports. Now, deflators give a correct picture of price changes in this economy. Volume changes at the level of domestic use and exports are not an exact match of the real changes in volume; the last item being directly measured from the quantity information.

The main conclusion of this paragraph should be that collecting and using actual volume information can improve the quality of the compilation of the supply and use tables. Of course, in most cases changes in the quality of products make a direct use of quantity information impossible. But, with the master’s eye, this data can be very valuable for verification.

Table 1. Deflated values and volumes

	Before balancing				After balancing		
	Output				**Output**		
	value	**average price**	**deflated value**	**quantity**	**value**	**deflated value**	**price index**
	(NLG 1000)	*(NLG)*	*(NLG 1000)*	*(1000's)*	*(NLG 1000)*	*(NLG 1000)*	
Year T-1	1000	10.0		100.0	1000		
Year T	1050	10.5	1000	100.0	1050	1000	
Index T-1 = 100	105.0	105.0		100.0	105.0	100.0	105.0
	Domestic expenditure				**Domestic expenditure**		
	value	**average price**	**deflated value**	**quantity**	**value**	**deflated value**	**price index**
Year T-1	600	12.0		50.0	600		
Year T	650	12.2	639	53.3	650	631	
Index T-1 = 100	108.3	101.7	106.6	106.6	108.3	105.2	103.0
	Exports				**Exports**		
	value	**average price**	**deflated value**	**quantity**	**value**	**deflated value**	**price index**
Year T-1	400	8.0		50.0	400		
Year T	400	8.6	374	46.7	400	369	
Index T-1 = 100	100.0	107.0	93.4	93.4	100.0	92.2	108.4
	Total use				**Total use**		
	value	**average price**	**deflated value**	**quantity**	**value**	**deflated value**	**price index**
Year T-1	1000			100.0	1000		
Year T	1050		1013	100.0	1050	1000	
Index T-1 = 100	105.0	103.6	101.3	100.0	105.0	100.0	105.0

8. Concluding remarks

In the Netherlands supply and use tables were introduced in the mid 'eighties. This paper gives an overview of the main features of the current implementation of supply and use tables in the Netherlands and of some of more complex statistical problems we have encountered over the last ten years.

As for the future plans are being developed to co-ordinate with other integration systems as labour accounts and social accounting matrices (SAM). Also first steps have been taken to build a quality control system, which makes it easier to analyse the results in time series or to compare final estimates with provisional estimates.

The way the system of balancing supply and use tables is implemented in the Netherlands is aimed at improving the transparency and the quality of its estimates of the main meso and macro economic data. It makes optimal use of the data available. In statistical surveys, most reporting units detail their production and intermediate uses in terms of products and in current prices. The transformation of this data at a low level of detail into a data set with both current and constant prices generates a solid and consistent starting point of the balancing process.

A major advantage of compiling price and volume measures within an accounting framework, such as provided by the supply and use tables, is that a check is provided on the numerical consistency and plausibility of the set of measures as a whole. Balancing of constant price supply and use tables can lead to the adjustment of current price data. Another advantage is that price and volume measures for the important balancing items can be derived. In particular, gross value added can be measured at constant prices by subtracting intermediate consumption at constant prices from output at constant prices, the so called "double deflation" method. Double deflation may be used at the level of an individual enterprise, industry or sector, or for the total economy as a whole by subtracting imports at constant prices from total final expenditure at constant prices.

Although the simultaneous compilation of current and constant prices in supply and use tables has many advantages, the procedure is not perfect. Attention should still be paid to possible differences between deflated data and real volume information. Here, additional quantity information can be very useful.

After a (too) ambitious start, we have found it necessary to adapt working procedures to a more human scale. Splitting up the supply and use table into small groups of related products to be handled by one person has proved to be an effective way of organising the integration process. The automation has been constructed accordingly; thus permitting the compilation of three estimates of supply and use tables and Input/Output-tables per year in both current and constant prices.

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Annex. Fertiliser industry and supply and use of fertilisers

Balancing Supply and Use tables
Industry overview

Year: 1996 **Type of year: provisional** **Industry** **24150 Fertiliser industry**

mln guilders **Startset** **Corrections** **Total**

		Cu-p	Cn-p	Cu-p T-1	Cu-p	Cn-p	Cu-p T-1	Cu-p	Cn-p	Cu-p T-1	Pi	Qi	Vi
OUTPUT													
1400000	Mining and quarrying products	86	83	88	0	0	0	86	83	88	94,3	103,6	97,7
2413000	Inorganic basic chemicals	68	66	69	-1	0	0	67	66	69	95,7	101,5	97,1
2414000	Organic basic chemicals	257	272	264	0	0	0	257	272	264	103,5	94,3	97,7
2415000	Fertilisers	1995	1829	2036	26	24	0	2021	1853	2036	91,0	109,1	99,3
2419000	Other basic chemicals	89	88	91	0	0	0	89	88	91	96,7	101,1	97,8
4010000	Electricity production and distribution	14	14	14	0	0	0	14	14	14	100,0	100,0	100,0
4020000	Gas distribution	20	20	20	0	0	0	20	20	20	100,0	100,0	100,0
7023000	Rental services of non res. buildings	21	21	21	0	0	0	21	21	21	100,0	100,0	100,0
9991310	Own account cap. form. of mach.	11	11	11	0	0	0	11	11	11	100,0	100,0	100,0
TOTAL OUTPUT		**2561**	**2404**	**2614**	**25**	**24**	**0**	**2586**	**2428**	**2614**	**92,9**	**106,5**	**98,9**

Balancing Supply and Use tables
Industry overview

Year: 1996 **Type of year: provisional** **Industry:** **24150 Fertiliser industry**

mln guilders		**Startset**			**Corrections**			**Total**					
		Cu-p	Cn-p	Cu-p T-1	Cu-p	Cn-p	Cu-p T-1	Cu-p	Cn-p	Cu-p T-1	Pi	Qi	Vi
INTERMEDIATE CONSUMPTION													
112200	Flowers and ornamental plants	2	2	2	0	0	0	2	2	2	100,0	100,0	100,0
141200	Landscape gardening	2	2	2	0	0	0	2	2	2	100,0	100,0	100,0
1110200	Natural gas	581	530	590	26	29	0	607	559	590	94,7	108,6	102,9
1400000	Mining and quarrying products	135	130	145	0	1	0	135	131	145	90,3	103,1	93,1
1800000	Wearing apparel	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
2010000	Wood	21	22	24	0	0	0	21	22	24	91,7	95,5	87,5
2030000	Wood products	2	2	2	0	0	0	2	2	2	100,0	100,0	100,0
2110000	Paper and paperboard	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
2122000	Toilet paper and tissues	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
2129000	Other paper products	4	4	4	0	0	0	4	4	4	100,0	100,0	100,0
2212001	Subscriptions	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
2229000	Other printed matter	3	3	3	0	0	0	3	3	3	100,0	100,0	100,0
2320110	Gas oil	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
2320150	Diesel oil	1	1	1	0	1	0	1	2	1	200,0	50,0	100,0
2320190	Other oil products	3	3	3	0	0	0	3	3	3	100,0	100,0	100,0
2413000	Inorganic basic chemicals	191	191	213	1	0	0	192	191	213	89,7	100,5	90,1
2414000	Organic basic chemicals	32	33	37	0	0	0	32	33	37	89,2	97,0	86,5
2415000	Fertilisers	155	146	162	0	0	0	155	146	162	90,1	106,2	95,7
2416000	Plastics in primary form	11	12	13	0	0	0	11	12	13	92,3	91,7	84,6
2419000	Other basic chemicals	31	31	34	0	-1	0	31	30	34	88,2	103,3	91,2
2460000	Other chemical products	5	4	5	0	0	0	5	4	5	80,0	125,0	100,0
2520000	Plastic products	26	27	30	0	-1	0	26	26	30	86,7	100,0	86,7
2650000	Cement, lime, plaster	10	10	11	0	0	0	10	10	11	90,9	100,0	90,9
2690000	Other construction materials	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
2890000	Metal products	28	28	31	1	1	0	29	29	31	93,5	100,0	93,5
2910000	Machinery	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
2950000	Parts and repair of machinery	36	36	40	0	0	0	36	36	40	90,0	100,0	90,0
3100000	Electric machinery and appliances	12	12	13	0	0	0	12	12	13	92,3	100,0	92,3
3690000	Other products n.e.c.	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
4010000	Electricity	59	58	65	1	0	0	60	58	65	89,2	103,4	92,3
4020000	Gas distribution	54	53	59	7	4	0	61	57	59	96,6	107,0	103,4
4100000	Water supply	6	5	6	0	0	0	6	5	6	83,3	120,0	100,0
4510022	Maintenance and repair of buildings	6	5	6	0	1	0	6	6	6	100,0	100,0	100,0
4510030	Civil engineering works	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
4530022	Installation work	22	22	24	0	-1	0	22	21	24	87,5	104,8	91,7
4590000	Other building activities	7	7	8	0	0	0	7	7	8	87,5	100,0	87,5
5000000	Repair of motor vehicles	2	2	2	0	0	0	2	2	2	100,0	100,0	100,0
5540000	Beverage serving servives	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
5590000	Other hotel and restaurant services	5	4	5	0	0	0	5	4	5	80,0	125,0	100,0
6010100	Railway transportation	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
6020100	Other passengers transportation	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
6200000	Air transportation	2	2	2	0	0	0	2	2	2	100,0	100,0	100,0
6400000	Communication services	7	6	7	0	0	0	7	6	7	85,7	116,7	100,0
6500000	Monetary intermediation services	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
6600000	Insurance services	6	6	7	0	0	0	6	6	7	85,7	100,0	85,7
7023000	Rental services of non-res buildings	12	12	13	0	0	0	12	12	13	92,3	100,0	92,3
7100000	Rental services of movables	8	8	9	-1	0	0	7	8	9	88,9	87,5	77,8
7200000	Computer services	18	18	20	2	1	0	20	19	20	95,0	105,3	100,0
7300000	Research and development	4	4	4	0	0	0	4	4	4	100,0	100,0	100,0
7415000	Holdings	61	61	68	6	5	0	67	66	68	97,1	101,5	98,5
7450000	Supply services of support personnel	9	9	10	1	2	0	10	11	10	110,0	90,9	100,0
7480000	Other business services	44	43	48	0	0	0	44	43	48	89,6	102,3	91,7
8510000	Health services	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
9000000	Environmental services	22	22	24	2	2	0	24	24	24	100,0	100,0	100,0
9100000	Social work services	2	2	2	0	0	0	2	2	2	100,0	100,0	100,0
9992200	Imports of services n.e.c.	45	45	50	0	-1	0	45	44	50	87,2	102,4	89,4
TOTAL INTERMEDIATE CONSUMP		**1706**	**1637**	**1818**	**46**	**43**	**0**	**1752**	**1680**	**1818**	**92,4**	**104,3**	**96,4**

Balancing Supply and Use tables
Industry overview (continued)

Year: 1996 **Type of year: provisional** **Industry:** **24150 Fertiliser industry**

mln guilders	**Startset**			**Corrections**			**Total**					
	Cu-p	Cn-p	Cu-p T-1	Cu-p	Cn-p	Cu-p T-1	Cu-p	Cn-p	Cu-p T-1	Pi	Qi	Vi
VALUE ADDED												
9997120 Motor vehicle tax	4	4	4	1	2	0	5	6	4	150,0	83,3	125,0
9997150 Waste disposal charge	3	3	3	0	0	0	3	3	3	100,0	100,0	100,0
9997250 Levy on water pollution	2	2	2	0	0	0	2	2	2	100,0	100,0	100,0
9997390 Other levies	8	8	9	1	1	0	9	9	9	85,7	100,0	85,7
9997410 Wage subsidies	-4	-4	-4	-4	-2	0	-8	-6	-4	150,0	133,3	200,0
9997420 Other subsidies	-4	-4	-5	-2	-2	0	-6	-6	-5	120,0	100,0	120,0
9998100 Wages and salaries	232	228	228	-2	-2	0	230	226	228	99,1	101,8	100,9
9998200 Employers social contributions	45	45	44	2	2	0	47	46	44	105,9	102,8	108,8
9999990 Operating surplus	569	486	515	-17	-18	0	552	468	515	90,9	117,9	107,2
TOTAL VALUE ADDED	**855**	**767**	**796**	**-21**	**-19**	**0**	**834**	**748**	**796**	**94,0**	**111,5**	**104,8**

Balancing Supply and Use tables
Product overview

Year: 1996 **Type of year: provisional** **Product: 2415000 Fertilisers**

mln guilders **Start set** **Corrections** **Total**

		Cu-p	Cn-p	Cu-p T-1	Cu-p	Cn-p	Cu-p T-1	Cu-p	Cn-p	Cu-p T-1	Pi	Qi	Vi
SALES													
1100	Agriculture	21	26	27	5	0	0	26	26	27	100,0	96,3	96,3
15700	Feeding stuff	5	5	5	0	0	0	5	5	5	100,0	100,0	100,0
24140	Petrochemicals	85	80	83	0	0	0	85	80	83	106,2	96,4	102,4
24150	Fertilisers	1995	1829	2036	26	24	0	2021	1853	2036	109,1	91,0	99,3
51000	Whole sale trade	92	87	88	0	0	0	92	87	88	105,7	98,9	104,5
1	Domestic sales	2198	2027	2239	31	24	0	2229	2051	2239	108,7	91,6	99,6
411000	Imports of goods (cif)	442	436	440	0	0	0	442	436	440	101,4	99,1	100,5
2	Imports of goods and services	442	436	440	0	0	0	442	436	440	101,4	99,1	100,5
360061	Wholesale trade margins	272	256	278	6	6	0	278	262	278	106,1	94,2	100,0
360062	Retail trade margins	61	61	59	0	0	0	61	61	59	100,0	103,4	103,4
360063	Transport margins	184	174	189	4	4	0	188	178	189	105,6	94,2	99,5
3	Margins	517	491	526	10	10	0	527	501	526	105,2	95,2	100,2
360100	Import duties	3	3	4	0	0	0	3	3	4	100,0	75,0	75,0
4	Taxes and subsidies	3	3	4	0	0	0	3	3	4	100,0	75,0	75,0
TOTAL SALES		**3160**	**2957**	**3209**	**41**	**34**	**0**	**3201**	**2991**	**3209**	**107,0**	**93,2**	**99,8**
PURCHASES													
1100	Agriculture	636	599	597	-2	0	0	634	599	597	105,8	100,3	106,2
1400	Agricultural services	10	9	9	0	0	0	10	9	9	111,1	100,0	111,1
7	Agriculture, forestry, fishing	646	608	606	-2	0	0	644	608	606	105,9	100,3	106,3
24100	Basic chemicals	16	15	16	0	0	0	16	15	16	106,7	93,7	100,0
24140	Petrochemicals	42	40	41	0	0	0	42	40	41	105,0	97,6	102,4
24150	Fertilisers	155	146	162	0	0	0	155	146	162	106,2	90,1	95,7
15	Basic chemicals	213	201	219	0	0	0	213	201	219	106,0	91,8	97,3
24200	Chemical products	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
16	Chemical products	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
33000	Medical and optical equipment	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
36219	Manufacturing n.e.c.	31	29	31	0	0	0	31	29	31	106,9	93,5	100,0
22	Med. , opt. and other manufacturing	32	30	32	0	0	0	32	30	32	106,7	93,7	100,0
50100	Wholesale trade of motor vehicles	2	2	2	0	0	0	2	2	2	100,0	100,0	100,0
51000	Wholesale trade	39	36	35	-1	0	0	38	36	35	105,6	102,9	108,6
52000	Retail trade	10	9	9	-1	0	0	9	9	9	100,0	100,0	100,0
25	Trade, repair, hotels and restaurants	51	47	46	-2	0	0	49	47	46	104,3	102,2	106,5
65000	Banking	5	5	5	0	0	0	5	5	5	100,0	100,0	100,0
67000	Act. aux. to financial intermediation	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
27	Banking and business activities	6	6	6	0	0	0	6	6	6	100,0	100,0	100,0
75100	Public administration	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
28	Public administration and soc.security	1	1	1	0	0	0	1	1	1	100,0	100,0	100,0
80000	Subsidized education	23	22	22	0	0	0	23	22	22	104,5	100,0	104,5
29	Education	23	22	22	0	0	0	23	22	22	104,5	100,0	104,5
73000	Research and development	15	15	14	0	0	0	15	15	14	100,0	107,1	107,1
32	Research and development	15	15	14	0		0	15	15	14	100,0	107,1	107,1
311000	Exports of goods (fob)	2060	1888	2070	-38	-18	0	2022	1870	2070	108,1	90,3	97,7
311501	Re-exports	33	30	33	0	0	0	33	30	33	110,0	90,9	100,0
35	Exports of goods and services	2093	1918	2103	-38	-18	0	2055	1900	2103	108,2	90,3	97,7
321000	Final consumption of households	136	136	133	0	0	0	136	136	133	100,0	102,3	102,3
36	Final consumption of households	136	136	133	0	0	0	136	136	133	100,0	102,3	102,3
330000	Final consumption of government	26	24	26	0	0	0	26	24	26	108,3	92,3	100,0
37	Final consumption of government	26	24	26	0	0	0	26	24	26	108,3	92,3	100,0
354000	Changes in inventories	0	0	0	0	0	0	0	0	0	0,0	0,0	0,0
40	Changes in inventories	0	0	0	0	0	0	0	0	0	0,0	0,0	0,0
TOTAL PURCHASES		**3243**	**3009**	**3209**	**-42**	**-18**	**0**	**3201**	**2991**	**3209**	**107,0**	**93,2**	**99,8**

Related publications **(translated)**

National accounts (incl. diskette)	P-2	ƒ 85,00
The Dutch Economy	P-19	ƒ 32,50
Social security, pension insurance, life insurance	P-6	ƒ 15,00
Quarterly accounts (subscription)	P-14	ƒ 52,00
Quarterly accounts on diskette (subscription)		ƒ 165,00
Business Cycle report, monthly annex to the Statistical Bulletin Subscription Statistical Bulletin	A-1	ƒ 131,00
Regional economic annual data	P-11	ƒ 75,00
Methods and research		ƒ 12,50

All these publications are in Dutch only, except for the Quarterly accounts on diskette and the National accounts

A large number of the above mentioned publications can be consulted in the libraries of Statistics Netherlands at Voorburg (direct line +31 70 337 5151) or Heerlen (direct line +31 45 570 71 87).

List of occasional papers

The list below will give an impression of the subjects covered in previously published Occasional papers. A complete list of all available Occasional papers can be obtained from the National accounts information desk (telephone 31 70 337 58 76; fax 31 70 337 59 81; e-mail infopni@cbs.nl). The price of a single issue comes to Dfl. 20.00. For an annual subscription of at least six issues the costs amount to Dfl. 100.00.

NA/84 **The future of the national accounts, Bos, Frits (1996).**
This paper investigates the consequences of globalisation, European unification, automation and more market-oriented government for the national accounts as a central international overview-statistic on national economies. The perspective on the future is a mixture of exploiting present and new potentials and coping well with dangers.

NA/85 **Accounting for the use of financial capital as an input in production; with an application to multi-factor productivity change estimation, Keuning, Steven J. and Ted Reininga (1997).**
It is increasingly acknowledged that the financial structure of a firm is an important determinant of its economic activity. Therefore, the use of financial capital should be seen as a separate input in the production process. This paper attempts to operationalise a meso-economic measurement of financial capital inputs in production and shows the consequences for the estimation of multi-factor productivity change. This approach establishes a much closer relationship of macro-economic accounting and analysis to business economics

NA/86 **Volume measurement of government output; the Dutch practice since revision 1987, Kazemier, Brugt (1997).**
In 1992, Statistics Netherlands published the first results of a major revision of national accounts statistics. Part of this revision was the introduction of an alternative method to estimate the volume change of government output. This paper briefly describes this alternative method and the results of the revision with respect to the volume change of government services.

NA/87 **Chain indices in the national accounts: the Dutch experience, Boer, Sake de, Jan van Dalen and Piet Verbiest (1997).**
In this paper we discuss the use of chain indices in the Netherlands. In Dutch practice chain indices are applied from 1980 onwards. Chain indices are a good base for the construction of economic models, since changing weights guarantee a near approximation of actual developments and the actual economic structure. However, special attention should be paid to the tuning of the model to the characteristics of the data and to the presentation of model results to the public.

NA/88 **Measurement and valuation of natural gas and oil reserves in the Netherlands, Pommée, Marcel (1998).**
This paper discusses some conceptual and methodological issues related to the estimation of reserves of natural gas and oil. The first section focuses on these subsoil assets in relation to the 1993 SNA. The second section deals with the situation and valuation of these assets in the Netherlands. The valuation method applied may be of special interest because of its simplicity and modest data requirements.

NA/89 Data constructors and data users can co-operate: an illustrative case study, Jacobs, Jan, Jan-Egbert Sturm and Peter Groote (1999).
This paper illustrates the benefits of communication and co-operation between data using macroeconomists and data constructing historians by describing a joint research project on the effects of infrastructure investments on the economy in the Netherlands in the second half of the nineteenth century. The case study shows that co-operation can be fruitful and may lead to new insights for both groups.

NA/90 Measuring Well-being with an integrated System of Economic and Social Accounts: An Application of the SESAME Approach to the Netherlands, Kazemier, Brugt, Steven Keuning and Peter van de Ven (1999).
This paper contains a pilot application to the Netherlands of the socio-demographic module of SESAME: the modular statistical information system that serves to enable an integrated measurement of welfare. From this module the inactive/active ratio can be derived; an indicator of the welfare state that plays quite an important role in social-economic policy.

NA/91 Revision Dutch National Accounts: first results and backgrounds, Buiten, Gert, Jacqueline van den Hof and Peter van de Ven (1999).
The national accounts of the Netherlands have been revised in accordance with the new world-wide System of National Accounts (SNA) 1993, and its European equivalent, the European System of National and Regional Accounts (ESA) 1995. The first results and backgrounds of this revision are presented in this paper.

Table 1. Deflated values and volumes

	Before balancing				After balancing		
	Output value (NLG 1000)	average price (NLG)	deflated value (NLG 1000)	quantity (1000's)	Output value (NLG 1000)	deflated value (NLG 1000)	price index
Year T-1	1000	10.0		100.0	1000		
Year T	1050	10.5	1000	100.0	1050	1000	
Index T-1 = 100	105.0	105.0		100.0	105.0	100.0	105.0
	Domestic expenditure value	average price	deflated value	quantity	Domestic expenditure value	deflated value	price index
Year T-1	600	12.0		50.0	600		
Year T	650	12.2	639	53.3	650	631	
Index T-1 = 100	108.3	101.7	106.6	106.6	108.3	105.2	103.0
	Exports value	average price	deflated value	quantity	Exports value	deflated value	price index
Year T-1	400	8.0		50.0	400		
Year T	400	8.6	374	46.7	400	369	
Index T-1 = 100	100.0	107.0	93.4	93.4	100.0	92.2	108.4
	Total use value	average price	deflated value	quantity	Total use value	deflated value	price index
Year T-1	1000			100.0	1000		
Year T	1050		1013	100.0	1050	1000	
Index T-1 = 100	105.0	103.6	101.3	100.0	105.0	100.0	105.0