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THE METHODOLOGY OF THE DUTCH SYSTEM OF QUARTERLY ACCOUNTS

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1. Introduction

1.1 Plan of the paper

Early in 1986 the Quarterly Accounts of the Netherlands Central Bureau of Statistics (CBS) have become operational. The present paper describes the methodology of these quarterly accounts.

The purpose of the Dutch quarterly accounts is to provide, fairly soon after the end of each quarter, integrated information on the economic process within a coherent framework. The framework does not cover the whole of the economic process but is, for the time being, restricted to transactions in goods and services and transactions related to the generation of income. In addition to data on the value of the macro-economic aggregates, their changes in value and volume are given, both seasonally adjusted and non-adjusted. In the latter case, changes are given with respect to the corresponding quarter in the previous year. In the future, extension of the accounts is planned, both in the direction of disaggregation and in that of other types of transactions.

The present method of compiling quarterly accounts has gone through a try-out period of several years. The purpose of the try-out was, particularly, to test the process of statistical integration for quarterly periods and to compare the sum of the quarterly data with the annual national accounting data that had already been published. The latter comparison provides an indication of the reliability of the quarterly data. This 'simulation process' concerned the quarterly data for 1977, 1978, 1981, 1983 and 1984. In addition to this, a method of interpolation was used to compile quarterly data for the intervening years. Hence quarterly data are now available for the whole period from 1977 onward. These may be used for, e.g. the calculation of seasonal adjustment schemes.

The plan of the paper is as follows. The second section of this chapter briefly surveys the history of quarterly accounts in the Netherlands. Chapter 2 summarizes the main concepts of national accounts and discusses the relation between the quarterly and the annual accounts. Chapter 3 describes the compilation of quarterly input-output tables. These are the basis for the

quarterly accounts. Using input-output tables is the reason why the quarterly accounts cover, at present, only transactions in goods and services and transactions related to the generation of income. Chapter 4 is devoted to a description of the simulation process by means of which the 1977-1984 quarterly data have been compiled. The methodology of calculating volume changes and seasonal adjustment schemes is also covered in this chapter. Chapter 5 surveys the source data.

In the Netherlands, the annual national accounting data are revised several times. First, about half a year after the end of each reporting year provisional accounts are published. After one year these are revised, yielding 'revised provisional data'. After yet another year these are revised once more, yielding the 'final data'. Once every five to ten years the latter go through a major revision, in which changes in methodology are made, new statistical sources are introduced in the compilation process, and so on. The tables in Kwartaalrekeningen, vol 1, no.1 provide the quarterly accounts for the years for which final annual data were available at the time of publication: 1977-1982. The seasonally adjusted data, however, have been based on 1983 and 1984 as well, in view of the need for a fairly long time series for the calculation of the adjustment schemes by means of the census X-11 method employed.

1.2 History of quarterly accounts in the Netherlands

The present system of quarterly accounts is not the first one in the Netherlands. As early as 1950 the CBS published quarterly accounts, viz. for 1948 and 1949. In the immediate post-war period, the CBS was in the process of developing a system of national accounts. Compiling quarterly accounts fitted well in this process. In a sense, the process was an experimental programme aimed at the development of a 'Business Cycle Survey'. This survey should have tracked the most recent macro-economic trends as well as possible. Quarterly accounts kept on being compiled for 1950-1952, but after the data for the second quarter of 1953 had been published their compilation was discontinued.

Why this discontinuation? The main purpose of the quarterly accounts was to provide timely statistical data on economic reality. The compilation of the quarterly accounts, however, took so much effort that there was no room left

for the independent compilation of annual data. The annual accounts were therefore obtained by summation of the quarterly data. This procedure was risky, because the most recent integrated quarterly information could not be calibrated rapidly enough with annual and census-type data. It soon became evident that this method of compilation caused systematic discrepancies between the resulting annual data and the true trends. Small cumulative biases generated structural divergences after some time.

Thus, in 1953, the compilation of quarterly accounts was discontinued and that of annual accounts resumed. This led to a drastic revision of the annual national accounting data from 1948 onward. The quarterly accounts were not revised. It is interesting to note that the decision to compile only annual accounts only to a large-scale development of annual statistics. These were, particularly in the 1970's, developed into a co-ordinated system of economic statistics, with a greatly expanded coverage. 1)

The discontinuation of the quarterly accounts was meant to be temporary. There remained a considerable need for integrated quarterly macro-economic information. Both 'De Nederlandsche Bank' (the central bank of the Netherlands) and the Central Planning Bureau employed - independently of each other - models to achieve a quarterly breakdown of annual national accounting data. Though this did not generate timely information, it was relevant as a basis for the explanation of short-term fluctuations. Meanwhile, quarterly accounts were developed in several other member states of the OECD, the organization entrusted with the international co-ordination of quarterly accounts. Usually, these were fairly simple systems employing macro-economic indicators for the entries in the GDP-account. In most countries this procedure led to some uncertainty with respect to the value of the aggregates; but this was accepted because the direction and the order of magnitude of the changes were a reasonable approximation of reality. In the Netherlands, however, the uncertainty in the estimates that would have resulted from a similar procedure was not acceptable. Changes in stocks, particularly stocks of imported goods, were considerably more sizeable than in other countries. For example, in 1950 stocks grew by 1500 million guilders while the GDP (net, market prices) was 17,500 million guilders. Frequently, the quarterly change in stocks, expressed as a percentage of the GDP, was even higher (10-20%)

Resuming the compilation of quarterly accounts was deemed to become feasible only if reasonably reliable information on changes in stocks was to become available. This required extended coverage of stock statistics. But direct measurement of stocks is technically impossible for many products and groups of products; therefore the development of quarterly input-output tables was also indispensable in order to obtain information on changes in stocks: this would permit their calculation as balancing items and allow plausibility judgments. As long as the compilation of quarterly input-output tables was not feasible, the CBS therefore did not compile quarterly accounts. Incidentally, this does not mean that no short-term indicators concerning national accounting data were compiled. Quite to the contrary, in the fifties, sixties and seventies an indicator system was set up simultaneously with the further elaboration of the system of annual accounts. The indicator system makes it possible to track the monthly and quarterly volume changes of the main macro-economic variables. In addition, a system of detailed observation of prices has been implemented. This system shows the short-term (monthly) movements of the prices of major (categories of) goods and services. However, no statistical integration was achieved of all these indicators for industrial production, consumption, investment, foreign trade.

In the early eighties the CBS resumed the integration of monthly and quarterly indicators, within the framework of a system of quarterly accounts. This integration is now considered to be feasible, particularly because most of the required basic statistical information is becoming available ever more rapidly and has an acceptable quality. Moreover, because - in contrast to the situation of the early 1950's - a system of independently estimated annual accounts and input-output tables exists, it is possible to calibrate the quarterly accounts with the latter. As a consequence the most recent annual information can be incorperated in the compilation of recent quarterly accounts. Furthermore, in the course of time the macro-economic importance of changes in stocks has become less. A main cause of this is the gradual increase of the share in the GDP of services, which do not, by definiton, affect stocks. In the activities where sizeable (changes in) stocks do still occur, these are increasingly surveyed quarterly.

2. Main concepts

2.1 Main concepts in the national accounts

2.1.1 The system of national accounts

The Dutch system of National Accounts may be considered as a quantitative survey providing, as comprehensively as possible, a systematic description of the economic process in the Netherlands in a given period. The economic process consists, e.g., of all activities aimed at the production, trade and transfer of scarce goods and services and at the distribution of the income generated by their production. In the context of national accounts, the word 'comprehensive' indicates that the activities of all persons and institutions in the economy are covered, at least to the extent that they can be described quantitatively. The survey provided by the national accounts is 'systematic' in the sense that it is based on a uniform system of definitions and classifications. In the national accounting framework, the relevant activities of economic agents and the transactors are classified into categories of transactors and into economic activities and sectors, respectively.

Important characteristics of the national accounts are complete coverage and mutual consistency of the data. From a statistical point of view, an important characteristic of the compilation of the accounts is that, in the source data, many variables have been measured in different ways; the results obtained from different sources are not always consistent with each other. However, the national accounting framework is a closed system containing a number of identity restrictions that must be satisfied. The process of achieving this by judging the reliability of data from alternative sources and selecting from them is called statistical integration. Because of this process, the national accounts are an integrated system.

In the national accounts, all activities belonging to the economic process are considered as transactions. The latter concept does not refer to transactions between agents only (e.g. purchases of goods), but also to some activities carried out within economic units such as establishments (e.g. use of stocks).

In a system of national accounts, the time of recording the various transactions has to be decided upon. Several possibilities exist. In the present Dutch system, transactions in goods and services are in principle recorded at the time of delivery. This principle of recording implies that the total payable or receivable sum is recorded at the moment of delivery. However, for technical reasons the recording principle is not applied throughout the accounts. In some cases transactions are recorded at the time of payment. Examples are taxes and subsidies.

The transactions described in the national accounts relate to various flows within the total 'circulation system' that constitutes the economic process. Definitional and recording decisions with respect to one variable in this system affect other variables. As a consequence, with the national accounts variables have to be defined consistently with each other, both in respect of the concepts and of the time of recording of the transactions. In the next few sections the main variables will be defined.

2.1.2 The domestic product

The domestic product is the total remuneration of the services of the production factors that have been employed in the domestic sectors of the economy in a given period. By definition, it equals the total value added generated in the domestic 'economic activities'. From this point on we employ the term (economic) activities to indicate groups of producing establishments classified according to the characteristics of their production process; this use of the term corresponds with that in the United Nations' System of National Accounts. Value added that results from productive effort is the variable that represents the closest approximation of the concept of 'production' in economic theory. Value added is determined as the difference between the value of an activity's total production and its total use. In turn, total use is the total value of the goods and services (but not the factor services) that have been used in order to produce the total output of the activity. These inputs must not be taken into account in the determination of the activity's contribution to the domestic product; this would result in double counts because their value is already recorded at the activities producing the inputs.

In defining the domestic product a distinction is made between gross and net value added. If total use is defined to include the 'consumption of fixed capital' (i.e. the deterioration of the fixed capital caused by its employment in the production process), this yields net value added as the difference between total output and total use. Aggregation of gross or net value added, respectively, over activities yields the gross or the net domestic product.

Defining value added requires a decision as to the treatment of indirect taxes and subsidies. Indirect taxes (subsidies) raise (lower) unit costs and can hence be either recorded as an increase (decrease) in the price of output or as decrease (increase) of value added. As a consequence, gross and net domestic product or value added can be recorded both at market prices and at factor cost. Value added at market prices is the concept that comes closest to that of value added as output less total use: the value of output is determined at market prices, i.e. inclusive of the indirect taxes and subsidies paid and received, respectively, by the producer. Value added at factor cost can be considered as the remuneration of factor services as long as indirect taxes and subsidies are not considered as such.

In the tables of the quarterly publication, the net domestic product at factor cost is broken down into the items 'compensation of employees' (wages, salaries, employers' contribution to social security and pension funds) and 'operating surplus' 2) . The first item concerns the remuneration of resident nationals and resident foreigners in respect of services rendered as employees in domestic enterprises and civil government; also included in wages are the compensations of draftees in the military services. For all employees, compensation of employees includes various special items such as allowances in respect of vacations, bonuses, tips, commissions, as well as compensations in kind such as food and housing supplied freely. In case of military personnel, however, the only compensations in kind included are food, clothing and medical care. Withheld employee taxes and social security contributions have not been deducted from wages and salaries.

In the present Dutch system the operating surplus is a balancing item in the determination of net value added at factor cost; it is approximately equal to payed and retained profits, net interest payments (exclusive of payments on government debts) and net rents.

National income is obtained by adding the balance of the net compensation of employees and net property and entrepreneurial income from the rest of the world to the domestic product. Net transfers from the rest of the world are not yet compiled in the system of quarterly accounts. Since the latter are the difference between national income and national disposable income, the latter is not estimated in the present system.

2.1.3 National expenditure

National expenditure consists of consumption, investment in fixed assets, and changes in stocks and work in progress. Adding exports of goods and services yields total expenditure. The latter, in turn, equals the sum of the domestic product at market prices and the imports of goods and services (cf. the tables on supply and disposition of goods and services). Total expenditure is gross or net according to whether investments and the domestic product are defined gross or net, consumption of fixed capital being the difference between the two in both cases.

Consumption

National consumption consists of the consumption expenditure of households and government. The concept of consumption can be defined as the use of goods and services (except exported ones) for non-productive purposes. Households' purchases of goods with a life-span exceeding one year are considered as consumption expenditure too, except for those of houses. These durables (e.g. cars for private use, furniture, audio and video equipment) do not contribute to future production as defined in the national accounts; therefore they are not treated as investment goods.

Government consumption is defined as the compensation of employees plus government's total use. The government's expenditure on durables is, however, not included in its total use. In this case, the durables do contribute to future production as defined in the national accounts. As stipulated by international guidelines, government's military purchases (e.g. military trucks, planes, ships) are considered as consumption.

National consumption is the consumptive expenditure of all residents of the Netherlands, including those who are temporarily abroad (tourists, diplomats, etc.). Thus the concept does not include expenditure in the Netherlands by non-residents. The concept of domestic consumption, in contrast, relates to all expenditure in the Netherlands, irrespective of the residency of the consumers.

Fixed capital formation

Gross fixed capital formation (investment) can be defined as the value of the part of the domestically available goods (and services) that serves as addition to the stock of capital goods or the replacement of the 'consumption' of the latter. From a statistical point of view capital goods are: buildings, other constructions such as roads, waterways, etc.; land improvement; machinery and equipment, transport equipment; durable goods purchased by government and other producers. In addition, investments include the transaction costs of purchasing second-hand capital goods and changes in the (productive) livestock. In the present national accounts, gross investments in fixed capital are measured indirectly as the total value of the capital goods that have become available in a given period, except for those added to stocks and exported.

Change in stocks

Change in stocks consists of the value of the changes in the stocks of goods for intermediate use and of the goods produced for final use; and, in addition, of the change in the value of work in progress. An exception is made for the construction industry. Increases in the value of work in progress on buildings, land improvement, roads, waterways, etc. are, in agreement with the UN and EC systems of national accounts, recorded as investment in fixed capital. However, changes in the value of work in progress in other activities such as ship-building and the machinery industry, are recorded as changes in stocks of the producers of these capital goods.

In principle, the value of the change in stocks is determined by measuring the difference in the quantity of stocks at the beginning and the end of the period and valuating this quantity change at the average market price in the period concerned.

2.1.4 Imports and exports of goods and services

The imports of goods consists of the value of the goods that are brought into the free circulation of the Netherlands, either directly or through customs-warehouses or free-areas. Included is the value of re-exports; the latter concerns imported goods that are exported again without having gone through a significant transformation. Imports are valued at CIF (Cost, Insurance, Freight) prices; that is, including all transport costs and insurance premiums paid until the customs clearing, but excluding import duties, import taxes and commodity taxes on motor cars. The imports of services consist of expenditures of Dutch transport enterprises abroad, sales expenditure abroad, etc., as well as consumption by Dutch residents in the rest of the world.

Exports are valued at FOB (Free-on-Board) prices. These equal producers' prices plus trade and transport margins up to the Dutch border. In the input-output table, these margins are treated as a separate commodity flow. Exports of goods consist of goods which are transferred out of the free circulation of the Netherlands. Not included are goods sold to the rest of the world but not yet delivered.

The value of exports of services includes gross receipts from the rest of the world by domestic transport enterprises, receipts in respect of harbour services to the rest of the world, repairing of ships, sales expenditure of foreign enterprises in the Netherlands and receipts in respect of construction abroad by Dutch enterprises. Consumption by non-residents in the Netherlands is also included.

2.2 The place of the quarterly accounts in the system of national accounts

The CBS has a rather long tradition of compiling annual national accounts. These are, as indicated in chapter 1, distinguished in final and provisional data. This distinction is made because the compilation of the final accounts, for which very detailed annual information is employed, takes several years. In the present system of national accounts, final annual data on year (t-3) become available in July of year t. At the same time the 'provisional annual accounts' become available. These are compiled by extrapolation of the final data; they relate to the years (t-2) and (t-1) and are referred to as,

respectively, the revised provisional and the provisional annual data. The provisional annual accounts are published in lesser detail than the final accounts. However, the two sets of data have in common that they are an 'integrated' and 'comprehensive' description of the economic process (cf. section 2.1.1).

Apart from annual data, the CBS also compiles monthly and quarterly data (indicators) that give short-term information by means of which the trends in the volume of a number of important macro-economic variables of the national accounts can be tracked. These data are not comprehensive; they just describe the part of the economic process that is most relevant from the point of view of the business cycle. Moreover, these data are not integrated; the emphasis is on the timeliness of their availability (appr. 1 to 2 months after period under review).

The quarterly accounts have an intermediate position between the provisional annual accounts and the indicators. On the one hand, the quarterly accounts provide comprehensive and integrated quarterly information, though the level of aggregation of the published data is much higher than in case of the provisional annual accounts; on the other hand the quarterly accounts may be viewed, due to their methodology (cf. chapter 3) as the integrating framework of all monthly and quarterly indicators that are compiled independently of each other.

For the time being, the quarterly accounts are published 5 to 6 months after the quarter under review. Subsequently, the quarterly estimates are thrice adjusted to the annual national accounting data, viz. first to the provisional annual data, next to the revised provisional data and finally to the final data. The last estimate will not be changed anymore, save for the benchmark revisions of the final annual data that occur once every 5 to 10 years. Section 3.2.3.4 discusses the adjustments of the quarterly accounts to the annual accounts in detail. In the presentation of the quarterly accounts, the emphasis is on changes, just as in case of monthly indicators. The aim is to publish, for each quarter, not only macro-economic data, but also some disaggregations of the latter. Each quarter, data for the nine most recent quarters will be given. Once every year, when the quarterly accounts have been adjusted to the annual ones, the latest eighteen quarters will be covered. In addition, a table

is included containing a time series for the most important macro-economic aggregates from 1977 onward.

2.3 Specific characteristics of quarterly accounts

Compared to the annual accounts, the quarterly accounts have a number of specific characteristics of which the most important will be briefly discussed in the present section. At issue are some practical differences with the annual accounts, in respect of the valuation of the flows of goods and services as well as the seasonal patterns that play a role in quarterly accounts. Both are connected with the recording rules for transactions (cf. section 2.1.1).

As indicated in section 2.1.1, recording flows of goods and services at the time of transaction means that transactions are defined in respect of the time of delivery. Both the amount (the quantity) and the value (e.g. as given by the bill) of the transaction have to be recorded at that time. Thus, in theory aggregation of all transactions in one quarter or year cannot cause a difference between the (weighted) sum of four quarterly aggregates and the annual aggregate, since both relate to precisely the same set of transactions. In practice, however, a difference arises in the valuation of flows of goods and services because usually not every transaction is valued separately.

Valuation is achieved by means of average prices in the period under review. Consequently, in case of annual data the point of departure is the (unweighted) average prices during the year concerned, whereas the annual data that are obtained by summation of quarterly data are implicitly weighted with the relative values of the transactions in the four quarters. To achieve consistency between the annual and the quarterly accounts, these differences are eliminated when the quarterly data are adjusted to the annual data (cf. section 3.2.3.4).[3)]

Recording of transactions at the time of delivery also induces a number of specific seasonal patterns in the quarterly accounts. Particularly, this concerns a number of economic activities with time-dependent production processes that frequently take more than one quarter. Examples are agriculture, particularly crop production, mining and construction (with interruption of production in periods of frost).

Recording of the value of crops is a subject of a lot of publications. The central issue is whether production has to be recorded as crops grow, the value of production being shown as work in progress, or whether production has to be recorded at the time of delivery to the market. In the Netherlands system of quarterly accounts the second option has been adopted. Intermediate use, consumption of fixed capital and, where relevant, compensation of employees are recorded in the quarters to which these items relate. In practice this choice implies that the operating surplus in crop production (determined as a balancing item) is relatively high in the third (harvesting) quarter and negative in the other quarters.

Another point of interest in the compilation of quarterly accounts is connected with vacations. Thus production processes in some activities (e.g. construction) are interrupted by vacations while in other activities production peaks occur during holidays and vacations (e.g. hotels, restaurants, caf'e's). In addition to this, seasonal effects exist that turn up in expenditure patterns, e.g. in consumption (spending of vacation allowances, bi-annual bargain sales of retail stocks). A specific problem in the breakdown of value added is the proper way of recording vacation allowances and other special compensations that are part of wages and salaries. In the quarterly accounts these items are recorded in the quarter in which they are payable. This treatment has an important impact on government production, since the latter is mainly determined by the compensation of its employees.

3. Methodology

3.1 Outline of the methodology

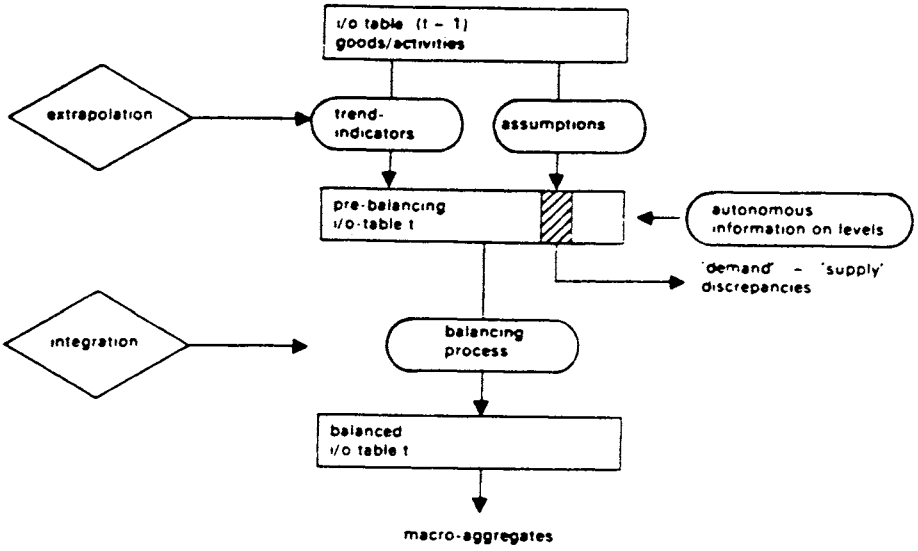
3.1.1 Overview

The Quarterly Accounts are compiled by constructing an input-output table for each quarter under review (cf. section 3.1.2). Such a table is a useful tool for combining and integrating the various flows of information. The row and column totals of the input-output table represent the macro-economic aggregates of the transactions in goods and services. For the compilation of these quarterly aggregates the input-output table is just a tool; it is not an end in its own right.

Its compilation is achieved by a technique of extrapolation of which the point of departure is a basic input-output table that contains structural information. By means of data on the trends of the various elements the table is extrapolated to the quarter under review. In addition to trend indicators, there are independent quarterly estimates for the level of a number of variables. In figure 3.1 this flow of information is referred to as 'autonomous information'. However, in the short run there are no trend indicators or autonomous information for all cells of the input-output table; hence assumptions will have to supplement the two types of information. Because the trend indicators, autonomous information and assumptions may be inconsistent discrepancies will occur between 'supply' and 'demand' in the table. Naturally, these discrepancies are not disequilibria in a dynamic market process where the equilibrium has yet to be attained. Instead, the discrepancies may be a consequence of the nature of statistical process, such as incomplete coverage (sampling, non-response). Analysing these differences between the statistically obtained demand for and supply of goods and services, and the selection of solutions (the process of statistical integration, cf. section 2.1.1) is achieved in the 'balancing process' (cf. figure 3.1).

Prior to elaborating on the methodology, some attention will be given to the input-output table in general (section 3.1.2) and to the system of commodity flows in particular (section 3.1.3).

Figure 3.1. Extrapolation and integration



3.1.2 The input-output table

In an input-output table the transactions in goods and services that occur within an economy are represented in an orderly and lucid way. Each cell of the table represents a given physical flow of goods and services, valued in money. The origin and destination of these flows may be both domestic and foreign (imports and exports). In case of domestic production the way the output concerned is produced is described in the table. It is shown which goods and services are used as inputs in a given production process in order to produce the output of that process. The output shown in the table either has its own domestic destination, or it is exported.

This production process is described in a column of the input-output table. The column total is the value of the quantity of domestically produced output of a process in a given period (including work in progress). The same column displays the values of the quantities of inputs used in that process in the same period. The total of these, monetarily valued, quantities of inputs is the total use. The difference between total output and the required total use is the value added in the production process. This value added reflects the remuneration of

the services of the production factors that have been employed in the production process (also cf. section 2.1.2). Consequently, the column of the input-output table may be thought of as an observation of a point of the production function: a production function describes a relation between quantities of inputs and the outputs of a production process.

The rows of an input-output table display the destinations of the flows of goods and services. Three main destinations may be distinguished, changes in stocks aside: exports, final domestic destination and intermediate destination. Apart from exports, which consist of all kinds of goods and services, the destination of the various flows of goods and services is frequently related to the nature of the good or service. This point will be elaborated in the discussion of the commodity flow system in section 3.1.3. In the input-output table the intermediate destination, in particular, is broken down further by the activity (groups) in which the production process takes place that uses the goods and services concerned.

In principle, when compiling input-output tables a confrontation is achieved between demand and supply of the relevant goods and services in each cell of the intermediate part of the table. As a consequence, demand in this part of the table is determined from the production process (in the columns), supply from the breakdown according to destination (in the rows). Naturally, this cell by cell confrontation can only be achieved at a detailed level if extensive statistical information of a structural nature is available. In section 2.2 it has already been indicated that, in case of the final annual data, this type of information is usually available to a greater extent than in case of the more recent annual data and the quarterly accounts, where the confrontation occurs at a higher level of aggregation.

An important issue in input-output tables is the valuation of the flows of goods and services of a quite different nature. As indicated in the early part of this section, the valuation is in terms of money. This requires prices. In fact, prices should be known for each flow of goods and services, i.e. for each cell of the input-output table. In this context it is also relevant that the information for each cell on

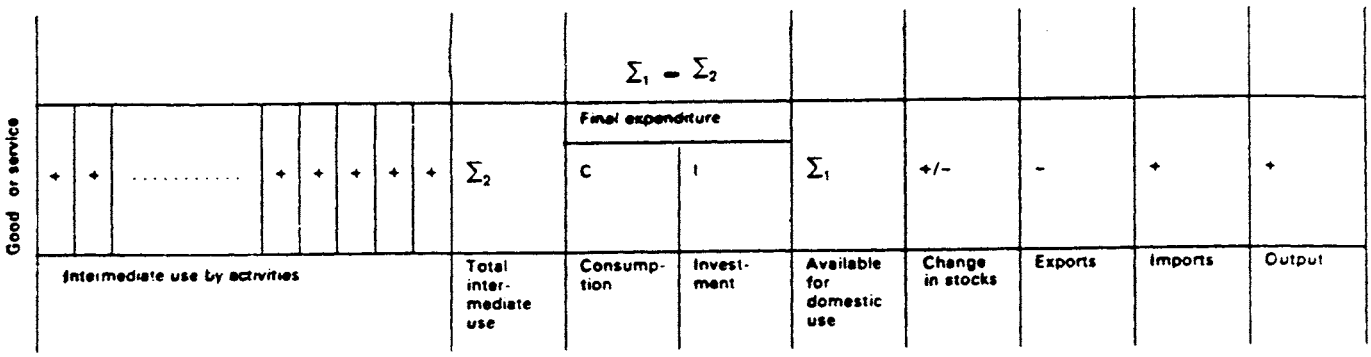
changes in value, volume and price should be consistent. However, in the statistical process these three data are not always available for each cell. In this case too, more detailed information is available in the compilation of the final annual accounts than in the compilation of the quarterly accounts. For short-term purposes, uniform trends in prices are usually applied for all intermediate deliveries of a category of goods and services. This, too, is elaborated in section 3.2.3.

Valuation of the various flows of goods and services in the input-output table is always done in terms of the prices of some period. If the latter coincides with the period under report, that is, the period in which the production processes concerned have taken place, the table is valued in current prices. Incidentally, the problem that prices may change in this period is abstracted from. If they change, some average price is used for valuation. Thus the period under report as a whole is, in a sense, viewed as the time of observation. We return to this problem in section 3.2.3.4. If the valuation of the flows of goods and services is done in terms of the prices of another period than the one under report, the table is valued in constant prices. By comparing two tables for different reporting periods but valued in prices of one period, the effects of changes in prices are removed. This way, the volume changes of the flows of goods and services from one time of observation to an other are displayed.

3.1.3 The commodity flow system

To achieve extrapolation, a so-called commodity flow system has been adopted both in case of the provisional annual accounts and in case of the quarterly accounts. In this system, the rows of the input-output table record flows of goods and services. In principle, these flows have been broken down in such a way that their final destination is either consumption or fixed capital formation (or neither of the two; in that case they are referred to as intermediate goods). This is necessary in order to make it possible to derive either consumption or investment as a balancing item. A row of the table then takes the following form (figure 3.2).

Figure 3.2. Commodity flow



An essential feature of input-output tables is the presence of identity restrictions: total input = total output. In an industry x industry input-output table this feature is included without problems, since both a row total and the corresponding column total represent the gross total output of the industry concerned. In a commodity flow table of the type displayed in figure 3.2, however, the identity restrictions can only be shown if an output matrix is known. The latter provides a transformation from commodities produced to producing activities. Put differently, it must be known which goods and services have been produced in which quantities by a given activity; and, vice versa, which activities produce how much of a given commodity. Generally speaking, this type of information is very scarce immediately after the quarter or the year under report. For this reason a special commodity breakdown has been adopted, both for the provisional annual accounts and for the quarterly accounts. It has the property that a given 'commodity' (a bundle of goods and services) corresponds with (a part of) the output of a given activity. This, does not yet solve the problem, because it would imply the need of recording separately all the goods and services produced by the various activities. Achieving this breakdown of flows of goods and services by activity of origin is not feasible. Hence, for practical reasons, the commodity breakdown employed in the rows of the quarterly table has been approximated by means of an elaboration of the activity breakdown. This table might be referred to as an 'elaborate industry x industry input-output table'. It contains the desired

identity constraints. Consequently, the 'commodities' distinguished in the commodity flow method are in fact the output bundles of activities.

In addition to the homogeneity criteria for distinguishing rows, as discussed above, homogeneity with respect to pricing and destination is an important consideration. However, the possibilities for further detailing of the commodities are restricted by the availability of short-term information.

As is evident from figure 3.2, imports are combined with goods and services produced by domestic ('competitive') activities. They are recorded in a different way in the final annual input-output tables as published in 'De Produktiestructuur van de Nederlandse volkshuishouding' (Production structure of the Dutch economy). In these input-output tables imports are recorded on a row in the primary inputs block of the table. Thus this table records which activities import and what the value of these imports is, but not what the commodity composition of each activity's imports is. However, information of this type is also published in the same publication, viz. in the form of an 'imports matrix'. In a commodity flow system it is necessary to have a breakdown of imports of goods and services by activity of origin. Since the latter is not known in case of imports (as the activity of origin is a foreign activity), a breakdown is made by competitive domestic activities.

3.2 Elaboration of the methodology

3.2.1 The quarterly input-output table

In compiling short-term data within an input-output framework, structural data are updated by means of trend indicators. An important structural element extrapolated in this way is the structure of an activity's costs, i.e. the column of an input-output table. The basic assumption underlying this is that the structure of costs does not change too much in the short run. Thus the point of departure is that all inputs have changed in proportion to the output of a production process. It should be added immediately, however, that this proportionality assumption can be modified at a later stage (in the

balancing process) if the need for modification exists. But in the first estimate of the column displaying an activity's costs, the possibility is ignored that the input structure of the activity's production process may change as a consequence of technological progress, substitution between inputs, heterogeneity of the activity's outputs or other causes.

In applying the proportionality assumption within the framework of the quarterly input-output table, seasonal influences on the structure of inputs should be taken into account. In case of a number of acitivities the inputs in the production process vary - partially as a consequence of the level of aggregation adopted - with the part of the year in which the production process occurs. Implicitly, the methodology of the quarterly accounts takes this into account. This is true because an extrapolation scheme has been adopted in which a recent quarterly table, viz. the one for the corresponding quarter of the previous year, is updated (cf. figure 3.5, section 3.2.3.4). The columns of this basic table contain the input structures of the various activities that are specific for the quarter concerned.

To obtain a point of departure for this extrapolation scheme, it was necessary to compile input-output tables for the four quarters of at least one year. To this end, the annual 1977 input-output table has been broken down into four quarterly tables. This benchmark project is discussed in section 3.2.2. Section 3.2.3 discusses in detail how the quarterly input-output table for each quarter is compiled on the basis of the table for the corresponding quarter of the previous year.

An additional advantage of the compilation of quarterly accounts on the basis of quarterly input-output tables is that this method admits a detailed comparison with the annual data. In the discussion of the adjustment of the quarterly to the annual data (section 3.2.3.4) it will become clear that discrepancies have to be analysed and eliminated for each cell of the input- output table. As far as information is available on the nature of the discrepancies, and hence on their quarterly breakdown, this adjustment procedure can improve the specific quarterly cost structures.

3.2.2 Compilation of the 1977 benchmark tables

The benchmark quarterly input-output tables that are the first set of basic tables in the extrapolation scheme (figure 3.5), have been obtained as a quarterly breakdown of the 1977 input-output table. The latter year was the one for which the latest benchmark revision of the Dutch annual national accounts was implemented. Due to this revision, more detail was available, in a well-documented way, for 1977 than for other years. Moreover, the selection of a not too recent year had the advantage that the system of quarterly accounts could be tried out for a number of years for which complete sets of final and provisional annual data were already available. Also, a time series of some length could be obtained for the calculation of seasonal adjustments (cf. chapter 4).

There were two stages in the breakdown of the 1977 annual input-output table. In the first stage, the columns of the annual table were broken down into four quarterly columns. The indicators employed in this breakdown are by and large the same ones to be used in the operational compilation of the quarterly input-output tables. Chapter 5 describes these source data. In case of the columns containing the cost structure of the activities distinguished in the intermediate block of the table, the 1977 breakdown was made as detailed as necessary. In particular, disaggregated breakdowns were made if it could be expected that different production processes within a single activity display both seasonal patterns and different input structures. An example is the activity 'Horeca' (Hotels, Restaurants, Caf'e's). The input structures of each of the three components of this activity differ from one another, while, at the same time, seasonal patterns exist. As a consequence, the cost structure of the activity as a whole in the third quarter (vacations) is determined to a greater extent by that of hotels than by that of the other activities.

In addition to quarterly breakdowns of the intermediate columns in the first stage of the process, breakdowns of consumption, investment, change in stocks, imports and exports were used. These variables were broken down both by breakdown indicators' and autonomous information. Next, in the second stage of the breakdown process a confrontation of

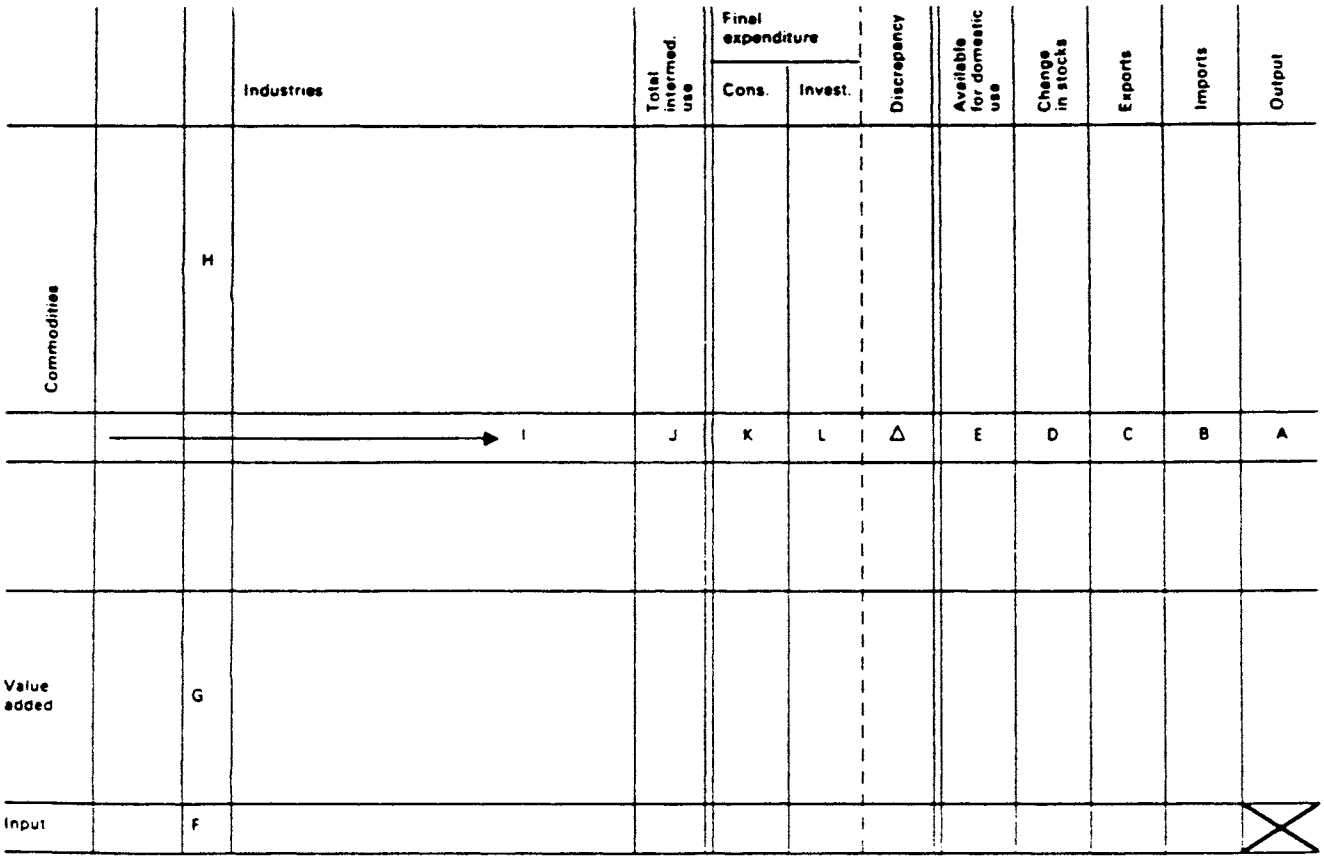
demand and supply was made in the rows of the quarterly tables. Of course the identity restrictions (total input = total output) had to be met in each quarterly table. Demand/supply discrepancies were due to statistical imperfections in the breakdown indicators and the autonomous information or to undetected seasonal patterns in input structures. Naturally, the annual sums of the quarterly demand/supply discrepancies had to be constrained to zero because the four quarterly values in each cell added up exactly to the annual value of the cell. Hence the same applied for the cells that jointly constituted a row. Excess demand of a good or service in any quarter therefore implied excess supply of the same good or service in another quarter. Consequently, balancing an individual quarterly table could not be done independently of the other quarterly tables. Thus in this integration process goods and services were transferred between quarters until the statistical discrepancies were eliminated; this eventually yielded the quarterly input structures of the activities distinguished.

3.2.3 The extrapolation process

3.2.3.1 Construction of the unbalanced table

In cell A of figure 3.3 the value is determined of production at current prices of the (groups of) goods and services distinguished in the rows. To this end, a value indicator is applied to the corresponding production value in the basic table, that is, the table of the corresponding quarter of the previous year. Next the supply of goods and services ('available for domestic use') is determined in column E. The latter column is equal to the production values plus the imports in column B minus the exports in column C plus, as far as known, the change in stocks (column D).

Figure 3.3. The process of compiling the unbalanced quarterly input-output table



Next comes the filling-in of the intermediate block of the table. To this end the change in the volume of each activity's production is determined. By way of a first estimate this change is applied to the whole of the intermediate part of the input column of the activities distinguished at H. In calculating this first estimate, use is thus made of the proportionality assumption explained above: constant output-input ratios (i.e. constant, in volume, vis 'a vis the basic quarter). Once this has been done for all activities distinguished in the table, the intermediate block is obtained of year t's quarter in prices of the corresponding quarter of year (t-1). However, confrontation of demand and supply of the goods and services in the rows of the table is to be done in current prices. Consequently, the activities' intermediate demand for goods and services is inflated (at I). This inflation is

achieved by means of an index representing the price change of domestic use since the corresponding quarter of year (t-1). These inflators are calculated from domestic prices, taking account of price-trends of imports and exports. They are, in each row, equal to the ratio of the value of A+B-C in current prices to its value in constant prices. Applying these prices to the intermediate use implies the assumption that there are no diverging price movements within the activities in the intermediate block or between intermediate use and final use. It should be noted that another implication of the procedure is that diverging price movements of the inputs may lead to output-input ratios in current prices differing from those in the corresponding quarter of the previous year. Finally it should be noted that the row totals of the intermediate block (column J) represent total intermediate demand for goods and services in current prices.

Conceptually, the difference between supply (E) and intermediate demand (J) for goods and services must either be zero (viz. in case of intermediate goods/services) or be uniquely attributable to consumption or investment. Hence, if the unbalanced table displays a difference between E and J in case of intermediate goods, this difference is immediately recorded in the discrepancy column Δ.

In the case the consumption and investment goods, the difference (E-J) is recorded in columns K and L. Thus these columns of consumption and investment in current prices are determined indirectly. As a consequence, it is of crucial importance to confront them with direct measurements of these variables. In a number of cases it is possible to enter direct measurements of final expenditure into columns K and L. In those cases the difference between the indirect and direct measurements is recorded in the discrepancy column.

3.2.3.2 Confrontation with final expenditure data

The quarterly investment data that the CBS publishes as timely indicators cannot be used for a confrontation with the results of the quarterly accounts: they are determined in a similar way, employing basic data that also enter the quarterly accounts. Direct, independent

quarterly observations of investments are virtually unavailable.

In case of consumption, a confrontation with direct measurement is possible. However, both in case of the annual data and the quarterly data, transformations are required in order to achieve comparability of direct and indirect measurements. Direct observations are made at the (retail) trade and in households (viz. the budget survey). Consequently, consumption is valued at consumers' prices, that is inclusive of trade and transport margins and indirect taxes (Value Added Tax, 'Special Use Tax', and so on). In contrast, the indirectly measured consumption data (the supply/demand differences in the commodity flow system) are valued at producers' prices and import prices (CIF). In the quarterly input-output tables, margins and VAT are recorded as separate commodity flows.

3.2.3.3 Balancing the quarterly input-output table

Confronting the alternative final expenditure data with each other, along with the 'supply' and 'demand' of the purely intermediate commodities, yields an input-output table that fails to satisfy all identity constraints (total input = total output). The resulting differences are recorded in the discrepancy column Δ (cf. figure 3.3). In the course of the balancing process these discrepancies have to be explained and eliminated, in order to obtain a consistent table. The latter is the basis for deriving the macro-aggregates on goods and services.

In the balancing process, there usually are several possibilities for eliminating discrepancies. Hence it is important to discover the most plausible explanations for the discrepancies, both those among the statistical indicators and those resulting from conflicts between statistical information and the a priori assumptions. This is true not only for the individual discrepancies in the rows of the table, but also, and especially so, for combinations of discrepancies. In an early stage of the balancing process this search for explanations of discrepancies may uncover implausibilities in the basic statistical material; usually these can easily be corrected. At a later stage, the

remaining discrepancies are eliminated on the basis of known differences in the reliability of the statistical sources and on the basis of additional information. The consequences of alternative ways of eliminating discrepancies are considered as well. Thus, e.g., a fairly small adjustment of the change of the value of output of the construction industry may cause considerable adjustments for the output of its suppliers. At this stage of the balancing process not only the basic statistical data may be adjusted, but the a priori assumptions as well. An example of the latter has been given in the discussion of the confrontation in the case of consumption, in the preceding section.

Just as in the case of the basic data, several alternative possibilities frequently exist for adjusting the basic assumptions. In practice, known trends of structural change are taken into account as far as possible. Suppose that a discrepancy indicates that intermediate 'demand' for an energy carrier exceeds 'supply' and that the recent statistical data on its output are thought to be reliable. Then the statistical discrepancy can be eliminated by a downward adjustment of the 'demand' estimate. This may be reasonable if rising energy prices would be inducing substitution with other energy carriers (which would be indicated by compensating statistical discrepancies for these substitutes) or if economizing on energy use is possible in a number of activities. In both cases the input structure of one or more activities using the energy carrier must be adjusted in such a way that (part of) the statistical discrepancy disappears.

The original assumption of constant input/output ratios is then modified.

Specifically, there are four types of adjustments that can be made in order to eliminate statistical discrepancies (cf. figure 3.3):

a) Adjustment of final expenditure, changes in stocks and/or foreign trade (B, C, D, K, L)
b) Adjustment of changes in prices (the whole of the intermediate part of the rows at 1)
c) Adjustment of the value of output (at A); this adjustment uses the

same adjustment of the corresponding column at F (since total input = total output). Then there are two possibilities:

- the adjustment does not alter input-output ratios. In this case the whole of the column H is adjusted, generating a new discrepancy column Δ.
  Thus this yields a kind of iterative procedure.
- the compensating adjustment is made in the value added column, at G.
  Clearly, this changes the ratio of total use to total output.

d) Direct adjustment of input-output ratios. This is the type of adjustment illustrated with the energy carrier example. If no substitution is taken to occur, the compensation correction occurs in the column at value added G and, within value added, at the operating surplus.

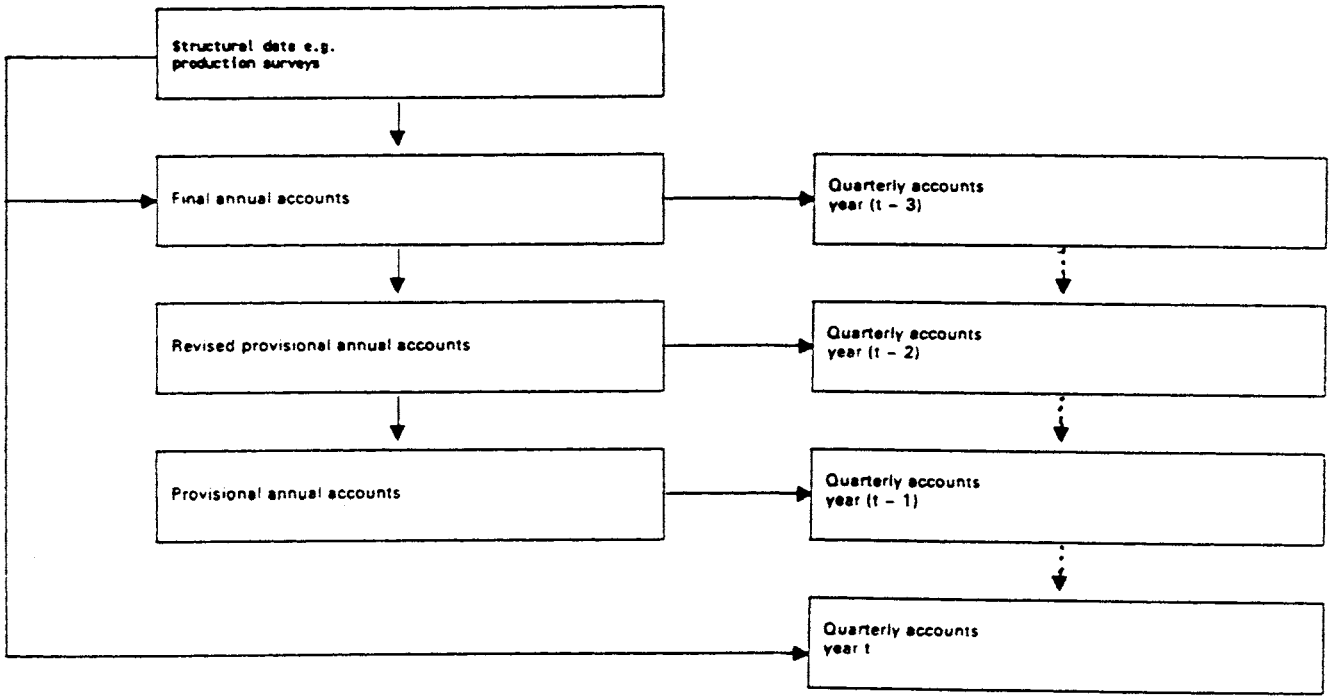
3.2.3.4 Adjustment to the annual accounts

Once every year the quarterly accounts have to be adjusted to the annual accounts. There are two reasons for this. Firstly, the data from the basic input-output table have to be adjusted as well as possible to the most recent structural data. Second, the data for quarters of years prior to that of the basic table have to tie in with the final annual data for the year concerned. The detailed adjustment to the input-output table of the previous year (t-1) (cf. figure 3.4) is necessary for the first of these two reasons. The latter annual provisional input-output table underlies the provisional annual accounts. It contains the most recent structural information. The quarterly data for year (t-1) have to be adjusted to this provisional annual table, because these quarters tables are the basis for the extrapolation to the quarterly of year t.

Adjustments to the provisional annual accounts (t-2) and the final annual accounts (t-3) related to older data. They are necessitated by differences between provisional and revised provisional annual data and between revised provisional and final data. Naturally it is important to analyse these differences and investigate whether they might have causes relating to specific quarters. If this turns out to be the case, the quarterly structure (that is, the quarterly distribution of annual

variables) is modified. Then it must be decided whether these modifications must have consequences for the quarterly structure in year (t-1) and year t (cf. figure 3.4). However, it is not planned to carry out the adjustment to annual data for years (t-3) and (t-2) in all cases at the detailed level of aggregation of the input-output table, in contrast with the adjustment to the (t-1) annual data.

Figure 3.4 Flows of information between annual and quarterly accounts



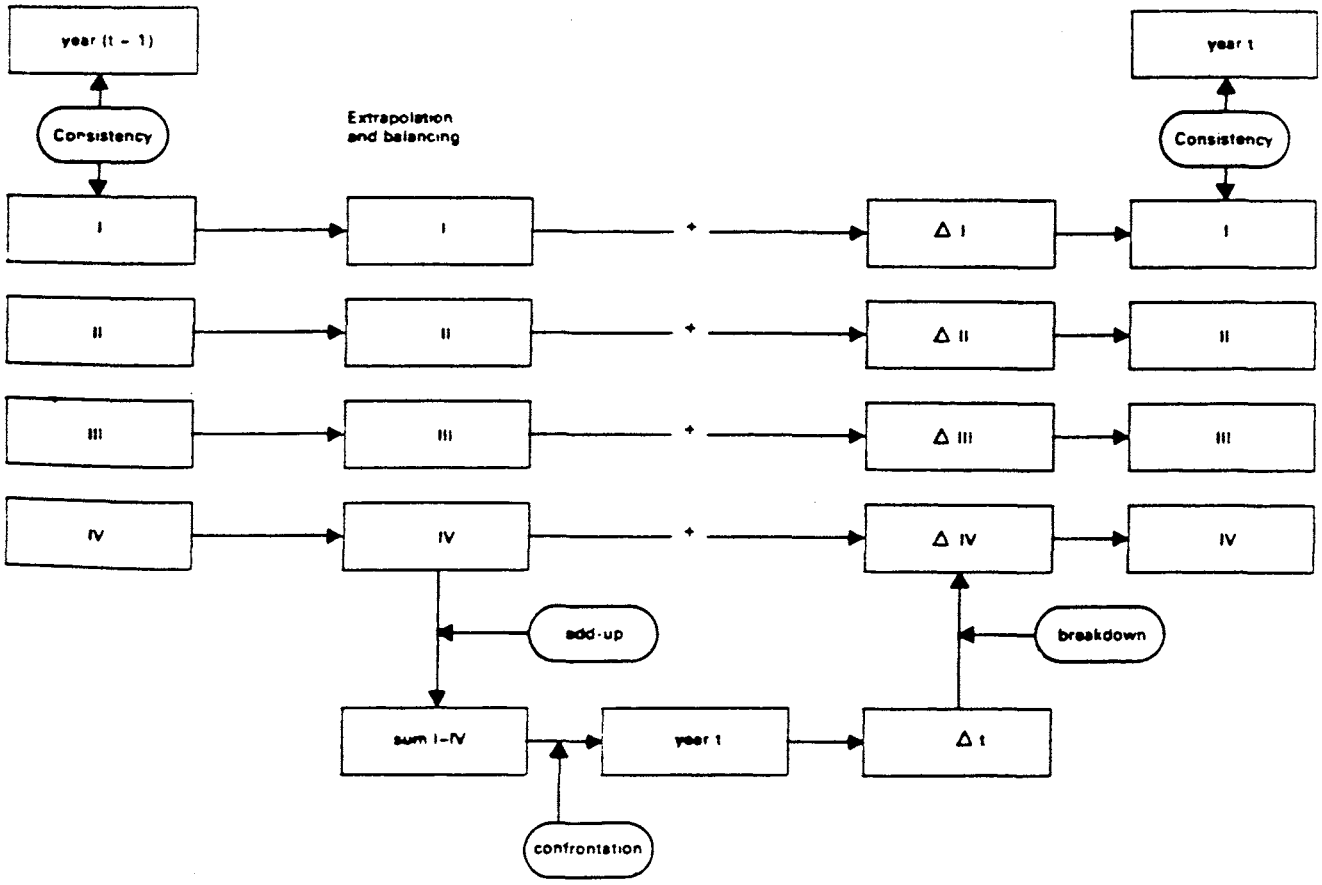
The dotted vertical arrows in figure 3.4 indicate that, when the quarterly data are adjusted to the annual ones, efforts are also made to achieve consistency between the successive quarterly accounts of succeeding years. This means that the original quarter to quarter changes, as determined using the basic statistical information, are left intact as far as possible. Usually, it is impossible to leave them wholly intact because in that case a difference between the sum of four quarterly data and the corresponding annual figure would have to be distributed proportionally over the quarterly data. This might not only be inconsistent with the 'adjustment strategy', discussed below, but it

would also cause a 'step problem': an adjusted change for the fourth quarter of a year would not necessarily be comparable with the similarly adjusted first quarter of the next year. It should be noted that the adjustment strategy does not (yet) include a systematic procedure to handle this step problem.

Another problem in the adjustment of four quarterly tables to an annual one occurs with respect to the valuation of the tables (cf. section 2.3). The four quarterly tables (at current prices) are valued at the average prices in the quarter under report. Accordingly, each cell of the table containing the sum of four quarterly tables is valued at a weighted average (weights being the relative importance of each quarter for the cell concerned) of four quarterly prices. In contrast, the annual table is valued at average annual prices that, as a rule, differ from the weighted averages of the quarterly prices. Mostly, the differences are small. But in some cases they need special attention, for example in agriculture and in case of changes in stocks. In the former case this is because of the characteristic seasonal pattern and the often sharp fluctuations of prices, in the latter case within -year alternation of increases and decreases of stocks is the culprit. In most of these cases adjustment is achieved by revaluation of all quarterly data at the average annual price.

The strategy of adjustment of quarterly to annual tables has as a central element that the quarterly balancing corrections of the first stage are reconsidered and, if necessary, modified. Naturally, this strategy is applied under the constraint that the quarterly tables have to remain consistent (total input = total output). Actually, the discrepancy table that consists of the differences between the annual table and the sum of the four quarterly tables, is broken down into four consistent tables; for the cells of the discrepancy table this breakdown is determined on the basis of the original quarterly balancing decisions. Figure 3.5 summarizes the adjustment of quarterly to annual tables.

Figure 3.5 Adjustment of quarterly tables to the annual data



Once a part of the discrepancy table (indicated by Δt in figure 3.5) has been explained by a reconsideration of the original quarterly balancing corrections, residual discrepancies remain that cannot be attributed to quarterly balancing processes. The breakdown of these residual discrepancies has to be such that each of the resulting quarterly discrepancy tables Δk (k=I, II, III, IV) is consistent (i.e. total input = total output). Usually there is a fair number of degrees of freedom in this process, implying that there are several alternative possibilities for the breakdown. These degrees of freedom are used to preserve the original quarter to quarter rates of change to an extend that is determined by the perceived reliability of the original basic statistical information. In addition, minimizing the 'step-problem' referred to above is a consideration in the breakdown of the residual discrepancies.

4. The 1977-1984 simulation period

4.1 Review of the simulation

As indicated in section 3.2, the first quarterly input-output tables compiled were related to 1977. To compile them, the annual table was broken down into four quarterly tables (section 3.2.2). The year 1977 was selected because it was not too recent; hence it was possible to test the various elements of the method of compilation. Moreover, the thus created opportunities for simulation made it possible to gain insight into the quality of the basic statistical information to be integrated within the system of quarterly accounts. The importance of this is that weak links in the system could now be pinned down prior to the operational stage of the system.

In principle, a confrontation between the sums of four quarterly tables and the annual ones could have been made for each year from 1977 onward. By doing this for each year in succession, the adjusted quarterly tables of one year could have served as the basic tables for the next year. In fact, this procedure was adopted for 1978. After constructing the 1977 tables, those for 1978 were compiled in the manner indicated in figure 3.5. In balancing these 1978 quarterly tables and in adjusting them to the final annual table the same procedure was followed that will be employed in the operational process. This made it possible to gauge the order of magnitude of the statistical discrepancies for each row (by commodity flow) as well as of their aggregates; the latter are the statistical discrepancies in the macro GDP account. These orders of magnitude of the discrepancies yield criteria by means of which to judge the quality and the stability of the basic indicators and other recent statistical information. The discrepancy table obtained by subtracting the annual table from the sum of the quarterly tables primarily served as a partial indication of the extent to which the original discrepancies have been eliminated correctly. This indication is obtained by the, partial, reconsideration of the quarterly balancing process (cf. section 3.2.3.4). It provides a partial indication only because the goodness-of-fit with the annual tables is irrelevant with

respect to the correctness of the quarterly distribution; no independent checks for the latter are available for the time being.

The results for the 1978 quarters were satisfactory from the above point of view, both with respect to the elements of the rows of the table and with respect to the macro-aggregates. This is illustrated by, e.g., the change in the value of GDP at market prices in the 1978 quarters (with regard to the corresponding quarters of 1977). They are shown in table 4.1. The first column shows the pre-balancing data, based on tables that still contain statistical discrepancies, the next four balanced data: the second column displays balanced data before adjustment to annual data and the final column balanced quarterly data adjusted to final annual data. Note that no adjustment of the quarterly data to the provisional and adjusted provisional annual data has been made for 1978. In the last row of the table a comparison is made between the sum of quarterlyfigures and the annual figures.

Table 4.1 Value changes GDP, 1978 with respect to corresponding period of 1977

	Pre-balancing	Post-balancing			
	QA	QA (Before adjustment to annual data)	PAA (Provisional)	RPAA (Revised provisional)	FINAL
		%			
I	+11.2	+9.4	x	x	+8.6
II	+ 9.2	+8.5	x	x	+8.6
III	+ 8.0	+7.9	x	x	+7.9
IV	+ 7.2	+6.7	x	x	+7.1
Year	+ 8.8	+8.1	+7.8	+7.8	+8.0

Because of the satisfactory results obtained for the 1978 quarters it was decided not to continue the succesive calculation for each subsequent year, but to attempt to jump a few years ahead. Consequently, the quarterly 1978 tables, adjusted to the final annual data, were employed as the basis for calculating the 1981 quarterly tables. At the time of simulation, 1981 was the latest year for which final annual data were available. Consequently, this was the last final reference year before the quarterly accounts would begin to anticipate the latter type of data. For the intervening years (1979, 1980 and 1982 as well, as indicated below) less detailed procedures were employed to obtain macro-economic quarterly data. We return to this subject in section 4.2.

Jumping ahead from 1978 to 1981 provided a more powerful test of the basic assumptions underlying the methodology of the Dutch quarterly accounts than the 1977 to 1978 step. In particular the constant input-output ratio assumption might be expected to be the more vulnerable the longer the period for which it is assumed to hold. Generally speaking, modernization of production processes with the implied efficiency gains in the use of inputs and substitution induced by changes in relative prices occur gradually. Hence these changes will usually be smaller if the period under consideration is shorter. In addition to this, skipping two years demands more of the basic statistical information. Indicators with a systematic upward or downward bias cause greater statistical discrepancies in the long run than in the short run. Consequently, the jump ahead has, as it were, put the indicators under a magnifying glass.

Extrapolating the 1981 quarterly tables from those for 1978 was done at a level that was somewhat more disaggregate than that of the 1977 to 1978 quarterly tables that had been adjusted to the final annual table. Instead of the original 70 rows (approximately), about 90 rows were distinguished for the extrapolation to 1981. In this disaggregaton the purpose was to achieve a somewhat greater homogeneity; of the homogeneity criteria distinguished in section 3.1.3, price homogeneity received particular attention. The price heterogeneity of some of the 70 original rows had turned out to cause relatively sizeable statistical discrepancies in the 1978 quarterly balancing process and the process of adjustment to the annual data.

The 1981 results turned out to be quite satisfactory; this is again

illustrated for the value change of GDP: table 4.2 is the analogon, for 1981 vis 'a vis 1978, of table 4.1. Therefore, it was decided to skip another year: the quarterly tables for 1983 were made directly on the basis of those for 1981, without calculating the 1982 tables first. The latter were, just as those for 1979 and 1980, estimated by less detailed procedures.

Table 4.2 Value changes GDP, 1981 with respect to corresponding period of 1978

	Pre-balancing	Post balancing			
	QA	QA (before adjustment to annual data)	PAA (provisonal)	RPAA (revised provisional)	FINAL
		%			
I	+19.9	+23.2	x	x	+32.1
II	+16.1	+18.3	x	x	+17.6
III	+14.0	+15.4	x	x	+16.7
IV	+16.8	+19.9	x	x	+18.2
Year	+16.6	+19.1	+18.0	+18.6	+18.9

At the time when the quarterly data for 1983 were compiled, this year was the last one for which provisional annual data were available. After adjusting the 1983 quarterly tables to the provisional annual data, the 1984 quarterly data were the first integrated quarterly data to be compiled in advance of annual accounts.

4.2 The interpolation of 1979, 1980 and 1982 quarterly data

The quarterly data for 1979, 1980 and 1982 have not been determined on the basis of complete quarterly input-output tables. In this interpolation, both the 1978, 1981, 1983 quarterly data and the 1979, 1980, 1982 annual data have been considered as fixed. In addition to these, there were statistical indicators for the development of the volume of production; these were not

necessarily mutually consistent. Moreover, there was (similarly not necessarily consistent) autonomous quarterly information on household consumption, government and non-government investment, exports and imports of goods and of services, changes in stocks, compensation of employees (including employers' contributions to social security), indirect taxes, subsidies and the difference between interest received and payed by banks. Estimating (interpolating) consistent quarterly data for the intervening years was achieved by staying as close to these data as possible, subject to a number of constraints. These constraints were: linkage with the rates of change between 1978 quarters and the corresponding 1981 quarters and those between 1981 and 1983, respectively; and the constraint that the 1979, 1980 and 1982 quarterly data have to add up to the annual data for these years. Another constraint implied by mutual consistency of the quarterly data is that the data for each quarter satisfy the identity constraints of input-output tables.

Because a complete input-output table is compiled from 1983 onward, more disaggregate data are published as part of the quarterly accounts, starting with that year. For 1977-1982 tables 1 and 2 in the publication Kwartaalrekeningen vol. 1, no. 1 provide just quarterly data on the main macro-economic aggregates.

4.3 Quarterly macro-economic volume changes

In addition to the changes in value of the macro-economic aggregates of transactions in goods and services, the quarterly accounts also provide volume rates of change. However, during the simulation the compilation of data in current prices was the first priority. For deriving macro-economic volume changes, a less detailed method was used. For the various categories of final expenditure and for imports, macro-economic deflators were selected first; their coverage fits as well as possible with that of the variables concerned. Below, each of these deflators is discussed. The constant price data implied by the resulting volume changes have to satisfy the constraint that four quarterly figures must add-up to the corresponding annual figure, just as in case of current price data. Consequently, the discrepancies between the sum of four constant price quarterly data and the corresponding annual data provide indications of the extent to which the selected deflators are representative for the annual changes in the prices of the macro-economic aggregates. After

analyzing these discrepancies, the quarterly deflators have been adjusted such as to achieve elimination of the discrepancies.

The volume changes of GDP have, in principle, been compiled by means of separate deflation of each of the categories of final expenditure and imports. In the resulting configuration of constant price macro-aggregates of goods and services transactions, constant price GDP is obtained as a balancing item. Then the change of the constant price quarterly GDP with respect to the corresponding quarter of the previous year provides a first-stage indicator of the volume change of GDP. But there is another indicator with which this first-stage indicator can be compared at an aggregate level: the 'direct' volume change that is obtained as an intermediate result in the compilation of the quarterly input-output tables. The latter are, as explained in section 3, compiled by calculating detailed volume data first and inflating them subsequently. Consequently, pre-balancing data on constant price value added of each activity is obtained as an intermediate result, viz. as the difference between F and H in figure 3.3 (section 3.2.3.1). The 'direct' estimate of the volume change of GDP is obtained as a result of aggregation of these value added data. This, thus, yields a pre-balancing estimate of the volume change of GDP which may be compared with the one described above.

The compilation of the deflators for the macro-aggregates is achieved as follows. For consumption, government investment and non-government investment derived price indices are available that are employed both in the compilation of the annual accounts and in the compilation of the consumption and investment indicators that the CBS traditionally compiles as short-term trend indicators (cf. section 1.2). Since, hence, the same price indicators are used in the compilation of quarterly and of annual accounts, the differences in the resulting volume changes are mainly due to the fact that the quarterly accounts are based on quarterly averages of prices and the annual accounts on annual (un-weighted) averages. Both in case of household consumption and in case of government and enterprise investment these discrepancies were, relatively speaking, very small. Government consumption has been broken down into two components that were separately deflated. For the government's use of goods and services, deflators have been derived from the system of quarterly accounts for the quarters of 1978 and 1981. This was feasible as a consequence of the availability of quarterly input-output tables for these years. These deflators

are weighted sums of price indices, the weights being the relative importance of the goods and services concerned for government consumption; the indices were applied to the intermediate part of the relevant rows of the input-output table (at I in figure 3.3). Next, the 1979 and 1980 quarterly data were obtained by interpolation, analogously to the method described in section 4.2. In this determination of the rate of change, the trend of the price index of household consumption was also taken into account. Finally, the compensation of employees that is part of government consumption was deflated by a procedure employing data from the semi-annual wage rate study and the survey of wages (cf. section 5.3.4).

In case of foreign trade, quantity data are available in addition to value data. The ratio of the two yields unit values. In the annual accounts, the unit values are not employed as deflators for all commodities, because quality changes in the bundle of goods making up a commodity may incorrectly cause the unit value to indicate a change in prices. Consequently, the import and export data for commodities that are subject to (wide) fluctuations in quality are deflated by means of specific price indices that measure constant quality price changes. In the deflation of the quarterly foreign trade data the annual methods have been followed as closely as possible.

Changes in stocks have been deflated by means of the price index of the goods concerned (producers' prices and import prices of raw materials of semi-processed and other intermediate goods). In case of this variable the alternation of quarterly increases and decreases in stocks led to the expectation of more substantial discrepancies with constant price annual data. This, however, turned out to be too pessimistic for the simulation period.

4.4 Seasonally adjusted 1977-1984 quarterly data

The census X-11 method (multiplicative case) has been used to obtain seasonally adjusted data. A general problem in deriving seasonal adjustment schemes is that there exists no method that simultaneously satisfies a number of logical constraints: additivity, multiplicativity, orthogonality, idempotence and symmetry.

The census X-11 method, adopted because of its general applicability is quite popular internationally. But it fails, in particular, to meet fully the additivity requirements of an integrating framework. Thus the sum of the quarterly seasonally adjusted components of final expenditure differed somewhat from the total quarterly seasonally adjusted final expenditure. Similarly, the sum of four seasonally adjusted quarterly figures was not always exactly equal to the annual figure. The latter (very small) discrepancies were removed by distributing them over quarters in proportion to the unmodified seasonally adjusted data. The first type of discrepancies have been eliminated by, on the one hand, determining the variable 'disposable for expenditure' as the sum of its two seasonally adjusted components; and on the other hand, in case of expenditures, by determining seasonally adjusted changes in stocks as a balancing item.

The seasonally adjusted GDP at current prices for 1977-1984 was the point of departure in the breakdown of this variable (notable by activities). Differences between seasonally adjusted components of a macro-aggregate and this seasonally adjusted macro-aggregate itself have always been distributed proportionally over the components (in proportion to the unmodified seasonally adjusted data).

5. Source data of the quarterly accounts

5.1 Overview

Sections 5.2 and 5.3 provide a detailed survey of the sources employed in the compilation of the quarterly accounts. By and large, the survey is structured according to the method of compilation of the quarterly input-output tables (cf. section 3.2.3), the latter being the basis of the quarterly main aggregates. In these sections the sources are discussed of the data on the value of production, wages, foreign trade, consumption, investment, change in stocks and indirect taxes and subsidies.

From the survey of sources it may be concluded that a lot of source data is available for mining and agriculture; for the manufacturing activities there frequently are several sources too. For the service activities there are, just as in the case of annual accounts, less source data; consequently, for these activities indirect estimates (employing data on other activities) or secondary sources have to be relied upon. As to the components of value added, there is not only data on compensation of employees, but also on indirect taxes and subsidies. In contrast, little information is available on gross operating surplus; therefore this item is mainly determined as a balancing item (total output less total use, compensation of employees, indirect taxes cum subsidies). As regards both the intermediate use of various activities and investment there is little direct information; indirect measurement and assumptions have to be employed liberally. In case of consumption there once more is direct information; the same holds true with respect to imports and exports. Quarterly information on changes in stocks is increasingly available.

Before discussing the sources in detail we first make some general remarks on the nature of the available source data. The available quarterly statistical information is usually less detailed than the annual information. Thus the annual statistics provide information on use as well as production, whereas quarterly statistics usually contain information on production only. This means that, as pointed out in section 3.1.1, more assumptions have to be made than in case of the compilation of annual accounts. Consequently, the macro-economic quarterly series are not published in the same detail as the annual ones.

In addition to being less detailed, the quarterly data differs in another way from the annual data. Annual data frequently focusses on the levels of variables and estimate changes with respect to the preceding year as a by-product. In case of monthly and quarterly statistics, in contrast, the emphasis is on estimating changes. This was one of the reasons for the decision to employ a system of extrapolation as explained in preceding sections. Incidentally, estimating correct changes puts considerable demands on the source information. An important element in this respect - a troublesome element in practice - is to distinguish actual, economically relevant, changes from statistical quirks. Thus, if the number of establishments in an activity appears to change, a distinction needs to be made between, on the one hand, establishments actually started or terminated in the period concerned and, on the other hand, establishments that were just not observed in the previous period. Without corrections for the latter, distortions are introduced of, e.g., the value of production of the activity concerned relative to that in the previous period.

A final point to be borne in mind with respect to the individual sources is that the reliability of the quarterly accounts does not depend on the nature and reliability of these individual sources alone. It has become evident that the balancing process that integrates, within the input-output framework, the data from all the various sources, yields data that is more reliable than the original ones, at least judging by the fit with the final annual data (cf. section 4). Naturally, the discussion of the subsequent sections is limited to the data employed in the compilation of the quarterly input-output tables.

5.2 Activities

5.2.1 Agriculture and fishing

In 1981 the share of agriculture in GDP was almost four and one-half percent. In determining the value of output not only CBS data is employed but also much data from the 'Landbouw Economisch Instituut, LEI' (a government subsidized institute for the economic analysis of agriculture) and of 'Produktschappen' (independent government bodies dealing with specific activities). Because of the nature of the information concerned, the

differences in production processes and in seasonal patterns, a distinction is made between, first, livestock production including animal products; second, production of cereals, potatoes and similar crops; and, third, fruits and vegetables.

Two-thirds of the value of agricultural output is due to livestock production and animal products. Of this, livestock represents about one-half; most of it is delivered to slaughterhouses. The share of the output of wholemilk in livestock etc. production is about 40%; eggs and products like cheese made by farmers make-up the remaining 10%. Off the latter, eggs are the most important product.

The value of livestock production is calculated from data on numbers of animals slaughtered, changes in animal stocks, imports and exports. The output of wholemilk is derived mainly from data on deliveries to the dairy industry. Production of eggs is estimated from data on the quantities delivered to consumption, producers of egg-based products and from data on exports and the number of eggs used for breeding. For almost all products, LEI price data is employed. The major part of the quantity data is collected by the CBS and the 'Produktschappen'.

Crop rising is, in terms of output value, the least important of the three components of agriculture: about one-tenth of total agricultural output. As a consequence of the harvest season, the third quarter's output has a much higer share, viz. over one-quarter. This is because the whole output is recorded at the time of harvesting. Valuation is at the market prices of the quarter concerned (cf. section 2.3). The value of production is derived from CBS quantity and LEI price data.

Growing of vegetables and fruits is responsible for one-quarter of total agricultural output. Source data is obtained from the 'Produktschappen'. The data is on quantities and values delivered to auctions; food produced on term contracts and not delivered to auctions is also taken into account, as well as some special items.

5.2.2 Mining and quarrying.

In 1981 mining and quarrying contributed about eight percent to GDP. Two activities are distinguished separately, viz. oil and natural gas on the one hand and other mining and quarrying on the other.

The latter group concerns sand, gravel, lime and salt. Data is available on the quantities produced of sand, gravel and salt. In addition, sales data is available. The CBS also collects price data for the major products. It should be noted that the activity as a whole is of limited importance.

By far the major part of mining and quarring is the first group of activities, natural oil and gas production. The core is natural gas production (93% of the total in 1981). There is a detailed and comprehensive monthly account of all receipts and deliveries of natural gas. Since there is, in addition, price data for virtually all components of total deliviries, the account can also be used to derive quantity data.

Oil output has doubled since production on the Dutch portion of the continental shelf started. The value of output is estimated on the basis of data on the value of sales and the quantity produced.

5.2.3 Manufacturing

In 1981 just under 18 percent of GDP was generated in manufacturing. In manufacturing, a large number of different production technologies are employed. As a consequence, a relatively large number of columns must be distinguished in compiling input-output data. The assumption of constant input-coefficients (cf. section 3.2.1), made in the first step of the compilation and relaxed subsequently, naturally presumes a classification of production processes into classes with fairly homogeneous input structures. Therefore thirty-eight manufacturing columns are distinguished. In addition, there are forty-four rows (commodities).

For each column and row the quarterly changes of the value of production are estimated, both at constant and at current prices. In virtually all cases, source data is collected by the CBS. The data may measure the changes in

production both directly and indirectly. In fact, six types of information can be distinguished.

(1) quantities produced	37%
(2) sales plus change of stocks, in quantities	15%
(3) value of turnover	36%
(4) value of sales	3%
(5) quantity of sales	4%
(6) use of raw materials, in quantities	5%

Here turnover is the total value of receipts measured at the moment they become payable (thus, e.g., ships are recorded at the moment the term payments are due). Sales are recorded at the moment the delivieries are due. In the list just given, the percentages are the 1981 share of each category in total manufacturing output.

For virtually all manufacturing activities the CBS compiles price indices for foreign and domestic sales. Wherever the value of sales is employed to estimate production trends, the initial hypothesis is that no inventory change occurred. In case of turnover data, this initial hypothesis is only made for the inventory changes for which no term payments are made.

Though most manufacturing output does not have a string seasonal pattern, in some activities there is an effect of the number of working days in each quarter. In a number of these activities, this effect occurs in the third quarter, due to the vacations. In other activities vacations have no discernible effect, because the production processes concerned are continous; an example is the iron and steel industry. In a small number of activities intermediate use is seasonally dependent, causing seasonal fluctuations of output as well. An example is the sugar industry, which depends on the beet harvest (fourth quarter).

5.2.4 Public utilities

In 1981, public utilities generated about 2.5 percent of the GDP. Three activities are distinguished: gas, electricity and water. A special problem in these activities is the difference between the time of delivery

(transactions) and that of payment. National and quarterly accounts record transactions at the time of transaction, at least in principle. Consequently, payments data cannot be used to estimate production.
However, for all three activities price and quantity data is available that can be used to determine changes in output. There also is information on components of intermediate use, notably use of energy carriers.

5.2.5 Construction

In 1981 construction contributed over seven percent to the GDP. Construction includes installation activities associated with construction. In construction there are about 20,000 establishments, of which three-quarters employ less than 10 persons. This large number of establishments, the geographic aspects of the production process and the sensitivity to meteorological conditions complicate the statistical description.

For construction proper (about 80 percent of production in total construction) monthly and quarterly data are available on: issues of licences for construction projects, progress of construction of dwellings and buildings, number of persons employed in construction projects, productive hours per person employed and producers' price indices for dwellings and other buildings. The statistic 'Progress of dwellings and other buildings' provides data for a direct indicator of the value of production. A second indicator for the value of production is compiled by means of an indirect approach, using data on productive hours per person employed, number of persons employed in construction projects and producers' price indices. In the compilation of the 1977 quarterly accounts, the latter indicator provided the best fit with the data that resulted from the balancing process. Therefore, for 1978-1982 this indicator was used. After 1981 some use is also made of the direct indicator.

To determine the output of infra-structural construction works, data for 1977-1983 were mainly taken from a survey covering the progress of these works. For the post-1983 quarters data were taken from a related statistic, 'Infra-structural works ordered and costs made'. The latter is based on a quarterly survey of the insitutions commissioning infra-structural works.

The production of construction related installation establishments (about 20

percent of total output in construction) is estimated from data on number of persons employed and number of productive hours (including hours lost by averse meteorological conditions).

Generally operating, the balancing process plays a more important role in the compilation of quarterly data on construction than in that of data on manufacturing. Thus the original indicators on construction are adjusted more often than those for manufacturing. In construction, these corrections are, e.g., made on the basis of data on the output of industries supplying construction, like the building materials industry.

5.2.6 Trade, hotels, restaurants, cafe's, repair

In 1981 the share of the trade industries in GDP was close to 15 percent. For hotels, restaurants and cafe's (or horeca) and repair together the share was 2.5 percent.

An initial figure on the volume trend of the output of trade services is obtained as a weighted average of the volume trends of trade margins on intermediate deliveries, consumption, investment, imports and exports. The volume trends of trade margins on intermediate deliveries are obtained as an intermediary result in the compilation of the inter-industry block of the quarterly input-output table. Recalling figure 3.3 (section 3.2.3.1), these trends are obtained as soon as the intermediate block has been filled in (at H in figure 3.3), for all industries except trade, in prices of the corresponding quarter of the previous year. The use of trade services by the trade industry, a relatively small flow anyway, is taken to have the average trend of all other industries.

Once the volume trend of the production of trade services is determined, the volume of intermediate and primary use by the trade industries is estimated. Price trends for trade services are derived from price indices for these inputs. In some years, 1978-1981, prices were regulated by government. In these years, the estimated price trend of trade services was constrained the permitted maximum. The price trends obtained this way are employed to inflate the intermediate part of the row of trade and transport margins (cf. I in figure 3.3). Total output value of trade services in current prices is then

determined by aggregation of total intermediate use of trade and transport margins, the margins on final domestic expenditure, on imports and on exports. In the formal terms of figure 3.3 this relation can be expressed as A= J + K + L + C - B, all variables being expressed in current prices.

The trend of the value of output of horeca is estimated form sales data for a number of separate activities, the main ones being meal serving establishments, drinks serving establishments and lodging establishments. The price index of household consumption of horeca services is employed as an indicator of output price.

The major part of output of repair of consumer goods is car repair. The trend of output value is derived from the quantity and price data on this industry provided by CBS surveys.

5.2.7 Transport, storage and communication

In 1981 the transport, storage and communication industries generated about 7.5 percent of GDP. These industries have very heterogeneous cost structures. Consequently, a number of distinct cost columns are distinguished. It is interesting to note that for a part of these industries not just transport data (i.c., data on output) are available, but also data on the traffic generated by this transport (i.e., data that are input related). In these cases no constant input-output ratios need to be assumed but the double indicator system can be used to compile independent estimates of inputs and outputs.

For railways, air transport and sea transport both transport data and traffic data are available, as well as sales indicators. In addition, subsidies to the railways are obtained from government records. The communication establishments are covered by a large number of quantity indicators, such as numbers of phone calls, pieces of mail, telex messages, and so on. Rates data are used to compile price indices.

For inland shipping companies the main indicator of output, both domestic and abroad, is the trend of the number of ton-kilometers. Price indices are derived form the Rhine freight rates and the average proceeds per ton-kilometer in tramp-shipping.

Road-passenger transport includes taxi-, touring car and group transport companies, as well as streetcar, busline and related companies. For the former groups of companies transport indicators and price indices are available; for the second group there are data on tickets (including season tickets) sold, as well as on rates.

The output of transport related companies (storage companies, travel agencies, harbour companies, etc.) is measured from indirect data, viz. quantities of transferred goods and numbers of incoming sea-going vessels. Price trends are derived from wage trends.

Output trends of road freight transport are estimated from data supplied by the 'Economic Bureau of Road and Water transport'. These data are obtained from a periodic panel survey and refer both to prices and to receipts.

5.2.8 Other services.

In 1981 the 'Other services' generated 38 percent of GDP. In discussing other services we distinguish banks (value added 3.5 percent; interest margin - 3.5 percent), insurance companies (over 1 percent), dwellings (almost 6 percent), general government (almost 15 percent), medical services (over 6 percent) and other activities (close to 10 percent). In the quarterly input-output table other services are broken down in 10 columns and rows.

Banking.

Banks derive their income from two main sources: fees, commissions and so on, and the margin between interest received and paid. The latter is measured from the quarterly trend of the value of the assets on the balance sheets of the money supplying institutions. Trends of fees, etc. are measured from data on number of persons employed by banking institutions. The average wage rate is used to estimate price trends.

Insurance companies.

The industry consists of three separate groups of activities: life-insurance

companies and pension funds; casualty insurance companies; and insurance brokers and agents. There are considerable differences in the definition of the value of output of these groups. In case of life-insurance companies, output is defined as the sum of administrative costs and operating surplus. Output of casualty insurance companies is defined as the differences between premiums and claims. Output of brokers is defined as total fees.

Output of life-insurance companies is estimated from a CBS statistic on production of new life-insurance contracts. The trend of the value of assets on the balance sheets of pension funds is used as an indicator of the funds' output. With respect to casualty insurances a number of separate categories of insurances are distinguished. The most important categories are health and accident insurances and motor vehicle insurances. Quantity indicators employed are, respectively, domestic demographic trends and numbers of motor vehicles. The trends of brokers' fees are estimated from a weighted average of the trends of the other insurance activities. The price trend of output is, in all cases except health insurance, derived from the trend of the price of financial services in the consumers' price index. Health insurance price trends are estimated with data on prices of medical care inside hospitals and other institutions.

Dwellings.

The value of the output of the economic activity 'services of dwellings and buildings, etc.', is mainly generated by letting of dwelling (rents) and by owner-occupied dwellings (imputed rents). These are monthly data on the stock of residential structures; these are used as a quantity index of output. Prices are derived from the average rent of letted and owner occupied houses that the CBS compiles; a correction is made for changes in rent caused by home improvement.

General government.

One-third of all value added in 'other services' is generated by government. Gross output (value added plus intermediate use) of government equals material government consumption (i.e. intermediate use), which includes military expenditure, and compensation of government employees. Material consumption is

estimated on the basis of data from central government records, compiled by the ministry of finance. Compensation of employees is derived from the wage survey (also cf. section 5.3.4). Price trends are derived from the weighted price indices of intermediate use and the trend of average wages.

Medical services.

The trend of the value of output of medical services is estimated from data on number of days spent by patients in hospitals and other insitutions. A weighted price index of consumption of some categories of medical services is used as an indicator of the price of output.

Other activities.

Other activities within the group 'other services' are business services, social services, household services, cultural and recreational services, and a number of services not elsewhere mentioned. The number of employees is the basic information from which the trend of output is derived. Average wage trends of employees in these activities are the basis for the determination of price trends.

5.3 Transactions: source data.

5.3.1 Consumption and investment

One of the monthly CBS indicators is the consumption index. It describes the trends of both value and volume of household consumption. Four broad categories of consumption goods can be distinguished: food and beverages, durables, other goods, and services. Consumption of the former three categories is usually estimated from sales data of the retail trade industry; consumption of services is mostly measured from non-CBS source data.

Consumption of some goods is estimated as a balancing item in a commodity balance (e.g., drinks, bicycles). For some other goods there is non-CBS data, such as data from the RAI (an organization of the bicycles and car industry) on sales of motor bikes and cars, and data of the central government road transport service on trade in second-hand cars. For still other groups of goods

secundary data sources are employed. Finally, data on consumption of residents abroad and of non-residents in the Netherlands are provided by the central bank.

Few direct data is available on investment (i.e. data obtained from the investors). An exception is investment in ships. The other investment data are indirect data, obtained from the commodity flow method as explained in section 3.1.3. Before the quarterly accounts were published, the CBS already compiled quarterly investment data. These were estimated in a way that is, by and large, similar to the quarterly accounts compilation method, though no balancing in an input-output framework occurried.

5.3.2 Changes in stocks

The commodity flow method described in section 3 requires data on production, import, exports, intermediate use and changes in stocks, by groups of commodities . If changes in stock data are lacking, the balancing items of the commodity flows need not be equal to consumoption or investment. For a number of commodity groups stock surveys are conducted. These record the levels of stocks at producers, users and/or wholesale establishments. For the remaining commodity groups similar data is increasingly becoming available.

5.3.3 Foreign trade

Data on imports and exports of goods is mainly provided by CBS foreign trade statistics; these, in turn, are based on customs documents. The data is corrected for differences in period between observation of a transaction and the date at which the transaction occurred. They are also adjusted to balance of payments data compiled by the central bank.

Imports and exports of services are derived from central bank data, taking account of the latest annual data.

5.3.4 Wages, salaries and employers' contributions to social security.

Given the available source data there are two methods to estimate wages and salaries. The first method uses data on total wages by industry, the second

one employs the average wage trend and the number of employees.

In the quarterly accounts compilation process the second method is predominant. The reason for this is that for mining, manufactoring and public utilities comprehensive data are available on number of employees in establishments with more than 9 employees. Data on average wages per person are available in the half-yearly 'wage study' and from the quarterly wage survey that covered 6000 establishments until 1983.

In 1983 the coverage of the quarterly wage survey was considerably extended. Consequently, from that year onwards, the quarterly accounts rely more heavily on the wage survey. Each quarter the latter now covers 20,000 establishments in all industries except agriculture. Two variables are observed, viz. total wages and number of employees.

Employers' contributions to social security are determined as a percentage of total wages per industry. This percentage is based on the latest annual accounts and adjusted on the basis of a half-yearly analysis of wage costs per industry.

5.3.5 Indirect taxes and subsidies

The total value of indirect taxes (in which value added tax bulks large) is derived from data from the central government main accounts of the ministry of finance. The distribution of this total over industries is based on disaggregate industry data, taking account of the ratio of taxes to intermediate use in the latest annual accounts.

The total value of subsidies and levies is also based on data from the central government main accounts. For some industries (e.g. railways) specific data are available.

Footnotes

1) Cf. C.A. van Bochove (1987), The micro-meso-macro linkage for business is SNA-compatible system of economic statistics. Paper presented at the 20'th IARIW general conference, Italy.

2) Prior to 1987 operating surplus was labelled "other income" in Dutch national accounts publications.

3) In the Netherlands these differences tend to be small, because of the low rate of inflation: even in the seventies double-digit inflation never occurred. In theory, however (as analysis of the case of hyper-inflation reveals), the differences could be huge. This is also true for specific economic activities, e.g. agriculture, with sharp fluctuations in prices and seasonal variations in stocks. In these cases, adjustment of the annual data to quarterly data is preferable conceptually. Presently, it is being considered to adopt this approach in the annual data on agriculture.

Available National Accounts Occasional Papers

NA/01 *Flexibility in the system of National Accounts*, Eck, R. van, C.N. Gorter and H.K. van Tuinen (1983)
This paper sets out some of the main ideas of what gradually developed into the Dutch view on the fourth revision of the SNA. In particular it focuses on the validity and even desirability of the inclusion of a number of carefully chosen alternative definitions the "Blue Book", and the organization of a flexible system starting from a core that is easier to understand than the 1968 SNA.

NA/02 *The unobserved economy and the National Accounts in the Netherlands, a sensitivity analysis*, Broesterhuizen, G.A.A.M. (1983)
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*, Eck, R. van (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)
In this paper 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*, Bochove, C.A. van and H.K. van Tuinen (1985)
This paper examines the purposes of the SNA and concludes that they frequently conflict with one another. Consequently, 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 full-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. It is argued that future revisions will concentrate on the modules and that the core is more durable than systems like present SNA.

NA/07 *Integration of input-output tables and sector accounts; a possible solution*, Bos, C. v.d. (1985)
In this paper, the establishment-enterprise or company 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. The proposed approach contains perspectives on further specification of the institutional sectors, households and non-financial enterprises and quasi-corporate enterprises.

NA/08 *A note on Dutch National Accounting data 1900-1984*, Bochove, C.A. van (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*, Bochove, C.A. van and A.M. Bloem (1985)
There are two basic issues with respect to the structure of the next version the UN System of National Accounts. The first is its 'size ': reviewing this issue, it can be concluded that the next SNA must be 'large ' in the sense of containing an integrated meso-economic statistical system. It is essential that the next SNA contains an institutional system without the imputations and attributions that pollute 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)
The economic process consists of various sub-processes, each requiring its own characteristic classification when described from a statistical point of view. In doing this, the interfaces linking the sub-systems describing the individual processes must be charted in order to reflect the relations existing within the overall process. In this paper, this issue is examined with the special refernce to dual sectoring in systems of National Accounts. 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 avoiding 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 cains as a measure of the hierarchy of industries in the production process. Production chains are sequences of transformation of products by successive industries. 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*, Boer, S. de and G.A.A.M. Broesterhuizen (1986)
This paper discusses a number of aspects of the procedure according to which input-output tables are compiled in the Netherlands. A few years ago this method underwent an essential revision. The most significant improvement means that during the entire statistical process, from the processsing 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. Data in current prices first used to be compiled and data in constant prices and changes in volume and prices used to be estimated only afterwards. With the new method the opportunity for the analysis of the interrelations between various kinds of data, and thus better estimates is used.

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*, Eck, R. van 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*, Bochove, C.A. van (1987)

NA/17 *Main national accounting series 1900-1986*, Bochove, C.A. van 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*, Bakker, G.P. den, T.A. Huitker and C.A. van Bochove (1987)

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

NA/20 *The micro-meso-macro linkage for business in an SNA-compatible system of economic statistics*, Bochove, C.A. van (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*, Laan, P. van der (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.

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