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THE MICRO-MESO-MACRO LINKAGE FOR BUSINESS IN AN SNA-COMPATIBLE SYSTEM OF ECONOMIC STATISTICS

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The views expressed in this paper are those of the author and do not necessarily reflect the views of the Netherlands Central Bureau of Statistics

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Summary

The Dutch system of economic statistics has evolved on the basis of the experience gained in national accounting and of the principles underlying the 1968 SNA. The system's first component is the 'basic system'. It consists of statistics with meso data on the processes of production, income distribution, financing and expenditure. These statistics are mostly institutional: they pertain to groups of actual organizational units: establishments in case of production, enterprise-type units and households in case of the other processes; the perspectives of these units are the point of departure. But the basic system is also coordinated: the units are defined according to uniform rules and are classified uninformly by means of the Register. The concepts, definitions and classifications of phenomena are also uniform in the basic system.

A second component of the system of economic statistics is economic demography and micro economic statistics. These provide information on the economic units as such; on their 'family relations', notably the establishment-enterprise relation; and link micro-economic information to the meso data of the basic system.

The national accounts are a third component of the system of economic statistics. These are now being developed into an institutional system. Thus the groupings of economic units, the classifications and the concepts will be the same as in the basic system so that there is a direct conceptual linkage with the highly disaggregate data in that system. In addition, the new system of national accounts will be a fully integrated meso system: not only will each process be described at the meso level, but the linkages between the processes will also be shown at the meso level. The central role in this meso-linkage is played by the three-dimensional generation of value added matrix which shows the linkages between the data on the production process and the data on the processes of income distribution and financing.

Contents

1. Introduction [1]

1.1 The need for micro-macro linkage

Macro-economics dominated economic thinking in the fifties and sixties. This was due to the powerful merger of, first, Keynes' theoretical macro-economics, and, second, the newly available set of reliable and well-conceived national accounting macro data. The popularity of macro-economics was enhanced by the then new discipline of econometrics, that did not yet have powerful computers to work with and was happy to concentrate on modelling on the basis of the conveniently small number of data in macro time series.

It became increasingly clear, however, that macro was not enough: macro analysis was not detailed enough for many purposes of planning and policy making. Moreover, it turned out that macro behaviour is both more and less than the sum of micro behaviour. Simultaneously, increased computing power made it possible to do something about this. As a consequence, a number of non-macro approaches gained in influence. One of them could be called the 'meso-economic' approach. It covers industry by industry analysis of production, analysis of income distribution, consumption and saving for many socio-economic groups, and so on. The analytical device employed is Marshall's representative agent concept: each group of agents, or 'actors' as we will refer to them later on, is supposed to behave in exactly the same way as a 'representative' agent from that group. Input-output analysis (both linear and non-linear) can be viewed as an early application. Presently an extension of the latter, general (dis-)equilibrium multi-'sector' modelling, is one of the hottest things in applied economics.

Another approach rejects the representative agent device. The 'neo-structuralists', or 'institutionalists', emphasize that organization is essential to the economic process. Regulation and de-regulation are hot issues as is (de-)unionisation. Size of enterprises, their mode of operation, the structure of their balance sheets are considered as very important. Analysis of R & D and diffusion of innovations, pricing behaviour, direct foreign investment are some areas in which organizational features are thought to be crucial.

In mainstream economics, analysis of micro data (data on individual economic units) is the fashionable thing. Micro simulation, the micro economic foundations of macro economics, longitudinal analyses are thought to provide fundamental contributions to economic knowledge. The basic idea is, here too, that the representative agent device is not applicable, even if there are no systematic organizational differences between agents. Behaviour of economic actors within one 'homogeneous' class, such as an industry, may vary widely for many reasons. Thus, within an industry with zero average profits, the investment behaviour of the enterprises that are above average (and hence do have profits) may differ considerably from that of enterprises with red bottom-line figures. Present behaviour is thought to be influenced by past behaviour and by the individual unit's past record; hence the need for longitudinal analysis.

This increased attention to micro analysis and to the micro-macro linkage has generated demand for more precision in and more information on the linkage of micro to macro data. Why? One could imagine micro and macro analysis to be completely separate disciplines, each with their own methods, applications, data and valuable insights. Then no data linkage would be needed. In fact, this apartheid is a good factual description of present conditions. It is not, however, a desirable condition. We already mentioned the movement to provide micro foundations for macro economics. This movement was inspired to some extent by the breakdown of macro-forecasting in the seventies. Micro-foundations could be helpful in preventing a reoccurrence of this breakdown. Clearly, a programme to provide these foundations can only be complete if the theory is supplemented by empirical research. The latter requires micro-macro data linkage. This point could also be phrased somewhat differently: the value of macro data improves if the relevant micro information could be added.

The need for micro-macro data linkage is not only caused by the desire to improve the usefulness of the macro data, but also exists because this linkage can add to the value of the micro data. Micro data rarely if ever add-up to macro data. Major reasons for this are that micro data usually do not provide complete coverage and that the various relevant groups of economic actors are not necessarily present in their correct proportions. Thus, often it is not clear whether the results obtained from micro data can be generalized to the whole population unless micro-macro data linkage exists to provide the basis for generalization.

This implies that micro data which are firmly tied to a macro framework are far more valuable than isolated micro data.

For these and other reasons, micro-macro data linkage is of considerable importance. However, just what is 'micro'? In the literature the word is much abused. As soon as an economy-wide model contains a breakdown into two or more highly aggregate 'industries', the word micro pops up, both in theoretical and, on occasion, in applied economics. 'Micro data' is tagged both on one digit ISIC data and on data for individual establishments. Some authors seem to imply that the only true micro data are the profit and loss accounts published in companies' annual reports, others say they do micro research if they study size distributions of plants. The only common denominator appears to be that micro is not macro. To discuss the micro-macro linkage fruitfully, more precision is required. In fact, both a fruitful discussion and a precise delineation of concepts requires a consideration of the system of economic statistics as a whole. Micro and macro are relative concepts that can not be defined outside the framework of a system of statistics. The purpose of the present paper is to provide such a discussion of micro-macro data linkage within the framework of a full-fledged system of economic statistics where every type of data has its proper position. It will turn out that, from a systems point of view, the micro-macro dichotomy is too much of a simplification and that additional concepts are needed: 'meso-data', 'economic demographic data', 'micro-economic statistics'. For the time being we shall employ the term 'micro data' whenever we wish to indicate data on an individual economic unit.

1.2 The emergence of a system of economic statistics

Forty years ago, when macro data began to be compiled systematically in a large number of countries, the underlying statistics[2] were a rather chaotic collection of uncoordinated individual statistics. In quite a few countries, a sizeable body of economic statistics existed, but there was no <u>system</u> of economic statistics: no conceptual scheme ordering them, no common set of definitions, no provisions against overlap and for comprehensiveness.

Each of the individual statistics had its own raison d'être; they were a reaction on ad hoc demand for information - e.g., in case of consumer budget surveys - or on ad hoc supply of data - e.g., in case of foreign trade statistics and other fiscal data.

This is no surprise, as no system of national accounts existed to provide the basic conceptual framework for economic statistics. Consequently, when the first national accounts began to be compiled, national accountants had to work with the available chaotic collection of statistics and make do as best they could. This meant that the linkage with individual statistics and the underlying data was often quite tenuous. At the same time, the emergence of the national accounts provided, for the first time, a systematic framework that could be used to judge the consistency, comprehensiveness and coordination of the economic statistics. This began to provide the first impulse needed to reorganize and extend the economic statistics into a system.

The first (1953) UN System of National Accounts was a macro system with some disaggregations, but without a full-fledged integrated structure at a level below the national one. Thus input-output tables were not integrated in the system and there was no systematic discussion of the differences in treatment of production on the one hand and income/outlay and capital finance on the other. This was unfortunate, because these elements are necessary if a system of national accounts is to serve effectively as the engine of growth of a whole system of economic statistics. Fifteen years later on, though, the national accounts had matured enough to warrant the publication of the new SNA (1968). This SNA went a long way towards a more disaggregate system. It did contain input-output tables and, even more important, it was quite explicit about the transactors of the economy. In practice it turned out to be of immense value in guiding the growth of economic statistics in the direction of a well-ordered system.

The extent to which the national accounts and the two SNA's actually succeeded in guiding the evolution of economic statistics varies from country to country. Apparently, there are two crucial factors. The first is the extent to which a country's statistical work is organized in a single centralized office. The second crucial factor is whether the national accounts are compiled in the same office. In the Netherlands, both conditions were met and national accounting had a strong impact on economic statistics.

At present, the latter have evolved into a coherent system. Though this system is specific for the Netherlands to some extent, it is so strongly rooted in 1968 SNA - type thinking that it can basically be considered as the natural extension of the SNA to the underlying statistics.

In section 1.3 we shall provide a concise survey of the structure of this system of economic statistics. It should be noted that this structure is not the ex ante plan of the system. In practice, the system grew naturally from the original statistics, guided by the knowledge obtained in the National Accounts compilation and by the theory provided by the SNA. The description of the structure as it will be provided here is an ex post observation of the system that has gradually evolved and is still evolving.[3]

1.3 The structure of the Dutch system of economic statistics

The Dutch system of economic statistics is centered around a basic system. At the heart of this basic system is the view of the economic process as a circular flow of value system. Value is thought to be generated in the production process and distributed over economic actors in the income distribution process. The current spending power of the actors is next added to or subtracted from by the financing process. The resulting funds are spent in the expenditure process, viz. on the goods and services produced in the production process, thus closing the circle. This system is, however, not truely closed. There are two types of flows into and out of the system as a whole. The first set of these is international: the flows to and from the rest of the world in each of the four processes. The second type of in- and out-flows is intertemporal: the value of additions to and withdrawals from stocks of goods and other assets. Clearly, this scheme is derived from the structure underlying the SNA. The input-output framework in the SNA is a description of the production process. The income and outlay accounts describe, along with the more detailed consumption tables, the process of income distribution and part of the expenditure process. The SNA capital accounts describe the financing process and another part of the expenditure process (viz: investment). The rest of the world accounts describe the international in- and out-flows and the reconciliation accounts and balance sheets the intertemporal relations of the system.

The basic system of economic statistics consists of a set of coordinated statistics that provide data on one or more of the four processes, the international and the intertemporal relations. The data it contains are highly disaggregate and can be called meso data. The system will be discussed in some detail in section 2.

A second component of the Dutch system of economic statistics is a set of functional systems. These describe subjects where the systematization is not based on the circular flow scheme. Examples are a system of energy statistics, a system of traffic and transport statistics and a system of construction statistics. Each of these has its own structure, but is at the same time firmly linked to the basic system by means of common classifications and coordination of concepts. In the present paper, these systems will not be discussed, because they are not relevant to the micro-macro linkage problem, as long as micro is taken to refer to data on individual economic units.

Highly relevant to the latter is the most recent component of the system of economic statistics: economic demography and micro-economic statistics. Once fully developed they will systematically provide micro data and other micro-type information that supplements the meso information in the basic system. Section 3 discusses this subject.

The fourth component of the system are the national accounts. These contain the macro data, as well as integrated meso information. Section 4 provides a description of the national accounts, focussing particularly on the plans to alter these in order to achieve better and more explicit linkage with the statistics of the basic system, as well as a more elaborate meso structure.

In this paper we restrict the discussion, mainly, to 'business'. This term is not precisely defined. We take it to include, in case of production, all producing units except those producing government services and other non-profit services. In case of income distribution and finance, we take it to include the units included in the 1968 SNA sectors of financial and non-financial enterprises, as well as the unincorporate enterprises.

2. The basic system

2.1 The institutional approach

In section 1.3 we indicated that the Dutch basic system describes, in detail, the four processes of production, income distribution, financing and expenditure, as well as their international and intertemporal relations. The basic system is comprehensive in the sense that it completely covers these processes and relations, within certain 'boundaries'. The production boundary is the central one. It corresponds, by and large, with that of the SNA. The boundaries of income distribution transactions, financing transactions and expenditure are largely defined on the basis of the production boundary. The reason for the latter is that in a circular flow system these boundaries have to coincide, or at least be closely related if the system is to be consistent.

These strict requirements are, however, modified by one of the central principles of the basic system: it is, as far as possible, an institutional system. This means that within each process the system focusses on the actors rather than on the phenomena of the process. The latter approach is referred to as 'functional'. [4] To clarify the difference between institutional and functional statistics we briefly consider the simple example of the statistical description of the production of printing. In a functional approach, a complete coverage of the production process would require that all printing output is covered by a production statistic of printing, irrespective of who produces the printing products. Thus the production statistic would cover printing produced by independent printing companies, by a central statistical office and by a multinational food company, provided the printing is sold on the market. The statistic would show a breakdown of printing into 'produced by printing companies' (with, possibly, a further breakdown of the companies), 'produced by government' (with no further breakdown) and by 'other industries'.

In contrast, an institutional approach would yield a production statistic for printing companies, i.e., for companies with their main activity in printing. It would provide a breakdown of printing products into a number of distinct products and would also show the printing companies' output of non-printing products.

In addition, there would be a production statistic of producers of government services which might contain a category 'printing products' but no breakdown of the latter. The production statistic of the food industry would not show printing output separately but would include it in a category 'other products'.

This example clarifies the meaning of the requirement of completeness. In functional statistics, completeness means that the coverage of the phenomena of a process is complete (in the example: the output of printing products). In institutional statistics all the actors participating in a process must be covered if completeness is to be achieved. In the latter case, the phenomena are, as far as is possible within a coordinated system, described from the point of view of the actors themselves. For each group of actors the detail in the description of the phenomena depends on the importance of the latter for the actors. In case of printing companies, the importance of the phenomenon 'output of printing products' is great; therefore, it is described in detail. In case of producers of government services the importance of the output of printing products is much smaller; hence it is described in lesser detail.

The institutional approach has two major advantages. The first of these is in the area of observation. Consider, again, the printing example. In a functional approach, total production of all printing products has to be covered, irrespective of who produces it. This could, of course, be achieved by asking each producer in each industry how much it produces of each type of printing products. That is clearly impractical. Therefore, in practice this type of statistic is compiled by surveying just the producers that have printing as their characteristic economic activity or as a very major non-characteristic activity. The production of printing by other producers is then imputed on the basis of occasional information. In institutional statistics, in contrast, the method of observation is quite straightforward: the actors are simply asked to specify their major activities. The institutional statistics satisfy the parsimony principle: there is no need for imputation on the basis of scanty information and haphazard assumptions. The micro data are not multilated; the link between the meso information in the institutional statistics of the basic system and the micro data is direct.

The second major advantage of institutional statistics is anaytical. Institutional statistics are summaries at the meso level of the behaviour and the record of flesh and blood economic actors, not of artificial constructs.

Therefore the meso data they contain can be immediately used for the analysis of economic behaviour, without having to clear away the statistical or theoretical veils first. The meso data of the institutional statistics are a data base that is directly useful for the meso economic analysis refered to in section 1.1. They could be considered as "representative agent" data. These are some of the reasons why the basic system of economic statistics mainly employs the institutional approach. This does not mean that it contains no functional statistics at all. Statistics on foreign trade in goods are functional because the focus is on the international flows of (highly disaggregate) groups of goods and not on the actors that export or import them. Consumer price statistics are not observed at households and published by socio-economic group in the detail required for each group, as an institutional approach would require. Instead, they are observed at the retail trade (mainly) and published with a breakdown by products, though indices for some specific socio-economic groups are compiled subsequently, by weighing the prices of individual products with the shares they have in the socio-economic groups' expenditure. This example makes it clear that on occasion a 'functional' observation method is employed to obtain 'institutional' data. Another example of this is that producers' prices in manufacturing are given industry by industry and are, in this sense, institutional. But they are compiled by observing the average price of a product first (a functional method of observation) and next weigh these with the share they have in each industry's sales.

2.2 Coordination

Institutional statistics take the perspective of the actors, whose economic acts they describe, as their point of departure. Since perspectives and viewpoints may differ from actor to actor, from industry to industry, from subsector to subsector, a radical institutional approach would lead to statistical anarchy if there were no countervailing force to provide order. This countervailing force is coordination. Coordination is what cements the individual economic statistics into a coherent system. In this section we describe the components of coordination.

The purposes of coordination are, e.g., to achieve additivity of the results of similar statistics (e.g., production statistics of different industries); to ensure that the results of dissimilar statistics can be related to each other (e.g., the production statistic for an industry and the statistics of the finances of the enterprises of that industry); to ensure that the statistics of the basic system together cover the economic process as a whole; to avoid overlaps; to structure the data collection process in such a way that the workload of the respondents to the surveys is minimized.

The distinction made in section 2.1 between phenomena and actors is also relevant in the case of coordination. Both in case of coordination with respect to actors, and in case of coordination with respect to phenomena, there are three steps in the process of achieving coordination: the formulation of coordinated definitions, the establishment of standard classifications and the practical application of coordination.

Coordination with respect to the actors

In demographic processes of the natural population, the actors are given a priori . In case of 'households', the definition of actors is more complicated but still manageable. But as soon as the other participants in the economic process are to be defined, there are many complications. In some cases it may be useful to consider a single legal entity as a group of economic actors, in other cases it may be necessary to define a whole group of legal entities as a single economic actor.

Therefore, the first stage of coordination with respect to the actors is to define the actors that are to be used as statistical units. Naturally, these definitions have to satisfy the principle that the basic system must provide a comprehensive institutional description of the processes in the economic circular flow system. This point of departure implies that each process has its own set of actors. In practice, the definitions of actors correspond closely to those in the 1968 SNA. The production process has its own set of actors (establishment-type units) and the other processes have a common set of actors (enterprise-type units and households). This could be referred to as the 'Dual actoring' principle. Neither of these two sets of actors are naturally given: both have to be defined and the individual actors have to be constructed by the statistical office: legal entities have to be broken-up or

joint together according to standard rules. The basis of these rules in case of establishments is that

- establisments have to be as homogeneous as possible with respect to the production process;
- but they must also have a degree of independence in making decisions on the production process;
- and it must be possible to describe them statistically at the level of the establishment, (i.e., micro data must be capable of being collected).

The second requirement is in practice usually thought to be satisfied if the establishment actually sells to third parties.

This concept of establishments leads to meso data on the production process that are both reasonably homogeneous with respect to economic activity and that at the same time summarize the economic acts of true 'flesh and blood' economic units, not of purely artifical statistical units.

Enterprise-type units and households are the actors of the process of income distribution, financing and expenditure. The term 'enterprise-type unit' comprises both business units and government units[5]. The basis of the coordination rules is, in this case:

- Enterprise-type units must be as homogeneous as possible with respect to their roles in the three processes just mentioned.
- They must have independence with respect to decisions on these processes.
- They must be observable.

Naturally, the resulting units correspond quite closely to the enterprises of the SNA and to the central government, municipalities, and so on, in case of general goverment.

The second step in the process of coordination with respect to actors is the drawing-up (and revision) of classifications. For the production process this is the Dutch version of the ISIC. In case of the other processes, the 1968 SNA employs the 'institutional sectors'. A more detailed sector classification is currently being made for the basic system of economic statistics. In addition, a number of other classifications are employed, for

instance, by size (in terms of persons employed).

The third step in the coordination with respect to actors is the statistical coordination process in the strict sense: the application of the definitions and classifications in practice. This coordination process is achieved through the general Register of establishments. In principle, this Register contains all the units that are involved in the economic process, except non-producing households. In the Register establishments are created from legal entities, e.g., by consolidating or deconsolidating them. They are classified according to the relevant classifications (ISIC, size class). This classification of each unit is then applied in all statistics of the basic system. Consequently, each establishment is classified in one and only one industry in the statistics of this system.

Enterprise-type units are included in the Register too. At present, work is being done so that the Register specifies the relations between establisment-type units and enterprise-type units. In principle, this is an n-to-one relation. To have this relation in the Register is very important if relations between the statistics on the production process and those on the other processes are to be coordinated. We return to the subject of the Register and to the micro-relations between the two families of actors in section 3.

Coordination with respect to the phenomena

In principle, both functional and institutional statistics require coordination with respect to the phenomena. Here too, the first step is the formulation of definitions or 'concepts'. For each of the four processes a set of economic concepts is formulated - or is being formulated. These are to be used in a uniform way in all the statistics of the basic system. In case of the production process, some examples of coordinated concepts are: production value, use, wages, and so on. This way, additivity of production statistics for different industries is achieved. At present, the definition of coordinated concepts for the production process is complete. In case of the other processes, formulation of definitions is in full progress.

As for the second step towards coordination, the establishment of standard

classifications, a standard goods nomenclature is virtually finished. In addition to this, work has now begun on the drawing up of a standard services classification , i.e., a commodity classification of services as distinct from a classification of the service industries.

The third stage, the application of coordination with respect to the phenomena has been virtually completed where the concepts of the production process are concerned. The Dutch Standard Goods Nomenclature cannot yet be applied unformly because it has still to be developed fully into a classification of goods with a complete hierarchical scheme of first, second, etc., digits. Its present state of development is still between such a full-fledged classification and a comprehensive list of goods. When the development of the classification is completed, coordination will mean that, in general, all statistics of the basic system - both the institutional and the functional ones - that contain information on goods, publish the latter according to the classification at some prescribed level of detail. Each individual institutional statistic will provide additional specific breakdowns that are relevant for the group of actors covered by the statistic.

Priorities in coordination

Coordination is a dynamic process. There are, both in case of actors and in case of phenomena, feedbacks between the three stages of coordination; moreover, economic developmments, changing information demands, evolution of economic thought have impact on concepts, classifications and the application practice of these. Thus, in the next few years a revision of the Dutch version of the ISIC will be finalized, as well as the development of the standard goods classification. We already mentioned the fact that a standard services classification is being drawn up. The development of the sector classification will probably be finalized within a few years.

A major development in the application of coordination that is now under way is the effort to specify the relations between establishment-type units and enterprise-type units in the Register. An important part of this effort concerns the dynamics of the composition of enterprises. For the largest 100 enterprises a data structure is being implemented that makes it possible to relate, at the micro level, all the establishment data to each other and to the

data at the enterprise level. This will make it possible to check the mutual consistency of these micro data.

2.3 Balancing effort and relevance

In a mature system of economic statistics, a balance must be achieved between, on the one hand, the relative effort devoted to achieving reliability and detailedness of the information on groups of actors and phenomena, and, on the other hand, the relative importance of the groups of actors and phenomena.This point of departure has three implications.

Firstly, the effort spent on each of the four processes of the economic flow system, on its international and its intertemporal relations must be in balance with the relative importance of each of these processes. The production process can be considered as the heart of the ecnomic process, since it generates the value and the goods and services that are distributed and allocated in the other processes. Put differently, without the production process there would be no income distribution and financing processes, nor an expenditure process. For this reason, the description of the production process traditionally occupies a major position in the collection of economic statistics. In the past few decades, however, the quantitative importance of the income distribution and financing processes has grown considerably. This has led to increased efforts to provide statistical information on these processes. The statistical information on the expenditure process is still a bit less well-developed in the Netherlands.

Secondly, a balance must be struck within a set of statistics describing a process. In case of, e.g., the production process this means that the effort devoted to describing each industry must be proportional to the importance of that industry for total production in the econony, for value added and for employment. Conseqently, the initial emphasis was on information about agriculture and manufacturing. Later on, the increasing size of services led to a greater emphasis on these industries. Within each industry, a balance must be achieved too. Thus, usually larger establishments are covered completely, smaller ones on a sampling basis.

Thirdly, the timelines of observation must be balanced. The most detailed and complete observations are mostly of annual data, that are normally available

about one year after the end of the reporting year. In some cases these 'structural' data are collected with a lesser frequency. The system of annual statistics is supplemented by short-term statistics: quarterly statistics, monthly statistics and expectations indicators.The quarterly statistics are less detailed than the annual ones, but are available earlier: one to two quarters after the end of the reporting quarter. The monthly statistics are available earlier than the quarterly data but are also still less detailed than the latter. Thus, in case of quarterly and monthly data there are two time dimensions: that of the length of the reporting period and that of the speed with which the data are available. In case of expectations indicators, the emphasis is on the latter dimension: they provide approximate indications of current and future trends expected by the actors themselves.

The choice of the detail of the short-term statistics depends on the potential variability of the phenomena concerned; the purpose of the short-term statistics in the basic system of economic statistics is that they provide, together with the annual statistics, a comprehensive and timely picture of the economic process. Thus in case of some parts of services, wage data are sufficient as a supplement to the annual statistics on production, whereas in case of parts of agriculture and manufacturing, much more detailed short-term information is needed for an adequate picture of economic trends. In all cases, the short-term statistics are institutional wherever possible and coordinated with respect to both actors and phenomena. This way, they are conceptually fully consistent with the annual data.

2.4 The production process

The annual information on the production process is given, as far as possible, in production statistics. These are purely institutional: they describe the production process of groups of estalishment-type units, grouped according to their main economic activity according to the Dutch ISIC. The standard format of the production statistics is a production account per three or four digit (Dutch) ISIC group. This specifies the debits and credits related to the production process. The debits are broken down, as far as relevant, in a number of categories, e.g., purchases of raw materials and intermediate products, energy costs, labour costs, indirect taxes, and so on. The credits are broken down into, e.g., sales of goods and services, subsidies. In

addition, data are provided on the number of persons employed. Thus, every production statistic has a few standard tables that are uniform for all industries. In addition to this, each production statistic has its own additional breakdowns and supplementary information. There may be breakdownsof the raw material and intermediate goods purchases by groups of goods, of sales by products; quantity and volume data are included wherever this is possible, and so on.

In agriculture, production statistics are not yet operational. Traditionally, agricultural production is observed functionally: there are statistics showing e.g., crop estimates by area, numbers of slaughters, market turnover by product, and so on. The reason behind this is that this way of observation was, traditionally, more reliable and cheaper than directly surveying farmers. However, the number of farmers has fallen and their mode of operation is now much more similar to that of 'business' than to that of informally producing households. Therefore, a 'production account' for agriculture has been developed. It provides value data on the production account items (as well as profit and loss account data and balance sheet data) for groups of establishments. It is, however, not yet coordinated, neither with respect to the actors nor with respect to the phenomena. Moreover, no quantity data are yet included. The reason for the latter is that the data for the production account are collected at the farmers' accountants, who don't have quantity data. Moreover, the farmers are not yet comprehensively covered by the Register (only the incorporate farms with personnel are in it now); in a few years they will probably have been entered completely, so that a full-fledged, coordinated production statistic becomes feasible.

Manufacturing is the heartland of the coordinated production statistics; with a few minor exceptions, all manufacturing is covered by them. All establishments with more than 9 employees are surveyed annually; the smaller ones are surveyed on a sampling base.

In construction, all establishments with employees are surveyed by coordinated production statistics.

The past 15 years a lot has been invested in the development of coordinated production statistics for service industries. The production statistics developed differ in one important respect from those for manufacturing and

construction: they do not provide quantity or volume data. To some extent, this is caused by conceptual problems: frequently it is difficult to define quantity or volume. The standard services classification mentioned aboveshould provide the basic conceptual framework for the definition of quantity or volume.

With a few exceptions, wholesale and retail trade, hotels, restaurants and cafe's, and transport and communication[6] are now completely covered by coordinated production statistics. Mostly, the surveys are on a sampling base. Recently, production statistics of other non-financial commercial services have also become available. Financial services are, with some exceptions, not covered by production statistics. This is because their production is not sold directly, but is paid mainly from the interest margin. Therefore, the observation of banks and insurances is done in specialized financial statistics.

To describe the way non-business production is covered by the system of basic statistics is, naturally, beyond the scope of the present paper. As to government we refer to Bloem (1987). As to education, health care, social work and cultural institutions, it suffices to say that the information is functional and to a considerable degree based on data from statistics on government. But institutional production statistics for some industries (social services and cultural institutions) may well be developed in a few years.

In the context of the present paper, it is not relevant to survey the short-term statistics too exhaustively, since micro-macro linkage will, in the next few years, be attempted at a small scale only.[7] Basically, monthly or quarterly institutional statistics are available for manufacturing, construction, a major part of wholesale and retail trade, transport and communication, part of other commercial trades.

2.5 Interlude: the labour market[8]

The labour market statistics are being developed into a system of their own. But this system is closely related to the basic system of economic statistics, because labour is an input in the production process and its compensation is at the interface of the production and income distribution processes. The labour market statistics are already coordinated. To some extent concepts and

populations of actors are defined fairly uniformly and can, to a degree, be related to each other.Currently, a system of labour accounts is being developed that should provide an integrated description of the labour market. This means that its position vis-à-vis the other labour market statistics will be comparable to that of the national accounts vis-à-vis the economic statistics of the basic system. Another important development is the Labour Force Survey. Monthly, ten thousand addresses are interviewed, by means of hand-held computers. This yields data on e.g., the composition of the labour force, employment and unemployment, working hours, with a breakdown by industry. Data will be published quarterly.

In addition to this and other observations of the individuals, there are a number of statistics that present data on employment collected at producers. One of these is the Statistic of persons employed; it provides data, collected at establisments, on number of jobs per three digit Dutch ISIC group. In addition, there are statistics on wages per ISIC group.

In both cases the statistics are institutional and coordinated with the basic system: each establisment is, through the register, classified in the same industry as in the production statistics. The data collected at individuals and those collected at establishments are being linked to each other. Conseouently, not only can the establishment-based data be linked to the establishment- and enterprise-based statistics of the basic system of economic statistics, but the labour data collected at individuals can be linked-up to the latter too. This implies the possibility of linkages to the data on household income and expenditure. But that is beyond the scope of the present paper.

2.6 The income distribution and financing processes

2.6.1 Nature of the processes

The production process generates value added in the establishments. A part of value added flows out of the establishments as a direct consequence of the production process, and arrives at other actors as income. This income deriving directly from production consists of three categories:

i) Wages and salaries. These are, of course, income flows from establishments to individuals.

ii) Employers' social charges. These are flows from the establishments to enterprise-type units, viz. social security institutions.

iii) Indirect taxes and subsidies. These are flows (positively and negatively valued) from establishments to enterprise-type units, belonging to the government.

The value of the flows in each of these three categories depends on the level of production; production is impossible without them and they are caused directly by production. Therefore, their flowing to, respectively, individuals, social security institutions and government can be considered as part of the production process.

The establishments are then left with an operating surplus (gross or net, depending on whether one wishes to impute consumption of fixed capital). This operating surplus is at the disposition of the enterprise-type actor of which the establishment is a part. These enterprise-type actors may coincide with the establishment; they also may also be e.g., a multi-establishment private enterprise; a municipality, central government or other government bodies; a household. Thus in case of these three groups of enterprise-type units, the production process puts at their disposal:

i) in case of private enterprises: the operating surplus of the establishments that belong to the enterprise.

ii) in case of central govenment: indirect taxes less subsidies and, if applicable, the operating surplus of the establishment-type units that are part of central government.

iii) in case of households: the wages and salaries of the individuals belonging to the household and the operating surplus of the establishment of the household (if present).

Next, and partly simultaneously with the production process, these incomes are redistributed. This is what we refer to as the income distribution process. The charateristic of this process is that it is not necessarily and directly related to the production process. Instead, the redistribution is based on other things. They can be grouped into three categories:

i) Property. Examples are interest, dividends, rents. The sum of the income derived directly from production and the balance of property income flows is referred to as 'primary income'.

ii) Taxation and social security. Examples are direct taxes, social charges of employees, social security benefits, both from social insurance

institutions and from the general budget of goverment.

iii) Miscellaneous. Examples are gifts, premiums and payments in respect of damage insurance.

The resulting income corresponds to some degree with net income in case of households and with retained after tax earnings in case of enterprises. The national accounting term is disposable income. Disposable income, however, need not be disposed of in the sense of being spent in the expenditure process on the goods and services produced in the production process. Instead, the financing process may alter the amount disposable for expenditure. This financing process can be thought of as consisting of three parts.

i) Lending and borrowing. Here disposability of value is transferred between actors in return for a claim on value in the future. Examples are bank loans, consumer credit, issues and purchases of new bills and bonds, mortgages, and so on.

ii) Substitution of the assets. Here there is no transfer of value in return for future claims, but rather an exchange between types of assets. The general characteristic of these exchanges is that assets that can directly buy goods and services produced in the current production process, are exchanged for assets that cannot do so, or vice versa. Examples of asset substitution are: exchange of equity capital for money, purchases of second hand goods and land, exchange of monetary gold for money. Two other items are, conceptually, in this category too, though their nature is slightly different: changes in the stock of foreign and domestic currency.

iii) Changes in stocks of non-investment goods. These may either be considered as balancing items or (as in portfolio theories) as consciously chosen forms of storing value.

For each actor, the disposable income plus the balance of lending and borrowing plus the balance of changes in the form of assets, is what the actor spends on the output of the current production process.

The two basic charateristics of this way of describing income distribution and financing are, first, that value produced in the production process is shifted between actors but that it is not added to or subtracted from in the aggregate; and, second, that in the aggregate all value generated in the production process is actually spent on the output of the production process.

This conceptual structure is based on the idea that apart from intertemporal and international in- and outflows, the economic process can be described as a closed circular flow ; ; value system. Individual actors, however, do not view the economic process in this holistic manner. Instead they have their own perspective which is concerned with a part of the total process only. For them, it is frequently irrelevant whether payments are related to production or must be viewed as redistribution of income; it does not matter to them whether they spend their money on something that is in the production boundary of the national accounts or beyond it (as, e.g., in case of purchases of land). Consequently, institutional statistics describing the processes of income distribution and financing are structured differently from the structure just discussed. They must provide information that is not too far from the perspective of the actors concerned and that yet fits into the conceptual framework of the system as a whole. This means that in some cases statistics cover more than one of these processes at the same time, as well as the stocks of assets, in a conceptual scheme that is close to the actors' own perspective but also sufficiently uniform and detailed to allow translation into the conceptual framework discussed above. This way, both meso data (and, for that matter, micro-data) that are comprehensible to the actors themselves are obtained, and data that can be fitted into the national accounts framework and that can be related to data on other actors and processes. Put differently: the statistics on the income distribution and financing process must be both relevant from a micro point of view and useful from a systems point of view.

2.6.2 Meso-data for on income distribution and finance

In view of the scope of the paper, we do not discuss the statistics on income distribution and financing for households and government. Consequently, we have the statistics for four groups of actors to discuss: non-financial incorporate enterprises, non-financial quasi corporate enterprises, unincorporate enterprises and financial enterprises.

Non-fnancial incorporate enterprises are covered by the 'Statistics Finances of Enterprises'. The enterprises are carefully defined in the Register: they are units that can be considered as independent with respect to income distribution and financing decisions; activities abroad are removed. Not all enterprises are included, only those with a balance sheet total of at least 10

million guilders ($ 4.8 million in early july 1987). The basic scheme of the statistics is a profit and loss account and a balance sheet. The data are not merely summaries of the enterprises' annual reports: the concepts on the profit and loss account and on the balance sheet are defined unformly, as far as possible.

There are several statistics finances of enterprises: one for enterprises of which the main economic activity is in industry and agriculture, one for transport, one for non-financial services. In the statistics, there are a number of alternative breakdowns. Thus, e.g., international enterprises are identified separately. Another breakdown is needed because it is not always possible to achieve the conceptual homogeneity just mentioned. Thus, for stocks of fixed assets and depreciation, various alternative valuations are current in the Netherlands: historical cost and replacement value being the most important ones. It is not possible to apply uniform valuation in the statistics, because the profit and loss account and the balance sheet do not contain the needed data. Therefore, the statistics provide a breakdown of the data according to the valuation method employed by the enterprises.

Non-financial quasi corporate enterprises are, as far as their income distribution and financing transactions are concerned, not yet observed. The same applies to government-owned corporate enterprises, with the exception of the utilities, that are included in the statistics finances of enterprises. Naturally, the enterprises concerned do publish annual reports, but these are not drawn-up according to the uniform scheme mentioned above.

The observation of unincorporate enterprises is not yet done uniformly. The production statistics contain, in a number of cases, additional tables providing profit and loss account and even balance sheet information, but not uniformly so. Some further information of this type is provided in income tax and property tax statistics.

This brief survey should make clear that in the Netherlands the observation of these processes is not yet as complete as that of the production process which has traditionally been the main concern of the economic statistics of the CBS. In view of rather severe budgets cuts in 1987 and the next few years, there will not be much room for improvement. Nevertheless, the statistics finances of enterprises, whose development began in the seventies, are a very efficient

tool for the observation of a major part of the income distribution and financing processes in 'business'. These statistics can be considered as a direct outgrowth of 1968 SNA's production of income/outlay and capital finance accounts for 'institutional sectors' consisting of 'institutional units'.

Financial enterprises are covered by another set of statistics of 'Finances of ...'. Here, however, the basic conceptual scheme is not derived from the format of these enterprises' own accounts, but from the accounts of the European System of Integrated Economic Accounts (ESA) which are more detailed than the SNA's accounts for this sector. In addition to the ESA based scheme, the statistics provide additional data, mainly depending on data availability. The latter is not fully controllable by the CBS, because the basic data collection is done by the Central Bank (in case of banks, etc.) and the 'Insurance chamber', an institution controlling the solvability of the insurance companies.

2.7 The expenditure process: investment

The expenditure process consists, in case of business, of expenditure on investment goods.[9] These are, in accordance with SNA-concepts, defined as goods lasting longer than a year and having a productive purpose. Investment can be described in three statistical ways:

i) as expenditure
ii) as addition to production capacity
iii) as a set of commodities

The description as expenditure is the only one that, strictly speaking, provides a description of the expenditure process: it shows the way the available funds are spent. The relevance of the resulting data is, of course, that they make it possible to analyse the feedbacks between investment and financing, as well as the impact on the balance sheet. As a consequence, this type of description requires:

- a registration at enterprise-type units and classification of the latter (i.e., sectoring) in the same way as in the income distribution and financing process.

- registration on the basis of economic ownership.

Because of these two requirements, the statistical information on investments as a category of expenditure is given in the same statistics that provide the data on the income distribution and financing processes. Thus, for business, the statistics 'finances of enterprises' are the most important data source.

Investments in fixed assets lead to changes in production capacity . Consequently, a second type of description is needed:

- registration at the establishments and classification by industry
- registration of the nature of the investment goods, in the sense of their role in the production process.
- registration according to the user-criteriom: who uses or may use the investment goods involved.

Since the late nineteen fifties, the CBS compiles a statistic on investment in fixed assets in manufacturing. The statistic is coordinated with respect to the actors. Thus, establishments are classified into industries in precisely the same way as in the production statistics. The statistic contains value information broken down by type of investment good. Investment data are also compiled for the transport industry and some other (parts of) industries. Coordination of concepts is not complete. In particular, the issue of whether to record investment at the owner or at the user still has to be resolved. Recording at the user runs into practical problems: in a number of cases these goods are often leased for periods that are far shorter than their economic lifetimes. In these cases, the user often does not know the value of the investment goods.

Therefore, the possibility is now being considered to record, in the industrial investment statistics, on the basis of the economic ownership principle throughout; in addition, the information would then be collected that is needed to allow the national accountants to make a transformation to the user criterion in the input output tables (notably in the investment matrices, to be discussed in section 4).

The third approach to investments is the commodity approach . Firstly, investment goods are produced by domestic producers. This production is covered by the production statistics, though not always in sufficient detail to

identify all individual types of investment goods. In addition to domestic production, the foreign trade statistics provide data on imports and exports of investment goods. Of course, in both cases time prices and volumes have to be recorded as well as values. In case of imports, prices are not yet observed adequately, though it is planned that they will be in a few years. It should be noted that the commodity approach is a functional one: it leads to data on the phenomenon of investment goods, that are not based on the perspective of groups of actors but rather on an economy-wide analytical point of view.

Traditionally, the functional commodity approach yields the most comprehensive data on investment. This is because the description of production is, traditionally, the center of gravity of the system of economic statistics; in addition, the foreign trade statistics were detailed and comprehensive for a long time, being the oldest of all economic statistics. The approach from the perspective of additions to productive capacity is rapidly developed further; in the next few years the coverage of the investment statistics will be extended to some industries not covered now (e.g., trade). This is important, because this way an institutional description of investment is obtained that fits in harmoniously with the institutional description of the production process.

2.8 Intertemporal relations

The current economic process is chained to the past and links-up with the future. In a flow of a value system, these linkages take the form of, on the one hand, stocks of goods and, on the other, stocks of claims on value. Until the nineteen forties, stocks took an important place in economic analysis. This prominence was lost in the fifties and sixties when Keynesian flow analysis dominated. This is reflected in the statistical effort devoted to stocks. The national wealth of the Netherlands in 1919, 1938 and 1948-58 has been estimated by the CBS. But no subsequent data on national wealth, let alone sectoral wealth, are available. The interest in stocks, however, has returned in the late sixties and accelerated in the seventies. This already began with the development of neoclassical growth theory in the late fifties, which was interested in physical capital. Subsequently, monetary analysis of stock-flow adjustment was revived. More recently, the inflation of the seventies led to the realization that price changes as such may lead to huge redistributions of wealth from one period to another, as a consequence of

changes in the nominal value of stocks of goods and of the real value of fixed claim financial assets.

Ideally, a comprehensive statistical description of the intertemporal linkages should describe, for each of the groups of actors in each of the distinguished processes, the stocks of relevant assets at the beginning and the end of the year as well as the way the values at the end of the previous year are related to the values at the beginning of the current year (or: the revaluation from one year to another).

The SNA attempts to do something like this in the balance sheets and reconciliation accounts for the nation and for 'institutional sectors' that are explained in a 1977 provisional guideline. These are rather unsatisfactory in a number of ways, as pointed out by an increasing number of authors, e.g., Ruggles (1987), Rushbrook and Wells (1987), INSEE (1987), Van Bochove and Van Sorge (1987), all of which propose improvements. But the provisional guideline is also incomplete: it covers just the enterprise - type units and ignores the establishments. There is no reason for this: why should the dual actoring and dual classification approach of the SNA be dropped as soon as one arrives at the reconciliation accounts and balance sheets? Put differently: why just specify the intertemporal relations of the income distribution, financing and expenditure processes and not those of the production process? The latter are the stocks of goods that each industry starts with in a period, and those it leaves to the next period. Thus, what is required is an industry by industry description of value and volume of stocks of non-investment goods and of physical capital.

Balance sheet data for <u>enterprise-type units</u> are, generally speaking, provided in the same statistics that provide data on the income distribution and financing processes. Thus the statistics finances of enterprises bulk large in the statistical description. Data are provided on financial balance sheet items; on durable material and immaterial assets such as fixed assets, land, immaterial assets; and on stocks of raw materials, intermediate products and finished non-investment goods. The statistics employ the valuations that are employed by the actors themselves. As noted above in the discussion of the financing process, the statistics finances of enterprises provide a breakdown by valuation method, so that reasonably consistent data are obtained.

Stock data for establishments are provided by the production statistics in case of non-investment goods. Here too there is heterogeneity of valuation methods; but in a considerable number of cases, quar y data on stocks are also provided. This way, one has the best of two worlds: the institutional data follow the establishments' own concept and the information needed to apply a uniform conceptual scheme is included as well.

In 1980 the CBS began to observe capital stock by industry. This is a major project which is only now approaching a degree of completeness. Ideally, that is if the budget of the CBS would be much larger than it is, one would annually survey all establishments and collect data on each type of capital good, by vintage and employing the user criterion (cf. section 2.7). In practice, direct and complete annual observation is too expensive. Therefore, a system has been developed that yields annual data for a considerable part of the capital stocks by means of a combination of detailed direct observation with estimation procedures. For manufacturing, this sytem is based on a once-only (possibly repeated after a number of years) direct and detailed observation of one four-digit Dutch ISIC group in each of the 19 three-digit ISIC groups. Observed are all establishments with at least 100 persons employed and the observation is based on the user criterion. A crucial variable observed is the lifetime of each type of asset, so that scrapping curves can be estimated. By means of the annual investment data from the investment statistics these capital stock data are kept up to date. This way, annual capital stock data for larger establishments in one four-digit group per three digit group are obtained. These are used to estimate the capital stock in the whole three-digit group. To this end, estimates have to be made first for the smaller establishments in the directly observed four-digit group and next estimates for all other four-digit groups in the three-digit industry concerned.

These estimates are also made on the basis of the investment statistics; this is possible because the latter are being collected since 1958 so that the scrapping curves just mentioned can be applied to obtain stock data. Some additional breakdowns of investment by type of asset are needed to apply the scrapping curves. These additional breakdowns are based on the directly observed four-digit group.

In addition to the capital stock in manufacturing, the one in transport is estimated as well as the livestock. In 1988 or 1989 the first estimate

for the capital stock in manufacturing will be completed. Unfortunately, it may well be the last one too, because of the budget cuts that are being implemented.

2.9 The basic system: concluding remarks

In view of the limited scope of the present paper (micro-macro linkages for business only) we did not cover the whole system of basic statistics. In particular, we largely omitted the parts of the sytem pertaining to government (cf. Bloem, 1987, for this subject), to households (a partial discussion is provided in Van Bochove, 1987) and to the international economic relations.

The latter are not discussed, because the statistics concerned are mainly functional and do, for that reason, not admit micro-macro linkage. However, it should be noted that some institutional information is available. To provide three examples: in the production statistics for manufacturing, sales are broken down into domestic sales and sales abroad, because this is required if the production process is to described from the perspective of the establishments concerned; in the statistics finances of enterprises a considerable number of items on the profit and loss accounts and balance sheets are broken down in 'domestic' and 'abroad'; and in transport, tourism industries and some financial services breakdowns are made that show exports of services. It could also be considered to include data on exports of services in the wholesale trade and construction production statistics.

3. Economic demography and micro-economic statistics

3.1 Concepts

The basic system described in section 2 provides a description of each of the four processes of production, income distribution, financing and expenditure, as well as of the intertemporal and international relations of these processes. The description is institutional: for each of the processes the appropriate economic actors are defined and their role in and contribution to the process concerned is described from their own perspective, at least as far as compatible with coordination of concepts. Moreover, per process the actors are broken down in fairly small groups: e.g. production statistics are frequently compiled and published for groups as small as a few hundred establishments. These groups are as homogeneous as possible with respect to the characteristics of the process concerned. Therefore we referred to the resulting data as meso data.

In spite of this body of highly disaggregate and institutional statistics, there still is a need for even more disaggregate data, usually called micro data. Why? To answer this question, we have to recall the three types of non-macro approaches to (applied) economic analysis that were briefly discussed in section 1.1: the meso approach that employs Marshall's representative agent device, the neo-structuralist approach that emphasizes the organization of the economic process and the micro data approach where differences in behaviour within fairly homogeneous groups of actors are emphasized.

The institutional meso statistics of the basic system are, as noted before, eminently suitable as the factual base for the meso approach to economic analysis. However, it is less well suited to the data needs of the other two approaches. Therefore, two other types of statistics are now being developed at the Central Bureau of Statistics: economic demography and micro economic statistics. Economic demography provides systematic information on a central feature of the organization of the economic process: the actors. In contrast with the basic system, economic demography pays no attention to the economic behaviour and record of the actors, but describes the actors an sich: their number, size, history, family relations with other actors, and so on. We survey the approach in section 3.3.

Micro economic statistics are being developed in response to the micro data approach to economic analysis. As noted before, analysis of data for individual economic actors has demonstrated that characteristics that have nothing to do with the process concerned, may influence behaviour considerably. This immediately leads to the essence of micro economic statistics: the latter links information on one of the phenomena of the four economic processes to information about phenomena that belong to other economic processes; or to characteristics of the actors involved in a process, that are not directly derived from the nature of the process as stylized in the meso statistics of the basic system. This way, the conceptual confusion about the concept 'micro' that we noted in section 1.1 is cleared up:

- if one disaggregates data on one of the four processes by homogenization with respect to the characteristics of that process, we obtain meso data;
- if one links these meso data to information on other processes and characteristics, we obtain micro economic information.

Micro economic statistics is discussed in section 3.4. First, however, we should take a closer look at the Register: how does it obtain its information. This is an essential issue because the quality of institutional statistics, of economic demography and, to a degree, of micro economic statistics are all highly dependent on the quality of the information in the Register.

3.2 Updating the Register

To a degree, the way in which the information in the Register is collected is specific to the Netherlands, because it depends on institutional conditions. Yet, there are also a number of aspects that are quite general. Hence it is interesting to provide a synoptic description here.

Register data are obtained from three sources. The first of these are the registers of the Chambers of Commerce. The Chambers, whose origins are in Napoleonic times, run two registers. One, the trade register, contains legal entities with a profit making purpose, as well as a large number of unincorporate enterprises. The other one, the

associations and foundations register, contains non-profit legal entities. However, the registers are insufficient as a data source for the CBS Register of economic units. Firstly, because they are incomplete in their coverage. Though there is a legal obligation to be in these public registers of the Chambers of Commerce, this obligation does not exist for government units, the liberal professions and agricultural establishments. At present, the introduction of a more comprehensive registration is being considered, the 'Basic registration system of social objects'. But even if that is established, the resulting data will still be not enough as sole information for the CBS Register. This is because of a second insufficiency of the Chambers of Commerce registers: changes in the entities in the latter are often not recorded with sufficient speed. This may both concern disappearance of entities - frequently the registers contain entities for a considerable period after they have been dissolved - and changes in essential characteristics of the entities, such as ISIC label, size in terms of persons employed, and so on. Moreover, some of the characteristics needed for the CBS Register, such as the sector label, are not recorded by the register. The third, most basic, insufficiency of the Chambers of Commerce registers is that they contain legal entities. In the CBS Register these have to be transformed into economic actors.

Consequently, additional information is needed. A part of it is obtained from the second source, the surveys the CBS undertakes for all kinds of purposes (notably: the compilation of the statistics of the basic system). Of the units that are surveyed, the ISIC label, size, class and so on can be kept up to date by means of the survey information. But not all the units that are in the register are actually surveyed; many statistics are based on cut-off surveys or on sampling. Moreover, the units that are not in the Register are not surveyed at all, as the Register defines the population of all surveys.

Therefore, a third data source is required to obtain an adequate register: censuses that provide a comprehensive inventory of all units and record all the units' characteristics that are needed by the Register. There are two types of censuses: the general and the special ones. The general censuses are, in principle, held once every 10 years. The law on censuses of enterprises requires the next one to be

held in 1988/89. Immediately after such a general census, the Register is up to date. Then the Register can be kept up to date for a while by means of the two other sources just mentioned. Gradually, new divergences between reality and the Register emerge, until a new census becomes necessary. How fast that happens depends on business dynamics. In case of specific groups of units, such as those of some industry, things may change so rapidly that an extra census becomes necessary, before the next general one. These are called 'special censuses'. They may also be needed because, e.g., a group of units (e.g. government units) is not covered by the general census, or because more information is needed than has been collected in the general census; the latter may be the case if a new statistic is started or new characteristics of units are being introduced into the Register.

Censuses are expensive. Therefore the possibility is being considered to do them by sampling. This may seem very odd at first glance: censuses are the tools par excellence for the determination of the population of units, so how could one do them by sampling? It is, however, not so odd if one bears in mind that the censuses have a fairly specific role in view of the existence of the registers of the Chambers of Commerce: the censuses must provide the data to transform the legal (and non-legal) entities that are rather comprehensively covered by the Chambers of Commerce, into economic units (or: actors) with the correct labels. Moreover, not all the economic units need to be known individually: as soon as the statistics involved are based on sampling, all that is needed in the Register is a sufficiently large number of economic actors, and the information to determine which part of the population the latter form. Consider the situation where the registers of the Chambers of Commerce contain 1000 legal entities with ISIC label A and 1000 with ISIC label B. Now of both groups a part no longer exists, another part consists of units that are just a component of an establishment and still another part is labelled ISIC A while the proper label would be ISIC B. Suppose that in reality, the set of 2000 legal entities in the Chamber of Commerce register contains just 1000 establishments of which 600 should be properly labelled ISIC A and 400 ISIC B. Suppose that the production statistics would be sufficiently reliable if they were to be based on a 25% sample, that is 150 establishments in industry A and 100 in industry B. Then the register could also work with a 25% sample: 500 of the 2000 legal entities, on

which the information would be obtained by a 'sample census'. The sampling data obtained in the production statistics could be employed to estimate the total production of the two industries by multiplication with the factor four.

3.3 Economic demography

The label 'economic demography' makes clear that the approach has been inspired by the demography of natural populations. Thus the methodology, concepts and methods of presentation of data are similar to those in natural populations demography. The core of a demographic approach is that the total population of actors is broken down into a number of sub-populations on the basis of relevant characteristics of the actors. In natural demography, these are characteristics such as age, sex, nationality, place of living, marital status, and so on. In case of economic demography, the relevant characteristics are, e.g., main economic activity (ISIC label), size, legal status, nationality of the owners of the actor. By classifying according to these and similar characteristics, a description is obtained of the structure of the business population. An elementary form of this are the 'population statistics' that are already being published. These provide frequency distributions of, e.g., the establishments in the Register on January first of each year. The characteristics according to which data are presented are main activity, size, legal status, region. In addition to these annual statistics, the census results are published separately. In the future, an important element in the 'population statistics' will be to describe the family relations between actors: the composition of enterprise-type units in terms of establishment-type units. Both would be grouped according to their appropriate classification, i.e. sector in case of enterprises and economic activity in case of establishments, with indications of size.

The 'population statistics' describe the economic demographic situation at one point in time: they are a snapshot. By comparing these snapshots with those for subsequent years, one can observe the results of economic demographic changes. These results, however, are not too informative, unless they can be broken down into the components of the underlying demographic changes. If a sub-population has grown from one year to another, this growth is the net result of both entries to and exits from the sub-population. The entries, in turn, can be broken down

in components, such as births of new units and break-ups of existing ones. The exits can be broken down into, e.g., 'deaths', mergers, buy-outs, and so on. Moreover, changes in characteristics of the actors can lead to entries and exits: changes in main economic activity, changes in size-class, relocation to another region, change in family relations, etc. By decomposing the annual changes in these underlying components, 'statistics of demographic changes' are obtained. A first step in this direction is now being made by compiling a statistic on incorporation of new enterprises.

Because the economic actors are not given by nature but have to be created in the Register on the basis of specially formulated concepts, the definition of 'entry' and 'exit' is not determined a priori either. Thus, it is not clear when an establishment or enterprise is 'new' and when it must be considered as a continuation of an existing unit or of a combination of existing units. It seems useful not to force all units into a dichotomy of 'new' and 'existing before' but, instead, to describe all the shades between these two extremes explicitly. Therefore, a necessary condition for a meaningful statistic of demographic change is the availability of a 'classification of economic demographic change'. This classification will also cover events that do not lead to entries or exits, but that may be relevant for economic analysis neverthesame. An example of the latter could be changes of ownership.

A series of annual demographic change statistics shows how the development of each sub-population did happen. But they do not provide information on the life-patterns of the individual actors. In the latter case, issues should be addressed such as: the pattern of growth in the course of time, the average lifespan of actors, the average number of times that actors change their main economic activity during their lifespan, the average regional and international mobility, and so on. To address such issues systematically, demographers developed the cohort approach. This means that the actors that have been 'born' in a given year (the cohort) are followed as a group. Of the cohort it is annualy recorded how many are still alive and how the cohort is distributed over sub-populations. For economic demography the cohort approach seems particularly fruitful. At the time this is written (early July 1987) the CBS is carrying out a cohort analysis: all the

establishments 'born' in the fourth quarter of 1985 are being censused, in order to find out how many are still alive and whether there are systematic factors that appear to have determined the degree of succesfulness of this group of new businesses. The project is financed by the Ministry of Economic Affairs, because it wanted to obtain information on which type of new business it could successfully support. This demonstrates precisely the use to which economic demography could be put: it is a tool to identify organizational factors that are relevant to economic behaviour and performance.

Thus the economic demographic approach by itself already leads to useful information. But the demographic data gain enormously in relevance if they are linked to data on the economic processes. If, in other words, the data on the production process, the income distribution process, the financing process and the expenditure process that are collected in the institutional statistics of the basic system, are grouped according to economic demographic sub-populations, changes in the latter and cohorts. This way, a linkage is also provided between economic demography and micro-economic statistics. This is made possible by the existence of a Register-based institutional basic system.

3.4 Micro-economic statistics

The Netherlands Central Bureau of Statistics collects enormous amounts of micro data, in order to be able to compile its economic statistics. The CBS possesses, due to the institutional nature of the basic system, more micro data than any other institution in the Netherlands. Probably the situation is not too different in other countries with a central statistical office. However, it is essential that these micro data are secret. Only by guaranteeing secrecy the CBS can achieve that economic actors provide reliable information: by making micro data public the interests of the actors could be seriously hurt. Therefore no data on individual units are published (even the Register is secret) or provided to other government agencies; all publications are screened in order to avoid that confidential micro data can be derived from them by statistical analysis.

Nevertheless, micro economic information in the sense defined in section 3.1 can be provided without endangering secrecy. There are a number of ways to do this: we describe them ordered according to the degree to which the information concerned approximates information on individual actors closest.

The closest thing to directly providing micro data is to provide micro data that have been made unidentifiable. Essentially, this is done by introducing random errors into the data file on purpose. The errors have to be made in such a way that data security is ensured but, at the same time, the usefulness of the data is not destroyed.

The second way to provide micro data is for the CBS to do its own micro economic analysis of the data and publish the results. This class of 'micro-economic statistics' consists of two categories. Firstly, the CBS carries out (and will do so increasingly) micro-economic research that yields results that are relevant for large classes of users of statistics. This type of research is carried out at the own initiative of the CBS. Secondly, specific micro research can be done in co-operation with specific users of the results (e.g. academic researchers, the Ministry of Finance, regional planning institutes, and so on). Both types of research have been initiated in the past few years. Examples are research into the factors determining exployment in individual establishments in manufacturing and into the relations between turnover and financial position of establishments in trade. Currently a project is underway, in co-operation with Erasmus University and with the 'Economic institute for medium-sized and small businesses', on substitution processes; the purpose is to verify some micro economic theories of production, employing the micro data underlying a number of production and investment statistics.

A very central element in all these types of micro research is the analysis of longitudinal data. Systematic publication of longitudinal data can only be achieved by means of the cohort-approach. As indicated in section 3.3, this subject is on the borderline between economic demography and micro economic statistics. Taking the point of departure in economic demography, for all manufacturing establishments information can be given on the production process, based on the data underlying the production statistics, by cohort of establishments. The

cohorts could be subdivided into a number of classes according to various characteristics. The process information and the breakdown by economic activity (ISIC) may, however, not be too detailed if identification of individual establishments is to be prevented. One may also take the point of departure in micro economic data. This would lead to detailed data on the production process and on economic activity, but a number of cohorts would be aggregated to prevent identification.

Another form of micro economic statistics, still a bit further removed from actual micro data, is also based on economic demography, viz. on the demographic changes statistics. This form of micro economic statistics is most easily understood if an example is given. A production statistic for an industry annually records the level of production of the establishments that belong to the industry in the year concerned. Consequently, for two subsequent years one may distinguish three groups of establishments: the group that belongs to the industry in both years, the group that belongs to it in the first but not in the second year (the exits) and the group that is new in the second year (the entries). In the production statistic, the information for two or more years could be broken down according to these three groups; exits and entries could be subclassified according to the 'classification of economic demographic change'. This not only yields micro economic information but also improves the intertemporal consistency of the production statistics, because changes are removed from the results of the production statistics that are attributable to changes in the underlying population of establishments.

The simplest form of economic demography, the population statistics, can also be linked with process information in order to obtain micro economic statistics. In the example of the production statistics, the establishments are, in each production statistic, broken down according to one or more of the economic demographic characteristics covered in the population statistics. To some extent, this simple form has been employed in the production statistics for a long time: the latter contain a breakdown by size of the establishments. Naturally, breakdowns of process data need not be restricted to breakdowns by economic demographic characteristics only. An example of an important alternative breakdown has already been given: by profitability.

A final possibility to provide micro economic statistics is to give some estimated parameters of the frequency distributions of the major variables in the meso statistics.

4. The economic process as a whole: the national accounts

4.1 Major elements in the evolution of the national accounts

Relations between national accounts and other economic statistics

Generally speaking, national accounts are linked only indirectly to micro data: they are based on specialized economic statistics which, in turn, are based on micro data. For this reason, we discussed the meso statistics first (in section 2) and the micro meso linkage next (in section 3). What remains to be discussed in order to complete the chain from micro to macro is the linkage between the meso data and the national accounts.

All systems of national accounts have a common feature: to obtain a statistical description of the economic process as a whole they integrate the results of a lot of individual statistics that each describe only a part of the economic process. This process of integration has three components:

i) Standardization: while separate statistics employ different definitions for similar concepts, national accounts are based on standardization of definitions. An important part of the integration process is the adjustment of the data for these differences in definitions. The same applies to the differences in classifications and in the degree of detail employed in the various underlying statistics.

ii) Completion: the individual statistics taken together often do not provide a complete description of the economic process as a whole. Statistics are absent on parts of the process, statistics need not provide complete coverage of their subject. In the national accounts these gaps are closed by means of estimates on the basis of all kinds of ad hoc information.

iii) Confrontation: between many variables in different statistics there may be conceptual relations. Thus, total production and imports of electricity must equal total use plus exports and transport losses. In the national accounts these conceptual relations are made explicit; and the data from different sources are confronted with each other on the basis of these explicit conceptual relations. Generally speaking, this process of confrontation yields data of a better quality than those in the individual underlying statistics.

In the course of time, there have been shifts in the relative importance of these three components of the integration process in the Dutch national accounts. Originally, say in the late 1940's, the emphasis was on standardization and completion. At that time there was no system of economic statistics yet (cf. section 1), so that standardization bulked large in the integration process. Similarly, a lot of completion had to be done because of the many gaps in the underlying statistics that were caused by the absence of a system. But, as we indicated in section 1, the presence of a system of national accounts provided the impulses needed for the systematization and complementing of the body of economic statistics. Eventually this led to the emergence of the basic system described in section 2.

Consequences of the growth of the basic system

The growth of the basic system had three important effects on the national accounts. Firstly, it led to the availability of many new and better statistical data. This necessitated a large scale revision in 1981, pertaining to the years from 1977 onwards. Presently, the continuing growth of the basic system necessitates another major overhaul of the accounts, which is now being worked on and will pertain to 1985.

The second effect of the growth of the basic system is that it makes it possible to develop the national accounts themselves into an institutional meso system. We return to this subject in section 4.2.

The third effect of the growth of the basic system is that the nature of the integration process changes. The basic system is, in principle,

fully coordinated with respect to both actors and phenomena; and it is, again in principle, complete. Consequently, standardization and completion become less important elements of the integration process and confrontation becomes more important. Moreover, the more institutional and the more meso the national accounts are, the greater the number of conceptual identies and hence the greater the possibilities for confrontation.

The dynamic structure of national accounting data

The gradual evolution of the national accounts and the integrative nature of the system have significant consequences for the dynamics of the national accounting data. Changes in underlying statistics, changes in classifications, changes in the definitions, and so on lead to the need to revise methods and concepts; this, in turn, leads to inconsistencies in time series. Moreover, the fact that the national accounts integrate data from so many individual statistics leads to lags in the availability of the national accounting data. But these are too important to be available with lags of more than two years. Therefore, a system of short-term and provisional data has been designed, as well as a strategy for revising final data. Though this subject bears only marginally on the meso-macro linkages, it is useful to provide a brief survey here for the sake of completeness.

The most timely national accounting data are published in the 'Business cycle survey'. This contains monthly data with a lag of one or two months on production, prices, consumption, foreign trade, as well as some quarterly data. These data are not integrated, but they are, as far as possible, compiled according to national accounting concepts. They can be considered as a macro summary of short-term meso data.

Next come the quarterly accounts. These contain data on, mainly, the gross national product account, as well as a breakdown into a number of industries. They appear some four months after the end of a quarter and are based on short-term data which are cast into an input-output framework that, in turn, is based on extrapolation of input-output tables for earlier periods. The quarterly accounts are revised a number of times, mainly to adjust them to the annual accounts once they become

available. It is important to note that the quarterly accounts play the same role vis à vis the short-term statistics that the annual accounts play vis à vis the annual statistics. In fact, the quarterly accounts, which were first published a few years ago, are already beginning to have impact on the development of the underlying short-term statistics into a more closely knit system. Currently, the possibility is being researched to reduce the lag of the first estimate of the quarterly accounts to zero by means of an integrated input-output and macro economic model which has leading indicators as inputs. This model would then be the integrating system for leading indicators and other very timely data; it could be used to guide the growth of the set of leading indicators into a system.

After the quarterly accounts come the provisional annual accounts, published nine months after the end of a year. They integrate all short-term data as well as the available annual data on the basis of extrapolation of the revised provisional annual accounts for the preceding year; the latter are published with a lag of one year and nine months. They are based on more data than the provisional accounts, but not yet on a complete basic data set. Hence extrapolation on the basis of the final accounts for yet one year before are necessary. These final accounts are published two years and nine months after the end of a year.

However, as we made clear above, nothing is final in national accounting. After the final annual accounts have been published, gradually a large number of corrections piles up that one would want to make. However, to make them to the data for just one year would break the consistency of the time series, because usually preceding years have to be corrected as well. But it is impossibly expensive to revise a whole time series annually. Therefore, a revision strategy has been adopted that ensures continuity of time series, adequate revisions and a manageable workload.

The strategy starts with the rule that rates of change are more important than levels. Thus, if for a given year corrections are found to be necessary in the level of a variable, they are not made immediately; but the data for the subsequent year are determined in such a way that the rate of change is as correct as possible. This may

imply that the levels of the variables for the most recent year are consciously adjusted to be 'wrong'. After a number of years, these errors cumulate and a large scale revision is made (say once every five to ten years). In these revisions, concepts, classifications and so on are also changed if desirable. Immediately after such a revision, revised time series of a limited length are published. Thus the 1981 revision, pertaining to 1977, has been calculated backwards to 1969. The next revision will also be calculated backwards to 1969, if the budget permits it.

This still leaves us with the earlier data. In the past, these have been a bit neglected. But now the CBS has begun to revise the historical data for 1900-1969 too, in order to achieve consistency with the post 1969 data. The first results, for 1921-1939, are presented in Den Bakker, Huitker and Van Bochove (1987).

4.2 The present Dutch national accounts

Two alternative approaches to national accounting

National accounts describe the economic process as a whole, that is: they describe not just all processes of the circular flow of value system but also the relations between these processes. But this can be done in various different ways. Therefore, national accounting systems vary widely, both in time and across countries. Essentially, they vary in two dimensions: the extent to which the description is meso or macro and the extent to which the description is functional or institutional. The trend is from functional macro systems to institutional meso systems. To clarify what this means, we consider the differences between these two extremes. These differences come in three groups: the treatment of the actors, the treatment of the phenomena and the degree of detail.

A functional macro system is almost void of actors. The only trace of actors that can be found is the distinction between 'producers' and 'consumers'. But these categories are not sets of identifiable organizational units. They are agents that are defined quite abstractly on the basis of the functions producing and consuming. In contrast, an

institutional meso system is fully based on actual economic actors of the flesh and blood type discussed in section 2.

The way the phenomena are dealt with in a functional macro system is both a consequence and the cause of the way the actors are treated. The variables are not derived from the experience of the actors. Concepts like the national product have, instead, been designed from a macro economic point of view. This is a characteristic of the functional approach as such: it analyses the economic process from the top down. This has important implications for the concepts employed. In functional macro systems, all kinds of imputations and attributions are made that make sense from a macro economic point of view. An example is household income. In a functional macro system this should include increases in the reserves of life insurances and pension funds. In contrast, institutional meso systems describe the processes in such a way that a close correspondence is achieved with the actors' own perspective. The approach is not top down but bottom up. Thus, in the household income example, an institutional approach does not add increases in life insurance and pension funds reserves to household income, because households do not experience it as income.

Because functional macro systems apply a top down approach, their description of the economic process is extremely condensed. Each sub-process is summarized in just a few variables. The amount of detail is just enough to show the link with the other processes. Thus the description of the production process is limited to showing the transformation of a few categories of primary inputs into production for final expenditure. Production for intermediate use is not described. Nor is there a breakdown of output by commodity groups or of production by industries. Naturally, these breakdowns can be made, but this has to be done essentially outside the system, in supplementary tables. The latter provide breakdowns of macro variables, but cannot describe the mutual relations between the disaggregate data. This is quite clear if one inspects the 1953 SNA, which is, to a considerable degree, a functional macro system with some supplementary breakdowns. In institutional systems, in contrast, not only the sub-groups can be described in detail by distinguishing a large number of homogeneous classes of actors within each process, but the linkages between these processes can also be given at the meso level. These linkages are shown for the groups of actors that are distinguished; section 4.3 covers this subject.

The present situation

Systematic thinking about an institutional meso system of national accounts has, in the Netherlands, been intimately linked-up with the UN Systems of National Accounts. The 1968 SNA, which is to a large degree an institutional meso system, provided a powerful intellectual impulse for the development of the institutional basic system. As the latter began to take shape, the shift to an institutional system of national accounts was placed on the agenda. The systematic reconsideration of the SNA, that was induced by the planned revision of the latter, accelerated this process. Now that both the concepts are clear and the basic data are available, the shift to the actual construction of a full-fledged institutional meso system is the first priority in Dutch national accounting. However, at present, the accounts are still mainly functional.

The basis of the Dutch national accounts has, from 1946 onwards, been an annual input-output table. Because there were not enough institutional basic data, this table has until now been functional to a considerable degree. Only a part of the industries is defined institutionally, that is as groups of establishments. A major part is defined functionally, that is, as groups of economic activities. Examples of the latter are wholesale and retail trade (measured in the input-output tables on the basis of trade margins), agriculture, a number of services.

The input-output table is functional in another respect as well: it does not provide breakdowns of inputs and outputs by commodities, but by industrial origin and destination, as well as by categories of primary inputs and final expenditure. This is a functional approach: the establishments themselves are not primarily interested in the origin of their inputs or even the destination of their outputs; frequently both are not known and not given by the production statistics. Instead, the producing units' primary concern is with the commodity composition of inputs and outputs. Hence an institutional approach requires input and output tables of the commodity by industry type.

The other processes have for a long time been dealt with in far less detail than the production process. Lack of basic data was the reason for this. The only information on income distribution and finance was the functional information that could be obtained from government and banks/insurances. This, however, was insufficient for reliable independent estimates of income, saving and expenditure. Consequently, income was estimated almost exclusively on the basis of the commodity flow method. Exaggerating a bit: the operating surplus derived from the input-output table was simply broken down into a number of categories of income distribution transactions using the information available; investment and consumption were determined as balancing items in the commodity flow (by means of a stylized breakdown of outputs into investment goods and consumption goods); and saving was determined by subtracting consumption from income. In fact, the income and outlay accounts and the capital accounts were not much more than appendices of the input-output table.

This situation made it impossible to apply dual actoring. This is made quite evident in the labels of the sectors in the accounts: there is no enterprise sector but an 'establishments sector'; and there is no household sector but a 'families sector'. The latter is defined functionally: the transactions of non-profit organizations working for households are registered in this sector, whereas the transactions of unincorporate enterprises are not. Thus, the 'families sector' approaches the functional concept of 'consumers'.

Because no distinct actors for the income distribution and financing processes were distinguished, it was impossible to describe these processes in detail. The reason for the latter is that only enterprise-type units participate in these processes, not the establishments (unless, of course, the two coincide). Consequently, if one wishes to describe the income distribution and financing transactions of 'establishments', this can only be done by combining all non-government establishments: then the sector coincides with the sector enterprises plus unincorporate enterprises. But as soon as one wishes to disaggregate this 'establishments sector', this can only be done by attributing the enterprise-based data to establishments. Thus, e.g., the profit taxes paid by an enterprise have to be attributed to the establishments of the enterprise. Consequently, arbitrary keys have to

be adopted, yielding data that reflect the choice of the keys rather than the true meso structure of the income distribution and financing processes.

Only if a group of establishments and a group of enterprises happen to coincide can a separate sector be specified for them within a functional accounting system. To a considerable extent this condition is met in case of banking and insurances. Hence these are a separate sector in the present Dutch accounts. This does not yield enough information. Therefore capital finance accounts are compiled; but because of the functional nature of the accounts, they must be highly aggregate. Thus the 1968 SNA sectors of non-financial enterprises, households and private non-profit institutions serving households are combined.

4.3 Towards an institutional meso system

In section 4.2 we indicated that a change towards an institutional meso system is both desirable and, because of the development of the basic system of economic statistics, feasible. In the present section we explain what such an integrated institutional meso system looks like, as well as the way it will be implemented.

Integration: the production process

The standard format of the description of the production process is the production statistics. In addition to two standard tables, these provide for each ISIC 3 or 4 digit class the inputs and the outputs with a commodity breakdown and a breakdown by primary costs into the categories that are most relevant for the industry concerned. Recall the example of printing, where the output of printing establishments is broken down by types of printwork, whereas in the production statistic for the food industry it is not shown explicitly but is included in the category 'other products'. A disadvantage of this procedure is that the total production of printing by all industries together is not described; the choice for comprehensiveness with respect to actors implies that comprehensiveness with respect to the phenomena has to be sacrificed. Therefore, a need exists for a description of the production process where both types of comprehensiveness are achieved simultaneously. This can be done by means of input and output matrices

of a type similar to the ones explained by the 1968 SNA. The output matrix shows for each industry the value of output broken down by groups of goods and services. The input matrix does likewise for the value of inputs as well as for the categories of final expenditure. Consequently, the input and output matrices have the same format as the production statistics, at least where the debits and credits of establishment-type units are concerned.

The crucial difference between the input and output tables on the one hand and the production statistics on the other, is that the former are integrated. All three components of integration distinguished in section 4.1 are relevant here: the input and output tables are a standardized and complete description of the production process, based on confrontation of the underlying data. One of the central elements of standardization is, in the present case, that a uniform classification of goods and services is employed for all industries. It should be noted that groups of goods and services are not the characteristic outputs of industries, but rather goods that are aggregates of the 'Standard goods nomenclature' and services that will, in the future, be aggregates of the Standard services nomenclature. For the time being, the national accounts will employ their own goods and services classification; it will be applied throughout the system, i.e., in the breakdowns of household consumption and of investment as well as in that of output and input by industry.

This also clarifies which form 'completion' takes in the input and output tables: in the output table the production of printwork by food producers is explicitly shown. Data to achieve this are based on ad hoc information and on the confrontation process. Confrontations can be made by group of goods or services: the information from all production statistics, from imports/exports statistics, and from statistics on expenditure (investment statistics and data on consumption) together provide a picture of the total amount available for use and the total amount used. Of course the two must be equal. Hence any differences are attributable to errors in the basic data. By studying the possible sources of errors, and by assessing the relative reliability of the various underlying data, the optimal way to implement this equality is found.

The input and output tables will be fully coordinated with the production statistics: the delineation of industries is identical, the description is institutional in the sense that no establishments are broken-up and the concepts are the same. This means that the link between the input and output tables and production statistics is quite direct: both provide meso data on the same groups of actors and according to the same concepts. The only differences are those caused by integration, notably confrontation. Since the macro variables are simple aggregates of variables in the input and output tables (e.g., in case of GDP) the link between the macro variables and the 'raw' meso data of the basic system are quite straightforward too.

In addition to the input and output tables a number of additional matrices are needed to provide a comprehensive, integrated meso picture of the production process. One of these is an input-output table. On the basis of the input and output tables one can construct (annual) input-output tables that are institutional in the sense that the industries consist of establishments and are not, as in the present i/o table, functionally defined. In addition, an 'analytical' input-output table will be constructed though not necessarily annually. This table is purely functional: establishments are broken up into homogeneous production units. The result is an 'economic activity by economic activity' table that can be used for 'technological' i/o analysis.

This relationship between input and output tables on the one hand and production statistics and other basic statistics on the other, is an idealization. It can only be achieved in practice once the basic system of economic statistics is complete, both in the sense that every industry is covered and in the sense that the information on each industry is complete. As long as that situation has not yet been achieved, additional information will be needed in compiling the input and output tables. This may be taken from functional statistics, special research and so on. Examples are data for small establishments, volume data and data on black output (for the latter, cf. Van Eck and Kazemier, 1987).

The shift to the system of input and output tables is now being made, as part of the 1985 revision (cf. section 4.1). By 1989/90 the results will be published. The input and output tables contain close to 200

industries and over one thousand groups of goods and services; publication must be at a higher level of aggregation, to avoid disclosure of data on individual establishments. Both tables in current prices and in prices of the previous years are compiled. Time series will, probably simultaneously with the 1985 data, be published for 1969-84.

Integration: income distribution and financing

Functional systems of national accounts employ concepts derived from macro economics (or from other economic theories). As indicated in section 4.2, this usually leads to concepts that diverge from the perceptions of the economic actors. In contrast, an institutional system takes the latter as its point of departure. In practice this means two things (cf. Al and Van Bochove, 1986)

- the production boundary is drawn so as to include only production that is sold on the market or of which the production leads to a monetary remuneration of the production factors involved. Therefore, there are no imputations. Thus, 'production' by owner-occupiers of houses is not included, in contrast with the convention in 1968 SNA.
- flows are, as far as possible, recorded at the actors that pay or receive the value flows; there are no attributions. Thus, employees' contributions to social security are not routed via households and the increases in reserves of life insurances are not added to household income.

This way of drawing the production boundary is what makes it possible to achieve a close linkage between the production statistics and the input and output tables. The absence of attributions makes it feasible to achieve an equally close linkage with the meso data in the statistics of the basic system that pertain to the income distribution and financing processes: the method of registration and the concepts in the institutional system of national accounts correspond closely with those employed in the basic system's statistics, such as the statistics 'finances of enterprises' and the income tax based statistics on household income. Consequently, in case of the income distribution and financing processes too, integration is mainly confrontation and completion; standardization is of lesser relative importance.

A central element in an institutional meso system will be a larger number of sectors. Both non-financial enterprises and households will be broken down into a number of sectors. In the latter case, one (or more) sectors would be households with an unincorporate enterprise. The sectoring will of course be coordinated with that in the statistics of the basic system.

Naturally, the choice for an institutional system does not mean that all functional information is redundant. The institutional meso system is just the core of the total system. In addition to this core, a number of modules is necessary. Two of them have already been mentioned: the institutional and the analytical input-output tables. Another one could contain the imputations and attributions of 1968 SNA that are not made in the institutional core. Other modules are described in Van Bochove (1987): modules for non-market production, for further disaggregation of households, and so on. All these modules would be closely linked to the core, e.g., by common classifications.

The shift to an institutional meso description of income distribution and financing will take more time than that to the input and output tables: the latter is a necessary condition for the former. This is because the information on the production process is still far more complete in the Netherlands than that on other processes. Consequently, the national accounts will continue to lean heavily on the commodity flow method; only if the revision of the description of the production process is complete, that of the income distribution and financing processes can begin in earnest. However, a lot of research has already been done. Therefore it is now expected that immediately after the publication of the 1985 revision a new revision will be initiated, pertaining to 1990; in the course of this revision the full-fledged institutional meso system should be achieved.

Integration: the expenditure process

In case of the expenditure process, the shift will be made earlier, at least a major part of the shift. Here two sets of expenditure matrices play a crucial role. The first one is that of the consumption matrices. There are two of these: an industry by group of consumption goods and services matrix, and a socio-economic group by group of goods

and services matrix. The former is, of course, part of the output table. The latter provides the linkage table between the production and expenditure processes. The consumption matrices integrate the meso data from, on the one hand, production statistics for retail trade and the budget survey with, the other hand, the data from the production statistics of other industries. Hence they are of central importance, not only to the meso - macro link for households, but also for the meso business - meso households linkage.

The other part of the expenditure process concerns investments. In the basic system these are described in three ways (cf. section 2.7): as expenditure, as addition to production capacity and as outputs. In the institutional meso system of national accounts these three approaches are integrated into a coherent whole. This yields investment matrices that provide breakdowns of investment by industry of origin and type of investment good; by industry of destination and type of investment good; and by sector of expenditure and type of investment good. The first two matrices will probably be compiled shortly, the last one has to wait until the 1990 revision. In the second investment matrix, investment will be recorded on the basis of the user criterion (cf. section 2.7). Thus the shift from the economic ownership criterion of the production statistics will be made in this matrix.

Integration: the system as a whole

The confrontations per group of goods/services that are made in the compilation of the input and output tables, also employ the information on consumption and investment on which the expenditure matrices are based: the latter are compiled simultaneously with the input and output tables. The value added of each industry - and hence the GDP, is thus calculated by means of a full-blown commodity flow method which integrates all information on production and expenditure at a very disaggregate level. This method of compiling the GDP is generally considered to be the most reliable one, precisely because there are so many detailed confrontations and checks. The reliability of the method has been improved even more, because not only a current price compilation is made but, virtually simultaneously with the latter, a compilation in prices of the previous year as well. Effectively, this means that for every flow of goods a double confrontation is made.

Of course, the national product can also be estimated by means of the income method; many countries do so. Generally speaking, this method is less laborious than the commodity flow method, but also less reliable, because of underreporting of income in the tax statistics that are the major source of information on households for the income meth and because of the non-uniform valuation methods in the profit and loss accounts that are the data source for enterprises. In the commodity flow method, both problems are far less severe. Thus a part of black household income is estimated in the commodity flow method by means of indirect methods; and the valuation problems are solved to a considerable degree because lots of detailed quantity and volume data are available to achieve uniform valuations.

Nevertheless, for parts of sectors and for a number of important categories of income, the income method information is quite reliable. This means that confrontations at a disaggregate level between production/expenditure data and income data would be quite useful. In functional systems of national accounts these are not possible, because the linkages between the various processes are made at a very aggregate level only. But in an institutional meso system detailed linkages and confrontations are feasible. The crucial tool is the three-dimensional generation of value added matrix first presented in Al and Van Bochove (1986). This table, which will be included in the next SNA, provides a breakdown of value added by components (wages, indirect taxes, social charges, operating surplus), industry of the establishments and sector of the enterprise-type units to which these establishments belong. Thus a cell of the table would show how much operating surplus is formed in the canned fruit industry by establishments that are part of multinational enterprises (assuming there is a sector of multinational non-financial enterprises). Another cell would show how much of the wages generated in the establishments of the printing industry are paid to households where a civil servant is the main income earner (assuming that such a household sector is distinguished).

The operating surplus plane of the three dimensional generation of value added matrix can provide, at the meso level, the family relations between, on the one hand, establishments and, on the other hand, enterprise-type units and households with an unincorporate enterprise. This makes it possible to determine, e.g., the way each industry is

financed, because there is a linkage between the data on the financing process for enterprise sectors and the industries of the establishments; the generation of value added matrix also makes it possible to determine the linkages between expenditure on investment by enterprise sectors and the additions to the production capacity of industries of establishments; and so on.

The compilation of the generation of value added matrix is only possible if economic demography is well-developed. This is because the compilation requires that the family relations between establishment-type units and enterprise-type units have been charted at the micro level in the Register. Once this has been done, the operating surplus of an enterprise sector can be compiled as the sum of the operating surplusses of the establishments belonging to these enterprises, to be derived from the production statistics data. The enterprise sector's operating surplus that is calculated in this way can then be confronted with the one that can be derived from the profit and loss account data provided by the statistics of finances of enterprises. This way, it becomes possible for the first time to integrate the commodity flow method and the income method.

The generation of value added matrix can be considered as the joint result of two of the central developments in the (Dutch) system of economic statistics: the development of the institutional basic system and of economic demography. It can probably be compiled for the first time in the early nineties, in the course of the 1990 revision. The introduction of the family relations in the Register will start by the end of 1987 when the Register will be moved to a new computer with newly developed software which contains the establishment-enterprise linkage. The first research on the process data linkage is now being done, in the project concerning the largest 100 enterprises that has been mentioned in section 2.2.

Notes

1. This paper is a modified and condensed version of a part of the comprehensive description of the economic statistics of the CBS which I wrote for the recently published 1987-1990 programme of the Bureau. In the course of that project I accumulated a huge intellectual debt to many persons. Most of all to Mr. Atsma, Director of economic statistics, who invited me to do the project, guided me through it with his cheerful common sense, contributed his extensive knowledge of detail and corrected many errors and imbalances in the various drafts. Dr. Begeer, Director General of statistics, spotted many of the remaining errors of judgment, unclear paragraphs and inaccuracies. The heads of the eleven departments of economic statistics checked the texts on the subjects of their department, and in some cases, notably Mr. Bloem, major portions of the whole manuscript. I am particularly grateful to Mr. Willeboordse, head of the department of coordination of economic statistics, for some lengthy stimulating discussions on the Register, and on economic demography. Dr. Oomens, former director of economic statistics, made some penetrating comments on the programme which I was happy to use in the present paper; moreover, Dr. Oomens, more than anyone else, has long been the driving force of the Dutch national accounts and of their influence on the growth of the system of economic statistics that is, partially, described in this paper. Finally, I am much in debt to Marion Moleveld for typing the many revisions of the draft of the programme in good humour and to Lesley Wirtz, Vivienne Pootjes and Loes Trampen for helping me out with the typing of the present paper in an impossibly brief time.

2. For lack of a better term we use, unless otherwise indicated, the word 'statistic' in the sense of a collection of published data on a subject. Thus a budget survey is a 'statistic', as well as a production survey of some industry.

3. In fact, the terminology 'basic system' and 'functional systems' was devised in the course of writing the 1987-1990 programme, when we first noted explicitly that these distinct systems exist.

4. 'Functional' is used in many different meanings in the literature. We use it as an umbrella-term to cover everything where the focus is on the phenomena rather than the actors. Also c.f. Van Bochove and Van Tuinen (1986).

5. The term 'enterprise-type unit' is preferable to 'institutional units', which is the 1968 SNA-term. The reason for this is that establishments are defined institutionally too: they are actual economic units with independent decision making power on the production process.

6. The latter industry is an exception to the rule that only limited amounts of quantity or volume data are available for the service industries. As indicated in section 1.3, there is an elaborate functional system for transport, traffic and communication that contains a lot of quantity data.

7. This section draws on a chapter of the 1987-1990 CBS-programme that was written by Mr. Van Tuinen, Director of social statistics.

8. Note that, in this stylized description, we have omitted the items of the reconciliation account of the SNA. In some cases, these amount to miscellaneous income distribution transactions; an example is the writing-off of bad debts. In other cases, they are similar to lending or borrowing, e.g. in case of being late in paying debts. Other reconciliation items are not relevant to the description of the circular flow of value system. Examples of the latter category are the revaluation and unforeseen obsolescence items.

9. One could consider changes in stocks of non-investment goods as expenditure items too. But usually they are completely integrated in the production process.

References

Al, P. G. and C. A. van Bochove, (1986). A proposal for the synoptic structure of the next SNA, National Accounts Occasional Paper NA014, CBS, Voorburg. (Paper presented at the OECD National accounts meeting, Paris, May 14-16, 1986).

Bloem, A. M. (1987). Micro-Macro link for government, CBS, Voorburg. (Paper to be presented at the Rocca di Papa IARIW Conference, August 1987).

Den Bakker, G. P., T. A. Huitker and C. A. van Bochove (1987). The Dutch Economy 1921-39 and 1969-1985, CBS, Voorburg (Paper to be presented at the Rocca di Papa IARIW Conference, August 1987).

Eurostat (1979). European system of integrated economic accounts, second edition, Luxembourg.

INSEE (1986). Proposition d'un scheme comptable de description des variations de patrimoine, Paris, Unpublished paper, first version.

Ruggles , N. D. (1987). Financial accounts and balance sheets: issues for the revision of the SNA, Review of Income and Wealth, 33, 39-62.

Rushbrook, T. and J. Wells (1987). National and sector balance sheets in concept and in practice, Review of Income and Wealth, 33, 19-37.

United Nations (1953, 1968). A System of National Accounts, first and third editions, respectively, New York.

United Nations (1977). Provisional guidelines on the national and sectoral balance sheets and reconciliation accounts of the System of National Accounts, statistical papers, series M, No. 60.

Van Bochove, C. A., (1987). Uncovering hidden income distributions, CBS, Voorburg (Paper to be presented at the Rocca di Papa IARIW Conference, August 1987).

Van Bochove, C. A., and W. van Sorge, Constant wealth national income: accounting for war damage with an application to the Netherlands, 1940-45, CBS, Voorburg, (Paper to be presented at the Rocca Papa IARIW Conference, August 1979).

Van Bochove, C. A., and H. K. van Tuinen (1986). Revision of the SNA: the case for an institutional core, Review of Income and Wealth, 32, 127-154.

Van Eck, R. and B. Kazemier (1987). Features of the hidden economy in the Netherlands, CBS, Voorburg (Paper to be presented at the Rocca di Papa IARIW Conference, August 1987).

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.

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