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HOW TO TREAT MULTI-REGIONAL UNITS AND THE
EXTRA-TERRITORIAL REGION IN THE REGIONAL ACCOUNTS?

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Abstract

This paper discusses the regionalization of production and capital formation by multi-regional kind-of-activity units. It also examines the circumstances in which a unit may be said to have a local kind-of-activity unit in the extra-territorial region and what should be attributed to this "region".

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1. Introduction

The concepts employed in the Netherlands' national accounts are also used, where possible, in the compilation of the country's regional accounts. The conceptual problems of regionalization have been outlined by Bloem and De Vet in "Regional Income Concepts" (Bloem and De Vet, 1989), from which it can be inferred that two major elements of the concepts used in national accounts have to be adapted to phenomena which exist only at regional level.

The first of these phenomena is the multi-regional kind-of-activity unit (KAU). This KAU is a unit which has local kind-of-activity units (LKAU) in more than one region ¹⁾. It raises a number of questions, such as how LKAU's should be described and what production and investments should be attributed to this units. The second problem centres on resident KAU's, one or more of whose LKAU's are on the economic territory of the Netherlands, but not in any of its regions. Such units cannot be accommodated in a region proper, and are conventionally attributed to what is known as an "extra-territorial" region.

The present paper takes a close look at conceptual problems associated with the regionalization of production and capital formation by multi-regional KAU's. It also examines the circumstances in which a unit may be said to have a LKAU in the extra-territorial region and what should be attributed to this "region".

This paper is not concerned with practical problems such as inadequate monitoring of exports and imports from other Netherlands regions (inter-regional transactions) or incomplete information on production by small KAU's.

1) In the context of national accounts, the regions in question are the COROP (Regional Research Programme Coordinating Committee) areas (NUTS III), the provinces (NUTS II) and the "Landsdelen" (NUTS I).

2. Concepts

2.1 Territorial definition of regions

The European System of Integrated Economic Accounts (ESA; Eurostat 1984a) sets out criteria for defining the limits of a national economy. These criteria correspond with those set out in the System of National Accounts (United Nations, 1968) and the Balance of Payments Manual (International Monetary Fund, 1977). The Draft Revised System of National Accounts (United Nations, 1990, Chapter 3) follows established conventions but provides a more wide-ranging discussion of the problems.

ESA delineates the national economy as :

"The units, whether institutional or of homogeneous production, which constitute the economy of a country and whose transactions are recorded in the ESA, are those which have a centre of interest on the economic territory of that country. These units, known as **resident units**, may or may not have the nationality of that country, may or may not be legal entities, and may or may not be present on the economic territory of the country at the time they carry out a transaction." (Eurostat 1984a, paragraph 204)

The nationality of the units is therefore not important; the important criterion is the units' **residence** on the economic territory of the country.

The term "economic territory" is defined, inter alia, as the geographic territory within which goods move freely. Paragraph 207 states: "The term 'centre of interest' indicates the fact that economic transactions have been carried out on the economic territory of a country for a fairly long period (a year or more). It follows that a unit which carries out such transactions on the economic territory of several countries is deemed to have a centre of interest in each of them." Transposing this to the regional economy, a unit which carries out transactions in the economic territory of several regions may be deemed to have a centre of interest in each of them. Chapter 3 (Institutional

units and residence) of the Draft Revised System of National Accounts (November 1990, Volume 1) discusses in this context quasi-corporations located abroad, which are treated as "residents of the country in which they operate".

2.2 Extra-territorial region

The economic territory of a national economy comprises the geographic territory, as recognized in international treaties, within which persons, goods and capital can move freely.

The economic territory of a country also comprises:

1. The national airspace, territorial waters and the continental shelf lying in international waters, over which the country enjoys exclusive rights or (according to the Draft Revised SNA) over which it has or claims to have legal jurisdiction as regards fishing rights or the right to extract minerals or fuels from under the sea bed.
2. Territorial enclaves, i.e. territory situated in the rest of the world which under international treaties or agreements between States are used by general government agencies for diplomatic, military, scientific or other purposes. Some examples are embassies and consulates, military bases, scientific bases, information offices, immigration offices and aid agencies. A feature of a territorial enclave is that goods and persons can move freely between it and the country but when they leave the enclave are subject to customs and immigration controls by the government of the country in which the enclave is situated.

The term "centre of interest" indicates that "economic transactions have been carried out on the economic territory of a country for a fairly long period (a year or more)". It should be pointed out that the stipulation of "a year or more" is not a hard-and-fast rule; see the Draft Revised SNA, which states: "an enterprise has a center of economic interest when it is engaged in a substantial amount of production in a country and maintains at least one production establishment in a country which it plans to operate either indefinitely or over a long period of

time."

It is therefore readily apparent that the geographic territory of a country is not necessarily the same as that country's economic territory. A centre of interest might therefore be situated on a country's economic territory, but not on its geographic territory. In this situation, the activity of a centre of interest cannot be attributed to any region within the country's geographic territory.

It was with this situation in mind that the "extra-territorial region" was devised. Units and the transactions which they carry out, which cannot reasonably be attributed to any region within a country's geographic territory using the concepts described above, are accommodated in the extra-territorial region (see, *inter alia*, Althuizen, 1966, 1982; Eurostat, 1984; Venekamp, 1972).

Extra-territorial units should not be confused with supra-regional units. The latter have centres of interest within both the geographic and economic territory of a country, the point being that certain of the transactions of the enterprise unit (the establishments taken as a whole) cannot reasonably be attributed to any one of its constituent establishments. It follows that the transactions of the enterprise unit cannot reasonably be attributed to the region in question in the geographic and/or economic territory of the country (Bloem and De Vet, 1989).

The residence of a centre of interest is crucial in determining where it should be accommodated. The choice is between a domestic and foreign location and, where the domestic economy is concerned, between a regional and extra-territorial location. The choice will depend on how, in the context of regional accounts, the concept of the centre of interest is developed.

2.3 Units and kinds of activity

Any attempt to describe production processes must take account of the KAU. The statistical unit for describing the distribution and

redistribution of income, outlays and finance is the enterprise unit (ENT). For both types of unit, autonomy (and therefore economic behaviour) plays a dominant role in transactions resulting from economic processes (see, inter alia, Bloem, 1987/1989; Willeboordse, 1990). These units may comprise several LKAU's. The terms KAU and LKAU are defined below.

Kind-of-activity unit (Bloem, 1989; see also Eurostat, 1984a (212, 213), SNA, 1968 (5.15-5.23) and SNA, 1990):

"A kind-of-activity unit is an enterprise or part of an enterprise which enjoys autonomy as regards decisions concerning production processes and which is to a certain extent homogeneous". 2)

Basically, the KAU is the smallest unit in respect of which a complete set of information on the production process becomes available. It is fair to say that describability is largely contingent on autonomy: a non-autonomous unit can often not be comprehensively described. Internal deliveries within a KAU, for example, destined for re-use in that unit's production processes, are not taken into account. Consequently, internal deliveries between LKAU's belonging to the same KAU are not, as a rule, disclosed in the latter's accounts.

Local kind-of-activity units (CBS, 1982).

A local kind-of-activity unit is any separate area, premises or group of areas or premises located in the Netherlands, which is used by a KAU for the carrying out of its activities. Every LKAU is part of a KAU and every KAU has at least one LKAU.

These definitions highlight the implicit assumption that LKAU's do not enjoy autonomy with regard to the economic transactions in question: after all, autonomy is the hallmark of the KAU. It also follows from the definitions that complete information on the relevant part of the

2) Pending amendment of the coordination guidelines, the definition contained in the "Handboek Coördinatie Algemeen" (CBS, 1982) is not reproduced here.

production process cannot be compiled in any meaningful way. Two observations are in place:

- a. The LKAU and the KAU are very often the same. In 1987, for example, nearly 90% of enterprises comprised a single LKAU (CBS, 1987). These could be described as "genuine" economic agents.

The importance of multi-regional KAU's can be illustrated by expressing the number of jobs in multi-regional KAU's with more than 20 employees as a percentage of the total number of jobs in the Netherlands. In 1987, the figure was about 40%, measured at Corop level (NUTS III). Measured at the level of the provinces (NUTS II), the figure was about 37% and at the most aggregated regional level (Norht, East, West and South; NUTS I) still about 33% (CBS, 1990c)

- b. A KAU which comprises several LKAU's in more than one region is likely to carry out more than one activity, but by convention it is considered to carry out one main activity. The LKAU's would then be attributed to the same activity as the KAU. In such a case, a discrepancy can arise at regional level between the activities actually carried out there and the activities inferred from the unit's designated area of activity. This situation could arise if, say, a unit has separate departments for sales, personnel, production, or pension fund management, etc. which are all located in different regions.

Then the question arises on which argument the convention to identify LKAU's activities has been based.

Generally speaking, regional accounts in the Netherlands can be described as constituting a statistical system which uses a top-down approach, based on KAU's, to describe the production process in a region (Nijkamp et al, 1984). After all, most national statistical systems are aimed primarily at collecting information from KAU's which operate at national level. This is certainly true of the Netherlands (see, inter alia, CBS, 1990a and Eurostat, 1984a). For regional accounts purposes, the transactions of the KAU are attributed to the region. Complete

information on the production process of a KAU with a single LKAU can be attributed to the region in which the unit is resident. The production figures of a multi-regional unit have to be attributed to the regions in which the unit has LKAU's, on the basis of partial information. To this end, a holistic principle is applied (see, inter alia, Bouma, 1968; Koopmans and Wellink, 1987).

The holistic approach is used in fields such as biology, business economics and public finance. The KAU is seen as an organic whole comprising related activities, which results in certain products or services being supplied to the market. The individual "organs", which together make up the whole body, are not regarded as living beings in their own right. Interest focuses on their inter-relationship within the body as a whole. The organic relationship between activities carried out by a KAU at regional level is chosen as the starting point in preference to the more technical variable of activities actually carried out. In the holistic approach, the fact that a KAU has located its administrative departments in various regions is not of great importance. The approach is in line with the more institutional (behavioural) thinking which finds expression in the Multi-Year Programme 1990-93 (CBS, 1990a) and in the new SNA. In other words, this approach places greater emphasis on the relationship between the LKAU's and the supra-regional entity. The latter's economic behaviour is reflected, as it were, in the region. The holistic approach is such that inter-regional internal deliveries between LKAU's for re-use in the KAU's production processes are, by definition, deemed to be zero.

From a functional point of view, of course, there might be a case for describing the actual activities carried out by the LKAU's in the region, but LKAU's which wish to collect the necessary information are faced with practical and, possibly, theoretical difficulties. Examples include the transfer prices which should be deemed to apply to internal deliveries, and indeed the deliveries themselves, on which the LKAU's would have to provide information. It should also be pointed out that the introduction of internal deliveries between LKAU's of the same KAU would break the link between regional and national accounts. This is

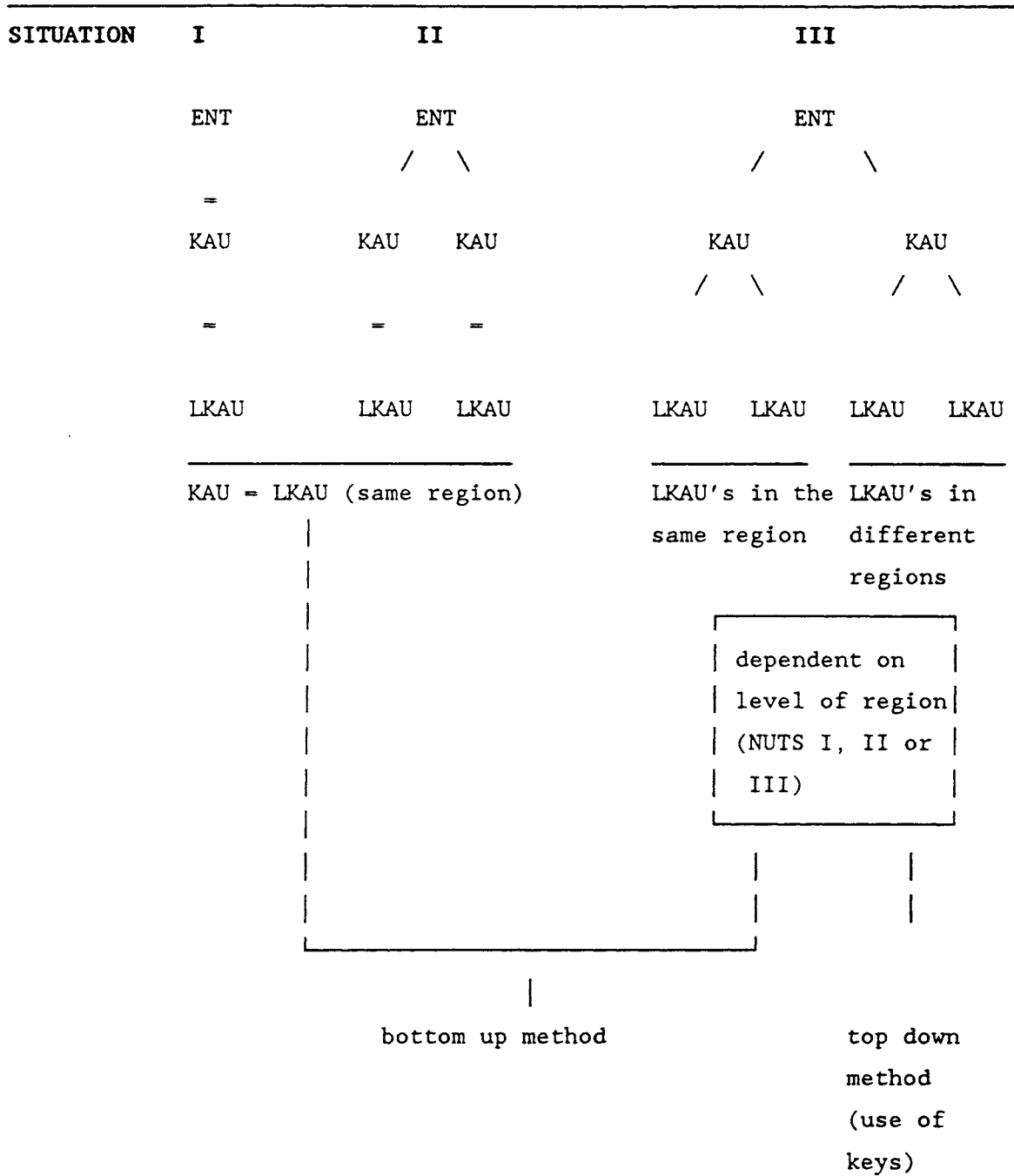
because the top-down approach places the requirement of additionality (producing national totals) on the regional data, including the variables production and consumption (see also Atsma, 1978). If a bottom-up approach is applied, of course, the link between the regional and the national accounts as regards the two above-mentioned variables can be dispensed with. As indicated earlier, however, it is questionable whether this approach could be put into effect.

The difference in regional results obtained from the top-down and bottom-up approaches is, as will have become apparent, determined by the number and size of multi-regional KAU's which effect internal deliveries between their LKAU's in different regions and the extent to which various activities are located in LKAU's in different regions. Taking as an example multi-regional KAU's with retailing activities in the food sector, the two approaches will produce broadly similar results. This is because the production process is homogeneous in character and the volume of internal transfers is likely to be low. In the case of industrial multi-regional KAU's, the somewhat more heterogeneous production processes in the various LKAU's and the associated internal transfers are likely to give rise to some discrepancy between the levels of production and consumption, and kinds of activity. The two approaches should not necessarily produce a difference in the creation of value added, however.

The top-down approach implies imputation for production and consumption, etc., and therefore also value added for the LKAU's. The choice of indicator for the regional breakdown should where possible be based on indicators (keys) which are closely related to the variables involved. Suggestions for the regional breakdown of production and consumption are set out in part 3.

The above can be presented in the following graph. There are basically three situations to be distinguished:

Table 1: Possible relations between statistical units



Autonomy is a determining factor in KAU status and is therefore one of the factors determining what information can be collected at regional level. It is against this background that some other elements which play a part in autonomy should be discussed.

The distance between establishments obviously has some relevance (see also Vanhove and Klaassen, 1980; Wever, 1980, etc.). Micro-economic considerations make it self-evident that the greater the distance between LKAU's - i.e. the higher the cost of transporting goods between them - the fewer internal transfers there will be. This makes it less likely that subsidiary LKAU's located in regions far from the main LKAU will function purely as suppliers of semi-finished goods. Generally speaking, therefore, the further a subsidiary LKAU is from the main LKAU, the more the former's production processes will be organized on separate lines from those of the main LKAU. This implies that the bigger the regions, the smaller the volume of inter-regional internal transfers between the LKAU's of a KAU. This means smaller imputations for LKAU's in bigger regions, which are not described separately. Given the size of some of their larger regions, countries like France and Germany presumably experience less severe problems with multi-regional KAU's than do smaller countries like the Netherlands (see also Berga (1990), Buck and Wever (1985) and Shepherd (1985)).

It is appropriate at this juncture to draw attention to the specific problem of multi-regional KAU's which make their products available via some form of network. Examples are the distribution of gas via a network of pipelines, the distribution of electricity via cables, telephonic services via cables or wireless communication links, and monetary transactions carried out via cash dispensers. A feature of all of these is that the place where the services or goods are produced and the place where they are acquired by the consumer can be different. In the context of the regional breakdown of the production process, importance obviously attaches to the location of the producer unit, i.e. the LKAU, and not to the place of consumption. The question of rail transport, which uses a special infrastructure, is examined in part 3.

2.4 Local kind-of-activity units in the extra-territorial region

Chapter II of the Manual Co-ordination (CBS, 1982) describes the various units used in statistical descriptions of the production process. As has already been stated, in the context of regional accounts, which provide a partial description of the production process in the various regions, the relevant units are the KAU and the LKAU.

It is appropriate to define what is meant by "LKAU in the extra-territorial region".

The definition given in section 2.3 should be expanded to include the following (CBS, 1982):

- a. Clearly defined premises on which installations are located which play a part in a production or distribution process but where personnel is not necessarily always present, such as a complex of installations used for the extraction of oil and gas (e.g. a group of nodding donkeys), power transformers and sewerage purification plants;
- b. The land address of inland waterway shippers who sail for own account and do not have any land-based commercial premises.
- c. Installations for the extraction of fuels in the Netherlands section of the continental shelf.

It follows from what section 2.2 that territorial enclaves located abroad, such as embassies, consulates, military and scientific bases, etc., should also be regarded as LKAU's.

It is apparent from the above that installations used in the extraction of petroleum and natural gas on the continental shelf in the North Sea come under category c). There are no explicit arrangements as regards petroleum and natural gas exploration on the continental shelf. For these activities, it is necessary to ascertain whether the LKAU on land should be taken as the criterion for regionalization, as is the case with shipping and sea towage, etc., or whether a "LKAU" should be deemed to exist on the continental shelf, as in the case of petroleum and natural gas extraction. What this actually boils down to is the

extent to which exploration differs from shipping and sea towage. Vessels engaged in the latter activities do not have a fixed place of residence for a period of at least one year: indeed, it is a vessel's very mobility which gives it its value added. The land-based LKAU from which the activities are controlled is conventionally regarded as the place of residence to which the activities should be attributed. Petroleum and natural gas exploration activities on the continental shelf are carried out with a view to locating reserves. The implication is that drilling vessels and oil rigs are confined to certain locations here for a long period of time. If the one-year rule is applied flexibly, it could be argued that "LKAU's" should be deemed to exist from which the exploration activities on the continental shelf are controlled.

Given that a LKAU exists - whether or not it is in the extra-territorial region - all transactions effected by it should be determined if the production process is to be described. This means that the production, consumption, value added, payroll costs and work volume of these units have to be ascertained. Value added and other income have to be accounted for as residual items. Other items which need to be ascertained are investments which can be attributed to LKAU's in the extra-territorial region, and exports.

2.5 Criteria for the regional breakdown of capital formation

2.5.1 Introduction

For national accounts purposes, capital formation is usually broken down according to three criteria:

1. Who produced the investment goods in question? There are two possible answers: domestic producers, sub-divided by manufacturing sector (origin) and foreign producers (i.e. the investment goods are imported).
2. Who acquires the goods (i.e. what is their destination), seen from the owner's point of view and from the user's point of view?
 - a. From the owner's point of view, the question is who has acquired

possession of the investment goods. The emphasis is on the relationship between the assets disclosed in the balance sheet and the expenses and revenues disclosed in the trading account. In cases where the goods are obtained by means of financial leasing, the lessee is also regarded as the owner. Annex 6 of the Draft Revised SNA states in this connection: "The durable goods or equipment, which is the object of a financial lease should be treated as being purchased and owned by the lessee. It is therefore recorded as gross fixed capital formation by the lessee and the subsequent capital consumption in respect of the goods is recorded in the capital accounts of the lessee".

- b. From the user's point of view, the question is who is actually using the investment goods; for example, where the goods have been obtained under an operational lease. The emphasis is on the technical relationship between labour and capital inputs and the output to which they give rise.

Traditionally, capital formation is broken down in Netherlands national accounts by origin and according to the user principle (CBS, 1990b). Following a revision of the national accounts, data are now also collected from the owner's point of view (Kroon, 1989; see also United Nations, 1990). The most important consideration when applying the owner principle is that greater emphasis than previously is now placed on the ability to analyse the behaviour of economic agents.

Hitherto, only the user's point of view has been used as the criterion for breakdown in Netherlands national accounts. This is partly because investment surveys only ask the user where the capital goods in question have actually been placed into use. The reason why regional data have not been collated from the two other points of view is therefore a practical one (no data available) rather than a theoretical one. The problems of regional breakdown associated with the three points of view are discussed below.

2.5.2 Capital formation broken down by place of origin

Data on the regional breakdown by place of origin of capital formation are collated for the purposes of regional input-output tables. A major

problem encountered when ascertaining this place is to ascertain for each region whether the goods produced represent intermediate or final sales. This is because it is very difficult, if not impossible, to collect information from a LKAU on capital goods supplied to other regions in the Netherlands (inter-regional transactions) and those supplied to agents in the same region. The smaller a region is, and the greater the likelihood of multi-regional transactions, the less feasible it is to compile an input-output table for it.

Indeed, it is questionable whether there is any point in an input-output table for a small region, given that the volume of internal transactions (measured using the number of intermediate and multi-regional transactions effected in and via the region) is likely to be small (Meijering and Wesseling, 1985; Vanhove and Klaassen, 1980).

The CBS compiled provincial input-output tables using what is known as the balance method (see, inter alia, CBS, 1983a) for the years 1960, 1965 and 1975. Because of cost-cutting measures, the CBS no longer produces regional input-output tables, which is partly why the present paper does not make a detailed examination of the regional breakdown by origin of capital formation. However, the conceptual problems encountered in this breakdown from the owner's and user's points of view are discussed in subsections 2.5.3 and 2.5.4.

2.5.3 Capital formation broken down by place of destination, seen from the owner's point of view

For purposes of attributing capital formation to a region, whether from the owner's or from the user's point of view, it is necessary to ascertain the place of residence of the unit concerned. This raises the conceptual problems associated with multi-regional KAU's and the extra-territorial region.

In theory, the ownership criterion can also be applied to regional accounts when ascertaining the destination of capital goods. However, this raises the question of what effect it has on those accounts, although it should be pointed out that this question only applies to

multi-regional units, since, in the case of non multi-regional units, the same criteria apply in regional accounts as in national accounts. If the ownership criterion is applied, the resident (domestic) KAU which acquires possession of the goods is the unit which makes the investments. The question which has now to be answered is how the investments are to be accounted for in the various LKAU's. If the holistic principle is applied, the component parts of the enterprise unit must be taken as a whole, and could be said to be juxtaposed; after all, the KAU is regarded as a single entity. Strictly speaking, therefore, it would be wrong to say that a main LKAU, whatever its function within the KAU, is in any way more important than the other LKAU's.

Although, in reality, investment decisions are taken in the main LKAU, this does not mean that the investments have to be attributed to that LKAU or to the region where it is located. In order to attribute investments by multi-regional KAU's to LKAU's, it is useful to adopt a technical approach. The important question is where the capital goods are put into service in the production process, or from which LKAU they are made available to third parties. This means in fact that, for regional accounts purposes, the user criterion is applied when a KAU's investments are attributed to its LKAU's. In the case of investments in fixed assets, the KAU can be asked to state the LKAU's in which the investments were made. The same is true of movable property such as office equipment, which can readily be attributed to a particular LKAU.

There is not likely to be much point in trying to obtain similar information from multi-regional KAU's on investments in vehicles, which can of course operate alternately from any LKAU in the country. Who is the user in such cases? Taking Netherlands Railways as an example: is the user the Headquarters in Utrecht, the terminals from which the trains depart every morning, the workshops where they are maintained or the stations where the freight and passenger transport services are provided? In cases such as this, where it is not easy to make a choice on theoretical grounds, consideration should be given to placing investments by multi-regional KAU's in a notional region with a supra-regional character (Bloem and De Vet, 1989). If, however, practical

reasons suggest a regional breakdown of vehicles, it is necessary to adopt certain conventions, which in the example just given might well be based on the relationship between the volume of transport activities and the use of rolling stock in a given region.

Lastly, a few words need to be said about the regional breakdown of investments in infrastructural networks by multi-regional KAU's. Again, the present author would advocate application of the residence principle (Bloem and De Vet, 1989). This option gains support from, inter alia, the Draft Revised SNA (United Nations, 1990), which makes an analogous statement on the ownership of capital goods in foreign countries: "The ownership of land and buildings within the economic territory of a country is deemed to be sufficient in itself for the owner to have a center of interest in that country ... It may happen, however, that an owner is resident in another country in which he owns the land or buildings other than the land or buildings themselves. In that case, the owner is treated in the System as if he delegated his ownership to a notional institutional unit which is actually resident in the country."

In the context of regional accounts, it should be added that for investments to be attributed to a given region, there must be a LKAU, or something which functions as such, in that region. An example is investments made by a company resident in Rotterdam in a pipeline running between Rotterdam and the Belgian city of Antwerp. Assuming there are no intermediate stations along the pipeline, the investments would, applying the above-mentioned criteria, be attributed in their entirety to the Rotterdam region in so far as they are situated on Netherlands territory.

2.5.4 Capital formation broken down by place of destination seen from the user's point of view

The principles described above for the regional breakdown of investment by destination, seen from the owner's point of view, can be applied by way of analogy to a breakdown seen from the user's point of view. The user KAU is asked to state the LKAU in which the investment goods have actually been placed into service (see also CBS, 1991). If the user of

the goods is also their owner, the two points of view will coincide. There can, of course, be major statistical differences between breakdowns seen from the two respective points of view, as in the following example.

If a LKAU of a leasing company in Province A grants an operational lease on a new commercial vehicle, which it owns, to a LKAU of an industrial KAU in Province B, the investment is made in Province A when seen from the owner's point of view and in Province B when seen from the user's point of view.

3. Regional breakdown of production, consumption and value added

In the case of KAU's comprising just one LKAU, production can readily be attributed to the region in which the unit is located by applying the residence principle. By convention, this principle is applied irrespective of where the activities in question are carried out. In this regard, transport services, for example, do not constitute an exception to the general rule, since the crucial factor is the location of the transport company's LKAU, not the place where it provides its services.

The breakdown of KAU's with LKAU's in more than one region, on the other hand, is problematic. Information on the production process is collected for the KAU as a whole, as indicated in the previous section. Complete sets of information on the production process are not collected for individual LKAU's. This means that no information on variables such as production, consumption and value added is collected for LKAU's individually. If the residence principle is applied, however, activities must be attributed to the LKAU's. This principle is based on the LKAU's where production is carried out. If the holistic principle is applied, the activities carried out in the LKAU's are assumed to correspond with those of the KAU of which they are part. The holistic principle therefore assumes that each LKAU has the same production process as the KAU of which it is part. On this basis, it is possible to assume a fairly stable relationship between inputs and the value added for all LKAU's. It follows that the regional breakdown can be based on variables which it is reasonable to assume that they are closely related with the computed value added of the LKAU. If the same key is used for the regionalisation of production and intermediate consumption, than homogeneity of the activities of the different LKAU's is assumed.

An important variable in this connection is the number of employees (preferably the volume of labour) per LKAU, the assumption being that there is a close correlation between this variable and the LKAU's value added. Another indicator of at least equal validity for regional breakdown purposes is the payroll, which is of particular relevance in

the services sector. The transport services e.g. provided by a KAU in a given region are attributed to its LKAU's in that region according to the payroll. This method can, of course, only be used where it is reasonable to assume a correlation of this type.

The special nature of the production process of government should also be noted. General government services do not have a market price. By convention, the national production value of the central government is deemed to be the total of intermediate consumption, the remuneration of general government personnel, depreciation and indirect taxes paid by general government (CBS, 1990). This means that if this information is available for the LKAU's of the central government, the national convention is also applicable to a regional level. The variable ultimately chosen as the basis for the regional breakdown depends mainly on the nature of the production processes but also, of course, on the availability of data.

Consideration should be given to one other important factor which suggests that a somewhat different approach be adopted for the payroll and number of employees to that adopted for the other variables. In the case of production, decision-making at KAU level determines the allocation of production factors, whereas, in the case of labour and wage bills, specific regional factors are important. On the one hand, a KAU's decision on where to locate a LKAU will be affected by information on the quantity and quality of labour provided by the household sector in a given region. On the other hand, households play an economic role as income-spenders. Allowing for inter-regional transactions effected by households, earned income is for the most part spent in the region where the households sell their labour to the LKAU's. In this way, the payroll, like the production process, becomes part of the distribution and spending process. Preference should therefore be given to collecting factual information on the wage bill per LKAU (i.e. of multi-regional KAU's) or, if this is not feasible, to collecting the information for each municipality in which the LKAU's are located. There is no theoretical reason why this approach should not be adopted. In practical terms, it should be feasible to obtain information on labour and wage bills from or in the LKAU's or municipalities in question (CBS, 1987a).

As has already been pointed out, however, the collection of information on production, consumption and value added is by no means as straightforward.

4. Conclusions

In compiling Regional accounts, national accounts figures should be regionalised on the basis of the residence of a local kind of activity unit (LKAU). The activities of LKAU are then allocated to their permanent addresses and not to the place where a LKAU really practises its activities. For example, activities of LKAU's of a construction company are allocated to the residence of the LKAU and not to the buildingsite.

A special problem in regional accounting is the regionalisation of the transactions of among other things embassies, agencies for military, scientific or other purposes abroad and activities of units at the continental shelf. These units have one or more LKAU's on the economic territory of a country but not within one of the regions of that country. These units are allocated to the so called extra-territorial region. The transactions of units within the extra-territorial region are treated the same way as units in 'normal' regions.

The condition that regional totals of branches have to add up to national totals implies that the type of economic activity of a LKAU has to be the same as the economic activity of the KAU. This could be called the allocation of economic activities of a KAU to a LKAU according to a holistic principle.

A lot of LKAU's that are part of a KAU does not have operating accounts. It is then very difficult to collect sufficient information on the economic transactions of the LKAU. In absence of operating accounts at the level of a LKAU, production, consumption and value added have to be attributed on the basis of indicators that have some relation with the activities of a LKAU. In practice, information is used on inputs of labour in the LKAU in the form of number of jobs, volume of labour or earned wages or salaries. For theoretical reasons the earned wages or salaries are the best indicator for the attribution.

In general, capital formation can be broken down on the basis of three criteria:

1. Capital formation broken down by place of origin.
2. Capital formation broken down by destination, seen from the owner's point of view.
3. Capital formation broken down by destination, seen from the user's point of view.

The choice for one of the criteria depends on the use of the data. If one wants to construct a regional input-outputtable, method 1 has to be used. This method shows the output of investment goods by industry of construction.

If the emphasis is on the relationship between the assets disclosed in the balance sheet and the expenses and revenues disclosed in the trading account, method 2 has to be used.

Method 3 means that capital goods are put into service by the real user of the capital goods, which is basically a technical approach. The emphasis of method 3 is on the relationship between the physical inputs of labour and capital and the outputs of the units concerned.

There are no theoretical arguments to give preference to one of the methods. However method 3 is used in most of the EC-countries.

A few remarks on two specific issues have to be made: investments in vehicles and infrastructural networks. These remarks are relevant whatever method is used.

There is not likely to be much point in trying to obtain information from multi-regional KAU's on investments in vehicles, which can of course operate alternately from any LKAU in the country. Who is the user in such cases? Where it is not easy to make a choice on theoretical grounds, consideration should be given to placing investments by multi-regional KAU's in a notional region with a supra-regional character.

If, however, practical reasons suggest a regional breakdown of vehicles, it is necessary to adopt certain conventions. In the example just given, the break down might well be based on the relationship between the volume of transport activities and the use of rolling stock in a given region.

The regional breakdown of investments in infrastructural networks by multi-regional KAU's should be based on the residency principle. However, in order to attribute the investments to regions there must be a LKAU, or something which functions as such, in that region. An example is investments made by a company resident in Rotterdam in a pipeline running between Rotterdam and the Belgian city of Antwerp. Assuming there are no intermediate stations along the pipeline, the investments would, applying the above-mentioned criteria, be attributed in their entirety to the Rotterdam region in so far as they are situated on Netherlands territory.

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**Netherlands Central Bureau of Statistics
National Accounts Occasional Papers**

- NA/01 Flexibility in the system of National Accounts**, Van Eck, R., 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 in 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**, Van Eck, R. (1985).
In the process of estimating national product and other variables in the National Accounts a number of methods is used to obtain initial estimates for each economic activity. These methods are described and for each method various possibilities for distortion are considered.
- NA/04 Comparability of input-output tables in time**, Al, P.G. and G.A.A.M. Broesterhuizen (1985).
It is argued that the comparability in time of statistics, and input-output tables in particular, can be filled in in various ways. The way in which it is filled depends on the structure and object of the statistics concerned. In this respect it is important to differentiate between coordinated input-output tables, in which groups of units (industries) are divided into rows and columns, and analytical input-output tables, in which the rows and columns refer to homogeneous activities.
- NA/05 The use of chain indices for deflating the National Accounts**, Al, P.G., B.M. Balk, S. de Boer and G.P. den Bakker (1985).
This paper is devoted to the problem of deflating National Accounts and input-output tables. This problem is approached from the theoretical as well as from the practical side. Although the theoretical argument favors the use of chained Vartia-I indices, the current practice of compiling National Accounts restricts to using chained Paasche and Laspeyres indices. Various possible objections to the use of chained indices are discussed and rejected.
- NA/06 Revision of the system of National Accounts: the case for flexibility**, Van Bochove, C.A. and H.K. van Tuinen (1985).
It is argued that the structure of the SNA should be made more flexible. This can be achieved by means of a system of a general purpose core supplemented with special modules. This core is a fully fledged, detailed system of National Accounts with a greater institutional content than the present SNA and a more elaborate description of the economy at the meso-level. The modules are more analytic and reflect special purposes and specific theoretical views.
- NA/07 Integration of input-output tables and sector accounts; a possible solution**, Van den Bos, C. (1985).
The establishment-enterprise problem is tackled by taking the institutional sectors to which the establishments belong into account during the construction of input-output tables. The extra burden on the construction of input-output tables resulting from this approach is examined for the Dutch situation. An adapted sectoring of institutional units is proposed for the construction of input-output tables.
- NA/08 A note on Dutch National Accounting data 1900-1984**, Van Bochove, C.A. (1985).
This note provides a brief survey of Dutch national accounting data for 1900-1984, concentrating on national income. It indicates where these data can be found and what the major discontinuities are. The note concludes that estimates of the level of national income may contain inaccuracies; that its growth rate is measured accurately for the period since 1948; and that the real income growth rate series for 1900-1984 may contain a systematic bias.

- NA/09 The structure of the next SNA: review of the basic options**, Van Bochove, C.A. and A.M. Bloem (1985).
There are two basic issues with respect to the structure of the next version of the UN System of National Accounts. The first is its 'size': reviewing this issue, it can be concluded that the next SNA should contain an integrated meso-economic statistical system. It is essential that the next SNA contains an institutional system without the imputations and attributions that pollute the present SNA. This can be achieved by distinguishing, in the central system of the next SNA, a core (the institutional system), a standard module for non-market production and a standard module describing attributed income and consumption of the household sector.
- NA/10 Dual sectoring in National Accounts**, Al, P.G. (1985).
Following a conceptual explanation of dual sectoring, an outline is given of a statistical system with complete dual sectoring in which the linkages are also defined and worked out. It is shown that the SNA 1968 is incomplete and obscure with respect to the links between the two sub-processes.
- NA/11 Backward and forward linkages with an application to the Dutch agro-industrial complex**, Harthoorn, R. (1985).
Some industries induce production in other industries. An elegant method is developed for calculating forward and backward linkages 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 chains 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**, De Boer, S. and G.A.A.M. Broesterhuizen (1986).
A few years ago the method of compiling input-output tables underwent in the Netherlands an essential revision. The most significant improvement is that during the entire statistical process, from the processing and analysis of the basic data up to and including the phase of balancing the tables, data in current prices and deflated data are obtained simultaneously and in consistency with each other.
- NA/14 A proposal for the synoptic structure of the next SNA**, Al, P.G. and C.A. van Bochove (1986).
- NA/15 Features of the hidden economy in the Netherlands**, Van Eck, R. and B. Kazemier (1986).
This paper presents survey results on the size and structure of the hidden labour market in the Netherlands.
- NA/16 Uncovering hidden income distributions: the Dutch approach**, Van Bochove, C.A. (1987).
- NA/17 Main national accounting series 1900-1986**, Van Bochove, C.A. and T.A. Huitker (1987).
The main national accounting series for the Netherlands, 1900-1986, are provided, along with a brief explanation.
- NA/18 The Dutch economy, 1921-1939 and 1969-1985. A comparison based on revised macro-economic data for the interwar period**, Den Bakker, G.P., T.A. Huitker and C.A. van Bochove (1987).
A set of macro-economic time series for the Netherlands 1921-1939 is presented. The new series differ considerably from the data that had been published before. They are also more comprehensive, more detailed, and conceptually consistent with the modern National Accounts. The macro-economic developments that are shown by the new series are discussed. It turns out that the traditional economic-historical view of the Dutch economy has to be reversed.
- NA/19 Constant wealth national income: accounting for war damage with an application to the Netherlands, 1940-1945**, Van Bochove, C.A. and W. van Sorge (1987).

- NA/20 The micro-meso-macro linkage for business in an SNA-compatible system of economic statistics, Van Bochove, C.A. (1987).**
- NA/21 Micro-macro link for government, Bloem, A.M. (1987).**
This paper describes the way the link between the statistics on government finance and national accounts is provided for in the Dutch government finance statistics.
- NA/22 Some extensions of the static open Leontief model, Harthoorn, R. (1987).**
The results of input-output analysis are invariant for a transformation of the system of units. Such transformation can be used to derive the Leontief price model, for forecasting input-output tables and for the calculation of cumulative factor costs. Finally the series expansion of the Leontief inverse is used to describe how certain economic processes are spread out over time.
- NA/23 Compilation of household sector accounts in the Netherlands National Accounts, Van der Laan, P. (1987).**
This paper provides a concise description of the way in which household sector accounts are compiled within the Netherlands National Accounts. Special attention is paid to differences with the recommendations in the United Nations System of National Accounts (SNA).
- NA/24 On the adjustment of tables with Lagrange multipliers, Harthoorn, R. and J. van Dalen (1987).**
An efficient variant of the Lagrange method is given, which uses no more computer time and central memory than the widely used RAS method. Also some special cases are discussed: the adjustment of row sums and column sums, additional restraints, mutual connections between tables and three dimensional tables.
- NA/25 The methodology of the Dutch system of quarterly accounts, Janssen, R.J.A. and S.B. Algera (1988).**
In this paper a description is given of the Dutch system of quarterly national accounts. The backbone of the method is the compilation of a quarterly input-output table by integrating short-term economic statistics.
- NA/26 Imputations and re-routeings in the National Accounts, Gorter, Cor N. (1988).**
Starting out from a definition of 'actual' transactions an inventory of all imputations and re-routeings in the SNA is made. It is discussed which of those should be retained in the core of a flexible system of National Accounts. Conceptual and practical questions of presentation are brought up. Numerical examples are given.
- NA/27 Registration of trade in services and market valuation of imports and exports in the National Accounts, Bos, Frits (1988).**
The registration of external trade transactions in the main tables of the National Accounts should be based on invoice value; this is not only conceptually very attractive, but also suitable for data collection purposes.
- NA/28 The institutional sector classification, Van den Bos, C. (1988).**
A background paper on the conceptual side of the grouping of financing units. A limited number of criteria are formulated.
- NA/29 The concept of (transactor-)units in the National Accounts and in the basic system of economic statistics, Bloem, Adriaan M. (1989).**
Units in legal-administrative reality are often not suitable as statistical units in describing economic processes. Some transformation of legal-administrative units into economic statistical units is needed. This paper examines this transformation and furnishes definitions of economic statistical units. Proper definitions are especially important because of the forthcoming revision of the SNA.
- NA/30 Regional income concepts, Bloem, Adriaan M. and Bas De Vet (1989).**
In this paper, the conceptual and statistical problems involved in the regionalization of national accounting variables are discussed. Examples are the regionalization of Gross Domestic Product, Gross National Income, Disposable National Income and Total Income of the Population.

- NA/31 The use of tendency surveys in extrapolating National Accounts**, Ouddeken, Frank and Gerrit Zijlmans (1989).
This paper discusses the feasibility of the use of tendency survey data in the compilation of very timely Quarterly Accounts. Some preliminary estimates of relations between tendency survey data and regular Quarterly Accounts-indicators are also presented.
- NA/32 An economic core system and the socio-economic accounts module for the Netherlands**, Gorter, Cor N. and Paul van der Laan (1989).
A discussion of the core and various types of modules in an overall system of economy related statistics. Special attention is paid to the Dutch Socio-economic Accounts. Tables and figures for the Netherlands are added.
- NA/33 A systems view on concepts of income in the National Accounts**, Bos, Frits (1989).
In this paper, concepts of income are explicitly linked to the purposes of use and to actual circumstances. Main choices in defining income are presented in a general system. The National Accounts is a multi-purpose framework. It should therefore contain several concepts of income, e.g. differing with respect to the production boundary. Furthermore, concepts of national income do not necessarily constitute an aggregation of income at a micro-level.
- NA/34 How to treat borrowing and leasing in the next SNA**, Keuning, Steven J. (1990).
The use of services related to borrowing money, leasing capital goods, and renting land should not be considered as intermediate inputs into specific production processes. It is argued that the way of recording the use of financial services in the present SNA should remain largely intact.
- NA/35 A summary description of sources and methods used in compiling the final estimates of Dutch National Income 1986**, Gorter, Cor N. and others (1990).
Translation of the inventory report submitted to the GNP Management Committee of the European Communities.
- NA/36 The registration of processing in make and use tables and input-output tables**, Bloem, Adriaan M., Sake De Boer and Pieter Wind (1990, forthcoming).
The registration of processing is discussed primarily with regard to its effects on input-output-type tables and input-output quotes. Links between National Accounts and basic statistics, user demands and international guidelines are examined.
- NA/37 A proposal for a SAM which fits into the next System of National Accounts**, Keuning, Steven J. (1990).
This paper shows that all flow accounts which may become part of the next System of National Accounts can be embedded easily in a Social Accounting Matrix (SAM). In fact, for many purposes a SAM format may be preferred to the traditional T-accounts for the institutional sectors, since it allows for more flexibility in selecting relevant classifications and valuation principles.
- NA/38 Net versus gross National Income**, Bos, Frits (1990).
In practice, gross figures of Domestic Product, National Product and National Income are most often preferred to net figures. In this paper, this practice is challenged. Conceptual issues and the reliability of capital consumption estimates are discussed.
- NA/39 Concealed interest income of households in the Netherlands; 1977, 1979 and 1981**, Kazemier, Brugt (1990).
The major problem in estimating the size of hidden income is that total income, reported plus unreported, is unknown. However, this is not the case with total interest income of households in the Netherlands. This makes it possible to estimate at least the order of magnitude of this part of hidden income. In this paper it will be shown that in 1977, 1979 and 1981 almost 50% of total interest received by households was concealed.

NA/40 Who came off worst: Structural change of Dutch value added and employment during the interwar period, Den Bakker, Gert P. and Jan de Gijt (1990).

In this paper new data for the interwar period are presented. The distribution of value added over industries and a break-down of value added into components is given. Employment by industry is estimated as well. Moreover, structural changes during the interwar years and in the more recent past are juxtaposed.

NA/41 The supply of hidden labour in the Netherlands: a model, Kazemier, Brugt and Rob van Eck (1990).

This paper presents a model of the supply of hidden labour in the Netherlands. Model simulations show that the supply of hidden labour is not very sensitive to cyclical fluctuations. A tax exempt of 1500 guilders for second jobs and a higher probability of detection, however, may substantially decrease the magnitude of the hidden labour market.

NA/42 Benefits from productivity growth and the distribution of income, Keuning, Steven J. (1990).

This paper contains a discussion on the measurement of multifactor productivity and sketches a framework for analyzing the relation between productivity changes and changes in the average factor remuneration rate by industry. Subsequently, the effects on the average wage rate by labour category and the household primary income distribution are studied.

NA/43 Valuation principles in supply and use tables and in the sectoral accounts, Keuning, Steven J. (1991).

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

NA/44 The choice of index number formulae and weights in the National Accounts. A sensitivity analysis based on macro-economic data for the interwar period, Bakker, Gert P. den (1991).

The sensitivity of growth estimates to variations in index number formulae and weighting procedures is discussed. The calculations concern the macro-economic variables for the interwar period in the Netherlands. It appears, that the use of different formulae and weights yields large differences in growth rates. Comparisons of Gross Domestic Product growth rates among countries are presently obscured by the use of different deflation methods. There exists an urgent need for standardization of deflation methods at the international level.

NA/45 Volume measurement of government output in the Netherlands; some alternatives, Kazemier, Brugt (1991).

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

NA/46 An environmental module and the complete system of national accounts, Boo, Abram J. De, Peter R. Bosch, Cor N. Gorter and Steven J. Keuning (1991).

A linkage between environmental data and the National Accounts is often limited to the production accounts. This paper argues that the consequences of economic actions on ecosystems and vice versa should be considered in terms of the complete System of National Accounts (SNA). One should begin with relating volume flows of environmental matter to the standard economic accounts. For this purpose, a so-called National Accounting Matrix including Environmental Accounts (NAMEA) is proposed. This is illustrated with an example.

- NA/47 Deregulation and economic statistics: Europe 1992**, Bos, Frits (1992).
The consequences of deregulation for economic statistics are discussed with a view to Europe 1992. In particular, the effects of the introduction of the Intrastat-system for statistics on international trade are investigated. It is argued that if the Statistical Offices of the EC-countries do not respond adequately, Europe 1992 will lead to a deterioration of economic statistics: they will become less reliable, less cost effective and less balanced.
- NA/48 The history of national accounting**, Bos, Frits (1992).
At present, the national accounts in most countries are compiled on the basis of concepts and classifications recommended in the 1968-UN-guidelines. In this paper, we trace the historical roots of these guidelines (e.g. the work by King, Petty, Kuznets, Keynes, Leontief, Frisch, Tinbergen and Stone), compare the subsequent guidelines and discuss also alternative accounting systems like extended accounts and SAMs.
- NA/49 Quality assessment of macroeconomic figures: The Dutch Quarterly Flash**, Reininga, Ted, Gerrit Zijlmans and Ron Janssen (1992).
Since 1989-IV, the Dutch Central Bureau of Statistics has made preliminary estimates of quarterly macroeconomic figures at about 8 weeks after the end of the reference quarter. Since 1991-II, a preliminary or "Flash" estimate of GDP has been published. The decision to do so was based on a study comparing the Flash estimates and the regular Quarterly Accounts figures, which have a 17-week delay. This paper reports on a similar study with figures through 1991-III.
- NA/50 Quality improvement of the Dutch Quarterly Flash: A Time Series Analysis of some Service Industries**, Reininga, Ted and Gerrit Zijlmans (1992).
The Dutch Quarterly Flash (QF) is, just like the regular Quarterly Accounts (QA), a fully integrated statistic based on a quarterly updated input-output table. Not all short term statistics used to update the QA's IO-table are timely enough to be of use for the QF, so other sources have to be found or forecasts have to be made. In large parts of the service industry the latter is the only possibility. This paper reports on the use of econometric techniques (viz. series decomposition and ARIMA modelling) to improve the quality of the forecasts in five parts of the service industry.
- NA/51 A Research and Development Module supplementing the National Accounts**, Bos, Frits, Hugo Hollanders and Steven Keuning (1992).
This paper presents a modified national accounting system tailored to a description of the role of Research and Development (R&D) in the national economy. The main differences with the standard National Accounts are some changes in basic concepts (e.g. own-account production of R&D is considered as capital formation) and the introduction of additional, more detailed, classifications (e.g. new subsectors).
- NA/52 The allocation of time in the Netherlands in the context of the SNA; a module**, Kazemier, Brugt and Jeanet Exel (1992).
This paper presents a module on informal production, supplementing the National Accounts. Its purpose is to incorporate informal production into the concepts of the SNA. The relation between formal and informal production is shown in the framework of a Social Accounting Matrix (SAM). To avoid a controversial valuation of informal production, the module consists of two SAMs. One expressed in actual prices with informal labour valued zero, and one which expresses the embedded informal labour input measured in terms of hours worked.
- NA/53 National Accounts and the environment: the case for a system's approach**, Keuning, Steven J. (1992).
The present set of main economic indicators should be extended with one or a few indicators on the state of the environment. This paper lists various reasons why a so-called Green Domestic Product is not suitable for this purpose. Instead, a system's approach should be followed. A National Accounting Matrix including Environmental Accounts (NAMEA) is presented and the way to derive one or more separate indicators on the environment from this information system is outlined.

NA/54 How to treat multi-regional units and the extra-territorial region in the Regional Accounts?, De Vet, Bas (1992).
This paper discusses the regionalization of production and capital formation by multi-regional kind-of-activity units. It also examines the circumstances in which a unit may be said to have a local kind-of-activity unit in the extra-territorial region and what should be attributed to this "region".

NA/55 A historical Social Accounting Matrix for the Netherlands (1938), Den Bakker, Gert P., Jan de Gijt and Steven J. Keuning (1992).
This paper presents a Social Accounting Matrix (SAM) for the Netherlands in 1938, including related, non-monetary tables on demographic characteristics, employment, etc. The distribution of income and expenditure among household subgroups in the 1938 SAM is compared with committant data for 1987.

NA/56 Origin and development of the Dutch National Accounts, Den Bakker, Gert P. (1992).
This paper describes the history of national accounting in the Netherlands. After two early estimates in the beginning of the nineteenth century, modern national accounting started in the 1930s on behalf of the Tinbergen model for the Dutch economy. The development spurred up after World War II to provide data to the government for economic planning purposes. In the 1980s, the development was towards a flexible and institutional approach.

NA/57 Compiling Dutch Gross National Product (GNP); summary report on the final estimates after the revision in 1992, Bos, Frits (1992).
This summary report describes the sources and methods used for compiling the final estimate of Dutch Gross National Product after the revision of the Dutch National Accounts in 1992. Attention is focused on the estimation procedures for 1988.

NA/58 Major changes and results of the revision of the Dutch National Accounts in 1992, Department of National Accounts (1992, forthcoming).
The revision in 1992 has improved the Dutch National Accounts in three ways. First, new and other data sources have been used, like Production statistics of service industries, the Budget Survey and Statistics on fixed capital formation. Secondly, the integration process has been improved by the use of detailed make- and use-tables instead of more aggregate input-output tables. Thirdly, several changes in bookkeeping conventions have been introduced, like a net instead of a gross registration of processing to order.

NA/59 A National Accounting Matrix for the Netherlands, Keuning, Steven and Jan de Gijt (1992).
Currently, the national accounts typically use two formats for presentation: matrices for the Input-Output tables and T-accounts for the transactions of institutional sectors. This paper demonstrates that presently available national accounts can easily be transformed into a National Accounting Matrix (NAM). This may improve both the transparency and analytic usefulness of the complete set of accounts.

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