CENTRAL BUREAU OF STATISTICS
The Netherlands
National Accounts Department

REGIONAL INCOME CONCEPTS*)

Adriaan M. Bloem
Bas de Vet**)

*) Paper to be presented at the december 1989 EC-working party on "Economic accounts and statistical indicators at regional level".

**) Head National Accounts Department, Chief National Accounts Regional Accounts Division, respectively.

Nr. NA-030
1989

REGIONAL INCOME CONCEPTS

Abstract

Policy-making at European and national level requires regionalised counterparts of macro-economic variables such as gross domestic product, gross national income and disposable national income. This paper goes into the conceptual problems involved in the regionalization of these variables, especially against the background of the information needs in the context of the EC regional funds, which centre around the concept of 'living standard'. As such a concept is not defined in the national accounts, the merits of all the usuall macro-economic production/income concepts are examined in a regional context. The regional counterpart of 'total income of the population' is also worked out. Attention is also paid to how various regional production/income concepts could be put into practice and quantified.

CONTENTS

1. Introduction

From the very beginning, the European Community has been concerned with the problems of regional differences in living standards. This is evident, for example, from a passage in the preamble to the Treaty of Rome stating that the Member States are "anxious to strengthen the unity of their economies and to ensure their harmonious development by reducing the differences existing between the various regions and the backwardness of the less favoured regions" (CEC 1987, p.81). To this end, the European Regional Development Fund (ERDF) was set up in 1975, its objective being spelt out in more detail: "to correct the principal regional imbalances within the Community resulting in particular from agricultural preponderance, industrial change and structural underemployment". The principles behind the allocation of resources from the Fund indicate clearly that they were to be used for investment in infrastructure or firms in regions covered by State regional aid schemes (CEC 1987, p.81). Other relevant European funds are the European Social Fund (ESF) and the European Agricultural Guidance and Guarantee Fund, Guidance Section (EAGGF-Guidance).

Elsewhere in CEC 1987 (p.VI), the Commission argues:

"Convergence is necessary if the objective of cohesion is to be attained. In this respect, two aspects need to be properly differentiated:

(a) nominal convergence, which is concerned with improved control over monetary developments and nominal incomes and with moves to secure and maintain price stability and overall equilibria in the fields of public finance and balances of payments;

(b) real convergence between regions and Member States, which involves bringing living standards and income generation more closely into line at the highest possible level while evening out disparities in unemployment at the lowest possible level".

The Commission intends to achieve this aim "without forced, uneven migration and without excessive concentration of population". The Commission also points out that there has been a substantial drop in mobility between regions. In the first half of the '80s the net annual migration rate was 0.25% of the population, representing a halving of the '60s rate. Partly for this reason, the Commission concludes that "strengthening economic performance and boosting employment in the problem regions will, therefore, make a major contribution to achieving sound, macro-economic growth". For the Commission, the aim of regional policy is to "generate employment and income in those areas possessing the necessary manpower and displaying potential for economic development".

In order to implement its policy, the Commission requires quantitative indicators, particularly for distributing the resources available. Eurostat is asking the national statistical offices to provide information for this purpose. The question then is what the Commission understands by standard of living and how is it to be defined in statistical terms. This requires familiarity with the policy objectives and study of the relationship between these objectives and relevant statistical concepts.

The possibility of defining these concepts in operational terms then needs to be examined. This note is intended to give an initial impulse to this discussion. It starts with a brief review of the production and income concepts in the national accounts which are or could be used in this connection. It then goes on to consider the specific problems of regionalizing these macro-variables. Finally, some aspects of the operational definitions are discussed briefly.

2. Production and income concepts in the national accounts

2.1 Gross domestic product

From the passages cited above it might be deduced that the production process in the regions and the employment associated with it form the concrete basis for Commission policy. In the system of national accounts, production is measured by Gross Domestic Product (GDP). A gross regional product (GRP) could be defined by analogy, and is widely used in practice.

However, it is arguable whether, in view of the various aims mentioned in the introduction, a region's production can serve as the single point of reference. There is, after all, a difference between a region's production and its income, since part of the value-added produced in a region is transferred to other regions - in the form of wages, return on capital, taxes and similar. Conversely, a region also receives income generated elsewhere. A distinction can also be made between income flows related to production and income flows due to redistribution measures.

2.2 Gross national income

As far as "income generation" is concerned, a measure of the capacity of a region to generate income would have to take into account income generated by this region in others, through the provision of labour or financial resources, and vice versa. This is referred to in the Dutch national accounts as primary income distribution. For the economy as a whole, the result is the national product or income. For the individual sectors, this is referred to as primary income to distinguish it from disposable income. The latter concept includes gratis income transfers, i.e. "secondary" income flows (considered in more detail in the following section). The regional counterpart of gross national income (GNI), i.e. gross primary regional income (GPRI), would be the most appropriate measure of "income generation". This is because GNI also

includes income flows to and from abroad that are more or less directly related to production. GPRI would also have to take into account corresponding income flows to and from other regions. This means, for example, that a worker resident in region A but employed by a producer resident in region B contributes to the GRP of region B. If, however, the wages of this worker are transferred to region A, this contributes to the GPRI of region A. Similar reasoning applies to a producer who is resident in region A but owns a factory in region B. The factory in region B contributes to the GRP of region B. If (part of) the "residual income" is transferred to the producer (owner) in region A, this contributes to the GPRI of region A.

Since the Commission does not regard interregional migration as a solution to economic imbalances between the regions, while not ruling out regional commuting, the introduction of the GPRI concept could indeed be useful.

2.3 Gross disposable national income

"Bringing living standards ... into line" is also mentioned as one of the Commission's objectives (CEC 1987, p.VI). This raises the question of what the Commission understands by living standard. A number of economic textbooks define it as the extent to which the consumer can satisfy his or her needs. On account of the highly subjective nature of this definition and the corresponding difficulty of measuring it statistically, the level of provision with goods and services is often used as the basis for measuring living standards (Lipsey et al, 1984).

In the system of national accounts, this could be interpreted as the consumer expenditure that residents can engage in without having to borrow money. The first question that may be asked here is how broadly should "consumption" be defined. Is it strictly confined to consumption in a given year or should savings (future consumption) also be taken into account? If the total of consumption and savings is chosen,

"disposable income" is the appropriate concept. This is the income resulting once allowance has been made for the process of income redistribution, i.e. income directly related to production plus the balance of gratis income transfers. The second question that needs to be considered is which sectors have to be taken into account for a comparison of disposable incomes. For a comparison of "living standards", the obvious approach would be to take households as the basis. However, the facilities supplied by the government, which come under government consumption in the national accounts, could also be included in a definition of the "material standard of living" of households. This applies in particular to "individualizable" government consumption (Pêtre, 1981), such as education and health care services. Any international comparison of living standards must also take into account the fact that the institutional arrangements for providing such facilities differ widely. Furthermore, it is conceivable that overall government consumption and also government savings (as deferred consumption) could also be included in the comparison of living standards. In terms of the national accounts, the disposable income of households plus gross disposable government income could be used as a basis for a regional breakdown.

Thirdly, it might also be asked to what extent the net disposable income of businesses need be considered, being the proportion of income, or profits, retained by businesses and which therefore does not contribute to the disposable income of households or government. It can, however, contribute to the wealth of households or government in the form, for example, of an increase in the market value of any shares they might own. In this respect, the disposable income of businesses may be regarded as indirect savings by households or government. However, the question is whether either will in fact ever cash in on such an increase. For these reasons and for statistical considerations, it does not seem appropriate to include the disposable income of businesses in the present discussion.

As regards the alternative interpretations of "standard of living" outlined above, two comments are in order:

1. As is known, the national accounts have a number of features that make it impossible for the income concepts they use to be equated with the standard of living. For example, some activities are not measured in the national accounts, e.g. because they fall outside the definition of production, such as housework. Factors such as environmental pollution are not considered either, although they may well have a regional dimension.
2. It is quite conceivable for the regions of a country to differ (considerably) in price levels and trends. One example would be different rents in urban and country areas for identical housing. This means that comparing regional disposable incomes does not fully reflect regional differences in the "material standard of living". This aspect could be taken into account by calculating regional purchasing power parities (see also Kravis et al., 1978).

Apart from the problems so far outlined, the statistical interpretation at regional level of the concepts used in the national accounts must also be looked at critically - the conventions used for operational definitions of concepts such as GDP have an effect on the regional breakdown of GDP and hence on such associated variables as GPRI. The following section deals with this question in detail.

3. Production and income concepts in the national accounts as applied at regional level

3.1 General principles

The definition of regional production and income concepts depends on how the conventions applying to the definition of national variables function at regional level.

The most important convention here is the "residency principle", which determines which actors are to be included in the national economy. The SNA, the ESA and the IMF Balance of Payment Manual all generally take this principle as their basis, meaning that all actors resident in the national territory belong to the national economy. The value-added produced by these actors forms part of GDP regardless of where it is produced.

This means, for example, that the value-added produced abroad (e.g. a service) by a business resident in the Netherlands is counted as part of the Dutch GDP and not as part of that of the country where the value-added is produced. It does not apply if the activities are undertaken by a foreign establishment, because establishments abroad are considered to form part of the economy in which they operate. The value-added they produce thus forms part of the GDP of the foreign economy.

The somewhat arbitrary nature of this sub-convention is all the more apparent when it comes to the question, for example, of what is understood by an establishment ("letter-box" company? building site? sales office? agency?).

The alternative to the "residency principle" is the "territory principle", i.e. in which the concept of territory is central. In this case, the goods and services produced within the territory and the added-value thus created are considered regardless of whether the

producer is resident in the Netherlands or established abroad. This principle is not relevant to the national accounts, except for the registration of certain transport services on foreign territory[1)].

At regional level, this issue plays an important role, affecting GRP most directly.

3.2 Gross regional product

A number of specific problems arise when measuring GRP:

a. There are by definition activities that are carried out within Netherlands territory but not within a Netherlands region. Examples are Dutch Embassies and Dutch military activities abroad. To preserve comparability with the national totals, an "extra-territorial sector" has been created for such cases.

b. A similar problem applies to the exploitation of natural gas on the Dutch continental shelf, where the arbitrary convention hitherto used is that production is measured at the point where the gas is brought onto land. The extraction of natural gas on the continental shelf does not in itself bear any relation to income generation in, say, the province of Noord-Holland. It might therefore be better to assign natural gas production to the extra-territorial sector. Income generated on the continental shelf could then be transferred as primary income from this extra-territorial sector to the region where the institutional financial entity concerned is established.

   The regionalization of such income flows gives rise to further problems, however (see point f. below and section 3.3).

---

1) This involves cif registration of imports and fob registration of exports.

c. A further problem with natural gas production is that the region where the gas is extracted does not by definition have to be the same as the region where the local units directing natural gas production operations are situated. There can thus be a distinction between the region of production and the regions from where the operations connected with production are performed (e.g. by means of remote control and measurement equipment in a central control room). Here too, the arbitrary convention is that production is ascribed to the point of extraction. When the annual regional economic figures are revised for the Netherlands, it is possible that the solution in a. will be adopted. Important considerations here are the obligation to preserve the confidentiality of individual data and the difference from the current method of regionalization whereby inputs are recorded in a different region from the resultant outputs.

d. As regards the regionalization of the production of transport services, the approach adopted in the Netherlands, mainly because of the basic statistics available for this purpose, has been partly to record production and added-value in the region where the transport physically takes place, i.e. the residence of the transporter is not relevant. This is thus essentially an application of the territory principle. However, this does not apply to transport services provided on foreign territory; in such cases, production is assigned according to the standard rule.

e. The Dutch approach to the regionalization of construction production also takes as its basis the region where production physically takes place. For example, if a company from region A constructs dwellings in region B, production is assigned to region B. The convention of considering the construction site to be a local establishment is questionable, particularly where commuting is involved. Here too, the "territory principle" is essentially applied in place of the "residency principle".

f. Also relevant is the operational definition of the term "actor" in the national accounts. In the Netherlands, the convention is that income generation is described by reference to the units associated with production processes (i.e. production units), with financial processes being described by reference to "institutional units". The rule is that the units are classified according to main activity. When assigning a resident production unit or institutional unit to a given enterprise group, no account is taken in principle of the region. This means, for example, that establishments with differing activities in different regions but belonging to a single production unit nevertheless come under the main classification of that unit (a "multi-regional" enterprise). Describing income generation in a region may thus result in a distorted picture of productive activities. Depending on the information available, differing production/consumption relationships in the establishments of a multi-regional enterprise can give rise to distortions regarding GRP. Here again, the convention used in the national accounts is seen to influence the regional breakdown of GDP.

   The problem of multi-regional enterprises also plays a role in the question of whether, say, income (and financial) transactions can be meaningfully described at regional level, quite apart from whether information on such transactions can be collected at reasonable cost. One problem is that of internal accounting prices - real goods flows being divorced from actual payments.

Regarding the use of GRP in the context of European funds, the main point is that these problems and conventions somewhat obscure the view of income-creating capacity, as well as to some extent distorting the relationship between GRP and working population or employment in the region. If jobs in a region are taken by inhabitants of other regions

commuting across borders or if, for other reasons, added value recorded in a region is not associated with work performed in that region, relating the GRPs of these regions to the number of inhabitants or size of the working population is less meaningful. In this sense, the accepted conventions tend to have arbitrary effects.

From a regional perspective, therefore, a review of the conventions at national level is required.

3.3 Gross primary regional income

The regionalization of GNI also raises conceptual problems, relating to the definition of the inter-regional primary income flows of multi-regional enterprises (in particular as regards residual income) and of flows between central and local government (e.g. in the form of subsidies). Conceptual problems also arise in respect of primary income flows between businesses and central government.

Furthermore, there are important questions regarding recording: e.g. should this be at market prices or at factor cost? Subsidies in particular can have a very distorting effect as regards the income-generating capacity of regions. Agricultural subsidies, for example, are spread very unevenly between the regions. Further study is needed to ascertain whether meaningful solutions can be found to these problems at regional level. Then there is the question of gross or net assessment. An international comparison of incomes is normally based on gross assessment, mainly on account of the low reliability of the estimates required for net assessment. This is even more so at regional level since there are virtually no regional data on the stock of capital goods and there are insufficient historical figures to apply the perpetual inventory method (PIM).

3.4 Gross disposable regional income

If the intention is 'to bring living standards... into line', a definition of 'living standard' needs to be chosen, as indicated earlier:

- in the narrow sense: the consumption of households, possibly supplemented by savings, together the disposable income of households, plus individualizable government consumption;
- in the broad sense: the disposable income of households, supplemented (or not) by gross disposable government income.

If disposable income is chosen as the basis, in whatever sense, account needs to be taken of specific regionalization problems regarding secondary income flows between, on the one hand, central government, social insurance institutions, life insurance companies and pension funds and, on the other, households.

4. Regionalization of various income concepts

The various income concepts can be defined on the basis of the objective (commodity flow method) or subjective method. In the Netherlands, the national accounts use elements of both methods.

GDP, GNI and GDNI are calculated mainly by the objective method.

4.1 Gross regional product

GRP has been calculated at NUTS-3 level using the conventions referred to earlier since the 60s, based on the objective method (see e.g. CBS 1983). The question of whether and to what extent GRP can be calculated using modified conventions requires further study. In any event, further harmonization of the conventions used in the various Member States is desirable if they are to be used for the European Funds.

4.2 Gross primary regional income

No data are collected in the Netherlands on GPRI. Both GRP and GDRI could provide a basis for estimating this parameter.

Taking GRP as the basis, primary income flows to and from other regions and to and from abroad would have to be estimated for each region. These flows comprise:

- wages and salaries earned abroad or in other regions by workers resident in the region;
- wages of workers not resident in the region;

- income obtained abroad or in other regions from wealth and entrepreneurial activity on the part of resident units (interest, dividends, royalties, rent, income from entrepreneurial activity, imputed interest on pension and life insurance reserves, income retained from quasi-corporate businesses);
- income from wealth and entrepreneurial activity on the part of units not resident in the region (ditto).

Taking GDRI as the basis, gratis income transfers to and from other regions and abroad would have to be estimated.

These comprise:
- occupational disability insurance
- health insurance
- superannuation scheme
- widows' and orphans' insurance
- unemployment and tideover insurance
- child benefit
- general social assistance
- individual rent subsidy etc.

Further research is required to demonstrate whether these income flows can be meaningfully measured at regional level.

4.3 Gross disposable regional income

GDRI can be measured using the subjective method. Van der Laan and De Waard (1985) have studied the relationship between income data in the incomes statistics (subjective method) and the corresponding data in the national accounts (objective method). Based on this research, the CBS has carried out an experimental study on behalf of Eurostat (CBS 1986)

into the possibility of regionalizing the income accounts and income expenditure accounts of households at NUTS-1 and NUTS-2 levels. A breakdown of GDNI by region was incidentally made possible only by arbitrarily calculating a regional breakdown for certain components, such as the imputed interest from life insurance companies and pension funds. If the Commission were to consider using the disposable income of households as an indicator for the standard of living in a region, a list would have to be drawn up of the arbitrary components in the calculation of the disposable regional income of households to enable agreement to be reached on them.

In addition, account should be taken of the fact that such data cannot be collected for NUTS-3 level. Regional accounts have also been compiled for local government as part of experimental studies. Some Member States are currently known to be examining whether regional accounts can be compiled for central government at some regional level.

5. Summary and conclusions

1. For the study of regional differences in prosperity, this note looks for correspondences with concepts used in the national accounts.

2. The choice of a given income concept as a criterion for distributing resources from a (regional) 'Fund' depends partly on the economic and social objectives of the Community.

3. The objectives of the Community seem to centre around strengthening the income-generating capacity of the weaker regions. This will make such regions less dependent on aid in the form of income and wealth transfers as far as their scope for spending is concerned.

   If the arguments outlined earlier are correct, the concepts of gross regional product and gross primary regional income are central in terms of the national accounts.

   However, if the Commission considers the 'standard of living' to be central, total household consumption, possibly supplemented by household savings plus individualizable government consumption, or alternatively the disposable income of households and gross disposable government income, may serve as fundamental concepts. In the Annex, a hypothetical example is provided to illustrate how the various national and regional income and production concepts relate to one another.

4. The regionalization of national concepts runs into specific conceptual problems. The harmonization of conventions is proposed to deal with these. Such conceptual problems concern:

   a. activities that could be assigned to an extra-territorial sector;
   b. the application of the 'residency principle' and the 'territory principle';
   c. the operational definition of the 'actor' concept;
   d. the problem of inter-regional primary income flows;
   e. the problem of assessing incomes (market prices or factor cost);
   f. the creation of a 'notional' region and the identification of those economic transactions that cannot be meaningfully regionalized; 'rules' could perhaps be formulated for assigning such data to this region;
   g. regarding the methods to be used, thought needs to be given to the extent to which institutional differences in the various Member States affect the variable to be measured;
   h. as regards the choice of variables on which the distribution of 'fund' resources will be based, research is also required to find out at which regional level the data can be compiled. The GRP (with all its limitations) is available in the Netherlands at NUTS-III level. It seems that GPRI and GDRI can be calculated at most at NUTS-I or NUTS-II level - assuming that the data can be compiled in a meaningful way.

References

CBS, 1983, Regionale economische jaarcijfers 1977-1979. (CBS, Voorburg).

CBS, 1986, Regionalisatie van de inkomensrekening en de inkomensbestedingsrekening van de sector gezinshuishoudingen (inclusief instellingen zonder winstoogmerk) voor de jaren 1978, 1979 en 1980. Statistische katernen no. 6. (CBS, Voorburg).

CBS, 1988, Nationale rekeningen 1987. (CBS, Voorburg).

CEC (Commission of the Euopean Communities), 1987, Third periodic report on the social and economic situation and development of the regions of the Community. (EC, Brussels).

Kravis, Irving B., Alan W. Heston and Robert Summers (1978), Real GDP Per Capita for more than one hundred countries, Economic Journal Vol. 88, No.350, P. 215 - 242.

Van der Laan Paul and Jan W.B. de Waard, 1985, Vergelijking tussen de inkomensstatistiek en Nationale rekeningen. Statistische onderzoekingen M26. (CBS, Voorburg).

Lipsey Richard G., Peter O. Steiner and Douglas D. Purvis, 1984, Economics. (Harper and Row, publishers, New York, 1984).

Pêtre Jean, 1984, The treatment in the national 1981 accounts of goods and services for individual consumption produced, distributed or paid for by government. Paper prepared for the 17th General Conference of the International Association for the Research in Income and Wealth, Rome, Italy, August 1981.

EC Council, 1984, Council Regulation (EEC) No 1787/84 of 19 June 1984 on the European Regional Development Fund, Official Journal of the European Communities, No L 169/1.

EC Council, 1988 a, Council Regulation (EEC) No 2052/88 of 24 June 1988 tasks of the Structural Funds and their effectiveness on coordination of their activities between themselves and with the operations of the European Investment Bank and the other existing financial instruments. Official Journal of the European Communities, No L 185/9.

EC Council, 1988 b, Council Regulation (EEC) No 1096/88 of 25 April 1988 establishing a Community scheme to encourage the cessation of farming, Official Journal of the European Communities, No L 110/1.

Annex: Hypothetical example of regional accounts for region A

A hypothetical example is given below, showing the relationship between the various regional (income) concepts. The example as such will naturally not contribute to solving the problems outlined earlier. The aim is merely to illustrate in a simple fashion, in addition to the relationship referred to above, the reciprocal flows that need to be measured for a regional breakdown.

The column 'national relationship with region A' has a multiple function. On the one hand, it includes other regions, e.g. in the case of the 'balance of primary incomes with other regions' and the extra-territorial sector. On the other hand, it may refer to a 'notional region', such as in the case of (indirect) taxation: such flows can hardly be assigned a regional destination. For other flows, such as subsidies, it is not meaningful to specify the region of origin. In the case of yet other flows, neither the origin nor the destination can be specified.

Where gratis income transfers are concerned, for example, it is incorrect to have these flow from or to the region where the central government or social insurance institutions reside. A notional region can provide a solution to this problem.

The example furthermore makes it clear that, in addition to disposable income, there are also net wealth transfers that ultimately determine the total financial resources of a region (e.g. investment by central government in local production units). The inclusion of such financial flows deserves to be considered.

Annex I: Hypothetical example of regional accounts for region A

	Region A				'National' relationship with region A		International relationship with region A
	Total	Sectors					
		Families	Businesses	Government	Government	Businesses	
GRP (mp)	120		95	25			
PI other	+20	+15	+5			-20	
PI abroad	+10	+5	+5				-10
Subtotal	150	20	105	25			
Wages		+70	-45	-25			
Other income (mp)		+20	-20				
GPRI (mp)	150	110	40	0			
Ind. tax.	-20		-20		+20		
Subsidies	+10		+10		-10		
GPRI (fc)	140	110	30	0			
Dir. tax.	-20	-20	-10	+10	+20		
Soc. Ins. contr.	-30	-30			+30		
Inc. trans.	+80	+40		+40	-80		
Bal. inc. trans.	-10	+5	-15			+15	-5
GDRI (mp)	160	105	5	50			
- Cons.	-100	-70		-30			
Gross sav.	60	35	5	20			
- Gross inv.	-55		-25	-30			
Reg. inc. surpl.	5	35	-20	-10			
Wealth tr. bal.	+15	-10	+20	+5	-10		-5
Incr. liq. res.	+20	+25	0	-5	-30	-5	-20

GRDI - GRP + wealth transfer balances = 55 to region A

160 - 120 + (+ 15) = 55

Abbreviations:

GRP (mp)	- gross regional product (market prices)
PI other	- balance of primary incomes with other regions
PI abroad	- balance of primary incomes with abroad
Other income (mp)	- other income (market prices)
GPRI (mp)	- gross primary regional income (market prices)
Ind. tax.	- indirect taxation
GPRI (fc)	- gross primary regional income (factor costs)
Dir. tax.	- direct taxation
Soc. ins. contr.	- social insurance contributions
Inc. trans.	- gratis income transfers to families and government
Bal. inc. trans.	- balance of remaining gratis income transfers with other regions and abroad
GDRI	- gross disposable regional income
Cons.	- consumption
Gross sav.	- gross savings
Gross inv.	- gross investments
Reg. inc. surprl.	- regional income surplus
Wealth tr. bal.	- wealth transfer balances
Increase liq. res.	- increase in liquid resources

Available 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 compilating National Accounts restricts to using chained Paasche and Laspeyres indices. Various possible objections to the use of chained indices are discussed and rejected.

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

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).

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 then the widely used RAS method. Also some special cases are discussed: the adjustment of row sums and column sums, additional restraints, mutual connections between tables and three dimensional tables.

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

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

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

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

NA/29 **The concept of (transactor-)units in the National Accounts and in the basic system of economic statistics**, Bloem, A.M. (1988).
This paper provides a fundamental discussion of the dual actoring as used in the 1968 SNA. Special attention is paid to the transformation of legal entities into units more suitable for economic analysis. Criteria for a precise delineation of the units are formulated. 'Establishment-type units and 'institutional units' turn out to be both institutional, that is both are really decision-making entities.

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).
It is argued that different purposes and actual circumstances lead (and also should lead) to the use of different concepts of income. Thus, in the National Accounts several concepts of income could be employed, e.g. differing with respect to the production boundary. Furthermore, these concepts 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. (1989).
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. The proposals in this paper entail that the way of recording the use of financial services in the present SNA remains 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 (1989).
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 (1989).
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 wishes and international guidelines are also taken into account.

Requests for copies of National Accounts Occasional Papers should be addressed to:
CBS, National Accounts Department
P.O. Box 959
2270 AZ Voorburg
The Netherlands