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THE HISTORY OF NATIONAL ACCOUNTING*)

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Summary

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 roots of these guidelines, compare the subsequent guidelines and discuss also alternative accounting systems like extended accounts and SAMs.

Contents

1. Introduction

National accounting is a very specific branch of applied economic analysis. In contrast to all other parts of economics, international guidelines play an important role: they are the basis on which most national accounts are actually being compiled and they represent a consensus view on the basic concepts and classifications to be used in the national accounts. At present, the National Accounts are the main empirical framework for macroeconomic analysis and policy. In the 1988 presidential address of the European Economic Association, Malinvaud even states that "all macro-economists agree to use as an objective base macroeconomic statistics and national accounts, even though each macro-economist finds some minor imperfections in this material and in its adequacy to his particular need" (Malinvaud, 1989, p. 206). In the same year, in the presidential address of the American Economic Association, the dominant role of the international guidelines is commented upon somewhat differently as the limitations of conventional national accounts are stressed. Eisner warns in particular that "dangers abound in basing policy on conventional measures of private and public saving, investment and capital". He also suggests that "usual estimates of some of the critical behavioral relations of macroeconomics may be suspect because of a failure to match theoretical constructs with appropriate empirical counterparts" (Eisner, 1989, p. 11).

In this paper, the evolution of national accounting from incidental estimates of national income and some related variables in the seventeenth century till present is sketched. The early estimates are discussed shortly in section 2.1. For a fuller account, we refer to the monumentous work by Studenski (1958) and to the article by Kendrick (1970), which for this period is mainly a summary of Studenski. For national accounting, the 1930s and 1940s proved to be revolutionary decades in several respects: a revitalization of discussions on basic national accounting concepts, three innovations in economic theory which were of direct importance to national accounting (input-output analysis, econometric modelling of the national economy, the Keynesian revolution) and the birth of the first national accounting systems. This period is

the topic of section 2.2.

The era of the international guidelines started in 1947 when for the first time an international guideline on national accounting was published (UN, 1947). In sections 3.1 and 3.2 the successive guidelines are compared and their role for present day accounting is examined. Alternative accounting systems and measures, like extended accounts, SAMs and satellite systems, are the topic of section 3.3. Conclusions are drawn in section 4.

2. National accounting as a free enterprise

2.1. From 'political arithmetick' to 'social accounting'

The origins of the present national accounting systems can be traced back to the first national income estimates by Petty and King in, respectively, 1665 and 1696[1]. At roughly the same time, in France estimates of national income were made by Boisguillebert and Vauban. It is not certain whether these estimates were influenced by the estimates in England. The estimates by Petty and King were unique milestones as they were only equaled in scope and quality in the next two hundred years(!) by the estimates of their 'intellectual debtor' Davenant in 1698 (see Studenski, 1958, p. 40).

In common with all early estimates of national income, the estimates of Petty and King were practical and directed to concrete policy issues. Petty "wanted [firstly] to prove mathematically that the State could raise a much larger revenue from taxes to finance its peace and wartime needs, and that it could do so by more equitable and less burdensome forms of taxation ... Secondly, Petty wanted to disprove once and for all the notion that England had been ruined by the Revolution and foreign wars and was no match, either militarily or commercially, for Holland and France" (Studenski, 1958, p. 27, 28). King also draws clear political conclusions from his estimates: "the Warr cannot well be sustain'd beyond the year 1698 upon the Foot it now stands, unlesse
1. The Yearly Income of the Nation can be Increas'd.
2. Or the Yearly Expence Diminish'd.
3. Or a Forreign or Home Credit be obtain'd or Establish'd.
4. Or the Confederacy be Inlarg'd.
5. Or the State of the Warr alter'd.
6. Or a General Excise, in effect Introduced." (King, 1936, p. 47).
Nevertheless, Petty as well as King recognized also the more general advantages of estimating national wealth and income. King states that information on a country's wealth and population is a "Piece of Politi-

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1. These estimates were published later: Petty's estimates were in 1691 and those of King in part by Davenant in 1698 and in full not until 1802.

call Knowledge, of all others, and at all times, the most usefull, and Necessary" (King, 1936, p. 13). Petty went even further by advocating that in socio-economic discussions "no word might be used but what marks either number, weight, or measure" (Studenski, 1958, p. 27).

The estimates by King can be regarded as improvements on those of Petty. We will shortly discuss the main features of King's estimates.

Like the estimates of Petty and the earliest estimates in France, King employs a comprehensive concept of production and income. This concept is also used in the present UN-guidelines, i.e. the SNA of 1968 (UN, 1968). According to this concept the production of goods as well as services generates value added. In contrast to this concept, the physiocrats argued that only agriculture could generate value added and that other sectors were 'sterile'. For three quarters of a century, Smith was very influential in his argument that labourers in agriculture as well as in manufacturing, commerce and the transportation of goods were to be regarded as 'productive'. However, unlike King, he still rated "the whole civil and military personnel of government, the professions, the domestics, and others engaged in the performance of personal services and the services of dwellings" (Studenski, 1958, p. 19) as unproductive labourers. "He considered the national product to be constituted solely of commodities, and the national income ... to be composed of wages, rent and profit (including interest) derived from the production of these articles" (Studenski, 1958, p. 19). Smith's view was supported by among others Ricardo, Malthus, James Mill and John Stuart Mill, but became increasingly subject to criticism by, e.g., Say, McCulloch, Senior, Walras and Marshall.

At the end of the nineteenth century, it appeared that Smith's material concept of production had received the final blow. But more than a half century later, this concept formed the basis of the Material Product System (MPS), that is the accounting conventions used in the communist countries (see further section 3.3.1). Studenski (1958, p. 22) argues that the MPS is based on the ideas of Marx, and, more in particular, based on a mistaken interpretation of it. This view seems

erroneous, as in none of Marx's writings accounting procedures for measuring production and value added are discussed; the topic was just absent in his writings.[2)]

A second important feature of the estimates by King is that they already represented the three ways of estimating national income: net production, distribution of income and expenditure. The estimates of Petty and most estimates up till the 1930's only covered one or two ways.

Furthermore, the calculations by King were remarkable in their coverage. He presented not only the total annual national income, expenditure, and saving, but also their distribution by social and occupational groups, a breakdown of national income by type of income and an estimate of wealth (gold, silver, jewels, furniture, livestock, etc.). Like Petty, King provided a comparison of the national incomes and wealth of England, Holland and France. International comparison, which is a major objective of the international guidelines, was therefore already present in Petty's and King's pioneering estimates. King's estimates contained also time series of the period 1688-1695 of national income, expenditure and taxes received. He even used his time series to forecast income, expenditure and tax revenue for the years 1696, 1697 and 1698. This type of use of national accounting figures dates therefore also back to the earliest estimates of national income. The idea of deflating national income and product is somewhat more recent and originates from Lowe in 1822 (see Studenski, 1958, pp. 107-109).

In the period from King till the 1930s, the idea of estimating national accounting figures spread over many countries and the number, frequency and timeliness of the estimates increased. In 1900, national income estimates had been constructed for 9 countries (England, France, United States, Russia, Austria, Germany, Australia, Norway and the Netherlands). In 1930, this number had increased to 23 and in 1940 the number had climbed to 33. The compilation of annual estimates by the

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2. Mark Blaug pointed out Studenski's error during the presentation of an earlier draft of this paper at the History of Economic Thought Conference, Durham, 2-4 September 1991.

government was another development. This occurred for the first time in 1886 in Australia and for the second time in 1925 in Canada. In 1933, the number of countries had increased to 6: adding then Soviet Russia, Germany, the Netherlands and New Zealand. At the end of the 1930s official estimates were also available for the United States, Turkey, Yugoslavia and Switzerland (see Studenski, 1958, p. 156 and, for the Netherlands: Den Bakker, 1992).

Events like wars, economic crises and revolutions cause an increase in the need for statistical description and therefore proved to be major stimuli throughout the whole history of national accounting. This is evidenced by e.g. the estimates of King and Petty, the rapid increase in the number of estimates after the first world war as well as by the developments in the 1930s and 1940s. The 1930s and 1940s marked a complete revolution in national accounting in three respects: revitalization of discussions on basic national accounting concepts, innovations in economic theory which were of direct importance to national accounting and the birth of the first national accounting systems. These major developments are the topic of section 2.2.

2.2. Revolutionary decades

The works by Clark and Kuznets were pioneering efforts that stimulated estimates all over the world. Their work consisted of profound and detailed estimates that were accompanied by elaborate motivations of the concepts and statistical methods used. Both had a keen eye for the limitations of their estimates, in theory as well as in practice. At the same time, they shared a certain boldness which is necessary for constructing estimates with imperfect data sources and drawing inferences from these estimates. Below, we will given an impression of their work by presenting some major cases in point.

In the first chapter of "National Income and Outlay" (Clark, 1937), Clark expounds the purposes of national income measurement and its basic concepts. Examples of the latter are his discussion of the inclusion of

the services of owner-occupied dwellings, the exclusion of the services of consumer durables, the exclusion of holding gains and losses, a possible 'deduction for any demonstrable exhaustion of natural resources' (Clark, 1937, p. 9) and his advocating of national income at market prices. In "The National Income, 1924-1931" (Clark, 1932), he strongly complains about the condition of the British official statistics. He criticized for example the use of different classifications in various national statistics on employment (Clark, 1932, p. vii). In his "Conditions of economic progress" (Clark, 1940), Clark discusses among others purchasing powers and the problems of international and intertemporal comparison. He is the first to compare real national income for many countries (see Kravis, 1984). He even makes a comparison between the level of well-being in the ancient world (Egypt, Greece and the Roman Empire at the peak of their powers) and that in the nineteenth century and the first half of the twentieth century! The influence of Clark's estimates was notable in for example the constant price calculations for the Netherlands in 1948. In the latter, a base year was chosen similar to that in Clark (CBS, 1948, p. 50).

Much more than Clark, Kuznets was also a pathbreaking theoretician on accounting concepts and statistical techniques. Famous is his discussion in Economica with Hicks on subjects like the relation between changes in national income and welfare, the valuation of government output and the concept of intermediate and final product (Hicks, 1940 and 1948, Kuznets, 1948b). There are two other well known discussions in which Kuznets played the central role: the discussion in 1944 on his National Product, War and Prewar (Kuznets, 1944; Gilbert, 1944) and the discussion in 1948 on the New Department of Commerce Income Series (Kuznets, 1948a) with Gilbert, Jaszi, Denison and Schwartz (1948). Like Clark, international and intertemporal comparison were a central focus of his work. As concerns statistical techniques, his contribution to the development of the commodity flow approach is most notifying[3] (Kuznets, 1938). Other examples in this respect are his discussion of data-

3. However, Lindahl already applied the commodity flow approach some years before Kuznets (Aukrust, 1992, p. 16).

processing techniques like interpolation and extrapolation and of the reliability of estimates (see e.g. Kuznets, 1941). For a general overview of the work by Kuznets, we refer to Lundberg (1984). A discussion of his contribution to the development of economic statistics can be found in Studenski (1958) and Carson (1975).

Although Clark as well as Kuznets made important contributions to national accounting, neither of them pioneered in developing social accounting systems, i.e. a system in which sectors as well as accounts are used in presenting data. In his discussion of the New Department of Commerce Series in 1948, he saw it even as a "dubious addition to the theoretical equipment" (Kuznets, 1948a, p. 154). The development of national accounting systems occurred simultaneously in Britain, the Netherlands and Norway. This development was closely linked with three other major innovations in economic theory in the 1930s: input-output analysis, econometric modelling of the whole economy and the Keynesian revolution. We will take these three innovations as a starting point in discussing the development of the social accounting approach.

In 1936, Leontief published an article, which started input-output analysis (Leontief, 1936). For this major innovation, Leontief was later awarded the Nobel Prize. Input-output analysis started not fully out of the blue. Precursors can be found amongst others in Quesnay's Tableau Economique and some of the equations relating input and output by Walras (see Stone, 1984). The crucial innovation contained in Leontief's article was that it formulated for the first time a "model connecting inputs and output, which made it possible to calculate indirect as well as direct inputs and thus to carry out the many, now familiar, analyses which depend on being able to do this" (see Stone, 1984).[4] In the fourties and fifties, input-output analysis was developed more fully and many of its applications were demonstrated.

Major differences between input-output tables and national accounting schemes are the focus and the amount of detail. On the one hand, input-output tables have a more restricted focus than national accounting

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4. This pioneering effort is reflected in the namegiving of the 'Leontief-inverse'.

schemes as they aim only at describing the supply and use of goods and services. On the other hand, the number of branches in the input-output-tables is generally much larger than the number of sectors in the accounts. In the international guidelines of 1968, input-output analysis was explicitly linked to national accounting (see section 3.2). In most countries, still no direct link exists between the National accounts and the input-output tables. Unlike the annual National Accounts, input-output tables are often compiled incidentally, e.g. once in a decade or every five years. For many years, an exception has been the Netherlands where annually input-output tables are published which are consistent with the national accounts tables. In this case, the input-output tables serve not only as a separate set of information, but are also used as the major statistical tool for compiling figures on the production accounts. In fact, the latter type of use has dominated in the Netherlands. Its usefulness for policy purposes was proved in, e.g., calculating the consequences of the 1953 waterflood (see Nooteboom, 1978, p. 4).

Another important innovation occurred in econometrics. In 1936, in advising the Dutch government, Tinbergen constructed the first econometric model of the business cycle covering the whole economy (Tinbergen, 1936, for its general importance to econometrics see Morgan, 1990). In order to provide a better empirical grounding to the econometric model, new and longer timeseries were needed and the quality of existing estimates was to be improved. This was the major reason for compiling the new and better figures that were to be published in 1939 (CBS, 1939). Tinbergen clearly saw the necessity of a quantitative description of the national economy in terms of large groups of people, goods, etc. (Tinbergen, 1936, p. 67), but he did not present concrete proposals for a social accounting system. In the Netherlands, this role was played by Van Cleeff (1941a, 1941b) (CBS, 1950, p. 13). In 1944, for the first time figures in the form of a social accounting system were available. This system was developed at the CBS under the direction of Derksen and Tinbergen and deviated substantially from Van Cleeff's system (Derksen, 1944 and 1946). The figures related to 1938 and were used in the national budget of 1945 (CBS, 1950, p. 14).

In Norway, Frisch, another pioneer in econometrics, not only stimulated but also pioneered himself in the development of national accounting systems. He devised a general accounting system in 1942, which was more elaborated by Aukrust in 1949 (see Ohlsson, 1953, pp. 51-61). In Aukrust's system, a clear distinction was already made between current and capital transactions and between product flows and financial flows (see also Studenski, 1958, p. 471). From 1946, estimates in the form of social accounts were published annually and presented as an integral part of the national budget transmitted by the Finance Ministry to Parliament.

At present, the link between econometric models and national accounting is still strong: the accounting logic is explicitly used in modelling national economies and national accounting figures are used as data input for estimating coefficients; the latter implies also that the concepts underlying these figures are used (see Klein, 1983).

The third major event in economic theory was of course the publication of the 'General Theory' in 1937. This launched the Keynesian revolution and gave birth to macroeconomics. This revolution in economic theory had an enormous impact on national accounting. The Keynesian type of analysis established a direct link between economic theory and national accounting as both came to use the same macro-economic identities. A direct effect on national accounting was that another definition of national income and product became most popular: in order to establish a closer linkage between national income and various categories of expenditure, net national income at factor costs was more and more replaced by gross national income at market prices.[5)] The Keynesian type of analysis also threw a new light on the role of the government: a new responsibility for stabilizing the economy was added. Accounting for this role of the government became necessary for economic policy analysis. This induced the introduction of accounting per sector, in particular the introduction of a sector government. As a consequence of

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5. The increased popularity of gross concepts was also due to the specific war circumstances: inasmuch the replacement of capital could be postponed till after the war, it was important to present national income figures gross of the related capital consumption (see Studenski, 1958, p. 153 and Bos, 1992b).

the Keynesian revolution, the importance of national accounting figures for economic theory and economic policy increased and was more widely recognized. At present, the link is much clearer. It is therefore not surprising that even introductory textbooks in economics, like that of Samuelson and Nordhaus (1985), include a chapter on national accounts.

Keynes personally also stimulated the development of national accounting systems, in particular in the United Kingdom. He clearly saw the importance of national accounting for planning a national economy in times of war as well of peace. On his instigation, Stone and Meade prepared in 1941 estimates on national income and expenditure (Meade and Stone, 1941). These estimates were used to present government expenditure and revenue as part of a system of balancing tables describing the whole national economy. In this way, they became a tool in planning the British war economy (Stone, 1951, p. 84; Patinkin, 1976, p. 1109). A quote from Stone on his work during the war may illustrate this use: "The main use of the work on national income and expenditure was to throw light on the magnitude of the problems of war finance, and for this purpose it was used both in discussions before the Budget and in the Chancellor's Financial Statement ... if substantial price increases in the free sector of goods and services and endless queues and confusion in the controlled sector were to be avoided, something had to be done to reduce the pressure of demand either by increasing taxation or by stimulating saving ... fiscal policy came to be directed not merely to the internal problems of financing government expenditure, but to the broader question of maintaining price and income stability throughout the economy" (Stone, 1951, pp. 86, 87).

In 1939, the League of Nations had requested for a report with guidelines in order to improve international comparability of national accounting figures, but the war delayed the progress on the report. In September 1944, representatives of the UK, the USA and Canada met in order "to exchange views ... and, if possible, to bring about uniformity in terminology and the treatment of controversial items" (Denison, 1947, p. 3). As a result of this meeting, the national accounts of the United States and Canada were revised, which made them more compatible with the

Stone/Meade proposals of 1941 and the British national accounts (see Carson, 1975, p. 177). Immediately after the war, in December 1945, consultations on the United Nations report were resumed. This time also representatives from countries occupied during the war by Germany, like the Netherlands and Norway, could be present. The report was published in 1947 by the UN (UN, 1947) and consisted mainly of an appendix by Stone (1947). This appendix can be regarded as the first fully worked out and detailed national accounting system (see Aukrust, 1986 and Carson, 1975, p. 178). Furthermore, the report was of course also path-breaking in that it contained for the first time international guidelines on national accounting.

3. The era of the international guidelines

3.1. Four generations

The era of the international guidelines started in 1947 with the publication of the UN-report, which mainly consisted of Stone's appendix. Although it was a UN-report, the system recommended was "based essentially on the model of an advanced industrial economy in which transactions in money are dominant" (UN, 1947, p. 24).

On request of the OEEC, new guidelines were written under the direction of Stone. The guidelines were to be used in planning the Marshall-aid. In 1951, this report containing a description of a "Simplified System of National Accounts" was published (OEEC, 1951). In comparison with the 1947 report, this was truely a simplified system: only a current and capital account were distinguished and the number of sectors was limited to three (government, enterprises and households), without any subsectoring. Such a 'simplified system' was deemed necessary as the proposed system in the 1947 report was far too ambitious for most OEEC-countries and in the beginning probably even unattainable for the countries most advanced in national accounting. The 1951 foreword contains a clear motivation of its choice of a very simple system: "any system of the kind described here must take account of the kind of information available in different countries. The standard taken is one which in a broad way should be well within the competence of those countries which are advanced in national accounting work but beyond what can be expected in those countries where this work is less advanced" (OEEC, 1951, p. 5).

In 1952, the 'Simplified System of National Accounts' was replaced by the "Standardised System of National Accounts" (OEEC, 1952). This new OEEC-guideline took account of the experience in implementing the simplified system. It contained more accounts, but in comparison to the 1947 report it was still very simplified.

Under the chairmanship of Stone, the UN issued a new guideline in

1953: "A System of National Accounts and Supporting Tables" (UN, 1953); this report is frequently referred to as the first 'SNA'. Not surprisingly (considering the role of Stone), the guideline looked rather similar to the OEEC Standardised System of National Accounts. In contrast to the 1947 report and the OEEC guidelines, the UN report was also intended to be of use for developing countries. This difference in orientation was only reflected in a somewhat extended production boundary, i.e. including also some types of non-market output. In 1956, a slightly revised version of the 1953 report was published.

Because of their many similarities, the guidelines by the OEEC and the UN from 1951, 1952, 1953 and 1956 can be regarded as one generation of international guidelines. If we call the 1947 report the first generation, the second generation consists of the guidelines from the fifties.

In 1968, the UN published an entirely revised and much more detailed "System of National Accounts" (UN, 1968). Aidenoff and Stone served as the main authors. Together with the guidelines of the EC (Eurostat, 1970), which are mainly intended to clarify the 1968 UN-guidelines, this report can be regarded as the third generation. The 1968 report takes a flexible view with respect to the attainability of its system: a very extended system is presented and countries can to a substantial extent determine their own priorities. For developing countries, a separate chapter is included with suggestions for priorities and some classifications especially useful for developing countries, e.g. the distinction between urban and rural areas or between modern and traditional modes of production.

At present, revision of the UN- and EC-guidelines is under way and is expected to be finished in 1992 or 1993. These guidelines will thus represent the fourth generation of international guidelines.

In section 3.2, the scope and basic concepts of the first three generations will be compared (for a more detailed comparison, see Bos, 1992a). However, before starting this comparison, it is necessary to pay

some attention to the role that the international guidelines have played and still play in national accounting.

International guidelines have been influential for several reasons. First, the systems in the international guidelines are recommended by the leading international experts of the profession. They are therefore relatively well thought out and it is costly, time consuming and not easy to invent an alternative system. Secondly, by keeping in line with the international guidelines, national figures can be compared with figures from other countries. This is important as international comparison is a major use of national accounting figures. Thirdly, in many countries, the national accounts have been set up by or improved with help from the international organizations issuing the guidelines (UN, OECD, EC) or with help from countries advanced in national accounting (Sweden, France). In the latter case, following the international guidelines is usually stimulated to the extent that the helping countries follow them. As a final reason, we mention that all countries are obliged to compile some figures on the basis of the international concepts, as the contribution to the UN depends on the level of National Income. Besides, the questionnaires of the international organizations employ these concepts. Some years ago, also the EC decided to tax its member states on the basis of their National Incomes.

The international guidelines are very successful in standardizing the concepts and classifications used in compiling national accounts figures. The guidelines achieved that all over the world official figures came to be based on uniform notions of the production boundary, asset boundary, the distinction between intermediate and final consumption, etc.[6] From 1947, countries have adapted their concepts in order to be in line with the international guidelines.

The international organizations have also issued several guidelines on topics related to the national accounts. In some cases, these guide-

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6. However, the centrally planned countries followed the MPS. This is discussed in section 3.3.1. As a direct consequence of data problems, minor deviations from the international conventions do occur in the national accounts figures of some countries.

lines (partly) overlap with the national accounts guidelines. An example is the Balance of Payments Manual of the IMF (IMF, 1977). In other instances, they could be regarded as supplementing the national accounts guidelines. Cases in point are the "Frascati-Manual" of the OECD on "the measurement of scientific and technical activities" (OECD, 1981) and the recommendations concerning Balance Sheets of the UN (UN, 1977).

Although national accounting is dominated by the international guidelines, some important alternative accounting systems exist. We will discuss these systems shortly in section 3.3. During the era of the international guidelines, the number of countries for which estimates of national income are available increased from 42 in 1946, to 92 in 1957 and at present national accounts figures are available for over 150 countries.

3.2. Constancy and change in the international guidelines

The accounting structure has changed a lot in the international guidelines. As already indicated in section 3.1, the accounting structure in the second generation guidelines was much simpler than in the first as well as the third generation. In the reports from the fifties only three sectors are distinguished (Government, Households and Enterprises), and the number of accounts per sector range from two (Current and Capital) in the 1951 report to four (Production Account, Appropriation Account, Capital Transactions Account and External Account). Financial flows are recorded only as balancing items of the capital accounts. Sector accounting seems mostly to be regarded as an instrument to compile national aggregates and does not seem to have been an objective for its own sake. Limited attention for financial flows[7] and sector accounting are distinctive features of the second generation guidelines.

In the 1947 report, the number of sectors is four and the number of

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7. The description of financial flows in the 1968 SNA was influenced in particular by the work of Copeland (1952) and that at the Norwegian Bureau of Statistics (see e.g. Bjerve and Selsjord, 1959). Reference can also be made to the Reserve Account in the 1947 report (UN, 1947).

subsectors is nine. "Financial intermediairies" and "Insurance and social security agencies" are separate sectors and the government is a subsector of the sector "Final consumers". The number of accounts is also larger than in the second generation reports. The most important difference is the recommendation of separate accounts for financial and non-financial capital transactions. The major difference in accounting structure between the 1947 Manual and the 1968 report is not the number of accounts or sectors, but the introduction of dual sectoring.

In the 1968 report, a separate sectoring is introduced for the Production, Consumption Expenditure and Capital Formation Accounts on the one hand and the Income and Outlay and Capital Finance Accounts on the other hand. This dual sectoring is supposed to reflect a difference in decision-making units. "In the analysis of production we are mainly concerned with the workplaces, or establishments, in which most operating decisions are taken. In the analysis of finance, on the other hand, we are mainly concerned with frequently much larger units in which most financial decisions are taken. For example, a business corporation may control a number of establishments producing similar or very different commodities and so assignable to the same or different industrial categories. And the corporation may itself be only one of a number, all of which are controlled by a giant business enterprise. A similar situation exists in government" (UN, 1968, para 5.4). The dual sectoring can be regarded as a direct effect of the integration of input-output tables and sector accounting.

Furthermore, irrespective of the dual sectoring, the sector classifications are in several respects different. For example, unlike in the 1947 report, in the 1968 report social security funds are part of the sector "General Government" and insurance companies and pension funds are part of the sector "Financial Institutions". The fourth generation will probably retain the dual sectoring, but there will be some changes in the sector classifications (see Harrison, 1990, p. 345 and Harrison, 1992, Annex 3).

The scope of the successive guidelines has been rather constant in

several respects as they mostly ignored balance sheet accounting[8], issues of employment and unemployment[9] and the distribution of expenditure and revenue by type of households (persons)[10]. Some changes, of course, did occur. Above, we already mentioned changes in the description of financial flows. Other cases in point are that input-output tables and tables in constant prices were recommended not until the third generation.

With the exception of the changes in the sector classifications,

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8. This did not withhold statistical offices and individual researchers to compile balance sheets, e.g. Goldsmith, 1951 (a pioneering article: for the first time the Perpetual Inventory Method is used in estimating capital stock!), 1962 and 1985. The absence of balance sheets limits the usefulness of the national accounts for various types of applied economic analysis. To name a few: growth accounting and productivity analysis, testing the portfolio theory, estimating vintage models and -more in general- the analysis of intertemporal decisions on investment, saving and consumption (see also Goldsmith, 1985, pp. 65, 66). Several of the early estimates of national income were accompanied by estimates of national wealth, e.g. those of Petty and King. In the Netherlands, the important estimates of 1938 were also accompanied by a presentation of balance sheets (see Derksen, 1946, p. 15).
9. The neglect of employment and unemployment implied that the national accounts present a description of a national economy excluding one of the most important policy targets. Another drawback is that labour is a crucial variable which can hardly be ignored in describing production. For statistical reasons, this neglect is also strange. As part of the statistical process, preliminary estimates on variables like compensation of employees, intermediate consumption and value of production are often related to volume of labour figures as a check on the plausibility of these estimates. In the absence of separate data sources on variables for some enterprises (e.g. the small ones), such ratios may even be the main basis of estimation. Recommendation of a definition of employment consistent with definition of e.g. compensation of employees is therefore of foremost importance to the quality of national accounting figures. In the guidelines of the EC (Eurostat, 1975, paras 815-820) and SAMs (see section 3.3.3.) employment is included in the accounting framework and it will be included in the fourth next SNA.
10. Although interest for personal income distribution issues was one of the major stimuli in the history of national accounting, the international guidelines have consistently ignored the issue. Several explanations can be given. First, directly after the war, for many countries, in particular those involved in drafting the guidelines, national recovery was much more important than issues of income distribution. However, this argument does not seem fully convincing for the drafting of the 1968 SNA, in particular if the data needs of the developing countries are taken into account. Secondly, for conceptual reasons, a clear choice had to be made between describing issues of income distribution or taking a more macro-economic point of view with respect to, e.g. the treatment of pensions. Only in a flexible system (see section 3.3.4), both conflicting views can be incorporated in one accounting system. Thirdly, the ideas about the classifications to be used were not yet worked out and it was therefore thought premature to present guidelines on the issue. In the next SNA, the present macro-economic view will probably be retained (e.g. with respect to pensions), but expenditure and revenues will be classified by type of household and the concept of 'total consumption of the population' (this concept amounts to attributing some types of final consumption by the government to the benefiting groups of households) will be introduced (see Harrison, 1990).

changes in basic concepts were minor or absent. For example, the production boundaries have always excluded the production of unpaid household services and included an imputation for the services of owner-occupied dwellings, they do not account for deterioration of the environment as such and do not employ a concept of human capital. Two examples of relatively minor changes are:

- the extension of the production boundary in the 1953 report and the 1968 report with some selected types of non-market production
- only in the 1947 report the creation of some intangible assets is regarded as production and fixed capital formation.

In the next SNA, only similar changes in basic concepts will be introduced. A case in point is the imputed charge for banking services. According to the 1968 SNA, this charge is to be recorded as intermediate consumption of a nominal (domestic) sector. This convention will be left and the convention of the previous international guidelines will be reintroduced: the charge has to be attributed to the various sectors. This implies that the imputed banking services can be recorded as intermediate consumption, final consumption or as exports.

During the era of the international guidelines, also alternative accounting systems and indicators have been developed. These will be discussed shortly in section 3.3.

3.3. Alternative accounting systems and measures

3.3.1. The Material Product System

After the Russian revolution, official national accounting figures of the Soviet Union came to be based on a 'Marxian' concept of production (Studenski, 1958, pp. 350-353; see also section 2.1). Since the fifties, also several other centrally planned countries adopted this concept for their national accounts. In 1969, the Comecon-countries adopted the "System of Material Product Balances" (generally referred to as 'Material Product System', MPS) as the basis for compiling their national accounting figures (Standing Statistical Commission, CMEA,

1969; see also UN, 1986). In 1971, the United Nations accepted that the centrally planned countries use the MPS for their national accounts. This implied among others that the UN-questionnaires sent to these countries -and thus the figures published by the UN about these countries - employ the concepts and classifications of the MPS and not those of the 1968 SNA. At present, the MPS is under revision. Due to the recent drastic changes in the Eastern Bloc-countries, the importance of the MPS is decreasing, as many (formerly) centrally planned countries have already decided to compile (only) figures on the basis of the SNA.

The MPS differs in scope as well as in basic concepts from the 1968 SNA. The scope of the MPS is wider, as the MPS includes balance sheets on national wealth and capital assets, balance sheets on the employment by activity and sectors, and indicators of real income by main socio-economic groups. Major conceptual differences are to be found in the choice of the production boundary, which is confined to 'material production' in the MPS. For example, unlike all the guidelines discussed in sections 3.1 and 3.2, the supply of collective services, like those of government health care, education and defense and the services of owner-occupied dwellings are not regarded as production. The choice of a different production boundary is reflected in the sector classification. The sectors distinguished in the MPS are: Branches of the material sphere, Branches of the non-material sphere serving individuals, Branches of the non-material sphere serving society as a whole and Households (see further: Ivanov, 1987 and Arvay, 1992).

3.3.2. Alternative indicators and extended accounts

The international guidelines contribute substantially to achieving international comparability of national accounting figures. Nevertheless, a comparison of national accounting figures is not without problems. Two reasons are that the relative prices underlying the national accounting figures may be widely different and that converting national accounting figures into a common currency by using official exchange rates may lead to misleading results. In Clark (1940), figures of con-

sumption were made more comparable by using one set of relative prices and by employing purchasing power parities in converting national currencies. In the fifties, under the direction of the OEEC, this work was continued (e.g. Gilbert and Kravis, 1954). In 1968, the UN launched the International Comparison Project (ICP). The purpose of the project was to develop the methods for international comparison of figures of product, income and expenditure and to make such comparisons for a selected group of countries. The ICP has gradually evolved into a joint effort of several international organizations (UN, World Bank, EC, OECD) and many individual countries. The number of countries involved has increased to 139. For a general overview of the ICP, we refer to Kravis (1984).

In the late sixties and the beginning of the seventies, national income was frequently criticized for not being a welfare measure (e.g. Mishan, 1969; an example of an earlier critique is Margolis, 1952). However, the authors of the international guidelines did not intend to provide a measure of economic welfare. For example, Jaszi even regards as one of his principal contributions to have resisted successfully to "the will-o'-the-wisp of forging national output into a measure of economic welfare. I was a minority of one in a company that included such mental giants as Simon Kuznets and John Hicks, and at one point I had to defy a forceful Secretary of Commerce who had instructed the BEA [Bureau of Economic Analysis of the USA] to prepare a measure of welfare" (Jaszi, 1986, p. 411; a similar opinion is expressed by Stone, 1974, and by Stone, 1986, p. 457). According to Okun, "[the] beauty of ... present practice is that no sensible person could seriously mistake the GNP for [a measure of total social welfare]" (Okun, 1971, p. 133).

In 1972, Nordhaus and Tobin (1972) responded to the criticism by illustrating in an impressive way what accounting aimed at measuring welfare would imply. They calculated a Measure of Economic Welfare (MEW) by modifying traditional national income figures in several respects. For example, they deducted an estimated value of the disamenities of urbanization and they added tentative estimates for the value of unpaid household services. Since then, many measures similar to MEW have been

calculated (see Eisner, 1988). Frequently, these measures were presented as part of extended or total accounts. Measuring the contribution of economic activity to welfare is only one of the reasons for drawing up such accounts. Some other motives are to obtain: "more inclusive and relevant measures of capital formation and other factors in economic growth, and better and/or additional data to fit concepts of consumption, investment, and production relevant to economic theory and structural econometric relations" (Eisner, 1988, p. 1612).

The increased use of social indicators like the Human Development Index (UNDP, 1991) is a somewhat related development. In these social indicators, national income (per capita) is only one of the variables, other variables being e.g. infant mortality, life expectancy and adult literacy rates. In contrast to measures like MEW and National Income, social indicators are not measures in money terms; they serve solely as indexes.

3.3.3. Social Accounting Matrices

The Social Accounting Matrix (SAM) concept originates from the sixties and was developed as part of the "Programme for Growth" at the university of Cambridge (UK) (Stone, 1962).[11] In SAMs, the national accounting system is presented in a matrix format and the input-output tables are fully integrated in the accounting system. As Stone played a major role in developing SAMs as well as in drafting the 1968 SNA, it is not surprising that the latter contains a matrix-presentation which summarizes the whole system. In fact, the 1968 SNA can be regarded as one specific SAM (see Pyatt and Round, 1977).

In 1976, Pyatt and Thorbecke, then employed at the International

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11. Another result of the project was the development of the RAS-method. The namegiving of this method reflects the role of Richard Stone. The method consists of multiplying the general matrix A with two other matrices. The latter are called R and S, because these are Stone's initials. Unknown to Stone and many of his contempories, Deming already suggested this algorithm twenty years before (Deming, 1943).

Labour Office (ILO), used SAMs as an instrument for development planning. They gave a fresh and new view on the content and applications of a SAM. In their view, in particular for developing countries, it is necessary to introduce income distribution and poverty in models and accounting systems. In order to explain income distribution, also employment should be included. In all these respects, they judged the scope of the 1968 SNA as too narrow. Or, to put it in other words, they preferred a system which integrates aspects of the 1968 SNA as well as of the System of Social and Demographic Statistics (SSDS; UN, 1975)[12]. Another distinctive feature is that they do not aim at achieving internationally comparable figures: international concepts and classifications should be used only to the extent that they suit the national data needs and possibilities. General recommendations concerning the construction and logic of SAMs will be included in the next SNA.

3.3.4. Satellite systems

In the mid seventies, the French statistical office developed several satellites supplementing the national accounts. Each of these satellites describes a specific aspect of a national economy, e.g. education, health or transport (INSEE, 1976, see also Vanoli, 1986). A decade later, the notion of a building-block system for the national accounts was taken up by the Dutch Central Bureau of Statistics (see e.g. Van Bochove and Van Tuinen, 1986; Gorter and van der Laan, 1989; a general overview can be found in Den Bakker, 1992, pp. 24-27). They advocated that the structure of the revised SNA should be made more flexibile. In their view, the SNA should contain a multipurpose core supplemented with special modules. This core is a full-fledged, detailed system of National Accounts with a greater institutional content than the 1968 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. Such a system has some clear advantages: there would be room for extended measures, linkages to other accounting systems like

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12. This system was published in 1975 by the UN. Again, Stone was the prime architect. A precursor of the system was presented in Stone (1971).

the SDSS (UN, 1975) could be explicitly shown, a clear micro-macro link could be established[13] and national data needs and possibilities could be taken into account.

For the next SNA, the Dutch notion of a core system with modules has not been accepted as the basic structure. However, the general idea of a building-block system will be introduced in the next SNA: it will contain a separate chapter on satellite analysis and functionally oriented satellite accounts and it is to be supplemented by various handbooks, e.g. on environmental accounting. Furthermore, for the countries in transition in Eastern Europe, Ruggles (1991) proposes the introduction of actual core accounts and imputations modules. These can then be used to create the major economic aggregates and accounts of the SNA. This strategy of following the SNA, while simultaneously employing a core-module system, is in principle applicable for all countries. Whether and to what extent this proposal will be appraised and implemented by countries in transition or other countries is at present uncertain.

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13. The recent discussions on the micro foundations of macroeconomics and the increased popularity of micro simulation, e.g. in investigating the consequences of changes in tax policy, have created a growing demand for such a link. Macroeconomic inferences from microeconomic experiments are greatly facilitated by a link between the concepts in the national accounts and and those in the micro simulations.

4. Conclusions

In the last quarter of the seventeenth century, national accounting had a brilliant start in the work by Petty and King. In the next centuries, the number of estimates gradually increased all over the world, in particular after the first world war. Substantial progress in national accounting as an applied science was mostly absent until the 1930s and 1940s. Then, a really impressive succession of innovations showed up: the development of the social accounting approach, the invention of (modern) input-output analysis and the publication of the first international standard on national accounting in 1947. Furthermore, the Keynesian revolution in economics and the birth of econometric modelling showed fresh applications of national accounting and made national accounting figures an indispensable tool for planning and evaluating economic policy.

The Keynesian type of analysis, input-output analysis and econometric modelling of national economies are clear examples of system thinking. The strong influence of these innovations and their inventors in person (Leontief, Tinbergen, Frisch and Keynes) on the introduction of a systems approach in national accounting is therefore not surprising. Another common feature of all these innovations is their applied and policy-oriented nature. This is probably also no coincidence as the general circumstances of crisis and war (preparations and recovery), urgently demanded new and practical tools for economic policy.

In the next decades, these innovations were tested and further improved. On request of the OEEC, in 1951 a guideline on national accounting was written which was to be used in planning the Marshall-aid. Apparently, the 1947 recommendations were not judged suitable for this purpose. This Manual and its two immediate successors (1952, OEEC and 1953, UN) can be regarded as the second generation of international standards. In contrast to the 1947 Manual, rather simple accounting systems were aimed at. In fact, a systems approach was nearly absent as only some aggregates and their composing parts are to be compiled; the financial flows in the national economy are even nearly fully ignored.

The 1968 Manual reinforces the notion of an accounting system. Remarkable features are the integration of input-output tables which induced also the introduction of dual sectoring, the inclusion of tables in constant prices and a drastically improved description of financial flows. Despite the differences between the successive guidelines, the basic accounting concepts like the production boundary and the asset boundary have been rather constant from the start. The three generations of guidelines have also in common that they mainly ignore balance sheets, issues of personal income distribution and employment and unemployment.

In order to overcome some of the limitations of national accounting systems in the international guidelines, alternative accounting systems and measures like extended accounts, SAMs, purchasing power parities and satellite accounts have been developed. Some of these developments will be incorporated in the next SNA.

As economic theory advances and extends its scope, the limitations of a rigid multipurpose system like the 1968 SNA will become more and more clear. Following the trends of the past decades, we can expect an increased demand for more heterogeneous sets of national accounting figures. Only flexible accounting systems which take account of the new possibilities of automation will be capable to respond to the higher information demands of the future.

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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.

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 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, 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**, Oudde-ken, 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 employ-- ment 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 roots of these guidelines, 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 introducton of additional, more detailed, classifications (e.g. new subsectors).

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