



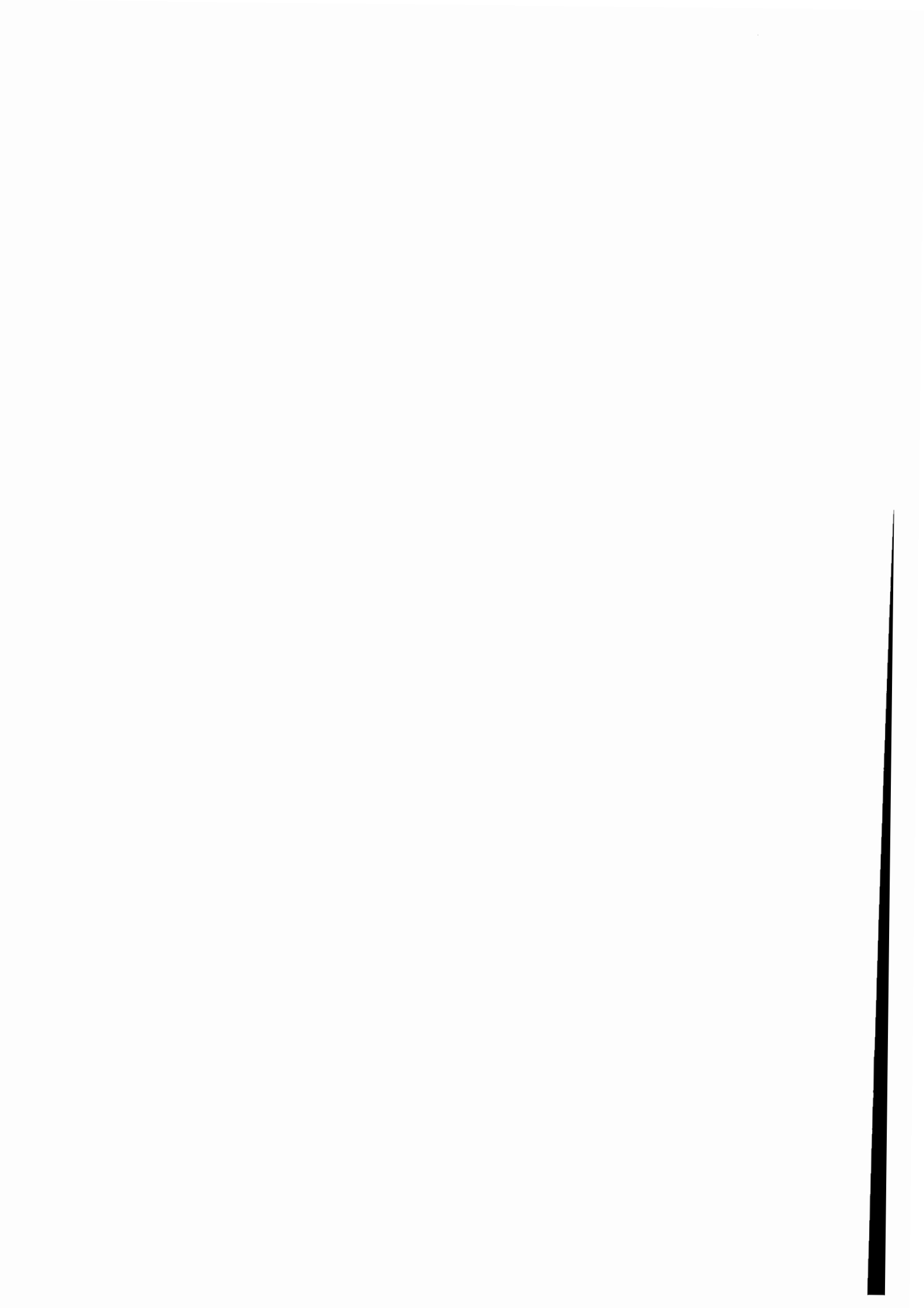
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MICRO-MESO-MACRO LINKAGE FOR LABOUR IN THE NETHERLANDS

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Abstract

In the the Labour accounts (LA), an explicit relationship exists between the micro data from, among others, the Labour Force Survey (LFS) and the macro data. The conceptual framework of the LA consists of a set of definitions (identities), both among macro variables and between aggregates and underlying micro data. Some of these macro variables are also included in the National accounts (NA), which leads to additional identities which have to be fulfilled. In case of discrepancies between preliminary estimates of the macro data, an analysis of the underlying source data leads to adjustments in micro as well as meso data. In the paper, an illustration of these adjustments is presented.

The combination of data from the integrated macro systems with the detailed source data enables the statistician to compile additional information on specific areas. In the construction of a Social Accounting Matrix (SAM) for the Netherlands, data from NA, LA and Socio-economic Accounts (SEA) are combined with source data from the Annual Earnings Survey and the LFS. As a result, detailed information on the distribution of income among household groups is presented in combination with elaborate labour market data (classified by sex and educational level) and National accounts data.

When combining integrated macro data and detailed source data, not all micro data are adjusted to achieve consistency with the integrated macro data. However, at Statistics Netherlands a growing number of source data is adjusted following the adjustments at the macro level. These adjustments comprise both corrections in individual records as well as adjustments of raising totals. This paper exemplifies the problems and possibilities for reconciling micro data within a coherent macro-meso information system.

Keywords: National Accounts, Labour Accounts, Social Accounting Matrix, micro-macro linkage, reconciliation

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1. Introduction

In the past, any relationship between macro National accounts and micro source labour data was hard to find. At present, linkages exist for parts of the total system by means of the system of Labour Accounts and the Social Accounting Matrix. This development is a direct consequence of the expanding automation in recent years. With this, the quality of statistics could be improved, respondent burdens reduced and discrepancies between various sources tackled. For the future, the ambition of Statistics Netherlands is a "one-figure" description of phenomena without emphasis on whether this figure stems from surveys or accounting systems. This will yield a comprehensive database with individual data.

This paper describes recent developments in the area of labour market statistics and shows the advantages of integrating these data in the system of Labour accounts and in Social Accounting Matrices. The benefits of such integrated information surpasses the sum of the benefits of various source data. A subsequent effort to adjust the micro data and aggregate figures increases the possible uses of statistics even further.

Before we move on, we would like to make a remark about the terminology used in this paper. In dealing with "data-sets", one usually distinguish between micro, meso or macro data. However, it must be realized that - besides this feature - there is also another dimension: the origin of data. That means that in this paper, we discriminate between source data (from various surveys and registrations) and integrated data (from the various accounting systems). As a consequence, we cannot avoid the use of compound terms like "micro source data" or "macro accounts data", because both source data and integrated data can relate to micro, meso and macro.

In chapter 2, the advantages of a system approach are discussed. Next, chapter 3 describes the achievement of a complete micro-meso-macro linkage of labour through a Labour accounts system and a SAM. And finally, chapter 4 concludes with our views on further developments, some nearly to be realized, some a little bit more futuristic.

2. The advantages of the system approach

2.1 Information systems

Statistical integration can be defined as the process of combining data from different sources to obtain information that is in some sense superior to that provided by the source data as such (Van Bochove [1991]). Accounting systems are recognized as the most familiar tools in achieving statistical integration. Well-known advantages of the system approach can be expressed in terms of (1) relevance, (2) reliability, (3) efficiency and (4) comparability over time (cf. Keuning [1996] and Leunis and Keuning [1994]).

Essentially, compiling accounting systems amounts to reconciling data from many sources in order to obtain the best possible estimates of the 'true' values of the phenomena to be described. This increases the relevance of data in several respects. Firstly, the resulting integrated data provide a coherent overall picture that is usually not available from the individual data sources. Secondly, integration yields consistent and linkable data on variables which in analyses and economic models may be used as explanatory factors or effects to be explained. Moreover, the process of statistical integration increases the reliability of the data because of additional checks on the outcomes of different sources. At the same time, integration promotes the efficiency of statistical agencies, because it is an instrument for statistical coordination. Concepts and classifications are harmonized, while the process also reveals lacunae and duplications within the statistical programme. With regard to comparability over time one can state that - contrary to accounting systems like the National accounts and the Labour accounts - source statistics often emphasize the description of actual levels, paying less attention to the construction of reliable time-series.

Less known advantages of integration systems are (1) timeliness and (2) flexibility (cf. Leunis and Keuning [1994], and Keuning [1995]). Timeliness is increasingly seen as one of the prime qualities of statistical information. Can integration systems meet the demand for up-

to-date figures? They certainly can. Of course, in compiling accounts for a recent period, fewer data are available than for previous years. Through the combination of scanty monthly or quarterly data with a detailed information system for an earlier period, and using some modelling assumptions, a rapid update of the aggregate variables from the information system can be published (refer to Janssen and Algera [1988]). Since 1991, Statistics Netherlands publishes a flash with the first approximations of the quarterly national accounts figures only seven weeks after the reference period; see e.g. Ouddeken and Zijlmans [1991]. Furthermore, recent source data can be structurally enriched by extrapolating the structural, less volatile characteristics of an information system. The provisional Labour accounts, for instance, provide figures on the employment growth by sex which precede those from the source survey by a full year.

Finally, integrated systems cater for a market in which the main interests of users are continually shifting. In this respect, integrated systems are sometimes thought to lack flexibility. Constantly adding or withdrawing key variables is not really possible. However, integrated systems do not lead an independent life from their sources. The very thing is that the strengthening of the micro-meso-macro link of data in accounting systems promotes its flexibility. As a consequence, particular indicators or dimensions can be introduced within the system. This makes it possible to obtain detailed data without losing the coherent data structure.

Social Accounting Matrices (SAMs)

Until recently, CBS' data users were confronted with difficulties in linking National accounts figures with figures from the other integrated systems, Labour accounts (LA) and Social-economic accounts (SEA).

A SAM is recognized as a useful tool for capturing disaggregated economic flows and their interaction in an economy. The SAM for the Netherlands incorporates the complete system of national accounts in matrix terms (cf. Timmerman and Van de Ven [1994]). In general, the SAM

emphasizes on distribution aspects by incorporating whatever degree of detail is of special interest. Among other things, the SAM for the Netherlands has been constructed to show the relationships between important economic indicators and the distribution of income and expenditures among household groups. At the same time, the compilation of a SAM does meet another objective: the accomplishment of the integration of main parts of the LA and the SEA into the system of national accounts.

The power of a SAM is that it allows new, more integrated types of analyses and policy simulations. Because it allows for "multiple actoring and multiple sectoring" (Keuning [1994]), it offers the opportunity to choose the most appropriate type of disaggregation to study the topic of interest. This possibility reflects the flexibility of the system. One of the requirements for a proper classification is that it should make the best use of the available data. Therefore, the design and construction of the SAM are not standardized¹⁾. In addition, this offers the opportunity to present labour data, social-economic data and NA data in one overall system. To allow for this integration, the SAM for the Netherlands -different from the conventional NA- also recognizes the employed person as a statistical unit²⁾. Let us elaborate on this issue. As industries demand and (household)sectors supply labour, wages and salaries are the link. In the NA, this is reflected by the incorporation of this variable both in supply and use tables and in the sector accounts. The question is how to distinguish various types of labour in the national accounts. Well, a matrix offers the possibility to include cross-tabulations (matrices) with respectively the demand for and the supply of labour (or: the payers and receivers of wages and salaries) classified by type of employee. These cross-tabulations accomplish a complete meso linkage between supply and use tables and sector accounts. One of the most important benefits is a better insight into the relationships

1) Refer to Keuning and De Ruijter [1988]. In their article they also warn against the use of standard classifications, because these inevitably lead to stereotypes. Whereas the macro aggregates in the NA should be internationally comparable, the subdivisions of these aggregates may not have to satisfy this condition at a very detailed level.

2) For it is not the household which works and earns a salary, but the individual, Keuning [1991].

between the labour market and other economic processes.

2.2 Micro-macro linkages

One of the prime objectives of SAMs is to provide a statistical basis for the creation of economic models. In the Netherlands, the importance of economic models in the interaction between economic theory and policy is unquestionable. As a consequence, the use of National accounts for policy making in the Netherlands has been increasing over the last decades, and still is. At the same time, quoting Keuning [1996], "...economic policy tends to require National accounts which are more reliable, more detailed, more transparent, and better internationally comparable". In view of this, Verbruggen and Zalm [1993: 161-162] note that "...The development of a "core" SAM with various satellite tables seems very promising as well."

A prominent institute providing models relevant to policy issues is the Dutch Central Planning Bureau (CPB). Among other things, CPB are constructing applied general equilibrium (AGE) models to analyze tax incentives and social security regulations on labour market performance (Gelauff et al [1991]).

A pragmatic approach to models is that these should adequately represent the phenomena they are assumed to describe. For AGE-models, this implies the availability of relevant and consistent micro data; see e.g. Zeelenberg [1991] and Gelauff [1992]). For instance, CPB requires specifically a consistent database with, besides macro-economic figures, disaggregated data on industries, households and persons. The NA offers consistent time-series data of sufficient length on a meso level (regarding industries), but one lacks e.g. consistent time series on detailed labour data.

More and more, the Dutch CBS gives priority to consistency and coherence of data at a more disaggregated level too. This can be achieved by linking micro data to data from accounting systems, which has various

ramifications:

1. Accounts data can be complemented by characteristics from source data, such as educational attainments, by means of raising survey data. This automatically leads to extensions of the accounting system, which -at the same time- meets the needs of users such as the CPB. For example, the Labour accounts data-base has recently been extended with consistent data on e.g. employment, unemployment and vacancies, classified by employment status (employer or employee), sex and educational level.
2. The sample error in the source data can be reduced. Accuracy will be improved when reweighting with data which are correlated with the target variable. In section 3.3, this is illustrated with respect to data on employed persons.

Summarizing, accounting systems and supplementary tables can provide the underlying data framework for models examining structural or behavioural questions (e.g AGE-models) just as input-output tables provide the underlying data for analysis based on multi-sector programming models.

3. Micro, meso and macro data on labour in The Netherlands

3.1 From micro labour data to macro Labour accounts

3.1.1 Sources of labour data

The labour market can be characterized by the demand for and the supply of labour. Establishments need persons to perform labour on the various posts within a firm. A distinction can be made between vacant posts (vacancies) and occupied posts (jobs). Persons supply labour. Total labour supply can be divided into unemployed persons (searching for a job) and employed persons (having a job). Where employment is realized, a description can be given of the persons employed, the number of jobs and the amount and type of labour performed (hours of work). The labour concept used in describing employment is paid labour. The payment for labour leads to an income for the person employed and to costs for the establishments. All these aspects are being described in Dutch labour statistics and meet, apart from some minor deviations in the concepts used, the demand for labour data in the revised United Nations System of National Accounts (1993 SNA)³⁾.

In the Netherlands there are three main sources of labour data:

1. Establishment surveys: presenting employment and vacancy data and hours of work and earnings/labour cost;
2. Household surveys: the continuous Labour Force Survey gives employment and unemployment data, mainly by personal characteristics;
3. Central registers offer information on gross earnings and benefits from social security institutions.

Each major method of observation has its own strengths and weaknesses. For an overview of these pros and cons see Leunis and Altena [1996].

3) The SNA concentrates on labour input variables in order to examine productivity. Included concepts are the annual average number of jobs (both employee and self-employed), total hours worked, full-time equivalents and in case of employee jobs the compensation of employees.

3.1.2 Accounts characterized by definitional equations

Within the Labour accounts the various sources with data on labour are combined and where necessary reconciled to present an overall view of the labour market. A characteristic feature of accounts is that the various aspects described are connected by way of definitional equations ('constraints'). In case of employees, the basic definitional equations of the Dutch Labour accounts are:

- (1) $\frac{\text{Persons employed (= main jobs)}}{\text{= Total number of jobs}} + \frac{\text{Secondary jobs}}{\text{= Total number of jobs}}$
- (2) $\frac{\text{Hours of work per job} \times \text{Number of jobs}}{\text{= Total hours of work}}$
- (3) $\frac{\text{Hourly wages} \times \text{Hours of work per job}}{\text{= Annual wages per job}}$
- (4) $\frac{\text{Annual wages per job} \times \text{Number of jobs}}{\text{= Total wages}}$

Some extensions of these identities are made by introducing more than one 'hours of work'-concept (contractual hours, hours overtime, hours paid for) and more than one wage concept (employee income and labour cost, in- and excluded bonuses and gratuities). Besides, quarterly data have to add up to annual data.

3.1.3 The process of statistical integration

For each variable to be included in the Labour accounts, a primary source is chosen. This choice follows from the pros and cons of each source and thus may differ each year. Within the process of statistical integration, the various adjustments leading to the Labour accounts are all recorded and accounted for in both internal documentation and publications. This way, the linkage between macro/meso accounts data and the micro source data can be shown explicitly.

Within the processing method different stages are distinguished. These stages together form the process of statistical integration. The first

three stages are related to the various types of differences which exist between the source data. These stages are called:

1. Harmonisation
2. Achievement of full coverage and
3. Minimisation of measurement errors.

In the third stage, we explicitly speak of minimisation instead of elimination of errors. The elimination of remaining minor differences takes place in the fourth stage:

4. Balancing.

In the following, we will illustrate the process of statistical integration by the way employment of employees has been determined in Dutch Labour accounts over 1991⁴⁾.

Because of the low variance of data from establishment surveys on labour as compared with the Labour Force Survey (LFS), establishment surveys are used as the primary source in the description of the employment of employees. In 1991 this primary source was the Annual Survey on Employment and Earnings (ASEE). In this survey firms receive two questionnaires. The employment questionnaire asks for the total employment in the firm. In the earnings questionnaire data on hours of work and earnings of individual employees are asked.

Table 1 gives a comprehensive view of all the adjustments made in the integration process. These adjustments will be discussed briefly for each stage in the process of statistical integration. For a more elaborate overview of the determination of employment data within the Labour accounts, see Leunis and Altena [1996]. An extensive description of the principles and the practice of Labour accounts is presented by Leunis and Verhage [1996].

4) The Labour accounts in the Netherlands describe the periode from 1987 onwards. Within four months after a reference periode - quarter or year - the first preliminary results are published.

Table 1

Jobs in paid employment, from source to Labour accounts, 1991

	Detail	Total
	x 1,000	
Jobs in paid employment measured by the Annual Survey on Employment and Earnings, September 30		5,395
Adjustments to achieve		
<i>Harmonisation</i>		
- reference date in the education branch		
- conversion to annual average		-41
<i>Full coverage</i>		
- conscripts	46	
- employees of size code zero establishments	86	
- employees not observed in company records		
- domestic staff	35	
- newspaperboys/girls	56	
- home care (working semi freelance)	35	
- clergy	7	
- outworkers	8	
- remaining jobs not insured under the Sickness Act and hidden employee labour	236	
	+ ----	
	509	509
<i>Minimisation of measurement errors</i>		
- jobs in education	9	
- temporary workers hired from private employment agencies	4	
- missing firms	3	
- plausibility adjustments	-4	
- adjustment for comparability over time	-30	
- cumulative balancing adjustments over previous years	-1	
	+ ----	
	-20	-20
<i>Balancing</i>		0
		+ -----
<i>Total number of jobs in paid employment</i>		5,843

Harmonisation

Though the construction of Labour accounts is completely based on micro source data, many of the calculations are being performed at a meso level. During the harmonisation stage, differences in definitions, classifications, reference period and amount of detail are removed. In this step, the various concepts in the source data are transformed to the concept to be published. The same applies to differences in classifications and to the level of detail used in the aggregate source data. Whether micro or macro source data are adjusted in this stage depends on the kind of differences to be adjusted. Adjustments for the reference period will be made on an aggregate level; adjustments for differences in concepts will be made by means of micro-editing in case the extent of these adjustments is not the same for all individual units underlying the aggregate data.

The adjustment needed to reach uniform definitions and reference period with respect to jobs in paid employment stems from the transformation of the data for September 30 into annual averages. In the calculation of the annual average, data from the Quarterly Survey on Total Earnings (QSTE) are used. For some branches the calculated quarterly average does not present a reliable picture of total employment in that quarter because of seasonal changes in between the end of quarter data. These seasonal fluctuations especially occur in agriculture and construction. Corrections for the average employment in the agricultural sector are made by comparing the quarterly patterns of total earnings and the number of jobs at the end of the quarter. For construction, the correction is based on unpublished data of a monthly output survey of the construction industry, which counts the number of jobs at the end of each month.

Full coverage

The achievement of full coverage is the adjustment for differences in populations. In most cases, completion of data from one source is achieved by adding data from another source; sometimes these data are estimated. Adjustments are made at the aggregate level, but they are

mostly based on micro source data.

To achieve full coverage the ASEE data have to be completed with data on various categories of employees. A distinction can be made between employees included and those not included in company records.

The first category added to achieve full coverage comprises the armed forces (conscripts) and employees of establishments which, because of a lack of up-to-dateness, are wrongly recorded as establishments without personnel ('size code zero' establishments). The number of these employees is estimated from data on paid days in these establishments, which can be taken from social insurance files.

Within the rest of the jobs not covered by establishment surveys some categories can clearly be identified. These are:

- domestic staff;
- newspaperboys/girls;
- home care (semi-freelance);
- clergy;
- outworkers;

These categories can be taken directly from the Labour Force Survey (LFS) occupational micro data in conjunction with economic activity data.

The category 'remaining jobs not insured under the Sickness Act and hidden employee labour' is the result of a confrontation of ASEE data and data from the Labour Force Survey (LFS). To be more precise, this relates to:

- labour of employees on which wage tax has been levied, but for which there is no compulsory Sickness Act insurance;
- labour intentionally and illegally hidden from the tax authorities and social insurance institutions.

Both categories of paid labour of employees are not included in company records. The reasons for not including them in the company records do not hold for answering in a household survey. Although there is not much information on the extent of these categories separately, it was concluded by Statistics Netherlands (cf. Leunis and Altena [1996]), that the discrepancy between the number of jobs according to the LFS and the

number derived from company records is indeed attributable to small and irregular jobs of employees not covered by Sickness Act insurance as well as to hidden labour. Consequently, without any contradictory information, the aggregate number of these jobs has been included in the Labour accounts estimates.

Minimisation of measurement errors

After the first two stages (harmonisation and the achievement of full coverage) all remaining discrepancies refer to errors in one of the measurement stages (from questionnaire design to the processing of the source data). The minimisation of measurement errors is an organized hunt for errors, by comparing data from different sources. Both micro and macro editing are applied to adjust measurement errors. A top-down approach is used here: only in case of substantial discrepancies in between aggregate meso and macro data, underlying meso and micro data will be analyzed.

The first four rows under this heading represent adjustments needed to approximate the actual level of employment as well as possible. Here the term approximation is used, because each adjustment represents the views at the moment the data are being determined. The fact is that in the years following the base year 1987, more energy has been put in determining actual changes than in determining actual levels.

The first two adjustments in the minimisation of measurement errors relate to jobs in specific economic activities, e.g. the education branch and private employment agencies. For both categories, more accurate information was available from other data sources.

The third and fourth adjustment pertain to incorrect reports of establishments, erroneous economic activity codes, etc. The third adjustment category contains the employment in firms which were missing in the integral part of the survey. These errors are revealed by micro matching procedures for data files from different sources. Whereas the third adjustment is an example of micro editing, the fourth (plausibility

adjustments) results from macro editing. It comprises all kinds of adjustments which arise from confrontation of aggregated data from various sources.

The adjustments made for comparability over time represent the differences between actual levels and the levels to be included in the labour accounts by reason of continuity. It brings about disruptions in the employment time series due to changes in sources or data processing.

The final adjustment category under 'minimisation of measurement errors' results purely from the calculation procedure. In order to approach the actual changes as close as possible the balancing adjustments of previous years must be taken into account.

Balancing

The search for measurement errors lasts till all relevant discrepancies have been solved. The remaining minor discrepancies are eliminated in the balancing procedure. This balancing is done by way of a purely mathematical method (a Powell minimisation procedure). The balancing process performs in such a way that the adjustment of the already corrected data is minimized.

3.2 The Social Accounting Matrix (SAM) and Labour Data

3.2.1 The Dutch System of National Accounts

The 1993 SNA states in the paragraphs on micro-macro links (p.12): "...for various reasons, it may be difficult, if not impossible, to achieve micro databases and macro-economic accounts that are fully compatible with each other in practice. Nevertheless, as a general objective, the concepts, definitions and classifications used in economic accounting should, so far as possible, be the same at both a micro and macro level to facilitate the interface between the two kinds of data.."

The Dutch NA⁵⁾ contain a fairly detailed description of the production process. For example, the most detailed supply and use tables for the Netherlands contain a breakdown into approximately 250 industries (ISIC) and 800 goods and services. On the other hand however, until recently labour was treated as a single, homogeneous factor of production; no details on the composition of labour (educational level, sex, age, occupation, etcetera) were provided. Consequently, when analyzing the inputs needed for the production of a particular industry, abundant data were available on the inputs of raw materials and semi-manufactured articles but one lacked detailed information on the input of labour. In addition, the NA did not provide information on the distribution of income and wealth among different household groups.

The demand for more disaggregated and detailed data increases the need for a better linkage between the (macro) NA and the micro data sources. Without such a harmonization, consistent analyses of both macro economic effects and distributional effects are impossible. The 1993 SNA states "... It might therefore appear desirable if the macro-economic accounts for sectors or the total economy could be obtained directly by aggregating corresponding data for individual units. There would be considerable analytical advantages in having micro databases that are fully compatible with the corresponding macro-economic accounts for sectors or the national economy..".

During the most recent revision (base-year 1987) of the national accounts, the Dutch changed over to a more institutional system⁶⁾. Since then, there exists a better connection between NA and the source statistics. This opened up the possibility to link all kinds of source statistics to the macro-economic accounts.

5) The NA system is mainly based upon the Production statistics. These statistics provide for each type of industry data on the structure and size of output, the use of products and value added, including wages and salaries and employers' social contributions. Besides, the Production statistics supply data on the number of jobs.

6) In the 1947 UN proposal Stone already emphasized the importance of the transactor/transaction principle.

3.2.2 Micro-macro link of labour data in the Social Accounting Matrix

As discussed before, the LA integrate data collected at individuals and establishments. So, it should be possible now to link not only establishment-based data to NA, but also labour data collected from individuals. The latter implies the possibility of linking labour data to data on the distribution and use of income among different (sub)sectors. The Dutch Socio-economic accounts (SEA) contain integrated information on the distribution and use of income among household groups. Both LA and SEA are useful in bridging the gap between the traditional National accounts and the micro statistics on households and individuals.

At a macro level the systems mentioned are in a certain way compatible (total wages and salaries, total household consumption) with each other. That is to say, differences between macro aggregates from LA and SEA and the corresponding national accounts figures can be specified. Differences between corresponding NA-figures and LA-figures are the result of:

- the use of different wage concepts
- differences in the population of persons employed
- the use of different benchmark years regarding self-employment
- the lack of harmonization with National accounts during the development of the Labour accounts system in 1990

With respect to labour data, the SAM for the Netherlands contains two types of cross-tabulations (see also Chapter 2). The first type classifies labour data (wages and salaries, labour input) by type of labour (sex and educational level) and type of industry; the other type subdivides labour data by type of labour and household group. In discussing micro-macro linkages on labour data in the SAM, we constantly distinguish between these two types of matrices.

Labour classified by sex, educational level and type of industry

The SAM for the Netherlands distinguishes for each industry fourteen types of labour classified by sex and level of education (see scheme 1). The remuneration of labour consists of wages and salaries and employers'

social contributions. Paid employment figures expressed in full-time equivalents are subdivided in the same way.

Scheme 1: Primary input categories in the SAM

1. Wages and salaries
 - a. men with basic education
 - b. men with lower general secondary education
 - c. men with lower vocational education
 - d. men with higher general secondary education
 - e. men with middle vocational education
 - f. men with higher vocational education
 - g. men with university training
 - h. women with basic education
 - i. women with lower general secondary education
 - j. women with lower vocational education
 - k. women with higher general secondary education
 - l. women with middle vocational education
 - m. women with higher vocational education
 - n. women with university training
 2. Employers' social contributions
 3. Consumption of fixed capital
 4. Operating surplus/mixed income (net)
-

The detailed information on the labour market in the SAM could be derived from a combination of data from different micro sources and meso data from LA and NA. The NA contain total labour input figures (employees and self-employed) for 58 industries, whereas the LA provide data on labour inputs classified by 81 industries. In the SAM, the most detailed intersection of the two classifications is applied: 41 industries. In the following, we will discuss the compilation of the matrices on wages and salaries and paid employment classified by (1) industry, (2) sex and (3) educational level.

When estimating these detailed matrices first the employment figures have been compiled. The LA provide integrated data on paid employment and wages and salaries both subdivided by sex, age, industry and hours worked. The Labour Force Survey (LFS) contain reliable employment data by educational levels. In compiling the detailed labour matrix, LFS data are linked to LA figures. Therefore, the LFS-records are clustered into 324 cells classified by industry, sex and labour hours. Next, each LFS-cell is raised by a factor in such a way that the result equals the corresponding LA-figure. This reweighted LFS-database provides first the submatrix on paid employment of employees classified by sex, educational level and industry, and secondly, an identically classified submatrix on

self-employed.

Next, the reweighted LFS-database is used to compile the detailed SAM-submatrix on wages and salaries. Data on wages and salaries by educational level are only available to a limited extent. A household survey appears most suitable for a proper measurement of educational levels, for respondents themselves know best how well they are educated. Establishments often do not know the most recent educational attainment of their employees, so they systematically underestimate these levels. This underestimation is clearly shown in table 2, in which the results from the LFS on households and the Annual Earnings Survey (AES) on establishments are compared.

Table 2: Paid employment (labour years) by educational level, 1989⁷⁾

Educational level	Employment		
	LFS (1)	AES (2)	(1) - (2)
Basic education	11.7%	9.9%	1.8%
Lower general secondary education	5.9%	10.9%	-5.0%
Lower vocational education	18.9%	25.6%	-6.7%
Higher general secondary education	4.8%	6.6%	-1.7%
Middle vocational education	37.8%	28.6%	9.2%
Higher vocational education	15.6%	13.4%	2.2%
University training	5.4%	5.1%	0.3%
Total	100.0%	100.0%	

Household surveys, on the other hand, are less appropriate for obtaining data on wages and salaries. For that purpose, establishment surveys like the AES are more useful. For SAM-purposes, data from this survey have to be combined with LFS-information.

The following procedure has been applied:

1. Based upon the 1989 AES, the following function has been estimated by

7) Unfortunately, the regular AES does not contain data on educational attainments. This kind of information is only recorded in personnel files. In order to minimize the response burden, the AES only asks for educational levels once every six years and even then only a limited number of respondents is involved. Such an additional survey on educational levels was carried out for the last time in 1989.

means of regression analysis:⁸⁾

Hourly wage rate = F (sex, age, hours worked, educational level)

2. The obtained coefficients were used to impute an hourly wage rate for each record (employee) in the LFS, based on the characteristics mentioned. In dealing with the underestimation of educational levels by AES, it was assumed that (a) the AES correctly estimated the wage ratios between educational levels, and (b) these wage ratios did not change over time.
3. Within each of the above LFS-cells total wages and salaries were computed as the product of the imputed hourly wage rate and hours of work.
4. The extended LFS-records were aggregated to obtain the same level of detail as the integrated LA figures on total wages and salaries.
5. Imputed wages and salaries are confronted with the corresponding LA-figures. This resulted into correction factors for each LFS-cell.
6. Using the correction factors and the imputed wage rates in 2. and making use of Iterative Proportional Fitting (IPF), integrated hourly wage rates could be obtained. Multiplying by the amount of full-time equivalents (hours of work) resulted into integrated data on wages and salaries per type of employee.

As mentioned before, NA and LA levels do not fully coincide at present. In dealing with this problem, NA-levels of respectively wages and salaries and employment per type of industry were used as benchmark estimates for the levels of wages and salaries and employment registered in the SAM.

Labour classified by sex, educational level and household group

The SAM also distinguishes labour input data and data on wages and salaries classified by sex, educational level and household group. The

8) See also Takkenberg en Walschots (1992): Earnings of employees by education.

SAM for the Netherlands distinguishes thirteen types of households classified by (1) main source of income and (2) household composition (see scheme 2). The SAM-subsectoring of households is based on the Social-economic accounts (SEA). The SEA constitute a framework which gives coherent and consistent information on income and outlays of 52 different household groups. In the SEA, total wages and salaries received per type of household are compiled based on micro tax data, also called the Income Panel Survey (IPS). The SEA also integrates data on total (paid) employment per type of household.

Scheme 2: Household groups in the SAM

■ Private households

Main source of income

- * Wages and salaries
 - Single-person households
 - Multi-person households without children
 - Multi-person households with children
- * Mixed income, engaged in
 - Agriculture
 - Trade, hotels, restaurants, cafes and repair services
 - Business and personal services
 - Other activities and property income
- * Transfer income in case of age
 - Single-person households
 - Multi-person households
- * Transfer income (other)
 - Single-person households
 - Multi-person households without children
 - Multi-person households with children

■ Institutional households

As stated before, the LFS collects data on personal characteristics, including position in the household (e.g. household, with or without children). Also household data like its composition (single- or multi-person and breadwinner, partner or child) belong to these characteristics. In order to compile matrices with labour data classified by sex, educational level and thirteen household groups, LFS-data have to be confronted with SEA-data and IPS-data. In addition, the previously discussed database of imputed hourly wage rates has been used again.

The SEA determine the main source of income of a household on basis of the sum of the incomes of all persons in the household. One of the difficulties in combining data from the LFS and the IPS is that the Dutch

LFS does not contain any information on income levels. Consequently, classifying households by **main** source of income of the household cannot solely be based upon the LFS. However, the LFS does contain information on the employment status (employee or self-employed) and the type of industry for each individual in the household who belongs to the labour force. Besides, the LFS inquires whether a person receives social security benefits and whether he or she has reached the age of 65. Based on these data the main source of income of the breadwinner⁹⁾ has been deduced. Regarding double-income households this method is not completely accurate. Table 3 shows that the discrepancies between SEA and LFS are indeed concentrated in the category multi-person households without children.

Table 3: Number of households by SAM-household groups according SEA and LFS, 1991

	SEA (1)	LFS (2)	(1) - (2)	
	x 1000		in %	
Wages and salaries	3416	3233	183	5.4
▪ Single-person households	686	676	10	1.5
▪ Multi-person households without children	1347	1177	170	12.6
▪ Multi-person households with children	1383	1380	3	0.2
Mixed income, engaged in:	382	429	-47	-12.3
▪ Agriculture	78	115	-37	-47.4
▪ Trade	89	89	0	0.0
▪ Services	116	138	-22	19.0
▪ Other activities and property income	99	88	11	11.1
Transfer income in case of age	1384	1381	3	0.2
▪ Single-person households	691	699	-8	-1.2
▪ Multi-person households	693	682	11	1.6
Other transfer income	880	1008	-128	-14.5
▪ Single-person households	391	368	23	5.9
▪ Multi-person households without children	269	413	-144	53.0
▪ Multi-person households with children	220	227	-7	-3.2
Unknown		10	-10	
Total	6062	6061	1	0.0

An additional problem is that the LFS mainly concerns variables related to the labour force. As a result, the LFS hardly contains data on, for instance, persons with a transfer income in case of age or

9) In case of multi-person households, the breadwinner is determined as follows: in case of married couples the man, in case of a single parent household the parent, in all other cases the oldest member of a household.

persons which live on property income. Of course, if it were possible to simply connect the LFS to the file with income statistics (based on fiscal registers) this would solve many problems. For that purpose the problems with privacy aspects must first be solved ("informed consent"). Statistics Netherlands invests much methodological research in this field.

3.2.3 Results and Applications

The SAM shows detailed labour data in relation to the complete set of NA. For instance, table 4 shows the shares of 6 types of labour in total paid employment for the year 1991. Men make up more than two third of total paid employment measured in full-time equivalents (FTEs). With respect to educational level the "middle educated" are in the majority with a share of 43%. These shares vary between the different types of industry. Non-commercial services is the only industry that employs more women than men. Besides, these women are relatively high educated. On the contrary, the manufacturing industry employs relatively more lower educated people and in this industry women are underrepresented. The government sector offers the best opportunities for high educated employees, both male and female .

Table 4: Paid employment (in FTEs) by type of employed person and by industry, 1991

	Manufac- turing	Trade, hotels, restaurants, cafes and repair	Commercial services	General government services and education	Non- commercial services	All indus- tries ⁴
in %						
Male, low education ¹	36.5	24.9	15.5	12.1	4.9	24.8
Male, middle education ²	34.4	32.2	23.7	29.2	11.7	28.9
Male, high education ³	11.7	6.8	17.7	31.4	16.6	14.6
Female, low education ¹	8.0	17.8	18.9	4.4	11.6	10.8
Female, middle education ²	6.7	15.7	18.3	8.5	37.0	14.1
Female, high education ³	2.6	2.5	5.9	14.4	18.1	6.8
Male, total	82.7	63.9	56.9	72.7	33.2	68.3
Female, total	17.3	36.1	43.1	27.3	66.8	31.7
Low education, total	44.5	42.7	34.4	16.5	16.5	35.6
Middle education, total	41.1	47.9	42.0	37.7	48.7	43.0
High education, total	14.3	9.3	23.6	45.8	34.8	21.3
Total	100.0	100.0	100.0	100.0	100.0	100.0

1) Completed basic-, lower general secondary- or lower vocational education

2) Completed higher general secondary or middle vocational education

3) Completed higher vocational education or university training

4) All other Dutch industries included

Table 5 shows average wage rates per full-time employee. Some striking results can be derived from this table. In general, female employees earn considerably less than male employees. The government is a very special employer in this regard; per hour, women make more money in this activity than in any other industry while, on the contrary, men receive the lowest hourly wage in this industry. Women earn the least in service industries (non-commercial industries excluded).

Table 5: Average wage rates by type of employed person and by industry, 1991 (in 1000 guilders)

	Manufac- turing	Trade, hotels, restaurants, cafes and repair	Commercial services	General government services and education	Non- commercial services	All indus- tries
Male, low education	51.1	44.8	45.3	44.4	46.4	48.3
Male, middle education	60.0	53.5	58.5	52.3	52.9	56.2
Male, high education	80.6	73.2	79.6	73.1	71.6	76.4
Female, low education	33.7	29.2	29.7	40.2	35.4	32.2
Female, middle education	40.9	35.9	37.6	46.8	42.6	40.5
Female, high education	52.4	46.4	48.8	57.2	53.1	53.3
Total	55.6	45.4	50.3	57.9	50.0	52.2

The SAM also gives information on how income -obtained from direct participation in the production process- is distributed among households. For example, table 6 shows the shares of all labour categories distinguished in employees' households. As expected, the proportion of women is closely related to the household composition. The percentage of female full-time equivalents within multi-person households with children is below 22%, while within single-person households this figure rises to 41%.

Table 6: Employment data of employees' household classified by sex, educational level and household composition, 1991

	H O U S E H O L D G R O U P S							
	Single person	Multi-person without children	Multi-person with children	Total	Single person	Multi-person without children	Multi-person with children	Total
	in % of total row				in % of total column			
Male	10.7	44.8	44.5	100.0	58.6	64.7	78.2	69.2
E Low educated	8.0	46.9	45.1	100.0	15.8	24.3	28.4	24.9
M Middle educated	10.9	45.8	43.4	100.0	25.2	27.9	32.2	29.2
L High educated	14.7	39.5	45.8	100.0	17.6	12.4	17.6	15.1
O								
Y Female	17.0	55.0	28.0	100.0	41.4	35.3	21.8	30.8
E								
E Low educated	10.4	55.6	34.0	100.0	8.6	12.1	9.0	10.5
S Middle educated	16.9	58.7	24.4	100.0	18.3	16.7	8.5	13.7
High educated	27.6	46.5	26.0	100.0	14.4	6.4	4.4	6.6
Total	12.6	47.9	39.4	100.0	100.0	100.0	100.0	100.0

With respect to their labour participation, women generally can be classified into different categories based upon age and household composition. Scheme 3 summarizes the most striking labour market characteristics of 6 types of women. Besides, the following applies to all women: the higher they are educated, the higher their labour participation rate is. In this regard, it can be noted that older Dutch women are far lower educated than the younger ones.

Scheme 3: General female labour market characteristics based on age and household composition

		AGE		
		younger (25-44 years)	older (≥ 45 years)	
		1	2	
C H O M O S O H I O T L I D O N	Single-person households	1	<ul style="list-style-type: none"> • ≈ male participation rate • full-timers • high educated 	<ul style="list-style-type: none"> • small group • very low participation in paid work
	Multi-person households without children	2	<ul style="list-style-type: none"> • < male participation rate • more part-timers when compared to cell (1,1) 	<ul style="list-style-type: none"> • mostly women grown out of children • low participation in paid work • mostly part-timers
	Multi-person households with children	3	<ul style="list-style-type: none"> • low participation rate • mostly part-timers 	<ul style="list-style-type: none"> • very small group • low participation in paid work

3.3 The creation of a macro-to-micro linkage

The process of statistical integration is limited to a certain amount of detail. Nevertheless, once integration has been achieved, additional subdivisions can be introduced by linking detailed source data to aggregated accounts data.

Statistics Netherlands has already accomplished two of such linkages: one for the benefit of the determination of regional employment data and the other one for the benefit of the description of persons employed.

3.3.1 Regional employment data

In the Annual Survey on Employment and Earnings (ASEE), the number of jobs are also classified by region. The original data from these surveys are not published, but directly reweighted by 'corresponding' Labour accounts data. Does this mean that the national totals of the regional employment figures fully coincide with those of the Labour accounts? Not yet. A definitional and a coverage difference still remain.

As far as the definition is concerned, the regional data refer to a point in time (end of third quarter), whereas the Labour accounts data

give quarterly and annual averages. Within the processing method of the Labour accounts, an unique link between 'end-of-quarter' data and quarterly averages has been achieved. By this linkage the average Labour accounts data can be translated into end-of-quarter data.

The coverage difference is due to a lack of regional information in case of jobs not observed in company records, refer to section 3.1.3. Therefore, the regional disaggregation resulting from linking micro data from establishment surveys to macro data from the Labour accounts only holds for data from 'company records'. Van Bochove and Everaers [1996] argue that in bringing about a macro-to-micro linkage, it might be too ambitious to translate definitional and population differences at the micro level from the start. After a few years of experience with the linkage discussed above, Statistics Netherlands will start a project to remove the coverage difference by further exploration of LFS data. At first this will only result in meso data at the regional level. A next step will be to extend the micro data set with imputed records, which reflect the information from the meso aggregates. Chapter 4 will further elaborate on this approach.

Another improvement is to be found in a modified raising of the ASEE data. At this moment, no use has yet been made from the fact that part of the adjustments in the process of statistical integration refer to individual units. Handling these adjustments separately from the general upraising enlarges the reliability of the resulting regional employment data.

3.3.2 The employment structure

A person may have more than one job. Therefore, the number of jobs will always be equal to or higher than the number of persons employed. The process of statistical integration as described in the previous sections has been effectuated for jobs, not for persons employed. Within the LFS the linkage between jobs and persons employed is described. By using this relationship in linking micro LFS data to the meso and macro data from the Labour accounts, persons employed data can be incorporated in the

Labour accounts and both jobs and persons employed can be further characterized by personal characteristics like occupation, education and ethnic background.

This will be achieved by (1) adjusting the LFS micro data according to the corrections implemented during the process of statistical integration and (2) reweighting the resulting LFS data with Labour accounts data. The raising totals for this reweighting procedure are the number of jobs from the Labour accounts subdivided by sex, weekly hours of work and economic activity.

Contrary to the regional breakdown of employment data, this linkage clearly results in identical macro totals (no differences in definition and population). The process of linking also distinguishes between adjustments for errors in individual records (corrected for in the micro data) and adjustments for errors in meso and macro aggregates (corrected for by the reweighting procedure).

The post-stratification as described above should be handled with care. Van Bochove and Everears [1996] mention the possible biasing of relations between variables which are not part of the poststratification scheme. This requires careful attention to detail and thorough evaluation and analysis of the results.

With respect to the reweighting of the LFS data two improvements can still be made. The first deals with comparability over time. Although the effects of sample errors in data on personal characteristics like occupation and level of education is diminished by reweighting to the more reliable target variable information from the Labour accounts, an even further diminishing of the sample error can be reached through specific analysis in the comparability over time of the time series on these characteristics.

The second improvement regards the extension with data on the non-working population. The adjustment of the numbers of persons employed in the LFS automatically influences the relation between the

working and non-working population. By simultaneously developing a new system of Social-demographic accounts, Statistics Netherlands will incorporate these aspects also.

Finally, the aboved described linkages not without obstacles. In case of large differences between the original raising totals and those resulting from the Labour accounts, one should be aware of the danger of selectivity within the stratification categories. This can be prevented partially if separate adjustments are made for (1) differences in definition and population and (2) measurement errors. In case these errors are very large, it might be better to concentrate on a future improvement, possibly even by redesigning the underlying survey.

4. Conclusions and future work

4.1 Conclusions

The statistical programme of Statistical Netherlands is determined by social needs. In society, there exists an urgent need for indisputable figures on a macro, meso and micro level, which are accepted by all parties involved as a starting point for negotiations, analyses, policy-making, etcetera.

Up to now Statistics Netherlands has successfully put much effort in creating a consistent labour data set on both a meso and macro level. The Labour accounts and the Social Accounting Matrix offer the structural frameworks by which this consistency could be realized. For the greater part this meso data set is constructed from micro data sets. However, as Van Bochove and Everaers [1996] argue, this micro-to-macro linkage does not automatically generate a macro-to-micro linkage. Regarding the latter, not everyone is convinced of the feasibility or even the desirability of such a linkage. Criticizers claim that as consistent aggregation of micro data is hard to achieve, developing consistent micro databases from macro accounts must be virtually impossible. Besides, they claim that the quality of adjusted (reconciled) micro data may be less than the quality of the original information. Of course, these people would be right if micro data were unscrupulously linked to meso or macro data. However, if it is assumed that micro data are only adjusted when this is scientifically justified, the above described process should always result in the best data. In fact, whenever information is available which pinpoints to a possible decrease in quality, this can be used in an interactive process to adjust the data from the basic source. In the end, both the micro data and the macro data will become more relevant and more reliable through this linkage. In agreement with this conclusion, Statistics Netherlands has already started to create macro-to-micro linkages; refer to section 3.3 for the first results.

Naturally, we do acknowledge the remaining danger of an aggregation-

bias and its potential ramifications for the quality of reconciled micro data. In handling this phenomenon, one should realize that the preference for a particular kind of data set originate from "...the theoretical split between the macro and micro world." (Ruggles and Ruggles [1986])¹⁰⁾. Acknowledging this, Ruggles and Ruggles (1986) state that: "... Micro-analytic simulation can provide a means of bridging the micro/macro gap." At the same time, they realize that for the sake of a conceptual relationship between the micro data and the macro frame "...an integrated and coherent data framework that will encompass both macro and micro data needs" is indispensable.

Thus far, all attention has been directed to micro-meso-macro linkages. Van Bochove and Everaers [1996] also point to micro-micro linkages. In principle, the linkage between the different micro data sets and their meso- and macro-counterparts in the accounting systems, enables a communication between the micro data sets. However, this indirect relationship does not mean that one micro data set is automatically consistent with another micro data set. This problem should also be solved in the (near) future.

In the coming years, improvements both in the area of linking micro, meso and macro data sets and in the area of micro-micro linkages, will be given a high priority. This should not be a one-way traffic. It has to start with an extensive exchange of experience between the analysts of the accounting systems and those of the original data sources, resulting in a synergy between all production processes. Only when this has been achieved, one can justly state that integration frameworks make the best possible use of available data or, to put it differently, are indispensable tools to compile the most reliable figures. Section 4.2 precludes on possible ways to reach this aim.

10) For example, the criticism of the macro-camp runs as follows: "Macro is more than a simple addition of micro. Consequently, using micro-economic systems in basing macro-economic phenomena, one produces the so-called "fallacy in composition".

4.2 How to fulfill our prophecies

4.2.1 Improvement of present production processes

Since the end of the eighties, Statistics Netherlands has paid an increasing attention to the development of accounting systems regarding social statistics. In order to make as much progress as possible, this process has been developed more or less apart from the current production of statistical data from surveys like the LFS and ASEE. Here, the linkage from micro-to-macro can be improved without much effort. For the greater part, checks and adjustments made by integration departments, could be embedded in the various current production processes of source data. After all, persons involved in these processes have more detailed knowledge of the ins and outs of a particular (original) data source and, in addition, have access to all individual (rough) data. With regard to that, considerable improvements can be obtained on three aspects: (1) the avoidance of "doing things twice", (2) a stronger commitment from the producers of source data figures to the figures resulting from accounting systems, and (3) a further improvement of quality in all stages of the statistical process.

At the same time, the above described synergy between accounting systems and its basic sources must be accompanied by an overall-synergy between all different accounting systems of the Bureau. In the following, we propose the use of a SAM-framework as one of the solutions to achieve an overall-synergy.

The 1988, 1990 and 1991 SAMs for the Netherlands are ex-post approximations. "Ex-post" means that National accounts totals were not affected. At the same time, the LA and SEA totals were generally used as starting points. Consequently, the linkage of the three systems takes place after they have been compiled. This has certain ramifications: In case there are differences between LA, SEA and NA, LA and SEA data will be adjusted to NA totals, even if these leads to unsatisfactory results at the meso level.

One of the results of compiling this "ex-post" SAM is that it pinpointed a lot of bottlenecks between the three systems LA, SEA and NA. Notably, the various wage and income concepts used in different CBS-statistics did not yet match. The best solution to this problem is to use the SAM directly as the overall integrating framework. The results from LA, SEA and NA should not enter the SAM process as final results but as intermediate results. In that case, discrepancies can be used to trace deficiencies in the production process. Once having determined the control (meso) totals in the SAM, LA, SEA and NA macro data completely match.

The next revision of the NA, LA and SEA¹¹⁾ will position the SAM as the overall integrating framework in which data on goods and services, industries, labour markets and income distributions are combined at a low level of aggregation. Eventually, the purpose of the SAM is twofold: to create better micro-macro linkages, and as a consequence, to obtain better figures for all variables at any level of aggregation. As far as National accounts are concerned this can even imply an improvement of the final GDP-estimate. How? Well, the NA input-output tables already enable a meso-confrontation of data on the supply and use of goods and services. A major advantage of the SAM is that it offers the possibility to include as well a meso-confrontation of income and expenditure data by subgroups of establishments, employed persons, households and products. In this way, the SAM combines the production-, expenditure- and income approach and thus makes the best possible use of the available data at CBS.

4.2.2 Extensions of accounting systems

In section 3.3.2, we already stressed the fact that linking micro data sets to macro accounts data only yields improved information on those variables included in the accounting systems. In case of the LFS, this means that only reweighted micro data with regard to persons employed can

11) The 1995 Revision follows the new ESA 1995 regulations on the compilation of National accounts. This revision is not limited to National accounts only, but has ramifications for all its sources, including the Labour accounts and the Social-economic accounts.

be presented. In order to include also categories which do not perform paid labour, the accounting systems have to be extended to other areas. Especially other forms of social participation (e.g. education, voluntary work) and the relation between labour and social security should be considered. Regarding these areas, we point to the (preliminary) development of a system of Social-demographic accounts as well as a system of Social-security accounts.

Next, consistency, completeness and coherence of labour market data can be improved by a linkage of these systems with the SAM. Considering the National accounts, this implies a valuable extension of the current monetary data set with non-monetary information. As a continuation of SAM, this extended set - a system of economic and social accounting matrices and extensions (SESAME) - can provide for the increasing wants for a better integration of monetary data and related information in non-monetary units¹²⁾. "...For instance, compensation of employees by industry and labour category in the SAM can be broken down into hours worked and an average hourly wage rate. In turn these hours worked for payment can be related to other time use of the employed persons concerned. Subsequently, time use of the employed persons can be combined with the time use of the other members of the same household group." [Keuning, 1996].

Generally speaking, the National accounts should be extended to a system in which all aspects of welfare are depicted. That means that its monetary figures should be reconciled with all kinds of non-monetary data. In the end, the development of the SESAME will yield an integrated description of economic, social and ecological phenomena. The usefulness of such a statistical information system is the possibility to derive a whole range of economic and social summary indicators. And, as the 1993 SNA states (p.469): "...Whatever set of aggregates is preferred, they would all share one crucial feature: every indicator is computed from the

12) Refer to Zalm (1994): "...Even further reaching is the internalization of non-economic processes in the analysis...", and Keuning (1995): "...A SESAME goes beyond a SAM by providing a conceptual and numerical linkage of related monetary and non-monetary phenomena...".

same, fully consistent statistical system."

4.2.3 A synthetic census

Despite all Dutch practice presented in this paper, our imagination goes far beyond the way micro-meso-macro linkages have been realized thusfar or will be realized in the near future. In talking about an ideal system, we imagine a fully micro based system, where all possible meso and macro aggregates can be constructed, just by adding records along the breakdowns to be distinguished. Within that system not only the linkages from micro-to-macro or from macro-to-micro hold, but also micro-micro linkages combining detailed information from various surveys and registrations.

According to Van Bochove and Everaers (1996), realizing micro-micro linkages can be achieved along three ways: (1) exact matching, (2) synthetic matching, and (3) a redesign of surveys. In case of exact matching there are limitations for privacy and methodological reasons. The privacy aspect might be solved by "informed consent". The methodological problem only arises in case of matching two independent sample surveys; the resulting matched sample will be very small. However, registers do not have these problems. By synthetic matching, records from all micro data sets are grouped according to common breakdowns. Within the resulting cells micro data from different sources are combined randomly. Although the problems related to exact matching do not show up, synthetic matching cannot guarantee anything with respect to the validity of the micro-micro relations. Recently, Statistics Netherlands started to redesign various household surveys. In the structure of the redesign a distinction is made between a large survey asking for core variables and subsamples for in-depth questionnaires on various areas. As long as the core variables are strongly related with the variables describing those areas, it is possible to construct large synthetic data sets on different subjects.

In the future, Statistics Netherlands will experiment with the use of all these techniques. The first aim is to search for the feasibility to

construct a kind of "semi-real/semi-synthetic" micro data set, which will replace the Census 2001 in the Netherlands. At the same time, this micro data set will have to add up as much as possible to the meso and macro totals of the accounting systems. Working along these lines, step by step, both micro-to-macro and macro-to-micro linkages will be realized and wherever possible, accompanied by micro-micro linkages.

Besides matching techniques, imputation techniques will be needed along with the integration approach as described in section 3.1.3.

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- NA/01 Flexibility in the system of National Accounts**, Van Eck, R., C.N. Gorter and H.K. van Tuinen (1983).
This paper sets out some of the main ideas of what gradually developed into the Dutch view on the fourth revision of the SNA. In particular it focuses on the validity and even desirability of the inclusion of a number of carefully chosen alternative definitions in the "Blue Book", and the organization of a flexible system starting from a core that is easier to understand than the 1968 SNA.
- NA/02 The unobserved economy and the National Accounts in the Netherlands, a sensitivity analysis**, Broesterhuizen, G.A.A.M. (1983).
This paper studies the influence of fraud on macro-economic statistics, especially GDP. The term "fraud" is used as meaning unreporting or underreporting income (e.g. to the tax authorities). The conclusion of the analysis of growth figures is that a bias in the growth of GDP of more than 0.5% is very unlikely.
- NA/03 Secondary activities and the National Accounts: Aspects of the Dutch measurement practice and its effects on the unofficial economy**, Van Eck, R. (1985).
In the process of estimating national product and other variables in the National Accounts a number of methods is used to obtain initial estimates for each economic activity. These methods are described and for each method various possibilities for distortion are considered.
- NA/04 Comparability of input-output tables in time**, Al, P.G. and G.A.A.M. Broesterhuizen (1985).
It is argued that the comparability in time of statistics, and input-output tables in particular, can be filled in in various ways. The way in which it is filled depends on the structure and object of the statistics concerned. In this respect it is important to differentiate between coordinated input-output tables, in which groups of units (industries) are divided into rows and columns, and analytical input-output tables, in which the rows and columns refer to homogeneous activities.
- NA/05 The use of chain indices for deflating the National Accounts**, Al, P.G., B.M. Balk, S. de Boer and G.P. den Bakker (1985).
This paper is devoted to the problem of deflating National Accounts and input-output tables. This problem is approached from the theoretical as well as from the practical side. Although the theoretical argument favors the use of chained Vartia-I indices, the current practice of compiling National Accounts restricts to using chained Paasche and Laspeyres indices. Various possible objections to the use of chained indices are discussed and rejected.
- NA/06 Revision of the system of National Accounts: the case for flexibility**, Van Bochove, C.A. and H.K. van Tuinen (1985).
It is argued that the structure of the SNA should be made more flexible. This can be achieved by means of a system of a general purpose core supplemented with special modules. This core is a fully fledged, detailed system of National Accounts with a greater institutional content than the present SNA and a more elaborate description of the economy at the meso-level. The modules are more analytic and reflect special purposes and specific theoretical views.
- NA/07 Integration of input-output tables and sector accounts; a possible solution**, Van den Bos, C. (1985).
The establishment-enterprise problem is tackled by taking the institutional sectors to which the establishments belong into account during the construction of input-output tables. The extra burden on the construction of input-output tables resulting from this approach is examined for the Dutch situation. An adapted sectoring of institutional units is proposed for the construction of input-output tables.
- NA/08 A note on Dutch National Accounting data 1900-1984**, Van Bochove, C.A. (1985).
This note provides a brief survey of Dutch national accounting data for 1900-1984, concentrating on national income. It indicates where these data can be found and what the major discontinuities are. The note concludes that estimates of the level of national income may contain inaccuracies; that its growth rate is measured accurately for the period since 1948; and that the real income growth rate series for 1900-1984 may contain a systematic bias.

- NA/09 The structure of the next SNA: review of the basic options**, Van Bochove, C.A. and A.M. Bloem (1985).
There are two basic issues with respect to the structure of the next version of the UN System of National Accounts. The first is its 'size': reviewing this issue, it can be concluded that the next SNA should contain an integrated meso-economic statistical system. It is essential that the next SNA contains an institutional system without the imputations and attributions that pollute the present SNA. This can be achieved by distinguishing, in the central system of the next SNA, a core (the institutional system), a standard module for non-market production and a standard module describing attributed income and consumption of the household sector.
- NA/10 Dual sectoring in National Accounts**, Al, P.G. (1985).
Following a conceptual explanation of dual sectoring, an outline is given of a statistical system with complete dual sectoring in which the linkages are also defined and worked out. It is shown that the SNA 1968 is incomplete and obscure with respect to the links between the two sub-processes.
- NA/11 Backward and forward linkages with an application to the Dutch agro-industrial complex**, Harthoorn, R. (1985).
Some industries induce production in other industries. An elegant method is developed for calculating forward and backward linkages avoiding double counting. For 1981 these methods have been applied to determine the influence of Dutch agriculture in the Dutch economy in terms of value added and labour force.
- NA/12 Production chains**, Harthoorn, R. (1986).
This paper introduces the notion of production chains as a measure of the hierarchy of industries in the production process. Production chains are sequences of transformation of products by successive industries. It is possible to calculate forward transformations as well as backward ones.
- NA/13 The simultaneous compilation of current price and deflated input-output tables**, De Boer, S. and G.A.A.M. Broesterhuizen (1986).
A few years ago the method of compiling input-output tables underwent in the Netherlands an essential revision. The most significant improvement is that during the entire statistical process, from the processing and analysis of the basic data up to and including the phase of balancing the tables, data in current prices and deflated data are obtained simultaneously and in consistency with each other.
- NA/14 A proposal for the synoptic structure of the next SNA**, Al, P.G. and C.A. van Bochove (1986).
This paper presents a proposal for the synoptic structure of the next SNA. This system is easier to explain than 1986 SNA; it provides a complete integration of input-output data and the income distribution data; it is more flexible and greatly facilitates micro-macro linkage.
- NA/15 Features of the hidden economy in the Netherlands**, Van Eck, R. and B. Kazemier (1986).
This paper presents the results of extensive and rigorous survey research into the black labour market in the Netherlands. It reveals the quantitative relevance of the hidden economy and gives detailed information on its structure.
- NA/16 Uncovering hidden income distributions: the Dutch approach**, Van Bochove, C.A. (1987).
The three modules in this paper constitute a system of Socio-Economic Accounts that provides a complete description of the distribution of income, both primary, secondary, tertiary and informal, as well as a complete description of the distribution of consumption and saving.
- 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 of the main problems associated with the compilation of long-term series. It is the purpose of this paper to make the historical series accessible to non-Dutch readers.

- 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).
The issue of the proper way to account for the consequences of crisis and disaster is best brought into focus by studying a practical case. In this paper the damage caused by the second world war in the Netherlands is used as an example. Constant wealth national income is introduced as an alternative income concept.
- NA/20 The micro-meso-macro linkage for business in an SNA-compatible system of economic statistics**, Van Bochove, C.A. (1987).
The new system of national accounts will be a fully integrated meso system: not only will each process be described at the meso level, but the linkages between the processes will also be shown at the meso level. A central role is played by the three-dimensional generation of value added matrix.
- NA/21 Micro-macro link for government**, Bloem, A.M. (1987).
This paper describes the way the link between the statistics on government finance and national accounts is provided for in the Dutch government finance statistics.
- NA/22 Some extensions of the static open Leontief model**, Harthoorn, R. (1987).
The results of input-output analysis are invariant for a transformation of the system of units. Such transformation can be used to derive the Leontief price model, for forecasting input-output tables and for the calculation of cumulative factor costs. Finally the series expansion of the Leontief inverse is used to describe how certain economic processes are spread out over time.
- NA/23 Compilation of household sector accounts in the Netherlands National Accounts**, Van der Laan, P. (1987).
This paper provides a concise description of the way in which household sector accounts are compiled within the Netherlands National Accounts. Special attention is paid to differences with the recommendations in the United Nations System of National Accounts (SNA).
- NA/24 On the adjustment of tables with Lagrange multipliers**, Harthoorn, R. and J. van Dalen (1987).
An efficient variant of the Lagrange method is given, which uses no more computer time and central memory than the widely used RAS method. Also some special cases are discussed: the adjustment of row sums and column sums, additional restraints, mutual connections between tables and three dimensional tables.
- NA/25 The methodology of the Dutch system of quarterly accounts**, Janssen, R.J.A. and S.B. Algera (1988).
In this paper a description is given of the Dutch system of quarterly national accounts. The backbone of the method is the compilation of a quarterly input-output table by integrating short-term economic statistics.
- NA/26 Imputations and re-routeings in the National Accounts**, Gorter, Cor N. (1988).
Starting out from a definition of 'actual' transactions an inventory of all imputations and re-routeings in the SNA is made. It is discussed which of those should be retained in the core of a flexible system of National Accounts. Conceptual and practical questions of presentation are brought up. Numerical examples are given.

- NA/27 Registration of trade in services and market valuation of imports and exports in the National Accounts**, Bos, Frits (1988).
The registration of external trade transactions in the main tables of the National Accounts should be based on invoice value; this is not only conceptually very attractive, but also suitable for data collection purposes.
- NA/28 The institutional sector classification**, Van den Bos, C. (1988).
A background paper on the conceptual side of the grouping of financing units. A limited number of criteria are formulated to form a basis for the classification of these units. The system is constructed in such a way that the sector classification of the SNA and the ESA can be derived from it.
- NA/29 The concept of (transactor-)units in the National Accounts and in the basic system of economic statistics**, Bloem, Adriaan M. (1989).
Units in legal-administrative reality are often not suitable as statistical units in describing economic processes. Some transformation of legal-administrative units into economic statistical units is needed. This paper examines this transformation and furnishes definitions of economic statistical units. Proper definitions are especially important because of the forthcoming revision of the SNA.
- NA/30 Regional income concepts**, Bloem, Adriaan M. and Bas De Vet (1989).
In this paper, the conceptual and statistical problems involved in the regionalization of national accounting variables are discussed. Examples are the regionalization of Gross Domestic Product, Gross National Income, Disposable National Income and Total Income of the Population.
- NA/31 The use of tendency surveys in extrapolating National Accounts**, Ouddeken, Frank and Gerrit Zijlmans (1989).
This paper discusses the feasibility of the use of tendency survey data in the compilation of very timely Quarterly Accounts. Some preliminary estimates of relations between tendency survey data and regular Quarterly Accounts-indicators are also presented.
- NA/32 An economic core system and the socio-economic accounts module for the Netherlands**, Gorter, Cor N. and Paul van der Laan (1989).
A discussion of the core and various types of modules in an overall system of economy related statistics. Special attention is paid to the Dutch Socio-economic Accounts. Tables and figures for the Netherlands are added.
- NA/33 A systems view on concepts of income in the National Accounts**, Bos, Frits (1989).
In this paper, concepts of income are explicitly linked to the purposes of use and to actual circumstances. Main choices in defining income are presented in a general system. The National Accounts is a multi-purpose framework. It should therefore contain several concepts of income, e.g. differing with respect to the production boundary. Furthermore, concepts of national income do not necessarily constitute an aggregation of income at a micro-level.
- NA/34 How to treat borrowing and leasing in the next SNA**, Keuning, Steven J. (1990).
The use of services related to borrowing money, leasing capital goods, and renting land should not be considered as intermediate inputs into specific production processes. It is argued that the way of recording the use of financial services in the present SNA should remain largely intact.
- NA/35 A summary description of sources and methods used in compiling the final estimates of Dutch National Income 1986**, Gorter, Cor N. and others (1990).
Translation of the inventory report submitted to the GNP Management Committee of the European Communities.

- NA/36 The registration of processing in supply and use tables and input-output tables**, Bloem, Adriaan M., Sake De Boer and Pieter Wind (1993). 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. Net recording is in general to be preferred. An exception has to be made when processing amounts to a complete production process, e.g. oil refineries in the Netherlands.
- NA/37 A proposal for a SAM which fits into the next System of National Accounts**, Keuning, Steven J. (1990). This paper shows that all flow accounts which may become part of the next System of National Accounts can be embedded easily in a Social Accounting Matrix (SAM). In fact, for many purposes a SAM format may be preferred to the traditional T-accounts for the institutional sectors, since it allows for more flexibility in selecting relevant classifications and valuation principles.
- NA/38 Net versus gross National Income**, Bos, Frits (1990). In practice, gross figures of Domestic Product, National Product and National Income are most often preferred to net figures. In this paper, this practice is challenged. Conceptual issues and the reliability of capital consumption estimates are discussed.
- NA/39 Concealed interest income of households in the Netherlands; 1977, 1979 and 1981**, Kazemier, Brugt (1990). The major problem in estimating the size of hidden income is that total income, reported plus unreported, is unknown. However, this is not the case with total interest income of households in the Netherlands. This makes it possible to estimate at least the order of magnitude of this part of hidden income. In this paper it will be shown that in 1977, 1979 and 1981 almost 50% of total interest received by households was concealed.
- NA/40 Who came off worst: Structural change of Dutch value added and employment during the interwar period**, Den Bakker, Gert P. and Jan de Gijt (1990). In this paper new data for the interwar period are presented. The distribution of value added over industries and a break-down of value added into components is given. Employment by industry is estimated as well. Moreover, structural changes during the interwar years and in the more recent past are juxtaposed.
- NA/41 The supply of hidden labour in the Netherlands: a model**, Kazemier, Brugt and Rob van Eck (1990). This paper presents a model of the supply of hidden labour in the Netherlands. Model simulations show that the supply of hidden labour is not very sensitive to cyclical fluctuations. A tax exempt of 1500 guilders for second jobs and a higher probability of detection, however, may substantially decrease the magnitude of the hidden labour market.
- NA/42 Benefits from productivity growth and the distribution of income**, Keuning, Steven J. (1990). This paper contains a discussion on the measurement of multifactor productivity and sketches a framework for analyzing the relation between productivity changes and changes in the average factor remuneration rate by industry. Subsequently, the effects on the average wage rate by labour category and the household primary income distribution are studied.
- NA/43 Valuation principles in supply and use tables and in the sectoral accounts**, Keuning, Steven J. (1991). In many instances, the valuation of transactions in goods and services in the national accounts poses a problem. The main reason is that the price paid by the purchaser deviates from the price received by the producers. The paper discusses these problems and demonstrates that different valuations should be used in the supply and use tables and in the sectoral accounts.

- NA/44 The choice of index number formulae and weights in the National Accounts. A sensitivity analysis based on macro-economic data for the interwar period**, Bakker, Gert P. den (1991).
The sensitivity of growth estimates to variations in index number formulae and weighting procedures is discussed. The calculations concern the macro-economic variables for the interwar period in the Netherlands. It appears, that the use of different formulae and weights yields large differences in growth rates. Comparisons of Gross Domestic Product growth rates among countries are presently obscured by the use of different deflation methods. There exists an urgent need for standardization of deflation methods at the international level.
- NA/45 Volume measurement of government output in the Netherlands; some alternatives**, Kazemier, Brugt (1991).
This paper discusses three alternative methods for the measurement of the production volume of government. All methods yield almost similar results: the average annual increase in the last two decades of government labour productivity is about 0.7 percent per full-time worker equivalent. The implementation of either one of these methods would have led to circa 0.1 percentage points higher estimates of economic growth in the Netherlands.
- NA/46 An environmental module and the complete system of national accounts**, Boo, Abram J. De, Peter R. Bosch, Cor N. Gorter and Steven J. Keuning (1991).
A linkage between environmental data and the National Accounts is often limited to the production accounts. This paper argues that the consequences of economic actions on ecosystems and vice versa should be considered in terms of the complete System of National Accounts (SNA). One should begin with relating volume flows of environmental matter to the standard economic accounts. For this purpose, a so-called National Accounting Matrix including Environmental Accounts (NAMEA) is proposed. This is illustrated with an example.
- NA/47 Deregulation and economic statistics: Europe 1992**, Bos, Frits (1992).
The consequences of deregulation for economic statistics are discussed with a view to Europe 1992. In particular, the effects of the introduction of the Intrastat-system for statistics on international trade are investigated. It is argued that if the Statistical Offices of the EC-countries do not respond adequately, Europe 1992 will lead to a deterioration of economic statistics: they will become less reliable, less cost effective and less balanced.
- NA/48 The history of national accounting**, Bos, Frits (1992).
At present, the national accounts in most countries are compiled on the basis of concepts and classifications recommended in the 1968-United Nations guidelines. In this paper, we trace the historical roots of these guidelines (e.g. the work by King, Petty, Kuznets, Keynes, Leontief, Frisch, Tinbergen and Stone), compare the subsequent guidelines and discuss also alternative accounting systems like extended accounts and SAMs.
- NA/49 Quality assessment of macroeconomic figures: The Dutch Quarterly Flash**, Reininga, Ted, Gerrit Zijlmans and Ron Janssen (1992).
Since 1989-IV, the Dutch Central Bureau of Statistics has made preliminary estimates of quarterly macroeconomic figures at about 8 weeks after the end of the reference quarter. Since 1991-II, a preliminary or "Flash" estimate of GDP has been published. The decision to do so was based on a study comparing the Flash estimates and the regular Quarterly Accounts figures, which have a 17-week delay. This paper reports on a similar study with figures through 1991-III.
- NA/50 Quality improvement of the Dutch Quarterly Flash: A Time Series Analysis of some Service Industries**, Reininga, Ted and Gerrit Zijlmans (1992).
The Dutch Quarterly Flash (QF) is, just like the regular Quarterly Accounts (QA), a fully integrated statistic based on a quarterly updated input-output table. Not all short term statistics used to update the QA's IO-table are timely enough to be of use for the QF, so other sources have to be found or forecasts have to be made. In large parts of the service industry the latter is the only possibility. This paper reports on the use of econometric techniques (viz. series decomposition and ARIMA modelling) to improve the quality of the forecasts in five parts of the service industry.

- NA/51 A Research and Development Module supplementing the National Accounts**, Bos, Frits, Hugo Holländers and Steven Keuning (1992).
This paper presents a national accounts framework fully tailored to a description of the role of Research and Development (R&D) in the national economy. The framework facilitates to draw macro-economic conclusions from all kinds of data on R&D (also micro-data and qualitative information). Figures presented in this way can serve as a data base for modelling the role of R&D in the national economy.
- NA/52 The allocation of time in the Netherlands in the context of the SNA; a module**, Kazemier, Brugt and Jeanet Exel (1992).
This paper presents a module on informal production, supplementing the National Accounts. Its purpose is to incorporate informal production into the concepts of the SNA. The relation between formal and informal production is shown in the framework of a Social Accounting Matrix (SAM). To avoid a controversial valuation of informal production, the module consists of two SAMs. One expressed in actual prices with informal labour valued zero, and one which expresses the embedded informal labour input measured in terms of hours worked.
- NA/53 National Accounts and the environment: the case for a system's approach**, Keuning, Steven J. (1992).
The present set of main economic indicators should be extended with one or a few indicators on the state of the environment. This paper lists various reasons why a so-called Green Domestic Product is not suitable for this purpose. Instead, a system's approach should be followed. A National Accounting Matrix including Environmental Accounts (NAMEA) is presented and the way to derive one or more separate indicators on the environment from this information system is outlined.
- NA/54 How to treat multi-regional units and the extra-territorial region in the Regional Accounts?**, De Vet, Bas (1992).
This paper discusses the regionalization of production and capital formation by multi-regional kind-of-activity units. It also examines the circumstances in which a unit may be said to have a local kind-of-activity unit in the extra-territorial region and what should be attributed to this "region".
- NA/55 A historical Social Accounting Matrix for the Netherlands (1938)**, Den Bakker, Gert P., Jan de Gijt and Steven J. Keuning (1992).
This paper presents a Social Accounting Matrix (SAM) for the Netherlands in 1938, including related, non-monetary tables on demographic characteristics, employment, etc. The distribution of income and expenditure among household subgroups in the 1938 SAM is compared with concomitant data for 1987.
- NA/56 Origin and development of the Dutch National Accounts**, Den Bakker, Gert P. (1992).
This paper describes the history of national accounting in the Netherlands. After two early estimates in the beginning of the nineteenth century, modern national accounting started in the 1930s on behalf of the Tinbergen model for the Dutch economy. The development spurred up after World War II to provide data to the government for economic planning purposes. In the 1980s, the development was towards a flexible and institutional approach.
- NA/57 Compiling Dutch Gross National Product (GNP); summary report on the final estimates after the revision in 1992**, Bos, Frits (1992).
This summary report describes the sources and methods used for compiling the final estimate of Dutch Gross National Product after the revision of the Dutch National Accounts in 1992. Attention is focused on the estimation procedures for 1988. A more extensive report is also available (NA/57_Ext.).
- NA/57 Ext. Compiling Dutch Gross National Product (GNP); full report on the final estimates after the revision in 1992**, Bos, Frits and Cor N. Gorter (1993).
This report describes the compilation of the final estimate of Dutch Gross National Product after the revision of the Dutch National Accounts in 1992. Attention is focused on the estimation procedures for 1988. The description covers i.a. data sources, sampling features of the surveys, grossing up procedures, adjustments for underreporting and the integration process.

- NA/58 The 1987 revision of the Netherlands' National Accounts**, Van den Bos, C and P.G. Al (1994).
The 1987 revision that was completed in 1992 has improved the Dutch National Accounts in three ways: First, new and other data sources have been used, like Production statistics of service industries, the Budget Survey and Statistics on fixed capital formation. Secondly, the integration process has been improved by the use of detailed make- and use-tables instead of more aggregate input-output tables. Thirdly, several changes in bookkeeping conventions have been introduced, like a net instead of a gross registration of processing to order.
- NA/59 A National Accounting Matrix for the Netherlands**, Keuning, Steven and Jan de Gijt (1992).
Currently, the national accounts typically use two formats for presentation: matrices for the Input-Output tables and T-accounts for the transactions of institutional sectors. This paper demonstrates that presently available national accounts can easily be transformed into a National Accounting Matrix (NAM). This may improve both the transparency and analytic usefulness of the complete set of accounts.
- NA/60 Integrated indicators in a National Accounting Matrix including environmental accounts (NAMEA); an application to the Netherlands**, De Haan, Mark, Steven Keuning and Peter Bosch (1993).
In this paper, environmental indicators are integrated into a National Accounting Matrix including Environmental Accounts (NAMEA) and are put on a par with the major aggregates in the national accounts, like National Income. The environmental indicators reflect the goals of the environmental policy of the Dutch government. Concrete figures are presented for 1989. The NAMEA is optimally suited as a data base for modelling the interaction between the national economy and the environment.
- NA/61 Standard national accounting concepts, economic theory and data compilation issues; on constancy and change in the United Nations-Manuals on national accounting (1947, 1953, 1968 and 1993)**, Bos, Frits (1993).
In this paper, the four successive guidelines of the United Nations on national accounting are discussed in view of economic theory (Keynesian analysis, welfare, Hicksian income, input-output analysis, etc.) and data compilation issues (e.g. the link with concepts in administrative data sources). The new guidelines of the EC should complement those of the UN and be simpler and more cost-efficient. It should define a balanced set of operational concepts and tables that is attainable for most EC countries within 5 years.
- NA/62 Revision of the 1987 Dutch agricultural accounts**, Pauli, Peter and Nico van Stokrom (1994).
During the recent revision of the Dutch national accounts, new agricultural accounts have been compiled for the Netherlands. This paper presents the major methodological and practical improvements and results for 1987, the base year for this revision. In addition, this paper demonstrates that a linkage can be established between the E.C. agricultural accounting system and the agricultural part of the standard national accounts.
- NA/63 Implementing the revised SNA in the Dutch National Accounts**, Bos, Frits (1993).
This paper discusses the implementation of the new United Nations guidelines on national accounting (SNA) in the Netherlands. The changes in basic concepts and classifications in the SNA will be implemented during the forthcoming revision. The changes in scope will be introduced gradually. Important changes scheduled for the near future are the incorporation of balance sheets, an environmental module and a Social Accounting Matrix.
- NA/64 Damage and insurance compensations in the SNA, the business accounts and the Dutch national accounts**, Baris, Willem (1993).
This paper describes the recording of damages to inventories and produced fixed assets in general, including damages as a result of legal product liability and of the liability for damage to the environment. In this regard, the 1993 System of National Accounts and the practice of business accounting are compared with the Dutch national accounts.

- NA/65 Analyzing economic growth: a description of the basic data available for the Netherlands and an application**, Van Leeuwen, George, Hendric van der Hoeven and Gerrit Zijlmans (1994).
This paper describes the STAN project of the OECD and the Dutch national accounts data supplied to the STAN database, which is designed for a structural analysis of the role of technology in economic performance. Following an OECD analysis for other industrial countries, the importance of international trade for a small open economy such as the Netherlands is investigated. The STAN database is also available on floppy disk at the costs of DFL. 25, an can be ordered by returning the order form below (Please mention: STAN floppy disk).
- NA/66 Comparability of the sector General Government in the National Accounts, a case study for the Netherlands and Germany**, Streppel, Irene and Dick Van Tongeren (1994).
This paper questions the international comparability of data concerning the sector General Government in the National Accounts. Two differences are distinguished: differences due to lack of compliance with international guidelines and institutional differences. Adjustments to National Accounts data are reflected in a separate module which compares Germany versus The Netherlands. The module shows that total General Government resources as well as uses are substantially higher in the Netherlands.
- NA/67 What would Net Domestic Product have been in an environmentally sustainable economy?, Preliminary views and results**, De Boer, Bart, Mark de Haan and Monique Voogt (1994).
Sustainable use of the environment is a pattern of use that can last forever, at least in theory. This pattern is likely to render a lower net domestic product than the present economy. The coherence between reductions in pressure on the environment and changes in net domestic product is investigated with the help of a simple multiplier model. This model is based on a National Accounting Matrix including Environmental Accounts (NAMEA).
- NA/68 A Social Accounting Matrix for the Netherlands, concepts and results**, Timmerman, Jolanda G. and Peter J.M. van de Ven (1994).
In this paper a Social Accounting Matrix (SAM) for the Netherlands is presented. Two years are covered: 1988 and 1990. The SAM is an integrated data framework based on national accounts extended with information on distribution of income, consumption and wealth among household. Furthermore, labour income and employment are subdivided into several labour categories. The tables of the SAMs of both 1988 and 1990 are available on separate floppy disks at the costs of DFL. 65 each.
- NA/69 Analyzing relative factor inputs of Dutch exports: An application of the 1990 Social Accounting Matrix for the Netherlands** (forthcoming), Reininga, Ted (1995).
In this paper the validity of neoclassical trade theory for explaining Dutch international trade patterns is studied. The analysis is carried out with the use of a Social Accounting Matrix for The Netherlands. This study corroborates the outcome of other recent analysis in this field: classical trade theory offers a better starting-point to understand Dutch trade patterns than neoclassical trade theory. Moreover, these recent studies point to the increasing relevance of insights derived from modern trade theory. The results presented here seem to support this point of view.
- NA/70 SESAME for the evaluation of economic development and social change**, Keuning, Steven J. (1994).
This paper elaborates on the concept of a System of Economic and Social Accounting Matrices and Extensions, or SESAME for short. The SESAME-concept serves to meet the criticism that conventional national accounts take a too limited view at social, environmental and economic development. SESAME details the monetary accounts and couples non-monetary information in an integral system approach. SESAME is meant as a synthesis of national accounts and the social indicators approach.

- NA/71 New revision policies for the Dutch National Accounts**, Den Bakker, Gert P., Jan de Gijt and Robert A.M. van Rooijen (1994).
This paper presents the (new) revision policy for the Dutch National Accounts. In the past, several major revisions of national accounting data have been carried out in the Netherlands. In the course of time, the policy has changed several times. Recently, the aim has become to publish relatively long time-series shortly after the publication of the revised benchmark year data.
- NA/72 Labour force data in a National Accounting framework**, Den Bakker, Gert P. and Jan de Gijt (1994).
This paper deals with the Dutch interwar labour force data. Starting with census data the estimation of the working and non-working labour force by industry and by occupational type is described and the results are discussed. The data have been estimated within the national accounts framework. It is the first time that labour market figures at a meso-level have been estimated which are linked to other national accounting figures.
- NA/73 Integrated estimates of productivity and terms-of-trade changes from a Social Accounting Matrix at constant prices**, Keuning, Steven J. (1994).
This paper demonstrates that measures of real income change for the total economy can best be derived from real income changes per subsector. For this purpose a Social Accounting Matrix (SAM) at constant prices has been compiled. By breaking down value added at constant prices into constant price estimates for each primary input category, productivity changes by industry can be estimated as an integral part of the regular national accounts compilation. The national total trading gain or loss from a change in the terms of trade is as well allocated to subsectors, thus embedding the estimation of this macro-measure into a meso-consistency framework. These ideas have been applied in a case-study for Indonesia.
- NA/74 Taking the environment into account: The Netherlands NAMEA's for 1989, 1990 and 1991**, De Haan, Mark and Steven Keuning (1995).
The National Accounting Matrix including Environmental Accounts (NAMEA) contains figures on environmental burdens in relation to economic developments as reflected in the National accounts. NAMEA's for the Netherlands in 1989, 1990 and 1991 have now been completed. They include a more detailed industrial classification and a series of environment taxes and levies, plus environmental protection expenditures by industry and households. Further, the depletion of two important mineral resources in the Netherlands is now incorporated in the NAMEA's.
- NA/75 Economic theory and national accounting**, Bos, Frits (1995).
This paper describes the relationship between economic theory and national accounting. This relationship is often misunderstood, by economic theorists and national accountants alike. Attention is drawn to the consistency required in a national accounting system, to national accounts figures as a transformation of primary data and to the fundamentally different valuation principles employed in economic theory and national accounting (forward looking and analytic versus backward looking and descriptive). The gap between economic theory and national accounting can only be bridged by satellite accounts, as in these accounts consistency with the overall system and valuation at current exchange value are not strictly required.
- NA/76 An information-system for economic, environmental and social statistics**, Keuning, Steven J. and Jolanda G. Timmerman (1995).
The 1993 SNA mentions that a SAM can also be extended to deal with environmental issues. This entails the integration of a SAM and a NAMEA into a SAMEA (Social Accounting Matrix including Environmental Accounts), a further extension into the direction of a so-called SESAME (System of Economic and Social Accounting Matrices and Extensions). This paper shows how environmental data and environmental indicators can be integrated into such a system. A Dutch case-study shows the interrelations between e.g. the employment of various types of workers (by sex/educational level) and the environmental problems caused by the activities in which they are employed. Moreover, this pollution is also allocated to the subsectors that receive value added. This enables a comparison with the consumption-based pollution by subsector. The SAMEA yields a framework for an integrated analysis and modelling of social, economic and environmental issues.

- NA/77 Material flows, energy use and the structure of the economy**, Konijn, Paul J.A., Sake de Boer and Jan van Dalen (1995). Many environmental problems are connected to production and use of materials and energy. It would therefore be desirable to have an information system that gives consistent, complete and detailed information on material and energy flows. Such a system would even be more useful if it could be connected directly to economic data. This paper presents such a system. Based on the foundation laid by the national accounts the authors construct a system for the analysis of flows of materials and energy through the economy. In this paper the proposed system is illustrated with an application to the flows of iron/steel and energy. An input-output table is presented that describes the production processes in the ferrous metal branch entirely in physical units. Subsequently, steel contents of final products are calculated, and an analysis is made of the consequences of a new technology in the basic steel industry on total energy use in the economy.
- NA/78 Calendar effects on quarterly GDP-growth rates**, Reininga, Ted K. and Brugt Kazemier (1996). Since 1986 Statistics Netherlands publishes Quarterly National Accounts. The earliest estimates of quarterly GDP, the so-called flash estimates, are published some seven weeks after the reference quarter. In this paper we examine a new, faster flash estimate, some three to four weeks earlier than its original counterpart. The gain is made by using a simple regression technique and incomplete data. To compensate for the lack of data, information on the number of working-days and shopping-days was added to the regression. It turns out that these calendar-aspects significantly affect GDP-growth: 0.30%-points extra GDP-growth for one extra working-day. One extra shopping-day accounts for about 0.17%-points extra GDP-growth.
- NA/79 The NAMEA experience. An interim evaluation of the Netherlands' integrated accounts and indicators for the environment and the economy**, Keuning, Steven J. (1996). The national accounts publication in the Netherlands contains not only the conventional economic accounts and indicators, but also an integrated system of environmental and economic accounts, the NAMEA (National Accounting Matrix including Environmental Accounts). This paper reports on the present status of the NAMEA-approach and gives a concise summary of this approach. It reviews the present applications of this framework in the Netherlands and, finally, a comparison with the SEEA is made and various common misunderstandings regarding Green National Income are set out.
- NA/80 What's in a NAMEA? Recent results of the NAMEA-approach to environmental accounting**, Keuning, Steven J. and Mark de Haan (1996). The National Accounting Matrix including Environmental Accounts (NAMEA) shows environmental pressures in physical units that are consistent with the monetary figures in the national accounts. This paper introduces the NAMEA-concept, provides some illustrative analyses of the recently completed NAMEA time-series, and demonstrates that social accounts and social indicators can easily be integrated. This results in a fairly broad, multi-purpose statistical information system.
- NA/81 Balance sheet valuation: produced intangible assets and non-produced assets**, Pommée, Marcel and Willem Baris (1996). This paper deals with the estimation of opening and closing stocks of produced intangible assets such as mineral exploration, computer software and artistic originals and non-produced assets such as land, sub-soil assets, patented entities and purchased goodwill. The first section elaborates on the main conceptual issues related to the compilation of stock data such as the asset boundary, the relation between flows and stocks and principles of valuation. The following sections discuss each of the asset categories in detail.

NA/82 **Micro-meso-macro linkage for labour in The Netherlands**, Leunis, Wim P. and Jolanda G. Timmerman (1996).
This paper describes recent developments in the area of labour market statistics and shows the advantages of integrating these data in the system of Labour accounts and in Social Accounting Matrices. The benefits of such integrated information surpasses the sum of the benefits of various source data. A subsequent effort to adjust the micro data and aggregate figures increases the possible uses of statistics even further.

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