NA-093

Linking Social And Economic Statistics through the 1995 Revision of National Accounts and Labour Accounts

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Statistics Netherlands

Division Presentation and Integration
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Verklaring der tekens

.	= gegevens ontbreken
*	= voorlopig cijfer
x	= geheim
-	= nihil
-	= (indien voorkomend tussen twee getallen) tot en met
0 (00)	= het getal is minder dan de helft van de gekozen eenheid
niets (blank)	= een cijfer kan op logische gronden niet voorkomen
1998-1999	= 1998 tot en met 1999
1998/1999	= het gemiddelde over de jaren 1998 tot en met 1999
1998/'99	= oogstjaar boekjaar schooljaar enz. beginnend in 1998 en eindigend in 1999
1988/'89-1998/'99	= boekjaar enz. 1988/'89 tot en met 1998/'99

In geval van afronding kan het voorkomen dat de totalen niet geheel overeenstemmen met de som der opgetelde getallen.
Verbeterde cijfers in staten en tabellen zijn niet als zodanig gekenmerkt.

Explanation of symbols

	= data not available
*	= provisional figure
x	= publication prohibited (confidential figure)
-	= nil
-	= (between two figures) inclusive
0 (00)	= less than half of unit employed
a blank	= category not applicable
1998-1999	= 1998 to 1999 inclusive
1998/1999	= average for the years 1998 up to and including 1999
1998/'99	= crop year financial year school year etc. beginning in 1998 and terminating in 1999
1988/'89-1998/'99	= book year etc. 1988/'89 up to and including 1998/'99

Detailed items in tables do not necessarily add to totals because of rounding.
Revised figures are not marked as such.

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Abstract

National accounts have a long tradition of publishing labour data, the Labour accounts development in the late eighties, early nineties primarily focused on the consistency within labour statistics at first. From the ESA 1995 revision onwards, National accounts and Labour accounts present equal employment and compensation of employees figures. This not only improved the linkage of economic to social statistics for users, but it also has enlarged data quality check possibilities for both sides.

Keywords: compensation of employees, employment, full-time equivalents, Labour accounts, National accounts

Table of Contents

1. Introduction

This paper describes the progress made in reconciling social statistics and economic statistics through the linkage of Labour accounts and National accounts in the Netherlands[1]. It lightens some infrastructural aspects, tells about the pro's and cons of the procedures followed and finalises with research suggestions for further improvement.

[1] The revision and linkage of National accounts and Labour accounts has been a co-production of the divisions responsible for both accounting systems. The author thanks the staff members of both divisions who have been engaged in the input for and comments on the draft of this paper. In this paper the Labour accounts procedures have been more spacious described than those of National accounts, because the NA working party members will be more familiar with National accounts themselves.

2. Labour statistics leading to Labour accounts

Labour data become available through household surveys (the Labour force survey), establishments surveys (employment, earnings and labour cost surveys, mainly using salary administrations) and register data on wage sums from social security institutions. The Labour accounts combine the different sources on their strong points. Establishment surveys and register data tend to provide high quality data on those aspects which the establishments themselves also consider important to keep track of. Registers are set up with a definite purpose and data extracts pertaining to this purpose will be highly reliable. Household surveys are the best source for quantifying personal characteristics. Each source serves in fact a particular perspective. Establishment surveys produce data, which describe labour as a factor of production; household surveys provide data on labour from a socio-economic perspective. It is not just a matter of choosing the source which fits our purposes best. In compiling labour accounts, the primary sources may still be adjusted wherever there is evidence for measurement failure, leading to a consistent set of tables covering all core aspects of labour input, labour income and labour cost.

2.1 The Labour force survey

The Labour force survey (LFS) is a continuous survey of persons resident in the Netherlands, excluding those who live in institutions. The advantages of households surveys are twofold: personal characteristics can be collected easily and the active population is covered in its entirety.

The main disadvantage of household surveys is the sampling error. Because this is an expensive way of collecting data, the sample is relatively small - e.g. 1% of all employed persons are covered in the LFS as against 50%-70% in stratified surveys of companies. Since participation in personal surveys is voluntary, the non-response rate is higher than with establishment surveys. Selectivity in the non-response is largely corrected for by reweighting the response on the basis of population totals broken down by a combination of sex, civil status, age, region and nationality/native country. Other errors can occur in addition to the sampling error. These include frame errors, measurement errors, processing errors and errors resulting from any remaining selectivity of non-response.

People might work at more than one company and would therefore be counted more than once if the survey unit was the company. The results of establishment surveys thus reflect the number of jobs and not the number of active persons. Because the survey unit in the LFS is the person, the LFS is the only large-scale survey covering active persons. In the LFS, active persons are asked to state both their main job and any secondary or third job they might have. This makes it possible for the Labour accounts to use LFS data as a basis for correlating active persons and jobs and comparing the results with the data from company statistics.

2.2 Establishment surveys on employment, earnings and labour cost

The statistics based on consultation of companies and establishments including government institutions, are, for the sake of brevity, referred to as "company statistics". The sample frame for these statistics is given by the General Business Register (GBR) of Statistics Netherlands. Two characteristics included in the GBR are of great importance for the Labour accounts: branch of industry and size category. The size category relates to the number of employees.

Consultation of enterprises is usually based on a random sample, stratified according to a number of characteristics. Size category is a much-used characteristic. The sample is selected in such a way that the sample fraction corresponds to the size category. Large firms are always covered, the smaller the firm the smaller the sample fraction. Working in this way, use can be made of the

fact that a considerable proportion of total employment is concentrated in a relatively small number of units.

In the eighties a broad scale of establishment surveys on employment, earnings and labour cost have been held by Statistics Netherlands[2]: quarterly surveys on (1) employment and pay-bill and (2) average hourly earnings and weekly hours of work, annual surveys on (3) employment and (4) average hourly and annual earnings and less regular surveys on (5) the structure of earnings and (6) the structure of labour cost. First these were completely independent surveys, recently more and more use is made of a modular approach taking information from other surveys where available.

The years from 1985 onwards are characterised by merging enterprise surveys on earnings and employment, lowering response burdens and the increased use of register data on earnings. Electronic data interchange has been introduced on a broad scale since a few years.

2.3 Social security registrations

By law and collective agreements, employers (and partly employees) are obliged to pay premiums to social insurance institutions in order to finance among other things disability, unemployment and pension benefits. The registrations of these institutions are integrally available for statistical purposes. Characteristic features of register data are the absence of sampling errors and cheap data collection.

The main disadvantages of centrally registered data and, to a lesser extent of data collected from companies are the limited number of variables available and the conceptual discrepancy between these variables and statistical purposes.

In case of Labour accounts, data from social security institutions is used on total earnings according to a concept of gross earnings, which includes all earning components submitted to the payment of social security contributions

2.4 The Labour accounts

The Labour accounts form a statistical system of core variables on labour acquired through integration, within the statistical information system on labour. It is characterised by its overall coverage and internal consistency, both over time and between different variables. As such the Labour accounts offer a framework to bring labour data from all kinds of source statistics together. The principle data on the main objects, incorporated in the framework, are labour input aggregates (persons, jobs, hours etc.) as well as labour payments (as income and as costs), both categorised by relevant characteristics.[3]

The conceptual framework of the LA consists of a set of definitions (identities), both among macro variables and between aggregates and underlying micro data. In the Dutch labour accounts the main identity relations in case of employee labour are:

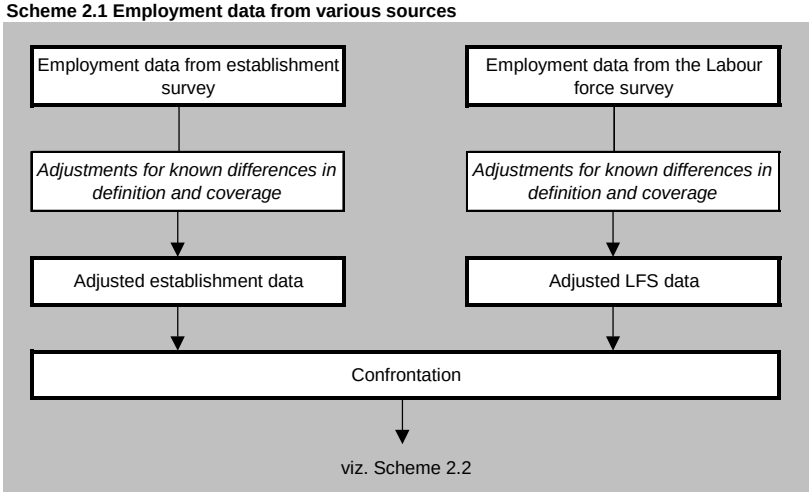
1. number of employed persons = number of main jobs
2. number of main jobs + number of secondary jobs = total number of jobs
3. number of jobs x annual earnings per job = sum of earnings
4. contractual hours + overtime hours = paid hours
5. annual paid hours per job x hourly regular earnings = annual regular earnings per job
6. number of jobs x annual bonuses and allowances per job = sum of bonuses and allowances
7. regular earnings + bonuses and allowances = total earnings

[2] For more background information, see Leunis (1998) and Vollemans (1993)

[3] An extensive description is given in Statistics Netherlands (1999)

The compilation of Labour accounts starts with a confrontation of employment data from establishment surveys on employment (ASEE) and the Labour force survey (LFS). The following scheme (taken from Statistics Netherlands, 1999, p. 87) shows the first two stages of the process, namely the adjustment for known differences in definition and coverage. This is not only done for employment data, but also for earnings and hours of work. The adjustments in the source data are partly being made in micro data, partly meso totals and averages are being adjusted. All adjustments are explicitly documented in order to arrive at a reproducible process which clearly describes the linkage between the original source data and the final data at the end of the integration process.

Scheme 2.1 Employment data from various sources



Whereas data quality checks within source statistics mainly consist of internal consistency checks for each reference period separately and consistency with the data on one previous period, the LA approach introduced additional quality checks in the confrontation stage as referred to in the above scheme. Regular analysis is carried out on

a. Employment level and change measured by establishment surveys compared with those found in the LFS.

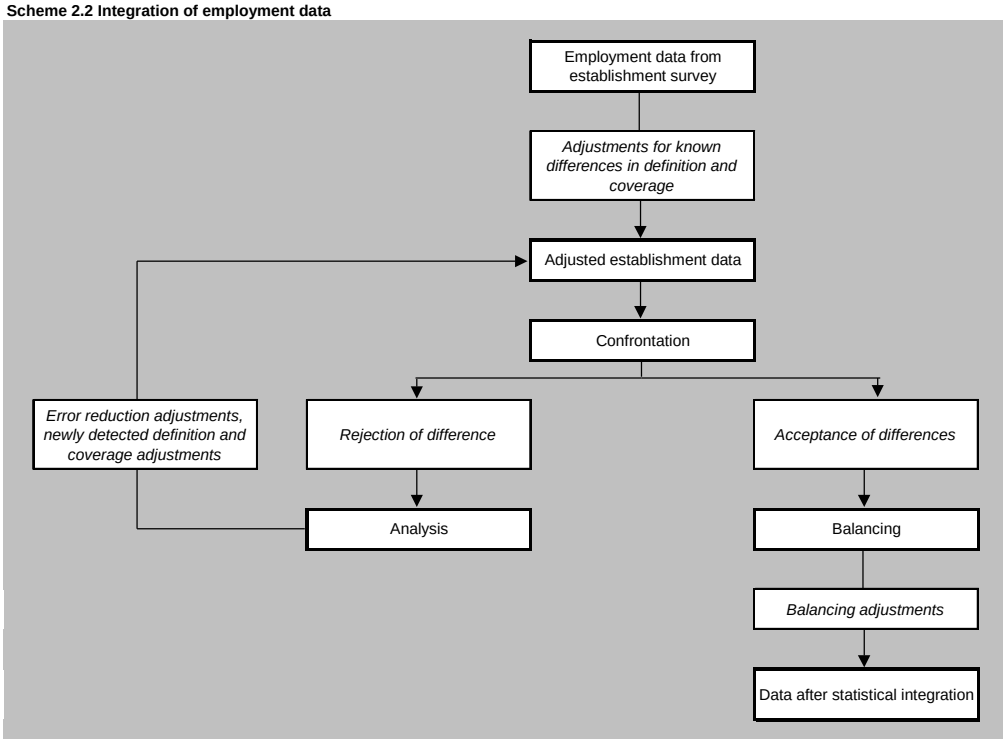
b. Levels of and changes in employment and average earnings (establishment surveys) compared with those in the total wage sum presented by both establishment surveys and social security files.

c. The interaction of changes in hourly earnings, average annual hours of work and average annual earnings.

d. Time series on changes in structural aspects of the labour market (branch of industry, gender, full-time/part-time, flexible and steady jobs).

The identity relations presented at page 3 do not only define the mutual relations between the published LA variables, they are extensively used during the process of integration to trace data errors, both sampling and non-sampling errors. This is an iterative procedure, illustrated in scheme 2.2 for employment data. The other variables included in the Labour accounts follow the same procedures. In the Labour accounts procedures, the term *balancing* has been reserved for the final mathematical smoothing down of remaining minor discrepancies. All adjustments following the analysis in unacceptable discrepancies are explicitly documented in a previous stage, mentioned *the minimisation of measurement error*.

Scheme 2.2 Integration of employment data



3. Labour data in National accounts

Within the system of National accounts the compensation of employees is fully incorporated in the system. The related labour input in full-time equivalents is a kind of a by-product, but it has been presented in Dutch National accounts since the second world war also.

3.1 Production statistics

The National accounts (NA) are mainly based on establishment data, to be precise upon Production statistics. These statistics provide for each type of industry data on the structure and size of output, intermediate consumption and value added, including wages and salaries and employers' social contributions. In addition, most Production statistics supply data on the number of jobs. Other sources used for the compilation of compensation of employees are the Agricultural census in May, Cost and Finance statistics for the health sector and bank and insurance companies and government data for the public administration, defence and education.

In Production statistics, questionnaires are partly directly made up according to the wage concepts to be included in National accounts, partly they fit in more or less with bookkeeping practices. Especially the often included component of 'other personnel costs' is difficult to divide in wages and employers' contributions at the one set and intermediate costs at the other side.

3.2 Social funds

Statistics Netherlands receives separate (often integral) data on the receipts by Pension funds and Social security institutions of employers' contributions to these funds (premiums as well as lump sum payments). This gives separate data on total received premiums distinguished by destination (disability, unemployment, pension). Information on branch of origin however mostly lacks.

3.3 Compilation of compensation of employees and full-time equivalent jobs within the National accounts setting

The Dutch National ccounts contain a fairly detailed description of the production process, both with respect to branches of industry and the breakdown by goods and services. Until recently the labour input data however were only treated as a single, homogeneous factor of production. Hereby, branch specialists calculate wage sums and social contributions on a very detailed level. Specific adjustments as compared with Production statistics output were needed with respect to the translation of measured wage data to SNA concepts, quantifying wages in kind according to SNA rules, the addition of an estimation of black (hidden) labour and the filling up of white spots. Quality checks at this stage comprise the relation production – wage sum and the relation between wage sum and employment.

Most of the NA source data do not contain full-time equivalent (fte) jobs directly. In those cases jobs data on a specific point in time are used in combination with part-time ratio's over previous periods to estimate fte-figures.

Before the balancing procedure starts, employers' social security contributions have been split up by the combination branch paid x destination[4]. In a number of cases (not yet systematically), additional quality checks have been performed in the balancing phase of NA with regard to level and change of the wage per full-time equivalent and the estimated incidental wage development.

[4] Production statistics data entail the row totals per branch of industry. The social security funds give the column totals of contributions received by the separate funds. A cross-tabulation of these figures is only limited available.

4. The revision of National accounts and Labour accounts

4.1 Results achieved

Before revision, CBS' data users were confronted with difficulties in linking National accounts figures with figures from the Labour accounts, because of differences in concepts, population, methodology and data availability at the time of nailing down the base-years levels. On all these aspects agreement is reached between the two accounting systems. The main precondition was that the SNA principles should be followed. Two fully distinct production processes have been consolidated into one. Now NA and LA both describe the same population and produce exact the same data on compensation of employees (employee costs in LA terms) and full-time equivalent jobs. Thereby other socio-economic data from the LA can be combined with the economic data from the NA (SAM extension included). Next table describes the effect of the revision from both sides.

Results before and after revision

	Labour accounts before revision	revision adjustment LA	Labour and national accounts after revision	revision adjustment NA	National accounts before revision
	full-time equivalent jobs, total employment (x 1,000)				
1995	5450	213	5663	283	5380
1996	5553	255	5808	322	5486
1997	5698	270	5968	339	5629
	full-time equivalent jobs, employees (x 1,000)				
1995	4828	90	4918	208	4710
1996	4914	121	5035	238	4797
1997	5045	132	5177	247	4930
	compensation of employees/employee costs (1,000 mln dfl)				
1995	319.1	22.0	341.1	15.8	325.3
1996	330.7	23.5	354.2	16.8	337.4
1997	345.7	26.1	371.8	17.6	354.2

4.2 The tuning process

With the linking of both production processes, additional quality checks became available from the confrontation between NA and LA results. Starting from the largest differences, discrepancies were being discussed with subject matter specialists from both sides, leading to both adjustments in the NA as in the LA data. This process has been repeated several times until full agreement was reached on all common figures.

For capacity reasons most attention has been drawn to the wage sum comparisons, with the confrontation of social contributions as runner-up. The confrontation of data on full-time equivalent jobs had to be done in too short a period.

4.3 Micro-meso-macro[5]

With the one-to-one linkage of NA and LA, data from both accounting systems can be used in connection. However, both systems present meso data. Ideally all underlying micro databases should be fully compatible with the macro accounts. This not only enlarges the coherence of all social and economic data, it also enables producers of statistics to diminish processing errors. Within the Labour accounts setting, extensions of the meso system with micro databases have been realised with respect to regional employment data (link with establishment survey data) and personal characteristics of employed persons (link with micro data on employed persons from the LFS).

Statistics Netherlands will elaborate on this further with the generation of a Social statistical file providing for instance the 2001 Census data, the Micro Lab which entails a micro database with individual firm data and a further extension of the SAM module of the National accounts.

4.4 Infrastructural aspects

With the 1995 revision, the NA and LA have been linked in the end stage of both production processes. The difficulties of the backward linkage of confrontation results to both accounting systems have been underestimated. The degrees of freedom to change the figures in that stage, depend on the effects these changes have on other parts of the system.

Therefore, it seems to be more advantageous to advance the first confrontation between NA and LA results in order to trace sizeable discrepancies at a time other parts of the system can still be influenced by the results of the analysis following this observation.

In Leunis and Timmerman (1996) is was suggested to use the SAM setting (Keuning, 1994) in the future as an early warning system of discrepancies between economic statistics and social statistics. Up to now the timeliness of data availability is not sufficient to work along that line. In deciding on a future change in this direction both the possibilities to accelerate data availability as well as the evaluation of the revision 1995 practice have to be incorporated.

4.5 Reflection

In implementing and improving the process of joint reconciliation, the quality of statistics can still further be improved. This will not only influence the final results of both accounts, it may also lead to proposals for design of questionnaire changes in primary sources. The crux is to find the optimal mix between the lowest response burden (avoid to ask the same question twice) and the availability of sufficient material in order to execute all analysis needed to reach the quality standards required.

Timeliness and quality can still be improved by an earlier commitment of subject matter specialist from both sides. Publication schedules may still withhold producers of statistics from carrying out all analysis before the publication date agreed upon. In between peak periods remaining analysis should be further executed. Although this will not effect that period publication, it may help to improve statistical description in the future.

During the confrontation of the preliminary figures from both systems no direct link to each other database was possible. This resulted in a needless delay in the confrontation work. Production systems should be organised in such a way that intermediate comparisons can also be made at an earlier stage.

For the Labour accounts it was the first revision. It was clear that the labour statisticians were less experienced in this work than the NA staff. Besides that, the revision base year was very unfortunate from labour statistics point of view. The primary sources had just been changed drastically, so all kind of teething

[5] For a more elaborated treatment of this aspect, see Leunis and Timmerman, 1996

troubles were still to be solved. A next revision therefore should not wait for a new revision of the international System of National Accounts.

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NA/86 **Volume measurement of government output; the Dutch practice since revision 1987, Kazemier, Brugt (1997).**
In 1992, Statistics Netherlands published the first results of a major revision of national accounts statistics. Part of this revision was the introduction of an alternative method to estimate the volume change of government output. This paper briefly describes this alternative method and the results of the revision with respect to the volume change of government services.

NA/87 **Chain indices in the national accounts: the Dutch experience, Boer, Sake de, Jan van Dalen and Piet Verbiest (1997).**
In this paper we discuss the use of chain indices in the Netherlands. In Dutch practice chain indices are applied from 1980 onwards. Chain indices are a good base for the construction of economic models, since changing weights guarantee a near approximation of actual developments and the actual economic structure. However, special attention should be paid to the tuning of the model to the characteristics of the data and to the presentation of model results to the public.

NA/88 **Measurement and valuation of natural gas and oil reserves in the Netherlands, Pommée, Marcel (1998).**
This paper discusses some conceptual and methodological issues related to the estimation of reserves of natural gas and oil. The first section focuses on these subsoil assets in relation to the 1993 SNA. The second section deals with the situation and valuation of these assets in the Netherlands. The valuation method applied may be of special interest because of its simplicity and modest data requirements.

NA/89 Data constructors and data users can co-operate: an illustrative case study, Jacobs, Jan, Jan-Egbert Sturm and Peter Groote (1999).
This paper illustrates the benefits of communication and co-operation between data using macroeconomists and data constructing historians by describing a joint research project on the effects of infrastructure investments on the economy in the Netherlands in the second half of the nineteenth century. The case study shows that co-operation can be fruitful and may lead to new insights for both groups.

NA/90 Measuring Well-being with an integrated System of Economic and Social Accounts: An Application of the SESAME Approach to the Netherlands, Kazemier, Brugt, Steven Keuning and Peter van de Ven (1999).
This paper contains a pilot application to the Netherlands of the socio-demographic module of SESAME: the modular statistical information system that serves to enable an integrated measurement of welfare. From this module the inactive/active ratio can be derived; an indicator of the welfare state that plays quite an important role in social-economic policy.

NA/91 Revision Dutch National Accounts: first results and backgrounds, Buiten, Gert, Jacqueline van den Hof and Peter van de Ven (1999).
The national accounts of the Netherlands have been revised in accordance with the new world-wide System of National Accounts (SNA) 1993, and its European equivalent, the European System of National and Regional Accounts (ESA) 1995. The first results and backgrounds of this revision are presented in this paper.

NA/92 Supply and use tables in current and constant prices for the Netherlands: an experience of fifteen years, Sake de Boer, Wim van Nunspeet and Taeke Takema
This paper concentrates on the ten years experience in compiling supply and use tables in The Netherlands. It focuses on the features that have become the main elements of the Dutch system. Three subjects can be distinguished here: the simultaneous compilation in current prices and constant prices; the column-row-column working procedures; and the transformation of supply and use tables into an industry by industry I/O-table.