Labour Accounts: A Step Forward to a Coherent and Timely Description of the Labour Market

By Brigitte Buhmann[1], Wim Leunis[2], Alain Vuille[3] and Kirsten Wismer[4] [5]

Preface

Both the necessity to resolve conflicting data and the wish to describe interrelationships on the labour market bring about the need for Labour Accounts. Denmark, the Netherlands and Switzerland have all chosen to develop such a system. Although they are in different stages of development and have sometimes chosen different solutions for the problems they meet, they all agree on the main principles underlying these accounts. Developing Labour Accounts gives them new opportunities to complement, present and improve existing labour statistics. This paper will provide an overview of the characteristic features of Labour Accounts and will present for each country the framework used for implementation and the possible policy implications for the future.

1. Introduction

Most developed countries have been systematically collecting labour market data since the beginning of the twentieth century. Population and establishment censuses, household and enterprise surveys on labour force, hours of work, earnings and labour costs, as well as register data on population, taxes and social security provide data for monitoring labour market development on a regular basis. However, despite the availability of a variety of information, researchers, statisticians and politicians encounter some major problems in obtaining a satisfying picture of the labour market situation. These difficulties are due to the following problems:

- *Occurrence of contradictory results between data sources:* In general the different labour market statistics not only use different reference populations, measurement units, reference periods and definitions but they all contain sampling and non-sampling errors too. This lack of comparability between the various sources can even lead to contradictory results.

- *Lack of global overview of the labour market data:* Each available data source on labour describes part of the labour market and related aspects. This fragmentary approach leads to both overlap and lacunae in description.

- *Difficulties and limitations in describing labour market dynamics:* Most surveys present only the situation at a given point in time or net changes between two points in time. They do not show the gross changes. It is often impossible to fully perceive important labour market phenomena without knowledge of the dynamic interplay.

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[1] Swiss Federal Statistical Office.
[2] Statistics Netherlands.
[3] Swiss Federal Statistical Office.
[4] Statistics Denmark.
[5] Views expressed in this paper are those of the authors and do not necessarily represent the official position of their statistical agency. This article is a revised version of Buhmann et al (2000).

- *The links between labour market data and other statistical systems are often missing:* The links between labour market data and data from the National Accounts are most in the picture at the moment, but links to population or education statistics should also be clear.

Each country with a developed system of labour market statistics is confronted with these problems. Therefore in the early Eighties, a broad-based international discussion was initiated to ascertain how to overcome these difficulties within an integrated framework. The proposed solution was called the "Labour Accounts" or "Labour Accounting System" (LAS). Although the systems in Denmark, the Netherlands and Switzerland are in different stages of development and the countries have sometimes chosen different solutions for the problems they meet, they all agree on the main principles underlying these Accounts. Developing Labour Accounts gives them new opportunities to complement, present and improve existing labour statistics.

In the following a summary of their work is presented. In chapter 2 you find a description of the *general aspects of Labour Accounts*, a presentation of the *integration process* and a discussion of the *underlying principles*. In chapter 3 some of the most challenging *results* are presented for each country. The *advantages* of Labour Accounts are presented in chapter 4 followed by a discussion of the *implications for further developments* in chapter 5.

2. Labour Accounts: General Aspects, the Process of Statistical Integration and the Underlying principles

2.1 General Aspects of Labour Accounts

The Labour Accounts can be described as a statistical system of *core variables* on labour acquired through integration. The Labour Accounts consists of a *set of tables providing a systematic and consistent overview*, mutually and over time, of the core variables (see Annexes 1 - 3).

The task of the Labour Accounts is to address the problems mentioned above by *combining various statistical data sources* so as to enhance their strengths and overcome their weaknesses as effectively as possible, thus producing new statistical series which are superior in quality to the original data sources. An appropriate choice of basic definitions enables direct *connections with other statistical systems*, such as the National Accounts or Demographic Accounts.

The central variables in labour statistics are a) persons in employment and jobs b) unemployed and underemployed persons, c) vacancies, d) hours of work and full-time equivalents, e) income from employment and labour costs, f) organization of the labour market: statistics on collective labour agreements, strikes and trade-union membership figures, etc. Statistics describe variables and their characteristics (like age, sex, and education) in quantities (totals, averages and volumes) and follow them in time.

In *ILO,* at the *15th International Conference of Labour Statisticians (ICLS)* in 1993, it was said that Labour Accounts "provide a logical framework for obtaining internally consistent estimates of key labour market variables and their distribution over the population ..(which) .. are necessary for the description and analysis of the state and dynamics of the labour market and its interaction with the rest of the economy".

In the Labour Accounts compilation a distinction is made between a cross-sectional and a longitudinal approach. The longitudinal approach can be seen in line with developments in mainly German- speaking countries on the "Arbeitsmarktgesamtrechnung". The Netherlands is concentrating for the time being on the cross sectional aspect. Switzerland is developing both the cross-sectional and the longitudinal variant within the same framework. In Denmark two separate systems have been

developed for the Working Time Accounts (cross-sectional accounts) and for the Labour Market Accounts (longitudinal accounts).

2.2 The process of statistical integration[6]

Labour Accounts offer a framework to bring together labour market data from all kinds of source statistics. The main objects this framework incorporates are labour input aggregates (persons, jobs, hours etc.), which describe supply and demand on the labour market as well as labour payments (as income and as costs), both categorized by relevant characteristics. *The aggregates have to satisfy a set of identity relations*. The identities exist both in the case of a static description of core objects as well as between stock and flow data.

In the integration process *the findings from source statistics and derived statistics are harmonized and adjusted for error*. In order to judge for quality, the process is in principle reproducible. Even if subjective decisions have been taken, these are explicitly documented and published to enable adjustments in future versions whenever evidence in favour of other decisions occurs. The resulting integrated statistics will have to be reliable approximations of real life aggregates and distributions.

The integration process can be described as a four-step procedure.

2.2.1 First step: Definition of the model and of the identity equations

In the first step, *the model and the identity equations have to be defined*. The models developed by each of the three countries are presented in Annexes 1-3. The identity equations can be derived from the model. These identities may be seen as the most important part of the Labour Accounts, not only from the point of view of users of statistics, who will be faced with consistent data at the end of the process, but even more from producers point of view. These identities give, in addition to quality checks performed by producers of direct sources, additional possibilities to check and complement the original data sources.

In **Denmark** (see Annex 1) the most important identity relationships of the *Working Time Accounts* covering *registered paid employment* are the three main relational equations for employees:
- Jobs = employed persons - employed persons on leave + secondary jobs
- Total hours worked = number of jobs * actual hours per job
- Total compensation = number of jobs * compensation per job

The calculations are performed for 2000 groups, i.e. 125 industries, gender and four groups covering the extent of hours worked, public or private sector. The core of the system estimates the total number of annual hours worked based on data from wage statistics on total hours worked per job multiplied by the average number of jobs from the Register of Employment covering the total population. See Annex 1 for an overview of the model for employees. The model for self-employed is a little more simple, because it only includes jobs, employment and actual hors worked.

The system *Labour Market Accounts* is primarily going to meet recurrent demands from both end-users and from within Statistics Denmark for *comprehensive and harmonized concepts for full-time equivalents.* In the year 2000 a pilot study was carried out with the purpose of examining the data sources with special focus on duration and extent of employment. The final purpose is to construct a micro-register covering the total population. The long-term goal is that the Working Time Accounts

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[6] For more details about the process of statistical integration see Buhmann et al (2000).

and the Labour Market Accounts will finally merge into one micro-based system. To accomplish this, the data sources have to be decisively improved.

In the case of the **Dutch Labour Accounts**[7] (see Annex 2) the most important identity relationships are:

- the relation between persons employed and jobs; here the link is made between data from household surveys (persons employed as well as jobs) and data from establishment surveys (jobs);
- the relation between the number of employee jobs, average annual earnings and total wage sum: jobs are derived at first from the confrontation of LFS and ES data on employment, annual earnings are available from the Annual survey on employment and earnings and the wage sum is for a large part integrally available from social security files.

Both relations offer good opportunities to analyse and improve the results from the direct sources. Annex 2 describes the identities, which hold for the annual data. The same identities hold for quarterly data also, but in that case average earnings and average hours of work are not distinct quarterly variables, but only calculated as intermediaries between hourly earnings and weekly hours of work on the one side and annual earnings and annual hours of work on the other side. In the case of the relation between earnings, jobs and hours a distinction is also made between regular earnings and special bonuses and allowances. Annual wage sum data for instance are only available for the total of regular earnings and special bonuses and allowances; quarterly wage sum data distinguish between both. Also in the case of annual average earnings a distinction between regular and irregular payments can be made.

In **Switzerland** (see Annex 3), priority is given to:

- the relation between persons employed and jobs; the link is made between data from household surveys (persons employed) and data from establishment surveys (jobs); unexplained differences are analysed and published.
- the relation between the number of persons employed, hours worked and full time equivalents; again the comparison is made between data from household surveys and establishment surveys, unexplained differences are analysed and published.
- the relation between the number of unemployed persons according to the labour force survey (international definition) and the number according to the unemployment registers; unexplained differences are analysed and published.
- the relation between demographic statistics and labour market statistics: The number of persons employed plus persons unemployed plus persons out of the labour market have to add up to the total population. Not only net changes, but also gross changes (immigration, emigration, death and births) are taken into consideration.

The monetary dimension of the labour market (wages and earnings) is not yet part of the Swiss Labour Accounts.

2.2.2 Second step: Harmonization of definitions and classifications in source statistics, achievement of full coverage

In the second step, choices are made first about which source serves as the primary source for which variable. In some cases this is quite clear beforehand, in other cases a combination of sources seems to be most appropriate beforehand. Then definitions, classifications, reference periods and the level of breakdown used by the source statistics chosen have to be *harmonized* to a common definition

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[7] For more detail on Dutch labour accounts see Statistics Netherlands (1999) and Leunis (2000a).

(e.g. ILO-definition of employment). Also the *achievement of full coverage* is included at this stage (e.g. domestic concept for employment).

The adjustments at this stage involve post facto co-ordination and focus on the completion of populations. Surveys are limited in their coverage and populations covered in registers unavoidably vary. Discrepancies between the type and size of these populations are detected and complemented by means of estimates. In this step source data are cut to size or expanded according to newly defined populations and definitions. After harmonization and the achievement of full coverage the aggregate values may still disagree in practice, but the findings from source statistics are co-aligned on shared parameters.

Scheme 1. Harmonisation of source statistics
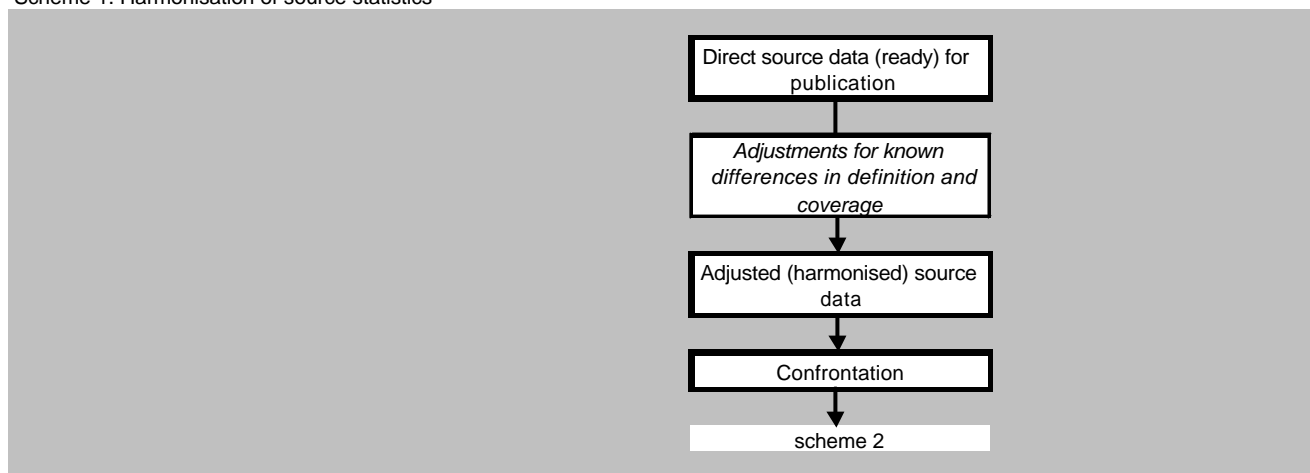
2.2.3   *Third step: Minimization of measurement errors*

The third step aims at error reduction. After the first two steps, it is very likely that the definitional equations, defined in the first step, do not fit with the harmonized data of step 2, because most data which originate from surveys or registers are afflicted with sampling and non-sampling errors. *Through confrontation within identity relations, errors, irregularities and improbabilities are traced and corrected* in this third step.

The correction process includes the comparisons of extrapolated sample findings with information from integral data to gain insight into the extent of under- or overestimation due to generalization of the sample. The credibility of response patterns is in fact verified in the cross light of additional sources and against the background of the predefined identities. Here both in-depth analysis checking for breakdowns according to various characteristics and comparisons over time are used to trace irregularities. This stage in the procedure is iterative (see scheme 2).

2.2.4   Fourth step: Balancing

The fourth step involves balancing. Very *small differences* are neglected in the third step. These are *smoothed out* in the fourth and final step of the integration process: the balancing. Here a mathematical procedure can be used by which the adjustments are minimized under the condition that the values attached meet the identity equations set before. The balancing procedure is in fact only a matter of (cosmetic) ironing and is not used in each of the three countries.

To fit the identities between the values resulting after the third step, only in the Netherlands, a Powell algorithm is used to minimize – in an iterative search – the sum of the squared deviations (percentages) between the values before adjustment and the randomly given values by the Powell algorithm per branch of industry. The values of more accurately observed variables are adjusted less than the values on other variables, by adapting their weight in the adjustment process accordingly. The result is that robust data (such as the wage sum extracted from the social security files) hardly change. The weights are only used to reflect large differences in accuracy. Only minor adjustments result from this step.

Scheme 2. Minimisation of measurement error and Balancing
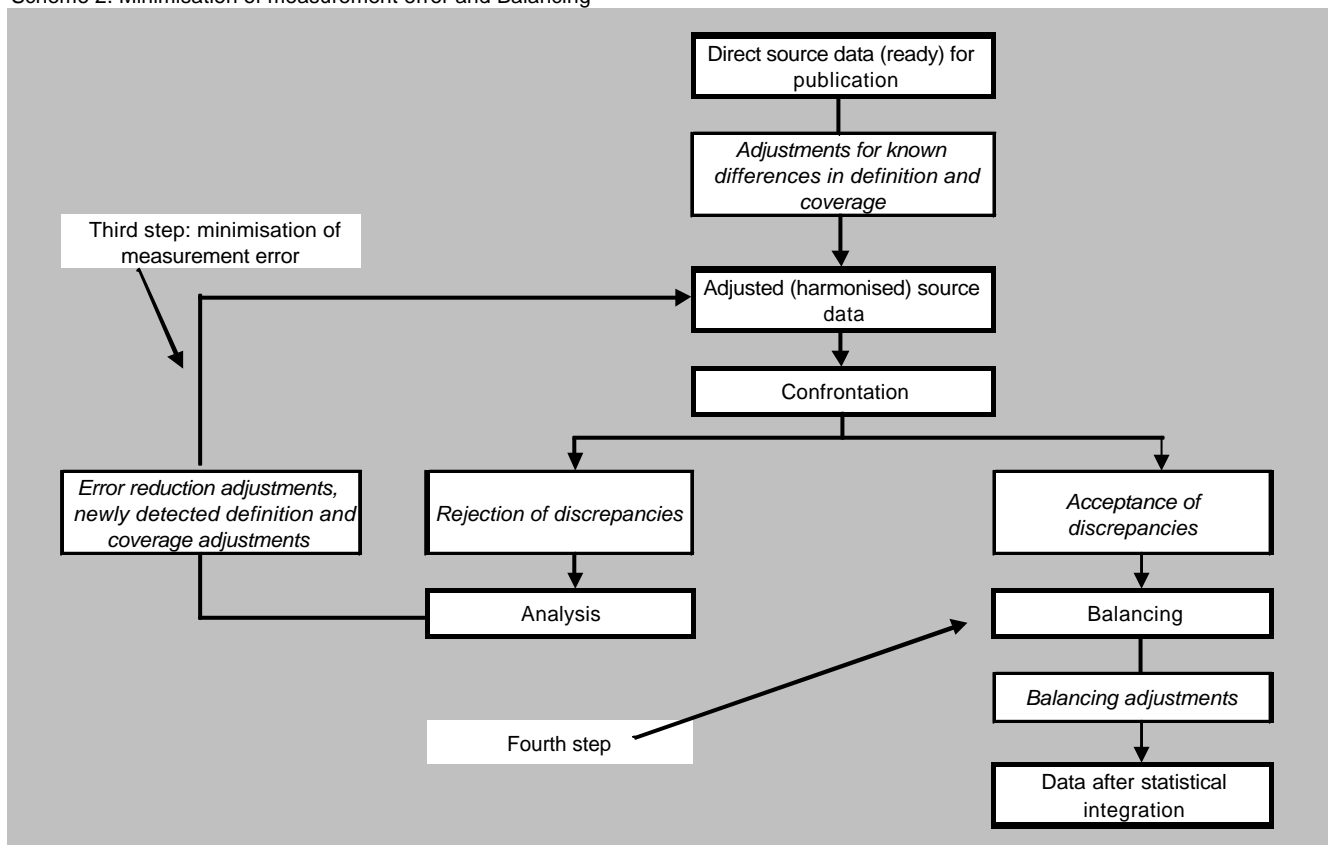
In Denmark there is no need for a final balancing of differences. When the dependent variables have been calculated by the system of equations, either annually or quarterly, all variables are 100 % coherent. In the Swiss Labour Accounts, the final balancing is only applied to the longitudinal accounts. In the cross-sectional accounts, the remaining differences are kept and published with explanatory comments.

2.3   General principles of Labour Accounts

Although the three national approaches presented here, have different priorities and have chosen different aspects to emphasise, their work shows or aims at a lot of similarities, which can be regarded as the 10 principles underlying the Labour Accounts approach.

1.   *Full coverage:* Labour Accounts, fully developed, are exhaustive. They cover all economic activities; all jobs and both the entire, actual labour force, and the potential labour force, and may quantify all central indicators of all labour dimensions.

2.   *Uniform use of ILO and SNA concepts:* In Labour Accounts concepts and breakdowns are transferred into uniform definitions and classifications, linked to ILO and SNA recommendations and resolutions. ILO concepts describe employment (paid and self-employment), underemployment, unemployment, earnings and labour cost, the SNA labour and compensation of employees. In linking population and economic statistics labour market data have to be published according to national concept (people who live in the country) and domestic concept (people who work in the country under review).

3.   *Reference point and period and corresponding type of data:* Statistics monitor developments by ordering the time dimension in points and periods. There are five kinds of data that can be considered in Labour Accounts: stock-data (inventories) which refer to a point in time, transition-data which refer to sequences of changes occurred between two points in time, events data which give an overview of the very moment of change, flow-data which refer to cumulating changes during a period of time and average-data which refer to the average during a period of time. Although diverse, conceptually they can all be linked.

4.   *Full consistency:* Fully developed Labour Accounts provide data, which are in full harmony and satisfy strict identity relations. Contradictory results do not occur. The term 'accounts' refers to the fact that the integrated statistics fit identities in a way similar to the macro-economic totals in the National Accounts and to the conviction that Labour Accounts can serve as a co-ordinating tool for all labour statistics, in the same way as SNA serves as a co-ordinating tool for economic and financial statistics (Hoffmann, 1999)

5.   *High quality data (combining strong aspects of available data sources and tracing errors):* Data from the Labour Accounts fulfil high quality standards, since they are based on an integration process, which is selective to the sources used. There are mainly two arguments, which support this thesis. *Firstly* it is the combination of sources. Each source has its strong and weak parts. Household surveys for instance are best equipped to measure personal characteristics and allow full coverage of the workforce. Enterprise surveys can best represent formal variables included in salary administrations and have an advantage over household surveys with respect to sample design (stratification according to size of enterprise), registrations give integral data on subjects where the registration has been asked for. Labour Accounts combine the strong aspects of the various sources. *Secondly,* the various possibilities of confrontation of data results help to trace and quantify errors in data processing, which can be adjusted for in the process of statistical integration.

6.   *Comparability over time:* Labour Accounts give continuity a high priority and provide consistent time series. In the processing of Labour Accounts explicit adjustments are made for unreal changes in the figures from the direct sources. Therefore, they do not suffer from design changes as surveys do nor from the changes in legal and administrative procedures that affect register based statistics.

7.   *Timeliness:* Labour Accounts are being based on as many sources as possible, some of them are available very early, some of them just after one or two years. By combining short-term

measurement with updating procedures for structural variables Labour Accounts may facilitate provisional releases very soon after a reference period.

8.   *Data variable flexibility*: Also one might think that an accounting system is less *flexible* than a direct source. This does not need to be the case. Once integration has been achieved, additional parts can be introduced by linking detailed source data to aggregated accounts data. So, if surveys come up with new information on related subjects, they immediately can find their way into the accounts as specific indicators or supplements, without affecting the general coherence.

9.   *Transparency***:** During the process of integration many decisions are made to adjust data results from the various sources used. Some of the adjustments are without any doubt; some of them are based on assumptions, which cannot always be tested. In documenting the different steps taken in the process, decisions can be challenged and by this improved wherever necessary.

10.   *Organization:* There are several aspects which are relevant concerning the organization of the production of Labour Accounts: a) There has to be a unit within the organization, which is responsible for integration of different data results. b) The person in charge should not be too near to one of the direct sources, because there is the danger of a bias in adjustment of the data from this particular source. But when the work is done in a completely different part of the organization, there is the danger of a sub-optimal use of the knowledge gathered by the producers of the direct source.

The extent of the success of developing Labour Accounts depends on openness with respect to methodologies practised, on willingness to gain from criticism and last but not least on the attitude of the men or women in control with respect to the publishing of conflicting data.

Do the general principles hold for the three countries?

The general principles underlying Labour accounting are still a goal for all countries, though not all of them have been achieved at the moment.

1.   **Full coverage:** Full coverage is not yet reached. In each country one or more elements are missing: For the moment the Working Time Accounts of Denmark only cover registered employment and self-employment. The Dutch Accounts only comprise data on realized employment, including estimations on the hidden economy (employment, hours, earnings and labour cost). No un(der)employment and vacancy data are included yet. On the self-employed only employment figures in jobs, employed persons and full-time equivalents have been presented. Hours worked and income from employment still lack for this category. The dynamic description of transitions into, out of and within the labour market is not yet included. In the Swiss Accounts the quantification of labour (in terms of persons in employment, hours of work, full-time equivalents or jobs, after the harmonization process of jobs statistics) includes all activities accomplished in the Swiss economic territory except a non-measurable part of the hidden economy. The Swiss Labour Accounts do not include earnings and underemployment data as yet.

2.   **Uniform use of ILO and SNA concepts:** In Denmark, the concept of employment and remuneration corresponds to the ILO and SNA guidelines, but using register-based statistics, the international definitions are adjusted to these statistics. The Dutch concept of employment corresponds to ILO guidelines. Also the distinction between paid and self-employment fits within the ILO concepts. Hours worked have only been introduced very recently in the Dutch Labour Accounts (next to contractual hours and hours paid). Here, a slightly different concept is used compared with ILO guidelines, as unpaid overtime is not included in the Dutch figures. Dutch Labour Accounts very well fit in with the (partly optional) ESA guidelines 1995. From the 1995 revision of Labour Accounts and National Accounts onwards the concept of compensation of employees is also included in the Labour Accounts. The Swiss LAS applies ILO guidelines (employment, unemployment and hours of work). The measure of activity respects the domestic concept according to SNA definitions.

3.   **Reference point and period and corresponding type of data:** In the Netherlands and Denmark survey and register data on a point in time have been transformed into periodic averages. The switch between point in time and average data can still be made in the resulting figures, thus facilitating the linkage of detailed source data on employment to the meso aggregates of Labour Accounts. Hourly and annual averages of earnings and labour cost cover the whole period, sum totals on wages and hours also. Transition data between points in time are not yet incorporated in the Dutch system. The Swiss model includes the four types of data. Unlike Denmark and the Netherlands, the use of *average data* is very limited in the Swiss model (used only to calculate job-based full-time equivalents). On the other hand, many important figures are shown as *stock data*.

4. **Full consistency:** Within the Dutch system, full consistency has been reached for all the variables, including the link to National Accounts. Also realized has been the consistency between the data in the Labour Accounts on the one side and data from the direct sources on the other side. Before the ESA 1995 revision: a) linking tables about the relation between comparable figures had been constructed for all primary sources, b) part of the direct source data were reweighed to Labour Accounts totals (regional employment figures from establishment surveys, data on personal characteristics of employed persons from the LFS). After the ESA 1995 revision this gradually changed. Because of capacity reasons it was not possible to produce linking tables for all Labour Accounts variables. With respect to the reweighing of micro source data to Labour Accounts totals, this is increasingly being incorporated in a more extended bottom-up processing of the main variables of the Labour accounts. Here, micro-integration takes on board part of the solution for discrepancies between meso totals in the past. With respect to other variables c) Labour Accounts employment totals are still not linked to unemployment data in order to describe total labour supply; the same holds for a description of total labour demand, d) discrepancies still exist between employment figures by age and earnings figures by educational level. In the Swiss cross-sectional account the full consistency principle is not respected. Indeed, the Swiss statisticians don't eliminate the remaining unexplained errors by adapting original data. On the contrary, in the longitudinal account full consistency and strict identity relations (initial stocks – departures + arrivals = final stocks by labour market status, gender, origin and age group) are satisfied.

5. **High quality data (combining strong aspects of available data sources and tracing errors):** In constructing Labour Accounts in the Netherlands, the strong aspects of the various sources used, are explicitly taken into account. This already strongly improved parts of statistics published. Also in Switzerland, the main aim of constructing LAS is to combine the advantages of source statistics (e.g. data available quarterly) and overcome their disadvantages (e.g. partial coverage, definitions different from ILO guidelines etc.). For all countries it holds that: the new statistics that result are superior in quality to the original findings. Confronting the results of the derived statistics with other statistical sources helps in tracing errors.

6. **Comparability over time:** To guarantee comparability over time, there will be a need to make revisions back in time. If a change in definitions or nomenclature occurs in the source data, the time series of the derived statistics are not adapted in the short run, but at the moment of introduction of that change in the time-series retrospectively over longer periods. The users of National Accounts are used to such revisions, but this will be a new feature in labour market statistics.

7. **Timeliness:** Solving the problem of timeliness the Danish Labour Accounts consists of both annual and quarterly figures. The Dutch update procedure used in the Labour Accounts facilitates releases, which even precede the findings of source statistics for some variables. Modelling and interpolation are used to produce both quarterly data and very timely annual data. Also the Swiss Labour Accounts allow the publishing of provisional data only very shortly after the end of the reference point.

8. **Data variable flexibility:** The Danish Working Time Accounts consists of two separate parts - first harmonization of data and afterwards calculations in the model. This makes it possible to shift input data if new sources should give better estimates. In the Dutch system, flexibility is achieved in different ways. Top-down by the extension of SAMs and the reweighing of direct source data to Labour Accounts totals, bottom-up through the linkage with direct sources. Two explicit linkages have been realized. The first one adds personal characteristics of employed persons to Labour Accounts totals (introducing LFS source data in the Labour Accounts), the second one links regional establishment data on employment from establishment surveys to the Labour Accounts core. In the Swiss Labour Accounts, the Data variable flexibility is not one of the strong aspects. However, derived statistics allow some combined breakdowns, which are not always possible with source statistics. The longitudinal Accounts offer only few possible breakdowns (labour market status, gender, origin, and age groups) because of source statistics used and the complexity of the construction.

9. **Transparency:** All three countries stress the fact of transparency and publish as much material on the methodological aspects as possible. Denmark publishes annually the linking tables, the Netherlands history of Labour Accounts has been built up by explicitly describing the adjustment procedures needed to reach uniform definitions and full coverage and the adjustments that are directed at error reduction. The manner in which the Dutch Labour Accounts produce integrated statistics is reproducible in that way. The entire integration process that links micro to macro data is in principle *transparent*. Adjustments are explicitly recorded in linking tables. In Switzerland the methodological procedures of the Swiss LAS (derived statistics and longitudinal accounts) as well as comparison boxes with other sources are published once a year in the publication called "Labour Market Indicators".

10. **Organization:** In Denmark Labour Accounts have been developed in the Labour Market department. This has been a benefit for both the producers of the primary statistics and for producers of the integrated statistics. In the Netherlands, the Labour Accounts have also been developed in the division of labour market statistics. Here, a separate unit next to the units collecting and analysing the direct source data on labour was introduced to build the first version of Labour Accounts. In a later stage, the link with national accounts (another department) was realized. With the large reorganization in 2000, the Labour Accounts section was transferred to the division of macro-economic statistics, together with the National Accounts. In Switzerland the Labour Accounts had been developed in the section of labour force statistics. As wage statistics are not in the same section and not even in the same division, it is certainly not a mere coincidence that wage data and thus the linkage to National Accounts have not been included in the LAS so far.

3. Results from Labour Accounts

3.1 Results from the Danish Labour Accounts

Based on the Register of Employment Statistics, the statistics on earnings, the labour force surveys, the labour cost surveys and a range of other sources (the database for fertility, the annual report from the Danish Financial Supervisory Authority, the Central Register of Salary Information (COR), the Register of Pension Statistics and the Register for Allowances for Sickness or Maternity) the Working Time Accounts publish figures on employment, jobs, hours worked, full-time equivalents and compensation by employees according to SNA definitions. Since the end of the year 2000 the adjustments to domestic population and unregistered employment are made in the division of SNA statistics.

Table 1 shows the aggregated linking tables, which explain the differences between the statistics of the Working Time Accounts and other published statistics (the register-based labour market statistics and the statistics of employment in businesses). Table 2 shows some results from the new statistics on hours worked.

Table 1: Linking table for employees, self-employed and compensation of employees, 1995-1999

	1995	1996	1997	1998	1999
		1.000			
Employment in the register-based labour force statistics end-November	**2 405**	**2 431**	**2 470**	**2.519**	**2.533**
- Average adjustment for employment in businesses	18	13	20	25	7
- Average primary jobs occupied by persons under 15 years	22	21	19	18	18
Employment in the Working Time Accounts	**2 366**	**2 397**	**2 431**	**2.477**	**2.508**
Self-employed in the register-based labour force statistics end-November	**222**	**219**	**212**	**212**	**212**
+ Average adjustment	1	1	4	0	0
- Average primary jobs occupied by persons under 15 years	0	0	0	0	0
Self-employed in the Working Time Accounts	**223**	**221**	**215**	**212**	**212**
		1.000 mio. DKK			
Sum of wages in the statistics of employment in businesses	**486**	**508**	**534**	**563**	**589**
- Sum of wages for persons under 15 years	0	0	0	0	1
+ Industrial injury insurance	2	2	2	2	2
+ Fringe benefits	4	4	4	4	4
+ Anniversary bonus, severance pay and gifts	2	2	2	2	2
+ Supplementary pension scheme	5	5	6	6	6
+ Pensions with current payments	18	20	23	26	31
+ Civil servants' pensions	10	11	11	12	12
- Reimbursement of maternity benefits	2	2	3	3	3
- Reimbursement of sickness benefits	1	2	2	2	2
Compensation of employees in the Working Time Accounts	**522**	**547**	**577**	**609**	**642**

Table 2.   **Employment and hours worked 1995 - 2000***

	Employment 1.000 persons	Hours worked 1. mio hours	Hours worked per employed
Total			
1995	2.611	3.290	1.260
1996	2.638	3.356	1.272
1997	2.665	3.437	1.290
1998	2.705	3.492	1.291
1999	2.735	3.525	1.289
2000*	2.762	3.578	1.295

3.2. Results from the Dutch Labour Accounts

The link between employed persons, jobs and full-time equivalents is described in Table 3. Employed persons are all persons having a job in business units or private households residing in the Netherlands. Both self-employed persons as well as employees belong to the employed persons.

Table 3:
Employed persons, jobs and full-time equivalents, 1998

1	Employed persons (= main jobs) 1)	Secondary jobs	Jobs total	Part-time factor working hours 2)	Full-time equivalents
	2	3	4 = (2+3)	5	6 = (4x5)
	x 1 000				x 1 000
Sex					
men	4395	209	4604	0,88	4059
women	3329	207	3536	0,59	2069
Status in employment					
self employed	1188	121	1309	0,60	791
employees	6536	295	6831	0,78	5337
Branch of industry					
Agriculture, forestry and fishing	286	15	301	0,77	232
Industry	1602	30	1632	0,90	1468
Commercial services	3412	172	3584	0,76	2737
Other services	2424	199	2623	0,64	1692
Total	7724	416	8140	0,75	6128

1) The division of employed persons over job characteristics is according to the characteristics of the main job
2) Ratio between average working hours of all jobs and the working hours in full-time jobs

Table 4:

Employment data, provisional linking table from LFS to National accounts, 1995 -1997

	1995	1996	1997
	x 1.000		
Employed labour force (Dutch definition) published by the LFS	6,063	6,187	6,400
Adjustments for definition and population differences			
Employed persons over 65 years of age	56	63	61
Employed persons who work less than 12 hours a week	771	784	793
	+ ---------	+ ---------	+ ---------
Employed persons LFS	6,891	7,034	7,255
Second jobs	354	385	385
Third jobs	44	49	50
	+ ---------	+ ---------	+ ---------
Jobs LFS national concept	7,289	7,468	7,690
Outgoing frontier workers	-38	-37	-39
Incoming frontier workers	45	46	50
	+ ---------	+ ---------	+ ---------
Jobs LFS domestic concept	7,296	7,477	7,700
Adjustments for measurement error			
Secondary jobs interpreted as consecutive jobs	-5	-5	-6
Jobs considered to be volunteer jobs	-6	-4	-7
Trainees	-25	-30	-31
Regular domestic helps	245	256	256
Other adjustments	20	32	34
	+ ---------	+ ---------	+ ---------
Jobs as presented by the national accounts and labour accounts	7525	7726	7946

A job is a working place occupied by an employed person. Because employed persons can have more than one job, the number of jobs is higher than the number of employed persons. When a job is only filled for part of the year it is counted for that part. The number of jobs in a year is an average.

In the availability of employment data, there is still a distinction between pre-revision (up to 1997) and post-revision (from 1995 onwards). In the post-revision data total employment can be presented by gender, status in employment and branch of industry. For the various pre-revision data on total employment also a breakdown by weekly hours worked can be presented and in the case of the persons employed breakdowns by occupation, educational level and the combination nationality/country of origin.

Table 4 presents the link between employment published by the LFS and the number of jobs included in both Labour Accounts and National Accounts.

3.3 Results from the Swiss Labour Accounts

When presenting the Swiss Labour Accounts, one has to distinguish between the cross-sectional accounts and the longitudinal accounts. Within the national statistical system only the longitudinal accounts are called "Labour Accounts" (Arbeitsmarktgesamtrechnung), the cross-sectional accounts are called "Labour Market Indicators" (Arbeitsmarktindikatoren - AMI).

3.3.1   Results from the Cross-sectional Accounts

In Switzerland, four different data sources give information on "employment": the Population Census (PC), the Swiss Labour Force Survey (SLFS), the Establishment Census (EC) and the statistics on Jobs (JOBSTA). All four sources use slightly different definitions. Table 5 compares the results of the official employment statistics (ES), based on the SLFS (completed with missing groups, such as frontier workers living abroad), with the results of the three other sources (harmonized and completed according to the common definitions). As the results show, there are varying degrees of differences between the official employment statistics and the harmonized employment figures based on the other sources. Employment statistics deviate only slightly (1%) from the harmonized JOBSTA 93, 94 and 96 data (the differences are within the acceptable range of random error). In contrast, these findings do not tally with the results adapted from the JOBSTA 92, 95, 97, 98, EC 91, 98 and the PC 90.

Table 5:		Summary of the findings of the PC, EC and JOBSTA brought into line with ES definitions, in thousands, mid -year, 1991-1998					
End of 2nd quarter	ES	Harmonized statistics			Unexplained differences		
		JOBSTA	EC	PC	JOBSTA-ES	EC-ES	PC-ES
1991	3921	-	4008	3716	-	87	-205
1992	3870	3963	-	-	93	-	-
1993	3849	3829	-	-	-20	-	-
1994	3781	3750	-	-	-32	-	-
1995	3803	3729	-	-	-74	-	-
1996	3819	3790	-	-	-29	-	-
1997	3804	3712	-	-	-92	-	-
1998	3858	3768	3733		-89	-125	

The difference between the total number of persons in employment according to the PC and according to the official employment statistics is roughly 205'000 Persons (5%). It should, however, be pointed out that the Population Census is based on a fairly simple questionnaire, which is completed by the persons themselves. Therefore a strict application of international recommendations regarding the definition of employment cannot be guaranteed. In particular, underestimation of small and atypical employment must be reckoned with. On the basis of these results, the Swiss Federal Statistical Office decided to reword the question for the PC 2000 in order to survey small and atypical employment more effectively.

The unexplained difference between the employment statistics on one side and the harmonized JOBSTA and the harmonized Establishment Census on the other side is more complex to analyse. These differences could be the result of rising atypical and shadow-employment (partially considered in person-oriented surveys but not in establishment-oriented data collection procedures), the difficulties in taking full account in JOBSTA and the Establishment Census of "new-born" enterprises or of sampling errors.

3.3.2 Results from the Longitudinal Accounts

The results from the Longitudinal Accounts 1991-1998, published for the first time in 1998, were very well aquatinted by the users. Especially the results on migration of the labour force were of highly political relevance. With the help of the Longitudinal Accounts, it could be shown that - unlike the situation in the seventies - in the recession years of the nineties, Switzerland did not "export unemployment". There was a net emigration of the labour force, but on a very small scale.

Table 6: Longitudinal Accounts, in thousands, 1991 -1998

	Year 1991	Year 1992	Year 1993	Year 1994	Year 1995	Year 1996	Year 1997	Year 1998
Labour force, 1 Januar	**3885**	**3941**	**3904**	**3941**	**3933**	**3939**	**3994**	**3982**
+ Labour market entries	295	242	288	247	274	295	258	277
- Labour market exits	269	275	249	264	261	225	258	257
+ Labour force immigration	141	128	110	115	116	90	71	73
- Labour force emigration	112	131	112	106	123	105	83	81
= Labour force, 31 Decembe	**3941**	**3904**	**3941**	**3933**	**3939**	**3994**	**3982**	**3995**

4. The advantages of Labour Accounts

The Labour Accounts results are very important for data users because they overcome the difficulties of traditional labour statistics, presented in the introduction to this paper: With the help of Labour Accounts, *contradictory results between data sources can be eliminated, a global overview of the situation on the labour market is possible, not only net changes but also gross changes can be observed and finally the links between labour market data and data from the National Accounts and Demographic Accounts can be guaranteed.*

Not only for data users, but also for statistical offices, the Labour Accounts open new opportunities: with Labour Accounts statistical offices can combine the pursuit of lowering survey costs and response burdens with an increase in data quality. Summarized, the following advantages for producers of statistics are the most pronounced:

- *Optimality with respect to definitions:* The definitions used in the data source (especially in administrative data sources) often do not coincide with the statistical concepts needed by our national users and for international comparison. The construction of Labour Accounts allows transforming inadequate definitions from available data sources into required definitions, e.g. breaks in administrative data concepts and questionnaire changes can be substantially remedied in making use of the accounting framework;

- *Reduction of data collection costs:* With the help of Labour Accounts one can reduce the need for asking the same question twice in different surveys to an absolute minimum needed for quality control and interlinkage.

- *Improvement in data quality checks:* Definition relationships between different variables play a prominent role within Labour Accounts. Effectuated supply of labour (by personal characteristics) has to be equal to filled demand (by all industries); wages and salaries in a certain industry has to be equal to total employment in that industry times the average wage rate; the combination of flows and previous stocks should lead to stocks for the next period. After the adjustment of the data

for differences in concepts and coverage, remaining discrepancies within these definition relationships reveal the magnitude of error in one or more of the underlying sources.

- *Increased timeliness*: Although initially the integration of data in an accounting system may be time-consuming, eventually more reliable timely indicators can be estimated by extrapolating such an accounting system with the necessarily very fragmented information that is available for a much more recent period.

- *Greater flexibility:* although the core variables of accounting systems will remain quite stable over time, introducing additional detail within an accounting system has the advantage that the consistency with different (more aggregate) standard classifications remains intact.

5. Implications for further developments in social statistics

In the past decade quite some changes have been realized in social statistics. In describing the labour market in Europe attention has been drawn to: a) the *description of changing structures* (Structure of earnings survey, Labour cost survey, Structural business statistics, continuous Labour force survey);   b) *extending and improving quarterly statistics* (Employment, Average earnings, Quarterly labour cost, Labour cost index, Short term statistics, quarterly LFS); c) *labour market dynamics* (longitudinal databases and analysis of year-to-year changes); d) *the link between social and economic statistics* (ESA 1995 revision, STS, SBS, EU leadership group on SAMs); e) *Research in linked employer-employee data.*

A further speeding up of *timeliness* together with more coherence in statistics are demanded from the users' side. More attention to *lowering respondents' burdens* and utilizing register data has been brought in from producers' side.

The various goals still to be reached at the international level require both a harmonization of the framework of data linkage and freedom of data choice. Questions to be answered in data linkage are: Which data should fit with each other? How to define these linkages? The freedom of data choice refers to the exploitation of all available data sources like register data in combination with survey results. Once having reached a coherent data framework, both attempts to speed up data releases and to exploit different data sources can be incorporated more easily than if the various surveys each play the role of islands.

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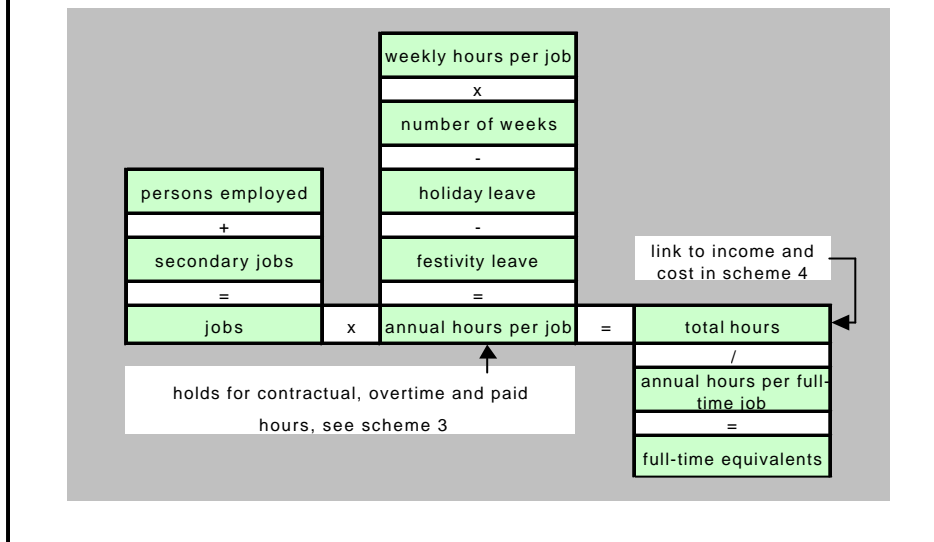
WISMER, K., SØLLING L., STENDER, P., NAUR M., ANDERSEN, S. (1999): "Labour market accounts in Denmark. Working paper no. 1", Statistics Denmark, 27 May 1999.

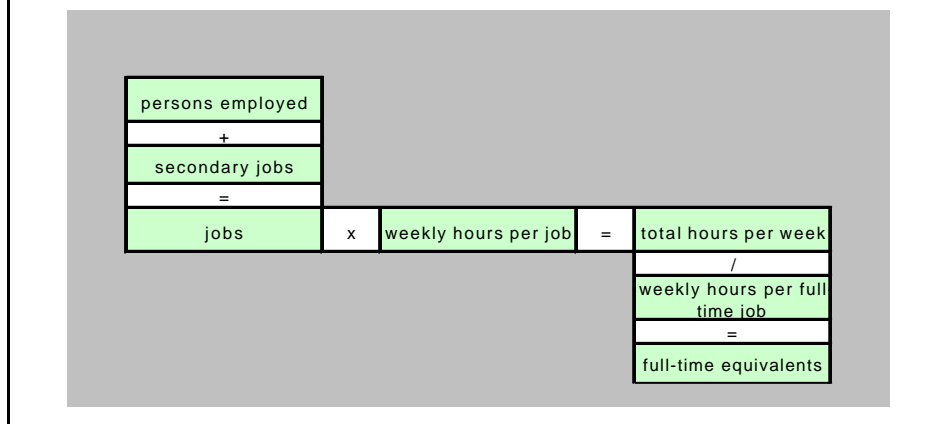## Annex 1: The Danish model of Working Time Accounts for employees
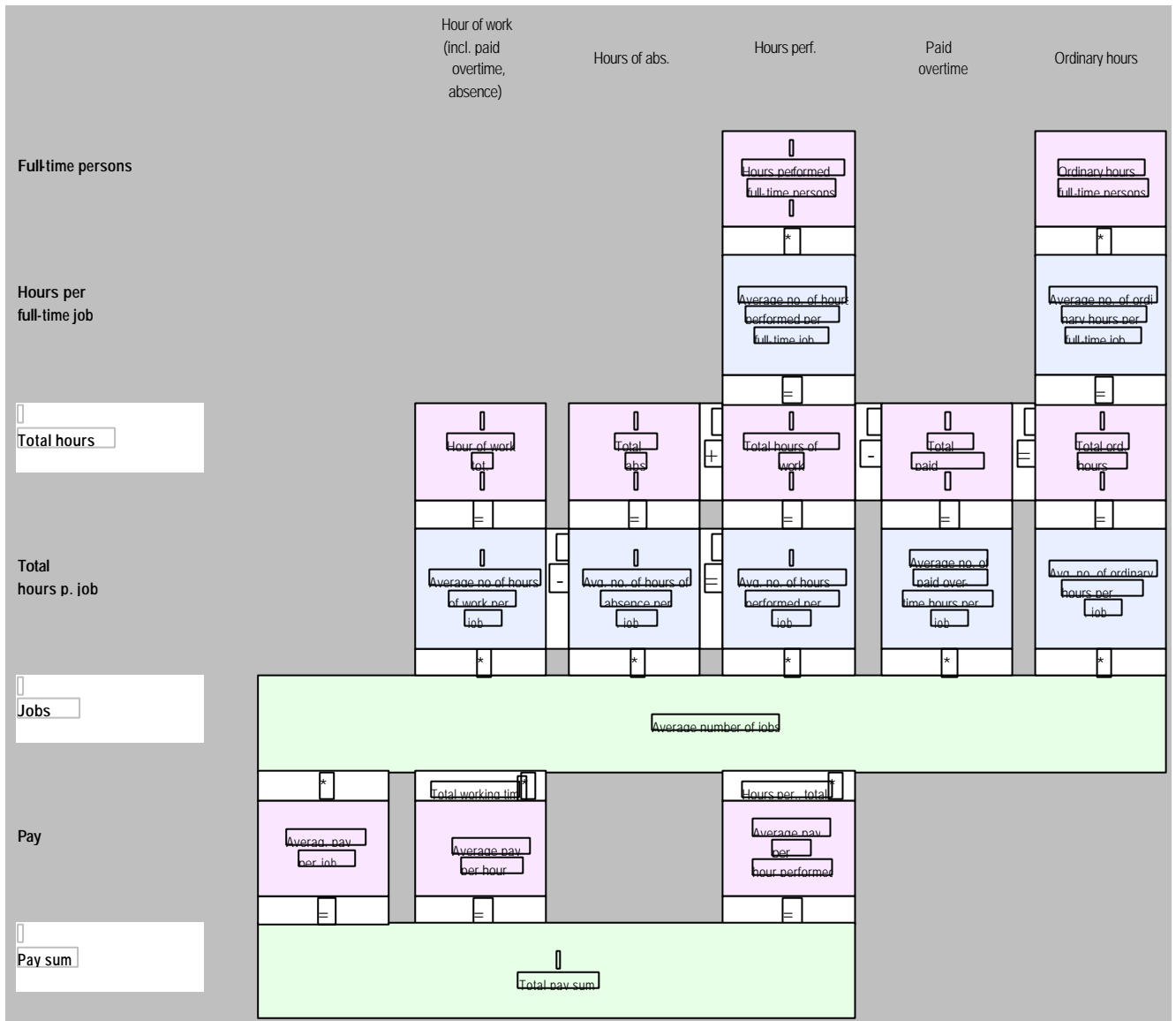
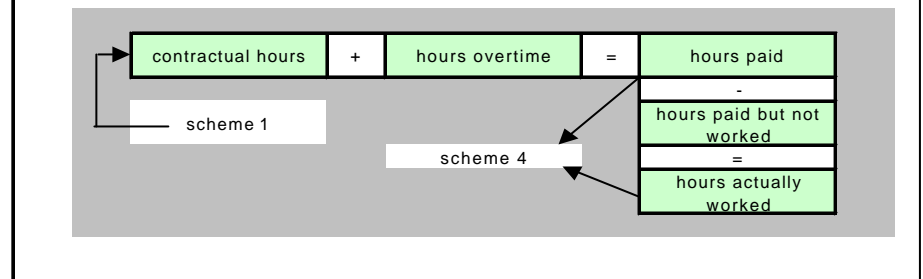**Annex 2. The model of identities underlying the Dutch labour accounts**
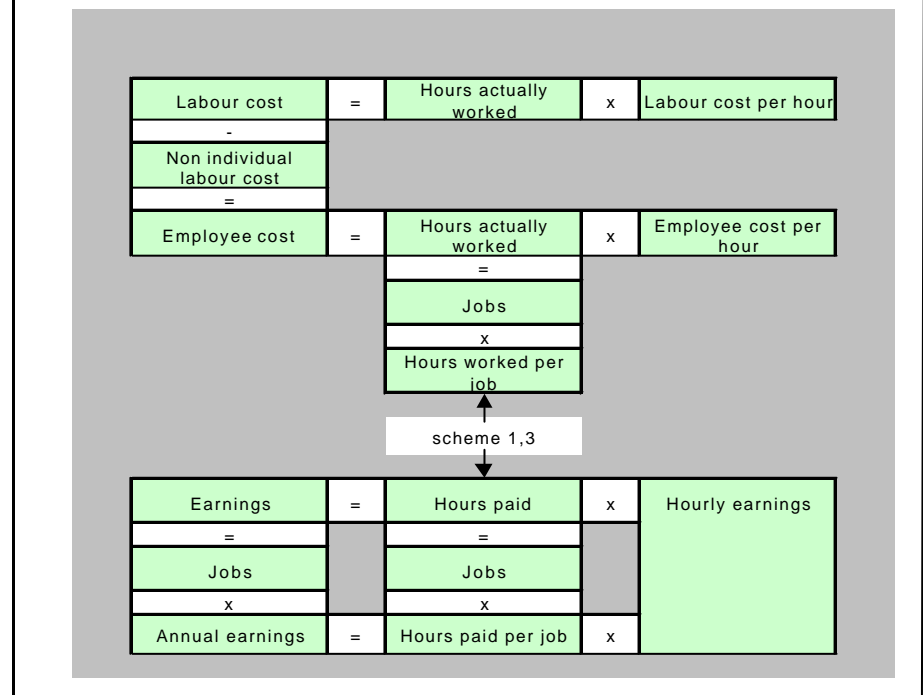
Scheme 1. Employee labour

		weekly hours per job
		x
		number of weeks
		-
persons employed		holiday leave
+		-
secondary jobs		festivity leave
=		=
jobs	x	annual hours per job	=	total hours

link to income and cost in scheme 4

holds for contractual, overtime and paid hours, see scheme 3

total hours
/
annual hours per full-time job
=
full-time equivalents

Scheme 2. Self employed labour

persons employed
+
secondary jobs
=

jobs	x	weekly hours per job	=	total hours per week

total hours per week
/
weekly hours per full time job
=
full-time equivalents

Scheme 3. Various concepts of hours

contractual hours	+	hours overtime	=	hours paid

scheme 1

scheme 4

hours paid
-
hours paid but not worked
=
hours actually worked

Scheme 4. Labour cost and labour income

Labour cost	=	Hours actually worked	x	Labour cost per hour
-				
Non individual labour cost				
=				
Employee cost	=	Hours actually worked	x	Employee cost per hour
		=		
		Jobs		
		x		
		Hours worked per job		

scheme 1,3

Earnings	=	Hours paid	x	Hourly earnings
=		=		
Jobs		Jobs		
x		x		
Annual earnings	=	Hours paid per job	x	

Annex 3: The Swiss model of Labour Accounts
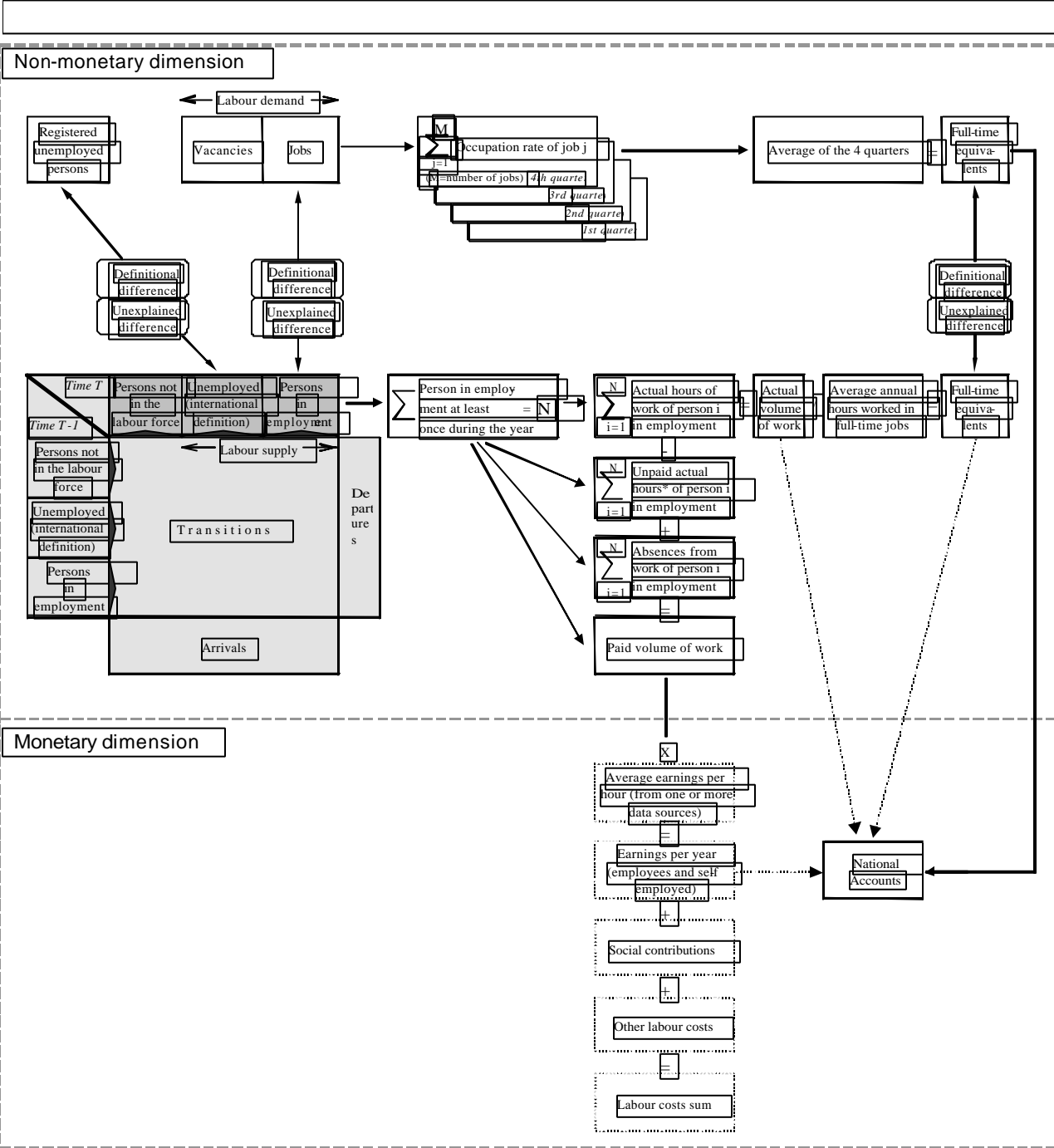
Résumé

Comptes globaux du travail: vers une description cohérente et opportune du marché du travail

La construction de comptes globaux du travail (Labour Accounts) répond tant à la volonté de surmonter les problèmes liés aux données discordantes, qu'à celle de décrire les interrelations sur le marché du travail. Le Danemark, les Pays-Bas et la Suisse ont tous choisi de développer un tel système. Bien que ces pays soient à des stades de développement différents et bien qu'ils aient parfois apporté des solutions différentes aux problèmes rencontrés, ils sont tous d'accord sur les principes fondamentaux sur lesquels reposent ces comptes. La construction des comptes globaux du travail leur donne de nouvelles opportunités de compléter, de présenter et d'améliorer les statistiques du marché du travail existantes. Ce rapport procure une vue d'ensemble des caractéristiques des comptes globaux du travail et présente, pour chacun des trois pays, le cadre utilisé pour leur mise en pratique, leurs principaux résultats et les implications possibles sur les procédés futurs.

Resumen

Cuentas del trabajo: un paso adelante hacia la descripción coherente y adecuada del mercado de trabajo

La necesidad de disponer de cuentas del trabajo nace tanto de la exigencia de conciliar los datos discordantes como del deseo de describir las interrelaciones en el marco del mercado de trabajo. Dinamarca, los Países Bajos y Suiza han decidido desarrollar un sistema de estas características. Aunque se encuentran en diferentes fases de desarrollo y, a veces, han elegido soluciones diferentes a los problemas que se les plantean, todos están de acuerdo en los principios generales sobre los que reposan estas cuentas. La preparación de cuentas del trabajo les brinda nuevas oportunidades para completar, presentar y mejorar las estadísticas del mercado de trabajo existentes. El presente documento ofrece una visión general de las características de las cuentas del trabajo y presenta, para cada uno de estos países, el marco utilizado para su aplicación y las posibles implicaciones políticas para el futuro.