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Prinses Beatrixlaan 428
P.O. Box 4000
2270 JM Voorburg (Netherlands)

Telephone : . .31 (070) 337 38 00
Fax : . .31 (070) 387 74 29
E-mail: lhka@cbs.nl
Internet: <http://www.cbs.nl>

Heerlen

Kloosterweg 1
P.O. Box 4481
6401 CZ Heerlen (Netherlands)

Telephone : . .31 (045) 570 60 00
Fax : . .31 (045) 572 74 40

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Maintaining an adequate response to business surveys on a minimum of reminders

Marjolijn Trijssenaar

Abstract

Response rates for business surveys on paper questionnaires have declined in recent years, a trend that may lead to a declining quality of statistics and put timeliness at risk. It is therefore very important to maintain an adequate level of response to questionnaires.

To do this reminders are sent to non-respondents, an expensive business that must therefore be kept to a minimum. This article reports on the analysis of the effect of paper questionnaires and reminders on the response behaviour of businesses, and on the basis of this gives some recommendations to improve the reminder strategy.

Key words: business surveys, response rates, reminder strategies

1. Introduction

In the last few years, response rates for business surveys on paper questionnaires have been declining. This trend may lead to declining quality of publications, and also put the timeliness of publications at risk. It is therefore of the utmost importance to maintain an adequate level of response to questionnaires.

One possible solution to the problem of declining response rates is to increase data collection via Electronic Data Interchange (EDI). In the last few years, the share of EDI has grown strongly among businesses and in some surveys it is quite considerable. Although this has certainly had a positive effect on the overall response percentage, as the response of companies using EDI is nearly 100 per cent, EDI is not yet the ultimate answer to response rate problems. First because it is still only a selective portion of all businesses that use EDI. For example, the share of EDI depends on company size: the larger companies in particular supply data via EDI. But it also depends strongly on the sector of industry: government organisations and energy and water companies have high EDI rates, while in sectors like agriculture and trade only a small percentage use this medium. This selectivity means that a high overall response rate obtained by encouraging companies to use EDI may still go hand in hand with low response rates in certain business groups. Secondly, per stratum EDI is also used by only a selective group of businesses: EDI and paper questionnaires give differing estimates. Thirdly, some surveys hardly use EDI at present, and some surveys cannot even use EDI because the data concerned are not yet available in electronic form. Therefore, paper questionnaires are still necessary.

In order to maintain adequate response rates to paper questionnaires, reminders are sent to non-respondents. However, written reminders are expensive and therefore must be limited to a minimum. To quantify the required minimum of reminders, we have analysed the effect of paper questionnaires and reminders on the response behaviour of businesses. Here, we describe this analysis and make some recommendations on how to achieve an optimal reminder strategy.

Section 2 describes the surveys and the existing reminder strategy. Sections 3 to 6 analyse the effect on response of response burden, company size and the economic activity of the company. Section 7 discusses the effect of reminders on response and Section 8 gives the optimum reminder strategy based on the response analysis. Section 9 rounds off with conclusions.

2. The surveys and reminders

The surveys used for this analysis are the *survey on employment and earnings* (SEE) and the *quarterly survey on vacancies and sick leave* (QSVS). The SEE design is based on stratification in economic activity and size class. It asks businesses for data on jobs and wages of employees, information which companies are legally obliged to supply. The SEE uses five different questionnaires: SEE-4 and SEE-5 in the first three quarters of the year, and SEE-1, SEE-2 and SEE-3 in the fourth quarter. SEE-4 asks businesses for number of jobs and total wage bill, SEE-5 for number of jobs, total wage bill and data on individual employees. SEE-1 asks for number of jobs per region, SEE-2 asks for number of jobs per region and total wage bill, SEE-3 asks for number of jobs per region, total wage bill and data on individual employees. The response burden increases from SEE-1, via SEE-4, SEE-2 and SEE-5 to SEE-3. Some respondents supply data via EDI.

The QSVS uses the same stratification as the SEE. Unlike the SEE, there is no legal obligation to supply data for the QSVS. The survey measures numbers of job vacancies and sick leave at companies. This survey also includes several questionnaires: QSVS-0 asks for number of employees, vacancies and sick leave, QSVS-1 for number of employees and vacancies, QSVS-4 for vacancies and sick leave, QSVS-5 vacancies and QSVS-6 sick leave. The QSVS is almost entirely a paper survey, EDI is only used partly for QSVS-6. The response burden decreases from QSVS-0, QSVS-1, QSVS-4, QSVS-6 to QSVS-5.

The standard reminder strategy is to send a written reminder to non-responding companies twice a quarter. The first reminder is a letter, the second a letter including a duplicate questionnaire. The legal obligation to respond to the SEE is stated both in the questionnaires and in the reminders. Reminders may sometimes take the form of telephone calls or visits to non-responding businesses, especially in order to obtain vital response from large companies. It is not possible to separate the effect of these reminders from the total response.

This article describes only the response to paper questionnaires and the effect of written reminders on the response to paper questionnaires.

3. Effect of response burden on response

It is known that increasing the response burden lowers the response percentage. And indeed, both SEE and QSVS show this effect clearly, for all quarters and all questionnaires. Figure 1 illustrates this effect for three size classes 4 to 6 in the SEE. Size classes 1 to 3 contain the businesses with 1 to 9 employees, size classes 4 to 6 companies with 10 to 99 employees, and size classes 7 to 9 companies with 100 employees or more.

4. Effect of size class on response

This study has shown that the size class of companies has an effect on response. Smaller companies respond better: more of them respond, and they respond sooner.

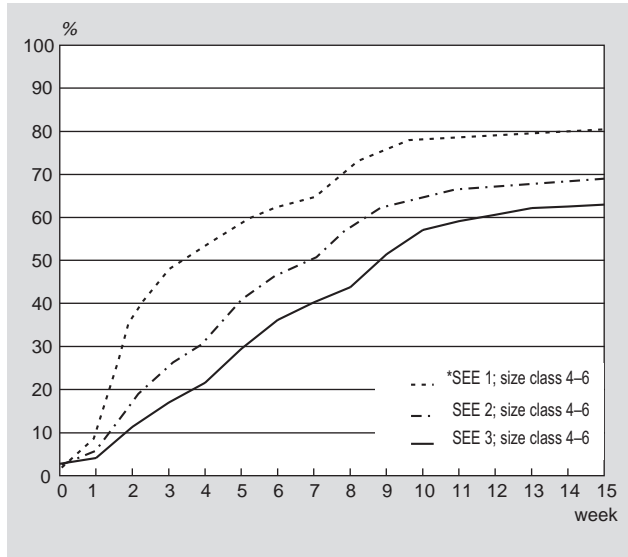
There were some exceptions on this rule, the first being that the final response of large companies may exceed the final response of

medium-sized ones, see Figure 2. This effect occurs when the response burden is high; it is seen in SEE-3, SEE-5 and QSVS-4. It may be caused by intensive telephone and personal reminding of large companies. The second exception is the questionnaire on vacancies: here small businesses respond less than medium-sized ones, see Figure 3. This may be because small companies that never have vacancies become tired of completing a questionnaire that is irrelevant for them.

5. Effect of size class on response decline caused by a larger response burden

This study found that company size class affects the amount of response decline caused by a larger response burden. The figure shows that the response declines as the questionnaires become more difficult. The response decline is largest for medium-sized businesses, see Figure 4. The same effect is shown in figure 5 for the QSVS: again the decline is largest for medium-sized companies, and much smaller for both small and large ones.

Figure 1
Effect of response burden on response, SEE



6. Effect of economic activity on response behaviour

This study shows that the company's economic activity has a substantial influence on response behaviour. Figure 6 shows the response of companies, by economic activity, to paper questionnaires. The business groups are:

- A. Agriculture;
- B. Fishing industry;
- C. Mineral extraction;
- D. Manufacturing industry;
- E. Energy and water companies;
- F. Building industry;
- G. Trade;
- H. Hotel and catering industry;
- I. Transport and communication;
- J. Financial services;
- K. Commercial services;
- L. Government;
- M. Education;
- N. Health services;
- O. Culture and recreation.

Figure 3
Effect of size class on response, QSVS

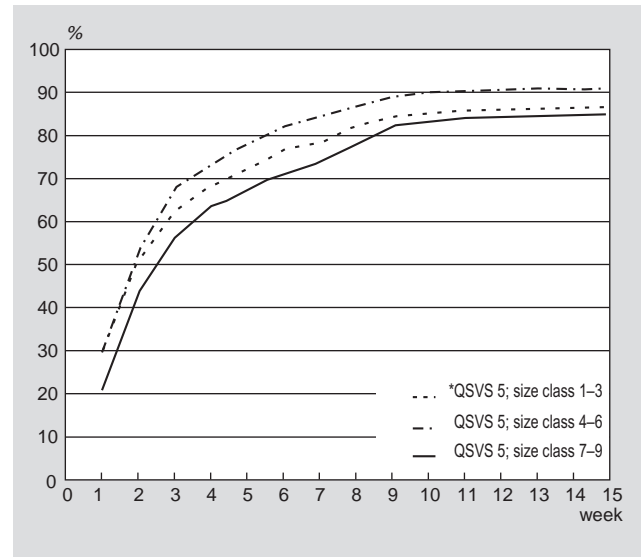


Figure 2
Effect of size class on response, SEE

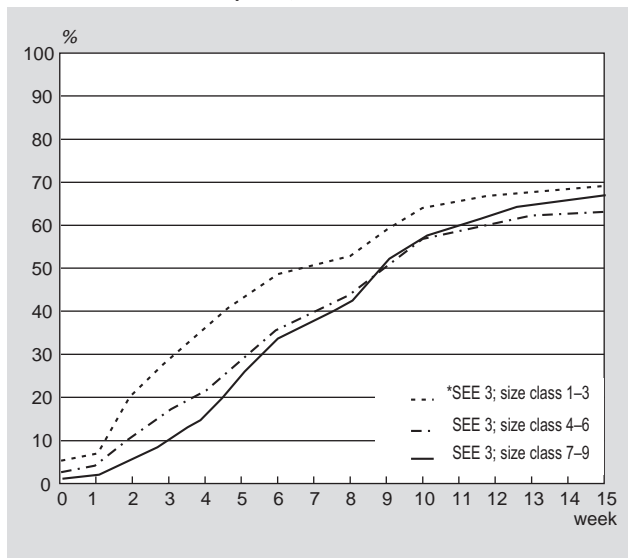
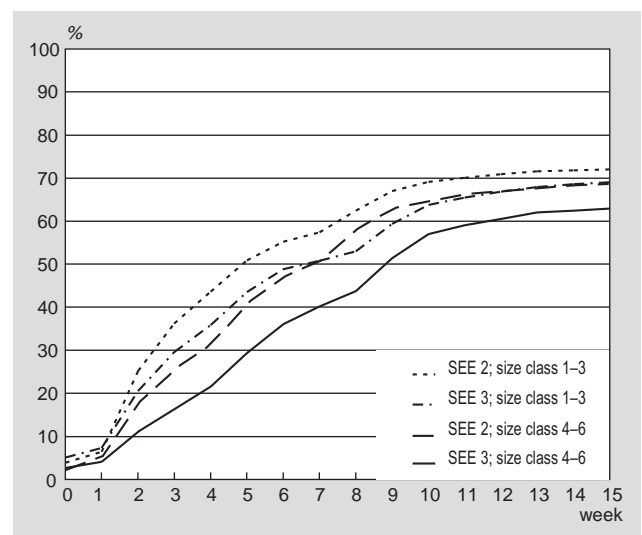


Figure 4
Effect of size class on response, decline caused by large response burden, SEE



The figure shows clear differences, for example the response of companies in the sectors mineral extraction, hotel and catering, and education is low, whereas response in transport and communication, financial services and health services is relatively high. When these businesses groups are broken down further, the response varies even more between sub-groups. Business groups that are economically heterogeneous, such as commercial services, have particularly varying response rates between the sub-groups. In general, response varies from 61% to 100% for the different sub-groups.

Business groups where response is low must be keenly observed, especially when large numbers of employees are involved. Manufacturing, trade, commercial services, and health services are all important business groups. Manufacturing has a fairly reasonable and homogeneous response for all classes. Trade can be divided into wholesale trade, retail trade and car trade. Wholesale trade responds better than car trade, which in turn does better than retail trade. The difference is not too large, about 5% in total. Health care is not further investigated. The overall response is

high and sub-groups will give a fairly homogeneous response. The most difficult group is commercial services, a large and very heterogeneous group, with elements notorious for low response (see Figure 7). There is more than 20% difference in response for best and worst responding sub-groups. Employment agencies have very low response, cleaning services somewhat higher, information technology services respond quite reasonably, and businesses in leasing and trading moveable and immovable properties have relatively high response.

7. Effect of reminders on the response

We have evaluated the effect of reminders on the response. As an example, Figures 8 and 9 show for SEE-1, SEE-2, SEE-3, and all size classes, the incoming response per week, and the reminder.

The figures show that all businesses respond well to reminders. The extra response generated by a reminder comes in two to four weeks

Figure 5
Effect of size class on response decline caused by larger response burden, QSVS

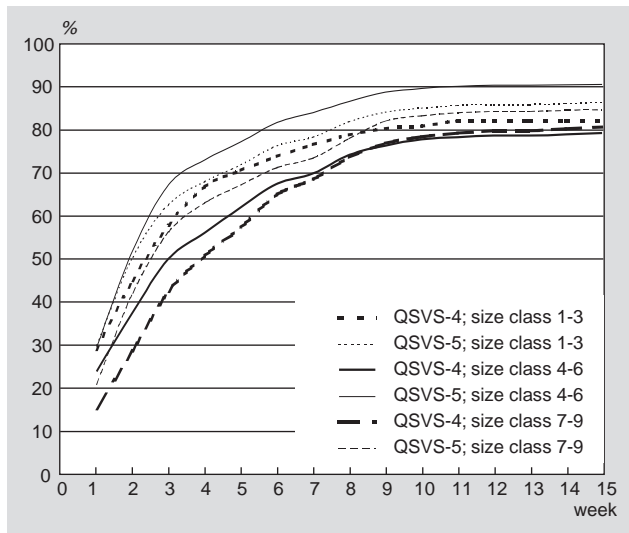


Figure 7
Effect of economic activity on response, for sub-groups of economic activity 'Commercial services', SEE

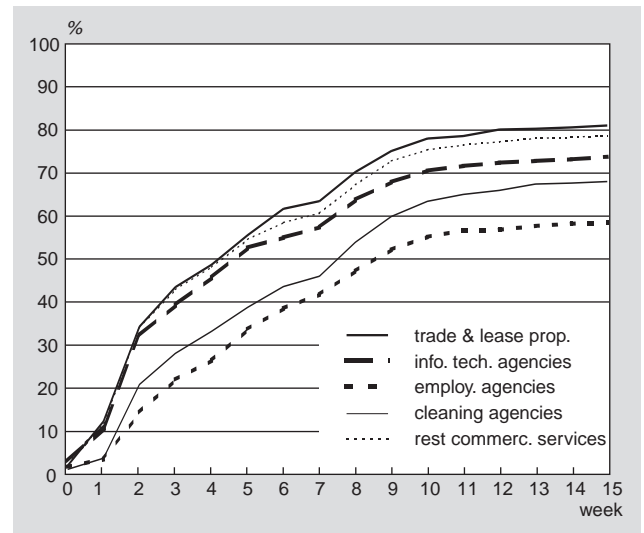


Figure 6
Effect of economic activity on response, SEE

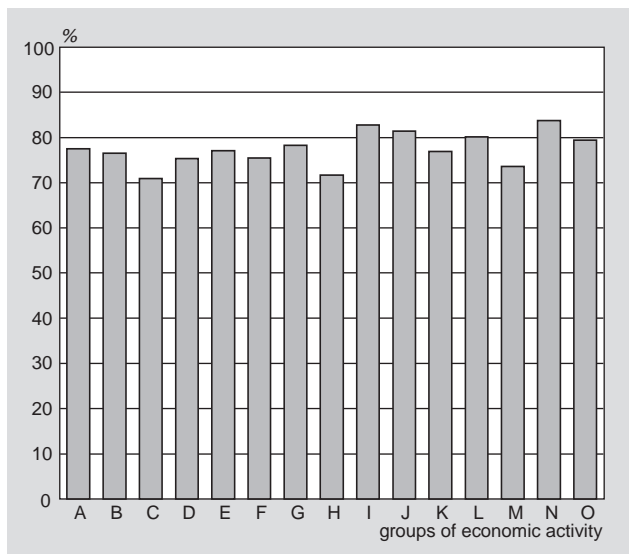
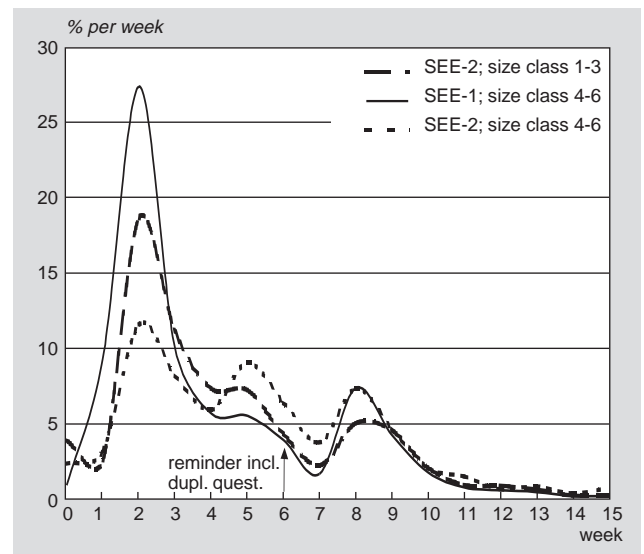


Figure 8
Effect of reminding on response, SEE-1 and SEE-2



after the reminder was sent. When the response burden is high, the extra response takes longer to arrive (three to four weeks) than when response burden is low (two to three weeks). The various business sectors, classified by size class, response burden or economic activity, generate about the same amount of extra response to a reminder.

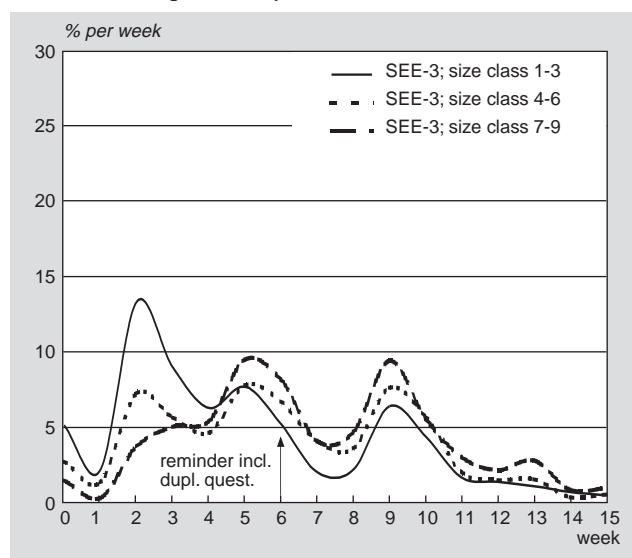
In order to differentiate between the effects of single and double reminders, we made rough estimates of the extra response generated by reminders. These estimates are visually determined on basis of the figures of response-per-week (see Table 1). Note that the standard strategy of sending two reminders was not applied in all quarters. It appears that a reminder with duplicate questionnaires has more impact than a letter alone. A reminder with duplicate questionnaire has more effect when it is not preceded by a reminding letter.

Table 1
Estimated extra response generated by reminders

Year /quarter	Letter	Letter + duplicate questionnaire
1995/4	3%	4%
1996/1	3%	4%
1996/2	2%	4%
1996/3	2%	3%
1996/4	3%	4%
1997/1	5%	6%
1997/2	–	–
1997/3	–	–
1997/4	–	9%
1998/1	6%	7%

Figures 8 and 9 show further that the response in week 2 is important for the final response. The response is generally highest in week 2; it also varies widely in this week. The figures show that this variation depends on size class and response burden: a larger response burden or a larger company causes a lower response in week 2. Moreover, response in week 2 varies for the different economic activities. In general, the dependence of response in week 2 on business characteristics or response burden already shows the same features as the final response. The response per week varies relatively little between the groups after week 2. In conclusion we can say that the response in week 2 gives a good indication of the final response.

Figure 9
Effect of reminding on the response, SEE-3



8. The optimum reminder strategy

Saving on reminders is quite feasible for specific groups of companies and surveys.

- The group should contain a large number of businesses. This rules out the large businesses. Furthermore, survey takers want full response from large companies, because of their dominant influence on the estimates. Therefore, reminders can be saved for *small and medium sized businesses*.
- Response must be high enough without extra reminders, so the *response burden must be low*.
- Some economic groups respond very well. However, these groups are sent only relatively few paper questionnaires. There is *no advantage in grouping in economic activity*.

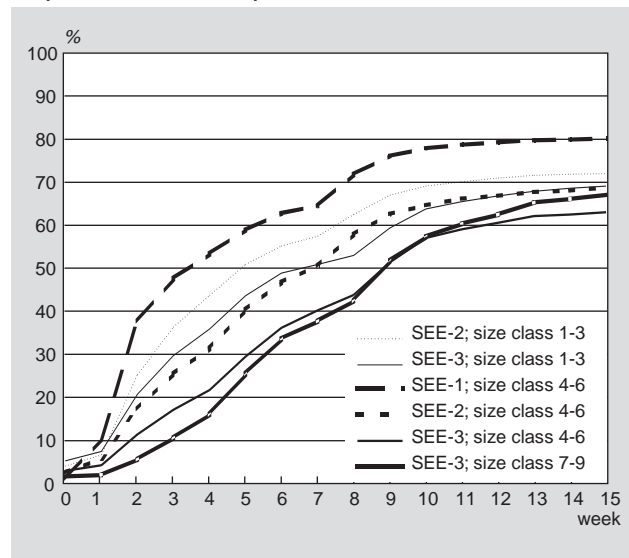
So in order to implement an *optimum reminder strategy*, first the companies need to be divided according to size and response burden. Subsequently the desired response in the deadline week must be set. Based on response of the groups in the past, we can now determine for which groups fewer reminders will suffice. If one reminder is omitted, the response declines by roughly 5%. If only one reminder is sent, it should take the form of a letter including a duplicate questionnaire. Lastly, the reminders should be as well timed as possible.

We shall work out an example here. We want to optimise the reminder strategy for the SEE in the fourth quarter. Figure 10 gives the response to the SEE in the fourth quarter of 1997.

In this quarter one reminder was sent in week 6. We set the desired response in week 10 at 75%. The figure shows that one group generates enough response in week 10 to need only one reminder: SEE-1, medium-sized companies. This matches the demands of low response burden and large group of businesses. Moreover, we checked that businesses in 'response-notorious' economic activities still give enough response if one reminder is omitted. The single reminder will be, as said, a letter with duplicate questionnaire. All other groups of companies need two reminders.

Furthermore, the right timing for the reminders is important. The additional response prompted by a reminder takes at most four weeks to arrive. The deadline of this survey is week 10. Therefore, the last reminder must be sent out in week 6 at the latest. If two reminders are sent, the first should be sent in week 4 at the latest. So for this survey, double reminders should be sent out in weeks 4 and 6; and it therefore seems rational to send the single reminder in

Figure 10
Response to the SEE, 4th quarter 1997



week 5. This has the additional advantage of spreading the process of sending the outgoing letters and processing the incoming response.

We should save about 11,500 reminders with this new strategy, compared with the standard strategy of sending two reminders to all non-respondents. We could save 12,500 reminders by reducing the double reminder to a single one for the group SEE-1, medium-sized businesses; however, we need 1,000 extra reminders for shifting the last reminder from week 7 to week 6.

9. Conclusions

This article shows that the response behaviour of companies depends on response burden, size class, economic activity and method of reminder. Based on this knowledge, we can design a cost-saving reminder strategy. For this purpose, we divide companies into groups according to size class and response burden, and remind only those groups whose response is too low. Such selective reminding can save costs considerably compared with integral reminder procedures.

The main features affecting companies' response behaviour are:

- **Response burden.** An increasing response burden slows the response and reduces the ultimate response. More surprisingly, the magnitude of this effect depends on size class of the company. This effect is stronger for medium-sized businesses than for small and large ones. Reminder strategies are based on response burden: companies that receive simple questionnaires need fewer reminders.
- **Size class.** Small businesses (1–9 employees) usually supply the fastest and highest response. Large companies (at least 100 employees) give the slowest and initially lowest response. However, this response continues to rise during the whole response period, when the response of small and medium-sized companies has already levelled off. Therefore, response rates of

large companies may well end up being higher than those of medium-sized ones. Reminder strategies are also based on size class.

- **Economic activity.** This has a distinct influence on response. Some sectors of industry show very low response rates, such as hotel and catering, employment agencies and cleaning services. Other sectors, such as government, health services and energy and water companies respond very well. We do not use economic activity as a basis for reminder strategies, as the groups that respond well are sent relatively few paper questionnaires.
- **Indication for final response.** Response received in the first two weeks after the questionnaires are sent out is a good indicator for the ultimate response. In the first two weeks, the sectors show a varied response behaviour, which conforms with the above-mentioned features. However, from week 3 onwards response per week is about the same for all groups of businesses.
- **Reminders.** The extra response generated by reminders is about the same for all sectors and hardly depends on size class, economic activity or response burden. A reminder that includes a duplicate questionnaire generates more response than a letter alone. Therefore, it is recommended that single reminders should consist of a letter including a duplicate questionnaire.
- **Timing.** The timing of reminders is important. As response to reminders comes in about two to four weeks of their being sent, they should not be sent too late. On the other hand, sending reminders early usually means sending more reminders.

Finally, it should be taken into account that this reminder strategy is based on response from previous years. Response from companies has shown a decline through the years and it is therefore recommended that this response should continue to be monitored in the future. This should preferably be done during the course of surveys among the separate groups, so that disappointing response rates can be spotted early on, facilitating the decision on which groups need reminders and which can do without.

Use of fiscal data for structural business statistics

Barteld Braaksma, John Schalen, Cees Steenlage and Sijbrand Veenstra

Abstract

Growing demands and diminishing resources, government policy directed at reducing the response burden, and a diminishing readiness on the part of enterprises to supply information have led Statistics Netherlands to look at other ways of getting the information it needs. Among other things the Bureau is making extensive use of fiscal data to compile structural business statistics on small companies in the wholesale trade sector.

This article discusses some relevant aspects of wholesale trade and some general problems with the use of fiscal data. It describes the use of data from VAT and corporate tax registrations, and how the results compare to those from other sources. The article concludes with a discussion of possible improvements and ideas for future developments.

Key words: fiscal data, business statistics, wholesale trade, corporate tax, VAT, tax data

1. Introduction

For the third year now, Statistics Netherlands is making extensive use of fiscal data to compile structural business statistics on small wholesale trade enterprises. For this population, the turnover total and the number of active enterprises are estimated from value added tax data, while the structure of their profit-and-loss accounts is determined from corporate tax data. Surprisingly, it appears that the results from fiscal data compare rather well to traditional sample survey results.

There are three main reasons why Statistics Netherlands uses external data sources instead of collecting its own data:

- We are faced with growing demands and diminishing resources. Some twenty years ago, Statistics Netherlands employed 3,500 people, at present there are 2,500 staff and a further reduction to 2,100 is planned in the next five years. In contrast with this decrease in capacity is the increase in demand for official statistics from both the national and the European governments.
- For a couple of years now, the policy of the Dutch government has been to help relieve the administrative burden for companies. Statistics Netherlands has to contribute its share to achieve these aims.

- The willingness on the part of enterprises to co-operate in the collection of data (even for surveys for which they are legally obliged to report) has decreased in recent years. Therefore Statistics Netherlands has increased its efforts to reach acceptable response rates.

NACE and SBI'93

The co-ordinated classification for economic activities in the European Union is *NACE Rev. 1*. Statistics Netherlands currently uses its own standard industrial classification (*Standaard Bedrijfsindeling 1993*, or SBI'93 for short) for its central business register (in Dutch: *Algemeen Bedrijfsregister*, abbreviated to ABR). This classification is based on the NACE classification, but with minor changes: compare the two additional classes in Table 1 below. Moreover, it includes one further level of classification, the 'sub-class' level, which is identified by five digits. This is the common base level for survey designs and also serves to create additional publication aggregates.

Size classes

For both stratification and publication purposes, enterprises are divided in ten size classes, according to the number of employees on the payroll. The classification ranges from size class 0 (no employees) to size class 9 (more than 500 employees). Enterprises in size classes 0 to 3 (fewer than 10 employees) are called 'small', those in size classes 4 to 6 (10 to 100 employees) 'medium-sized' and those in size classes 7 to 9 (100 and more employees) 'large'. We can now exactly define our target population, which consists of enterprises in NACE (or SBI'93) groups 51.2–51.7, in size classes 0 to 3¹⁾.

The present article discusses some relevant aspects of wholesale trade and some general problems with the use of fiscal data in Sections 2 and 3. In Sections 4, 5 and 6 we discuss the use of VAT data. First we discuss properties of the VAT source itself, then we describe our methods (and their results) for obtaining the number of active enterprises and the turnover total from VAT data. We also discuss the relation of these results to results from other sources. In Sections 7 and 8 we discuss the use of corporate tax data for obtaining the structure of the profit-and-loss account. Again, we first consider the source itself and then the methods and results. In Section 9 we describe the combination of results from both fiscal sources and finally, section 10 presents some concluding remarks,

Table 1
The six NACE groups in wholesale trade and their size

NACE	Wholesale of	Number of NACE (SBI'93) classes	Number of SBI'93 sub-classes	Number of registered enterprises (ABR 1996)	
				Size class 0–3	Size class 0–9
51.2	Agricultural raw materials and live animals	5	14	7,942	8,458
51.3	Food, beverages and tobacco	9	16	10,056	11,217
51.4	Household goods	7 (8)	35	26,541	28,207
51.5	Non-agricultural intermediate products, waste and scrap	7	25	11,445	12,982
51.6	Machinery, equipment and supplies	6	16	17,606	19,614
51.7	Other wholesale	1 (2)	7	9,931	10,251
	Total	37	113	83,521	90,729

including a discussion of possible improvements and ideas for future developments.

Although more recent results – for 1997 and 1998 – are also available, we focus on the statistical year 1996, mainly because the methods were originally developed for 1996, and most decisions are based on research regarding this year. In Section 10 we briefly discuss modifications and adaptations in later years.

2. Wholesale Trade

In order to judge the relative importance of wholesale trade, and in particular the importance of small enterprises in this sector, we present a number of characteristics. Table 1 shows that by far most wholesale trade enterprises registered in the ABR in 1996 belong to size classes 0–3. The enterprises are spread evenly over all six NACE groups. The NACE classification distinguishes 35 classes. On the level of classes and sub-classes the situation is less balanced: the largest class (NACE 51.65, wholesale trade of other machinery for use in industry, trade and navigation) contained about nine thousand enterprises in 1996, the smallest one (NACE 51.25, wholesale trade of unmanufactured tobacco) contained eighteen enterprises.

The annual survey of wholesale trade

The traditional annual survey of wholesale trade consists of a census of all enterprises in size classes 5–9 and a sample of enterprises in size classes 0–4. The samples are drawn at random, stratified by size class and SBI sub-class. Sampling fractions range from approximately one in two to one in thirty, depending on size class and SBI sub-class. For expansion purposes, post-stratification by legal form – incorporated or not – is applied. Survey questions cover aspects like employment, profit-and-loss account, and investments. Enterprises in size classes 4–9 receive a very detailed questionnaire, a six-page form including specific questions on their line of trade; enterprises in size classes 1–3 receive a less detailed questionnaire of four pages; and enterprises in size class 0 receive one page, with only seven questions.

The 1995 annual survey sample for our target population, size classes 0–3, consisted of 7,664 enterprises, approximately 10% of the population. From this sample, one in six enterprises did not respond at all, one in seven was a 'frame error', i.e. wrong economic activity or wrong size class, and one in three was not (yet) active. Hence, only one third of the survey, 3% of the population, yielded directly applicable data.

The results of the annual survey of wholesale trade are used for a number of different purposes. For instance, they serve as a major

source for compiling national accounts; they are used by the statistical office of the European Union, Eurostat; and they are also published in their own right.

Table 2 shows some key results from the 1995 annual survey. It shows that the six NACE groups are roughly comparable in size in terms of the number of active enterprises, total turnover or total number of employees. Note that 90% of all active enterprises are 'small'. These small enterprises account for one quarter of the turnover total, and for one third of the total number of employees.

Determining the active enterprises

There is a noticeable difference between the number of active enterprises in Table 2 and the number of registered enterprises in Table 1. Only a small percentage of this large gap can be attributed to the fact that figures relate to different years. The main reasons for the discrepancy gap are:

- The ABR is based on registration with the Chambers of Commerce. Some people register with the Chambers of Commerce for improper purposes – for example, to acquire access to suppliers not open to the general public. Dutch legislation makes it relatively easy to register as a wholesale trade enterprise;
- The so-called 'birth' and 'death' rates for wholesale trade enterprises are rather high, particularly for the population of privately owned enterprises without employees on the payroll. Many of these enterprises remain on the registers of the Chambers of Commerce when they are no longer economically active.

It is difficult to track these improper enterprises down, and eliminate them from the ABR.

3. The use of fiscal data

There are a number of difficulties involved in using fiscal data for statistical purposes. Below we describe some general problems, which indeed not only apply to fiscal data, but to all data obtained from external sources.

Matching

Enterprises known to the tax registration have to be matched accurately to the enterprises in our statistical register, the ABR. As these registrations differ, this is no trivial activity. Moreover, because each tax system has its own rules and regulations concerning, for example, the formation of fiscal enterprises, a matching procedure has to be carried out for each sub-system separately.

Table 2
Key results from the 1995 Annual survey of wholesale trade

NACE	Active enterprises (average for 1995; x 1,000)		Turnover (x million NLG)		Number of employees (x 1,000)	
	Size class		Size class		Size class	
	0–3	0–9	0–3	0–9	0–3	0–9
51.2	4.9	5.4	15.8	44.2	13.8	33.9
51.3	4.9	5.9	15.2	75.5	16.8	66.4
51.4	13.7	15.1	16.3	58.8	37.5	92.8
51.5	7.1	8.5	19.0	75.3	23.8	76.8
51.6	10.3	12.1	12.0	74.8	31.9	112.4
51.7	4.9	5.2	7.2	15.2	11.4	22.7
Total	45.8	52.2	85.5	343.9	135.2	404.9

Timeliness

The tax department always allows enterprises a period of time to submit their declarations. Statistics Netherlands aims at publishing figures on a certain time period at most one period later (for instance, monthly figures within a month, annual figures within twelve months after the year concerned has ended, etc.). Hence, taking into account processing time, data may simply be available too late to be used for statistical purposes.

Information content

Obviously, the aim – tax levying – of data collected by the tax department is very different from our statistical aims. Therefore, we have to ascertain which fiscal variables can, and should, be used. Even when the names of fiscal and statistical variables are identical, this does not mean that they refer to the same definition. Some statistically relevant variables are identical to fiscal variables, some have to be computed from a number of fiscal variables, and others cannot be derived from fiscal variables at all.

Correctness

Like all kinds of data, fiscal data may – and do – contain errors. Hence, the correctness of fiscal data should be established. When data are collected directly from an enterprise, we can contact this enterprise for questions concerning the correctness of the data. When information is obtained indirectly via the tax department, however, we are not permitted to contact the original source, and moreover we have agreed not to approach the tax department with questions concerning individual enterprises.

4. The VAT registration

The first of our two sources of fiscal data is *value added tax (VAT)*. We use this source for the estimation of both the number of active enterprises and their turnover.

The government levies VAT by on the one hand charging enterprises a percentage of their sales – 17.5% on luxury goods and 6% on food and other 'essentials' – and on the other hand refunding a percentage of its purchases. Thus we obtain turnover figures for enterprises.

Matching

All active enterprises, with and without corporate capacity, are subject to VAT regulations. The former group consists mainly of limited liability companies, the latter of privately owned companies and unlimited partnerships. In theory, our entire population should be covered by the VAT source, and thus in theory we should have complete turnover information at our disposal. Unfortunately, in practice the situation is less ideal. From our ABR population of 83,521 enterprises in 1996:

1. 2% (1,362 enterprises) cannot be matched to the tax register because the structure of the enterprise is too complicated to fit the matching algorithm;
2. 21% (17,392 enterprises) cannot be matched to the tax register because no corresponding fiscal unit can be found. The larger part of this group consists of enterprises that are probably not active and have therefore been eliminated from the tax register;
3. 2% (1,870 enterprises) cannot be matched due to an omission in the matching algorithm, which 'overlooks' these enterprises;
4. 14% (11,921 enterprises) can be matched to the tax register, but for one reason or another do not yield declarations. This happens for example when the tax liability is shared with, or transferred to, another enterprise in an enterprise group, and also when the enterprise is exempt from VAT. There are a

number of regulations for exemption for specific situations, for example for agricultural enterprises, very small enterprises, and foreign enterprises.

5. 9% (7,763 enterprises) can be matched to the tax register, but do not declare a positive turnover. We have reason to believe that for some of these enterprises the turnover is not really zero.

Note that categories 1 and 3 relate to problems on 'our' side of the matching, category 2 relates to the matching itself and categories 4 and 5 concern complications in the VAT source. All in all, for just over half of the enterprises (52%, 43,303 enterprises) we obtain quantitative turnover information. We will refer to this part of our target population as the *VAT declaration enterprises*. For the remainder of the population we have, however, qualitative information: a coding system with 14 different codes yields information on the reason why quantitative information is lacking. We will refer this part of our target population as the *VAT code enterprises*. Combination of both the quantitative and qualitative information yields complete coverage of the population.

The number of VAT declaration enterprises still compares favourably with the number of enterprises in the sample for the traditional annual survey of wholesale trade. As mentioned above, the 1995 annual survey sample of 7,664 enterprises in size classes 0–3 yielded directly applicable data for only 3% of the population, some 2,500 enterprises.

Timeliness

Timeliness does not constitute a real problem for VAT. The tax authorities require declarations on a monthly, quarterly or yearly basis, depending on the expected amount of VAT to be paid and the reliability of an enterprise or its line of establishment. The VAT form must be submitted within one month of the declaration period. This rule is maintained strictly and fines are high. So, including processing time at both the tax department and Statistics Netherlands, it takes three months at the most before data are available. This is well within the twelve months allowed for compiling annual statistics.

The definition of turnover

The VAT form contains eleven different turnover categories, relating to high, low and special tax rates, imports and exports and private use of goods. It turns out that the sum of eight of these categories agree with our statistical definition of turnover in wholesale trade. Of course, since we are interested in annual turnover figures, we have to add up declarations to a full year.

In order to determine the fit between the statistical and fiscal concepts of turnover, we compared the values of 1995 VAT turnover and with those from the 1995 annual survey. The comparison was carried out for the 1,714 responding enterprises in the survey sample for which VAT declarations were available. We found an excellent agreement between both values, as measured by correlation and regression coefficients and visualised by scatter plots²⁾.

5. Estimation of the number of active enterprises from VAT data

As a large number of enterprises in the ABR are not active, it is important to have a good estimate of the number of active enterprises in our population. Although this number is of interest in itself – it is often published alongside turnover figures – it also plays an important part in estimating the turnover total.

Activity probabilities for VAT code enterprises

We have quantitative VAT information on only half of our population. For enterprises in this half, it is safe to assume that they were active in 1996. What remains to be estimated is the number of active

enterprises in the other half of the population, the VAT code enterprises. This estimate is one of the cornerstones of our VAT method. In order to carry out the estimate, we make extensive use of information from the coding system.

We construct four sub-populations of VAT code enterprises, based on the size class (0 or 1–3, respectively) and legal form (incorporated or not); note that we do not distinguish between different NACE groups. For each sub-population, we estimate the probability that a VAT code enterprise, given its code, is active. Thus, for each of the 14 different codes we obtain four activity probabilities, one for each sub-population. The values of these probabilities are 'expert guesses', based on the meaning of the codes and a comparison with results from the 1995 annual survey. For all VAT code enterprises that were part of the 1995 annual survey, we determined whether or not they were active in 1995. In Table 3 we summarise some results from this sample. For example, most VAT code enterprises in size class 0 for which no match could be found in the tax register, were not active according to the 1995 annual survey – in particular when restricting to enterprises without corporate capacity. On the other hand, most of the corporations in size classes 1–3 were active.

These differences are reflected in the activity probabilities. For example, we attribute an activity probability of:

- 20% (size class 0, no corporate capacity) to 60% (size class 1–3, with corporate capacity) to enterprises for which no match could be found in the tax register;
- 100%, regardless of size class and legal form, to enterprises that cannot be matched because the enterprise structure is too complicated. The rationale behind this choice is simple: it does not seem to make sense to set up a complicated structure without using it.

Now for a given stratum, determined by SBI sub-class (5th digit), size class, and legal form, the estimator for the number of active enterprises is given by:

$$N_{active} = N_{decl} + \sum_{k=1}^K p_{code_k} N_{code_k}$$

In this formula, N_{active} and N_{decl} represent the number of all active enterprises and all enterprises for which we actually have declarations respectively; N_{code_k} is the number of enterprises with code number k and p_{code_k} is the activity probability attributed to these enterprises; and K is the number of different codes.

Results

Table 4 presents results for the number of active enterprises, computed from 1996 VAT data using the above method. Note that the total number of active enterprises equals approximately 48 thousand, while the number of VAT declaration enterprises – all of which we assumed to be active – equals 43 thousand. This implies that only 5 thousand of the 40 thousand VAT code enterprises are active.

We compare the results with two independent sources. First, with the 1995 annual survey results: generally the agreement is very good; on average we find a moderate increase, but this increase corresponds with the growth of the economy as a whole.

Second, we compare the figures with the 1996 statistics on the demography of enterprises (SDE). Here we find a systematic difference of some 20%. This can be explained by two different

Table 3
Summary of results for VAT code enterprises in the 1995 Annual Survey

Size class	Incorporated	Number of enterprises		State in 1995 annual survey			
		ABR	Sample	Active	Not (yet) active	Frame error	Non-response
		<i>x 1,000</i>	<i>x 1</i>	%			
0	No	16.2	793	8%	75%	7%	10%
0	Yes	5.0	248	18%	52%	17%	13%
1–3	No	4.1	295	20%	53%	8%	19%
1–3	Yes	5.4	721	56%	19%	6%	20%

Table 4
Number of active enterprises according to 1995 annual survey (average for the year), 1996 VAT (average for the year), and 1996 Statistics on the demography of enterprises (January 1st, 1996)

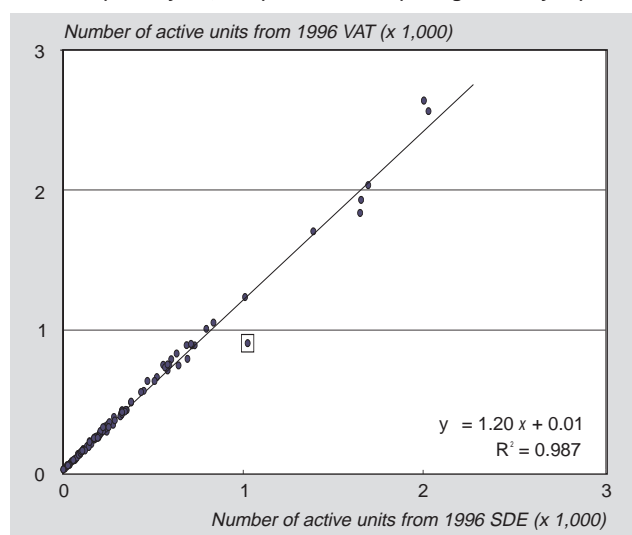
NACE	1995 Annual Survey			1996 VAT			1996 Statistics on the demography of enterprises		
	Size class			Size class			Size class		
	0	1–3	0–3	0	1–3	0–3	0	1–3	0–3
	<i>x 1,000</i>								
51.2	2.5	2.4	4.9	2.2	2.3	4.5	1.7	2.3	4.0
51.3	2.6	2.4	5.0	3.0	2.8	5.8	2.1	2.6	4.6
51.4	7.7	6.0	13.7	8.4	6.5	15.0	5.8	6.0	11.8
51.5	3.4	3.8	7.2	3.2	4.0	7.2	2.1	3.6	5.7
51.6	5.4	5.0	10.4	5.0	5.7	10.7	3.3	5.2	8.5
51.7	3.0	1.9	4.9	2.9	2.0	4.9	2.2	1.9	4.1
Total	24.6	21.5	46.1	24.9	23.3	48.1	17.2	21.5	38.7

causes: the SDE estimates the number of active enterprises on a given date (January 1st) instead of the average number of active enterprises during the calendar year. Moreover, the SDE applies a much stricter definition of the concept of 'marginal activity'.

For NACE group 51.2 the agreement is less than good. On closer inspection, the difference can be attributed to SBI sub-class 51.231, wholesale of live cattle. This is probably due to an imperfection in the tax department's registration concerning the agricultural exemption regulation. Preliminary calculations have shown that an ad hoc adaptation would yield an extra 400 active enterprises, which is more in line with the 1995 annual survey results. However, we chose not to apply this ad hoc method, both because we are not certain about our explanation of the difference and also in order to keep the method generic.

In Figure 1 below we present a scatter plot with more detailed results. Here we compare, on the level of SBI sub-classes, our 1996 VAT results with the 1996 SDE. The fit is excellent. The correlation between both sources is high ($R^2 = 0.987$), and the above-mentioned systematic difference accounts for the slope. One dot, the boxed one, clearly deviates from the regression line. This is the dot representing SBI 51.231, wholesale of live cattle, discussed above.

Figure 1
Number of active enterprises (in size classes 03) according to 1996 SDE (January 1st, 1996) and 1996 VAT (average for the year)



6. Estimating turnover from VAT data

Imputation of missing periods

For just over half of the VAT declaration enterprises (22,517 of 43,303, 52%), the information covers a complete year. The rest of the VAT declaration enterprises suffer from missing periods. For one fifth of the enterprises this is because of the birth or death of the enterprise; in these cases a consecutive number of periods at the beginning or end of the year are missing. In other cases, one or more periods are missing at random. With respect to whether these missing periods should be imputed, we decided to impute only those enterprises for which either only one month is missing, or the month of January 1996 and one additional month. The month of January 1996 is relatively often missing, because of start-up problems with the processing of VAT data. In these cases, missing months are imputed with the mean of the other months.

Outliers

The average turnover of active enterprises in our population is about 2 million guilders. For a small number of enterprises, however, the turnover is much larger. We consider these enterprises to be unique, and therefore we want to exclude them from the expansion procedure. Although there is certainly a relationship between average turnover and, for example, the line of trade and the size of an enterprise, we decided to apply a rather rough method to detect outliers. All enterprises with turnover above 25 million guilders are marked as outliers and excluded from the expansion procedure. This yields 340 enterprises to be marked as outliers, with total turnover of approximately 30,000 million guilders, about one third (!) of the turnover total.

Typing errors

To detect typing errors it is useful to single out enterprises with a high turnover. We inspected all 340 outliers individually in order to decide whether they contained obvious errors. For example, data entry typists may accidentally omit a separator between consecutive fields in a record. Then, two moderate-sized figures, say two six-digit numbers, may be recorded as a single large, twelve-digit, number. This kind of error, and some others, can easily be detected and corrected by comparing other declarations for the same enterprise. All in all, thirteen obvious errors were detected (and corrected), amounting to 3% (!) of the turnover total.

Expansion of turnover

For 43,303 enterprises we know – after imputation for missing periods, see above – their turnover. Above we have shown that, additionally, approximately 5,000 of the VAT code enterprises are also active. In order to estimate the turnover of this group we chose a straightforward approach. Each of the VAT code enterprises is attributed the average stratum turnover, multiplied by its activity probability. This coarse approach is certainly not correct. For example, turnover of active VAT code enterprises with a complex structure is generally above average, while turnover of active VAT code enterprises for which no corresponding enterprise can be found in the tax register is generally below average. For our purposes, however, the approach is sufficient.

For a given stratum, determined by SBI sub-class, size class, and legal form, the estimator for the turnover total is now:

$$Y = Y_{decl} + \bar{Y}_{normal} \times \sum_{k=1}^K p_{code_k} N_{code_k}$$

where

$$\bar{Y}_{normal} = (Y_{decl} - Y_{outliers}) / (N_{decl} - N_{outliers})$$

In these formulas, Y , Y_{decl} and $Y_{outliers}$ represent the turnover total of, respectively, the whole stratum, the sub-population with declarations, and the sub-population consisting of outliers; N_{decl} and $N_{outliers}$ represent the corresponding numbers of enterprises with declarations and the number of outliers, respectively; \bar{Y}_{normal} represents the average turnover of normal, non-outlier, enterprises with declarations; and N_{code_k} , p_{code_k} and K have the same meaning as above in the formula for the number of active enterprises.

Results

In Table 5 we present, on the level of NACE groups, results for the turnover estimates. Note that 80% of the turnover total follows directly from VAT declarations. This is in sharp contrast to estimates from a traditional annual survey sample, where typically only 5–10%

follows from direct observation and the remainder is imputed and expanded.

When comparing the 1996 VAT results with 1995 annual survey results, it appears that in general the agreement is less than the agreement for the number of active enterprises. On closer inspection, the main differences can be attributed to a few different SBI sub-classes. Below we discuss the two most important differences:

- SBI 51.231, wholesale of live cattle. According to the 1995 annual survey the turnover in this sub-class was 5,300 million guilders, while according to the 1996 VAT figures the turnover was 2,900 million guilders. In the tax register seems to explain part of the gap. A rough estimate yields 1,500 million guilders extra turnover, when we try to correct for this imperfection. On the annual survey side, it may be possible that respondents have mistakenly included subsidies in their turnover in the survey questionnaire; subsidies are very important across agriculture. Nevertheless, we think that the 1995 annual survey figure is closer to the truth.

- SBI 51.641, wholesale of computers and computer peripherals. According to the 1995 annual survey the turnover in this sub-class was 1,300 million guilders, according to 1996 VAT figures, the turnover was 9,500 million guilders. In the annual survey, the response of the 1995 sample for this sub-class was rather 'unlucky': a comparatively low response rate and relatively small responding units. Because of capacity problems this was not noticed, as its effect on the total of the sub-class, that is, including the larger enterprises, is much less apparent. On the VAT side, this sub-class contains a rather large number of outliers. In order to find out if the turnover declared for VAT was real, we decided to send a questionnaire to the ten largest enterprises in this sub-class, posing as a regular survey. All but one of the returned forms clearly indicated that the VAT turnover was real. The one exception concerned a typing error, which has of course been corrected in our figures. The 1996 VAT figure is probably closer to the truth.

One reason for the large number of outliers in SBI 51.641 is the phenomenon of 'distribution centres'. This is also an important factor in some other SBI sub-classes. Some manufacturers distribute all their products with a destination within Europe through an enterprise in the Netherlands, usually close to Amsterdam airport or Rotterdam seaport. Distribution centres are not trade enterprises in the strict sense, as they usually have little or no influence on where to buy goods, and sometimes not even on where to sell them. This is apparent from the fact that their level of turnover is generally rather high in view of their number of employees, while their gross profit, as a percentage of turnover, is rather low. An additional problem with distribution centres is that they are rather volatile: if tax regulations in another country are more favourable, they simply move to that country. This volatility poses a continuity problem for statistics.

Figure 2
Turnover from the 1995 AS and 1996 VAT. Each dot represents one of the 37 SBI'93 classes, size classes 0-3

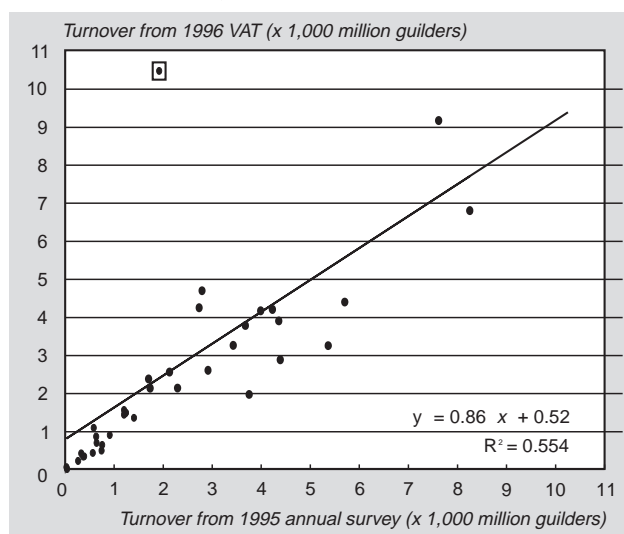


Figure 2 gives more detailed results in the form of a scatter plot. Here we compare, on the level of SBI classes (4th digit), our 1996 VAT results with the 1995 annual survey results.

The fit is less good than in the case of active enterprises ($R^2=0.554$). This is partly because figures for two different years are represented, but the main reason for the differences is the fact that it is more difficult to estimate turnover than the number of active enterprises. One dot (the boxed one) most clearly deviates from the regression line. This dot represents SBI 51.64 (wholesale of office machinery and equipment – including computers). When this single dot is removed, the squared correlation coefficient increases to $R^2=0.848$.

Quality

It is difficult to establish the quality of the above results rigorously. Sources of uncertainty are for example the exact content of VAT turnover, the effect of typing errors in the data, the imputation of missing periods, selectivity of enterprises for which we have declarations and the treatment of outliers. All of these sources, however, appear in one way or another in a traditional survey as well. It is an illusion to believe that all of these possible sources of bias and errors can be eliminated completely in either case.

Table 5
1996 VAT turnover results

NACE group	Size class	Number of enterprises		Turnover			
		in ABR	VAT declaration enterprises	direct from declaration	after imputation	after expansion	1995 Annual Survey
		x 1,000		x 1,000 million guilders			
51.2	0-3	7.8	4.0	9.7	10.0	11.9	15.8
51.3	0-3	9.9	5.0	12.2	12.6	15.4	15.2
51.4	0-3	26.0	13.6	13.3	13.8	17.5	16.3
51.5	0-3	11.2	6.4	15.8	16.3	19.4	19.0
51.6	0-3	17.3	9.8	19.2	19.7	23.0	12.0
51.7	0-3	9.6	4.4	3.9	4.0	5.2	7.2
51.2-7	0-3	81.7	43.3	74.3	76.5	92.5	85.5
51.2-7	0	50.9	23.5	12.9	13.2	15.6	14.7
51.2-7	1-3	30.9	19.8	61.4	63.3	76.9	70.8

The main source of uncertainty is the estimation of activity probabilities for VAT code enterprises. The 'expert guesses' for these probabilities necessarily involve some arbitrariness. Hence, it is important to assess the effect of choices made. In order to evaluate the effect of different choices, we considered the effect of changing all activity probabilities by a fixed percentage. For example, a change by 10%, yielded a change in turnover of 2,800 million guilders, while even a change by 30% yielded a change of only 7,500 million guilders – both to be compared with the total amounting to 92,500 million guilders. Since it is not to be expected that all probabilities are either too high or too low by such percentages, the margins are quite acceptable. The large number of enterprises for which we actually have data, as compared with the small traditional sample, clearly compensates for the fact that the data are not a random sample.

7. The corporate tax registration

The second of our two sources of fiscal data is the corporate tax registration. We use this source for the estimation of the structure of profit-and-loss accounts. Contrary to VAT, which concerns all enterprises, corporate tax only concerns enterprises with corporate capacity (mainly limited liability companies); other enterprises are liable to income tax. Unfortunately, for the time being no sufficient income tax information is available to Statistics Netherlands. This means that we have to consider to what extent corporate tax information may be applied to make estimates for the whole population, including enterprises without corporate capacity.

Matching

The matching procedure for corporate-tax-based data is more complicated than the VAT matching procedure. The rules for combining corporate tax declarations are much less restrictive than those for VAT declarations. For many enterprises it is advantageous to combine their declarations. Hence, more effort is put into trying to match enterprises with more complicated structures as well.

Timeliness

Timeliness constitutes a real problem for corporate tax. In order to distribute the workload of both tax inspectors and company accountants more evenly, agreements are made concerning the date of submission of forms. These agreements imply that forms are received at a more or less steady rate during two years after the tax year concerned. Table 6 gives an impression of the distribution in time of corporate tax declarations to be received. The missing 18% of declarations will not be received for administrative reasons, for example because an enterprise is exempt. This procedure means that given processing time, over half of the tax declarations will not be received in time to be used for statistics to be published within one year of the tax year.

Table 6
Distribution in time of corporate tax declarations for financial year 1995

Received by	October 1st, 1996	30%
	January 1st, 1997	51%
	April 1st, 1997	75%
	July 1st, 1997	80%
Not yet received by	July 1st, 1997	2%
Total to be received		82%

Information content

The corporate tax form contains more than 200 questions to determine the taxable result. These questions cover both the

balance sheet³⁾ and the profit-and-loss account. Not all questions are relevant for our purposes. Nevertheless, it is possible to extract a compact profit-and-loss account, which closely resembles the traditional annual survey questionnaire. In some cases, variables are identical, for example, turnover and labour costs; in other cases, variables have to be computed. For example, gross profit itself is not asked on the corporate tax form, but can be computed as turnover minus purchase value of turnover.

In order to determine the fit between fiscal variables and statistical variables, we compared these variables for a sample of 759 enterprises. Although we found some differences, these were not so severe that they limited the usability of corporate tax data. Moreover, since the annual survey system does not keep records of changes in the editing process, differences may be attributable to annual survey edits, and not real differences at all.

Purchase value zero

One particular problem deserves a special mention here. Inspection of corporate tax revealed that the 'purchase value of turnover' was surprisingly often zero, in approximately 20% of cases. This is of course rather peculiar for trade enterprises. Our first assumption, that this was based on frame errors, enterprises with a different activity, could not be kept up. When we compared 1995 annual survey turnover values with those from the 1995 corporate tax figures, it appeared that in almost all cases turnover and purchases had tacitly been balanced, contrary to the official tax regulation. Because it took some time before the origin of this 'purchase value zero'-phenomenon was resolved, we had to omit the corresponding enterprises from further applications.

8. Application of corporate tax data

Enterprises with and without corporate capacity

In order to investigate the relative importance of, and difference between, enterprises with and without corporate capacity, we analysed results from the 1995 annual survey. Table 7 shows that only 40% of active enterprises are incorporated. Nevertheless, the contribution of enterprises with corporate capacity to turnover is almost 75%. The average turnover for enterprises with corporate capacity is twice the average turnover for enterprises without corporate capacity in the same size class (!). The reason for this discrepancy is that enterprises that perform well are likely to be incorporated, because of tax advantages: corporate tax is only 36% of the taxable result, while the highest rate for income tax is 60%. In particular, larger enterprises are likely to be incorporated: in size class 3, 90% of active enterprises are incorporated, and in size classes 4–9 the number of enterprises without corporate capacity is negligible.

Table 7
Number of active enterprises and turnover; enterprises with and without corporate capacity (source: 1995 annual survey)

Size class	Number of active enterprises		Turnover			
			Corporate capacity?		Total	
	Yes	No	Yes	No		
	<i>x 1,000</i>		<i>x 1,000 million guilders</i>			
0	5.5	18.9	24.4	6.5	8.2	14.7
1–3	13.3	8.1	21.4	56.9	13.9	70.8
0–3	18.8	27.0	45.8	63.4	22.1	85.5

Apart from the difference in the level of average turnover between enterprises with and without corporate capacity, the underlying relative structure is more or less the same. For example, according to the 1995 annual survey gross profit was 18.6% of turnover for corporations, and 21.5% for enterprises without corporate capacity. There is, however, one notable exception. The owner of an enterprise with corporate capacity is formally employed by the enterprise, and so is paid a salary by the enterprise. On the other hand, the owner of an enterprise without corporate capacity does not receive a salary, but lives on the operating result of the enterprise. Hence, the operating result for corporations is lower than that for enterprises without corporate capacity, and vice versa for labour costs. Both the fact that the contribution of the incorporated enterprises is so large and the fact that structures are comparable between enterprises with and without corporate capacity, make it feasible to estimate the structure for our whole target population on the basis of corporations only. Of course, the structural difference in labour costs and operating result between enterprises with and without corporate capacity should be taken into account.

Useable corporate tax enterprises

Above we showed that quantitative VAT data are available for slightly over half our target population. The situation is worse for corporate tax data: useful data are available for only 4,038 enterprises (5% of our entire target population, and 12% of corporations). These enterprises are distributed evenly over our target population. Apart from the obvious fact that we may only expect to have corporate tax data on corporations which make up only 40% of our target population, the reasons for the relatively low coverage are:

- the algorithm for matching enterprises to fiscal units is successful for only half of all corporations;
- the timeliness of corporate tax declarations, see Table 6 above, implies that only half of all declarations from matched enterprises were available when we needed them;
- the 'purchase value zero' problem caused us to eliminate 20% of available declarations;
- various other problems (e.g. declarations with turnover zero, financial year of declaration different from calendar year) caused us to eliminate another 20%;
- for the computation of a weight factor, see below, we restricted our procedure to enterprises for which 1995 corporate tax data were also available. This caused us to eliminate another 25%.

All of these causes are independent, so that we finally have useable corporate data for only 40% x 50% x 50% x 80% x 80% x 75% = 5% of our target population. Because of the way in which we use these data, however, this relatively small percentage is not an insurmountable obstruction.

An important question is whether or not the available data are selective. From our investigations regarding this question we found

no indications of selectivity. For the time being we assume therefore that the 'useable corporate tax enterprises' are representative for the whole sub-population of corporations.

Estimating the structure of costs and revenues for corporations

For estimates based on VAT we were not restricted by the amount of data in our choice of stratification. With corporate tax the situation is different: because of the smaller number of enterprises, we have to be more careful with stratification in order to prevent too large a number of empty or marginally covered strata. We decided on a stratification by SBI sub-class and size class group (0 and 1-3, respectively). We chose to collapse size classes rather than SBI sub-classes for homogeneity reasons: enterprises with the same 5-digit SBI classification and different size class are more likely to resemble each other than enterprises with different SBI and the same size class. With this stratification, there are still some empty strata, but they are all very small.

The estimation procedure is essentially a ratio estimator. For each stratum, we compute for each profit-and-loss account variable the Y (weighted) ratio $R_{Y, stratum}$ to turnover:

$$R_{Y, stratum} = \frac{\sum_{i=1}^n W_i \times Y_{i,1996}}{\sum_{i=1}^n W_i \times X_{i,1996}}$$

where n is the number of enterprises with useable CT data, $X_{i,1996}$ represents the value of CT turnover for enterprise i in 1996, $Y_{i,1996}$ represents the value of one of the other variables for enterprise i in 1996 and W_i is a weight factor for enterprise i , given by

$$W_i = \frac{2}{X_{i,1996} / X_{i,1995} + X_{i,1995} / X_{i,1996}}$$

The reason for introducing this weight factor is simply that the time between availability of corporate tax data and the deadline for publication was too short to enable a detailed investigation of plausibility of records. The weight factor serves as a 'quick and dirty' way to diminish the influence of enterprises with large differences between turnover in the two years.

Results

Table 8 presents 1996 corporate tax results for gross profit as a percentage of turnover, on the level of NACE groups. It also gives corresponding estimates for standard errors and bias⁴⁾, both computed from standard formulas for ratio estimators. The values for both standard errors and bias are acceptably small. As is usually

Table 8
Gross profit (in % of turnover) per NACE group for corporations in wholesale trade, size class 0-3, according to 1995 annual survey (AS) and 1996 corporate tax (CT). Estimates of standard error and bias relate to 1996 CT results

NACE	Gross profit		Standard error of 1996 CT		Bias of 1996 CT	
	1996 CT	1995 AS	Absolute	Relative	Absolute	Relative
51.2	9.8%	12.4%	2.0%	20.2%	0.4%	3.9%
51.3	11.4%	10.6%	0.8%	7.4%	0.0%	0.4%
51.4	24.1%	25.5%	1.0%	4.3%	0.1%	0.4%
51.5	14.0%	16.7%	1.3%	9.0%	0.1%	1.0%
51.6	27.1%	29.0%	1.0%	3.8%	0.0%	0.1%
51.7	21.8%	17.8%	1.6%	7.5%	0.1%	0.6%
51.2-7	17.5%	18.6%	0.5%	3.0%	0.1%	0.4%

the case for ratio estimators, the bias is negligible in comparison with the standard error. The large values in NACE group 51.2 are due to an outlier in SBI 51.211, which has an exceptionally high turnover and an extremely low gross profit.

As it is known that the financial structure for a line of establishment does not change much from year to year, it makes sense to compare structures for consecutive years. When comparing our 1996 corporate tax figures with the 1995 annual survey figures, it appears that the differences are of the same order as the absolute standard errors. In four of the groups the 1995 annual survey profit is the higher of the two, in the other two groups the situation is reversed. This indicates that there is no systematic difference between the two sources. Furthermore, the 1995 corporate tax results differ only very little from those for 1996.

In Table 9 we present results for the standard profit-and-loss account for our target population as a whole. Again, differences are of the same order of magnitude as the standard errors. Where differences are larger, an explanation can be given:

- The difference in 'other revenues' is largely attributable to an outlier – and frame error – in SBI 51.721: wholesale trade with a general assortment of consumer goods, a diffuse rest group. When this single outlier is omitted, the 1995 annual survey entry for 'other revenues' decreases to 0.7%.
- The difference in 'labour costs' is caused by the treatment of size class 0 in the 1995 annual survey: recall that the questionnaire for size class 0 was very limited, and did not include questions on the cost structure.

In Table 9 the most important entries in the standard profit-and-loss account are put in bold. Absolute standard errors are expressed in % of turnover, relative standard errors give the ratio between the absolute error and the corresponding entry

9. Combining VAT and corporate tax results

Obtaining stratum level estimates

In order to obtain estimates for the level of profit-and-loss account variables per stratum, we multiply the corresponding ratio, as computed from the corporate tax figures, with the turnover level, as computed from VAT:

where $Y_{stratum}$ represents the stratum level for variable Y , $X_{VAT, stratum}$ represents the stratum level for turnover as computed from VAT, and $R_{Y, stratum}$ is the ratio computed above from CT data.

Adapting the structure of costs and revenues for enterprises without corporate capacity

Having obtained stratum levels for corporations, we want to adapt these results in such a way that they may serve as a reasonable estimate for enterprises without corporate capacity. As discussed above, the only adaptation carried out is a transfer of a part of the labour costs, representing the salary of the owner, to the operating result. This transfer is carried out as follows. For enterprises without corporate capacity in size class 0 we simply transfer all labour costs to the operating result, since a size class 0 enterprise has, by definition, no workers on the payroll. For enterprises without corporate capacity in size classes 1–3 we transfer only the 'salary of the owner' to the operating result. This salary is derived from 1995 AS results.

$$Y_{stratum} = R_{Y, stratum} \times X_{VAT, stratum}$$

Results

Once levels have been computed for all individual strata, we can compute aggregate structures. In Figures 3 and 4 we compare aggregate structures of the destination of total revenues. We compare structures according to the 1995 annual survey with those according to 1996 VAT/corporate tax figures. Both left-hand circles represent expenditures for our entire target population. The agreement is clearly less than perfect. This may partly be caused by imperfections in the correction of corporate tax data for enterprises without corporate capacity. The main reason, however, is the fact that the annual survey structure for size class 0 is incorrect. For example, the operating result for size class 0 enterprises amounts to 70% of the total revenues, according to the 1995 annual survey, and this is obviously questionable. Hence, for a fair comparison we have to exclude both enterprises in size class 0 and enterprises without corporate capacity. Indeed, the agreement between both right-hand circles, representing corporations in size classes 1–3, is excellent: without a magnifying glass it is hard to find differences.

In Figures 3 and 4 the parts indicate (clockwise, starting from the top): labour costs; depreciation; transport, housing, maintenance, sales, and 'not elsewhere stated' costs; and operating result. The larger circle on the left represents the structure for all enterprises in size classes 0–3, the smaller circle on the right represents the structure for corporations in size classes 1–3 only.

Table 9
Results (in % of turnover) for entries in the standard profit-and-loss account. Corporations in wholesale trade, size class 0–3

	1996 CT result (in % of turnover)	Standard error		1995 AS result (in % of turnover)
		Absolute	Relative	
Purchase value of turnover	82.5%	0.5%	0.6%	81.4%
Gross profit	17.5%	0.5%	3.0%	18.6%
Other revenues	0.4%	0.0%	10.3%	1.1%
Total revenues	17.9%	0.5%	3.0%	19.7%
Labour costs	7.2%	0.2%	3.3%	6.4%
Depreciation	1.1%	0.1%	4.7%	1.0%
Transport costs	1.0%	0.1%	7.0%	1.0%
Housing costs	0.9%	0.0%	4.6%	1.0%
Maintenance costs	0.1%	0.0%	13.8%	0.2%
Sales costs	1.7%	0.1%	5.5%	2.2%
Costs not elsewhere stated	2.8%	0.1%	3.7%	3.0%
Total other operating costs	6.5%	0.2%	3.6%	7.4%
Total operating expenses	14.8%	0.5%	3.3%	14.8%
Operating result	3.1%	0.1%	4.4%	4.9%

Figure 3
Destination of total revenues for small wholesale trade enterprises, according to the 1995 annual survey

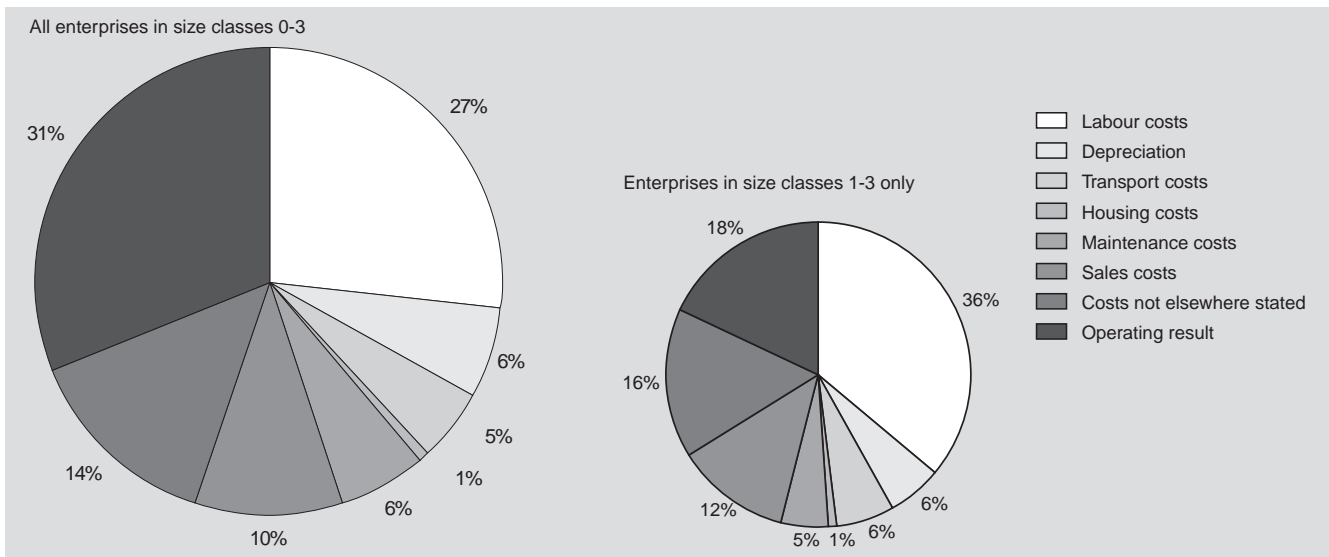
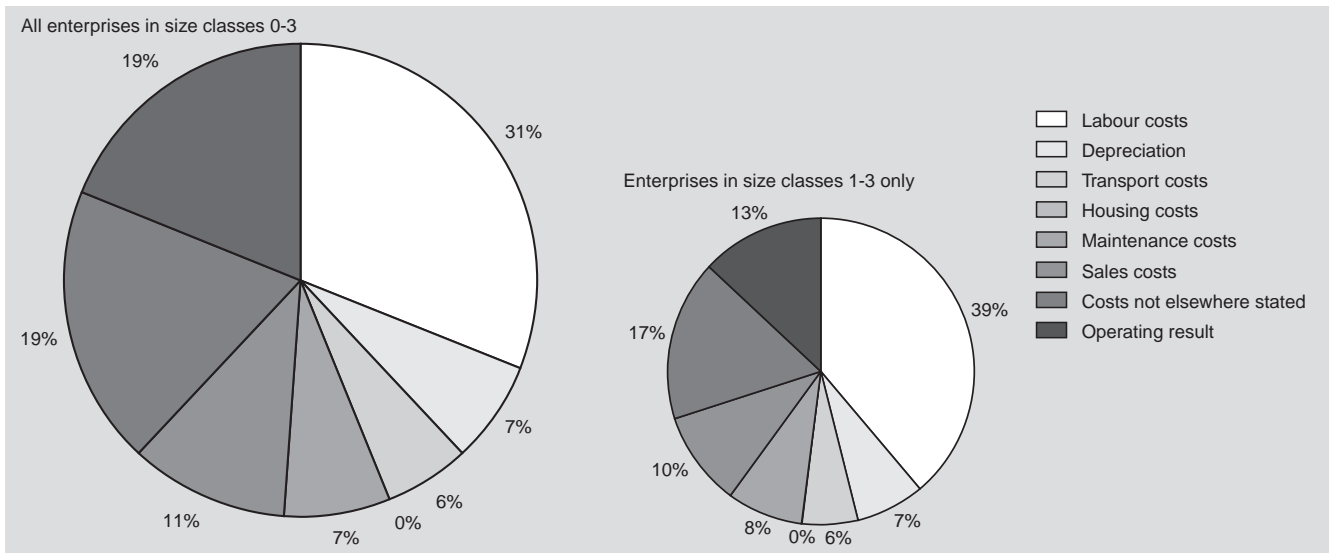


Figure 4
Destination of total revenues for small wholesale trade enterprises, according to 1996 VAT/CT data



10. Concluding remarks

In this article we have shown how we use fiscal data to compile structural business statistics on small wholesale trade enterprises. Although the methods are completely different from traditional survey sample methods, the outcomes agree surprisingly well with results obtained from more traditional sources, to the full satisfaction of our users.

We would certainly not suggest that our methods are the 'one and only' ultimate way of using fiscal data. A number of specific problems have already been discussed, and several improvements and extensions to the methods may be envisaged. In particular, the fact that we have to use a trick to estimate the financial structure of enterprises without corporate capacity is rather unsatisfying.

As mentioned in the introduction, the primary incentive for using fiscal data was the fact that there was simply no capacity to process a traditional survey for the statistical year 1996. Later on, some capacity was re-allocated and for the statistical years 1997 and 1998 a traditional survey was carried out again. These surveys were processed with minimum effort, involving blind data entry and

macro-editing instead of the traditional, very time-consuming, editing process. We have, however, opted to continue to base our statistics for publication on fiscal data as much as possible. The traditional survey results are only used where fiscal sources do not cover the information required, for instance, information on employment and investments.

Adaptations in the meantime

Our article has focused on a description of the method applied for statistical year 1996. The method was used again, with minor adaptations, for statistical years 1997 and 1998.

For the corporate tax part, the only real adaptation was the weight factor, described in Section 8. In the meantime Statistics Netherlands has built a central database for fiscal data, which includes some elementary routines for 'cleaning up' corporate tax data. Thus, the *raison d'être* for introducing the weight factor – a 'quick and dirty' way of diminishing the influence of 'strange' records – has disappeared. A side effect of the elimination of the weight factor

is that the number of useable enterprises has increased by 25%. For the 1998 computations, the number of useable enterprises increased again by some 30%. This increase was caused by the introduction of a modified definition of the concept of 'enterprise' in Statistics Netherlands' ABR, in order to be more in line with rules used by the tax department.

For the VAT part, the activity probabilities for VAT code enterprises have been updated using recent survey information: as we mentioned above, no survey data were available for 1996, so we had to use 1995 data, while for 1997 and 1998 a traditional survey was carried out again. For most codes we saw no reason to change the activity probabilities. For a few codes, however, the activity probabilities had to be adapted, because of a changed definition of the concept of 'enterprise'. Furthermore, our increased subject matter knowledge led to some modifications in our method. For example, instead of imputing only one missing month we now impute all missing periods, and our treatment of outliers and typing errors has been refined. Including some other corrections, the current estimate for the 1996 turnover total is 93,700 million guilders, instead of the former 92,500 million guilders.

Future developments in the application of fiscal data

In the near future we intend to improve our methods for the wholesale trade further. In addition to considering improvements and refinements in the application of the fiscal data themselves, we are investigating the feasibility of a small supplementary survey, supporting and augmenting results based primarily on fiscal data sources, and other external sources, as they become available. A limited survey might, however, serve some specific purposes:

1. Some variables are not covered by external (fiscal) data, like employment data and investments. As long as these data cannot be obtained in a different way, we have to collect them ourselves.
2. Since we have as yet no access to fiscal data concerning enterprises without corporate capacity, it may be helpful to maintain a survey of these enterprises.
3. The determination of activity probabilities for VAT code enterprises could benefit from a limited administrative survey. Such a survey could also be helpful for finding frame errors.
4. It is useful to have a means of 'monitoring' fiscal data, especially when tax legislation changes and it is suspected that this may have a statistical effect.

Limitations in the survey may concern the sample size, the number of questions asked and/or the frequency – not yearly, but every three years, for example.

Furthermore, we plan to extend the use of fiscal data to other statistical areas in our department:

- Application to retail trade is being considered. Users of retail trade statistics demand very detailed data, but enlarging the sample size to meet these demands is not an option. The use of fiscal data may be an alternative to supplement the traditional surveys. We are considering the use of VAT data to improve the monthly retail trade turnover statistics, as well as the use of both VAT and corporate tax data to improve and/or augment the annual retail trade survey.
- We are working on the introduction of quarterly turnover statistics on wholesale trade and transport and communications. For these statistics we intend to rely heavily on VAT data for smaller enterprises.
- On a different level we are considering the application of fiscal data in the editing process of traditional surveys. Fiscal data may be useful both for detection of errors and for imputation of missing values.

In summary, we are working towards an approach where statistics are made on the basis of a mix of different sources. Wherever possible, we want to use information that is readily available elsewhere. This includes, for example, VAT and corporate tax data; other data sources may become available in the future. Only for some specific purposes, as discussed above, do we intend to continue to collect our own data. We expect that this approach will serve simultaneously the purposes of relieving the administrative burden for enterprises, improving the quality of our statistics and increasing the efficiency of Statistics Netherlands.

Notes

- 1) NACE group 51.1 concerns commission trade, and is not considered part of wholesale trade in the strict sense.
- 2) Explorative studies have shown that the same excellent fit also holds for retail trade. The situation seems to be more problematic for transport and communications, however.
- 3) Corporate tax balance sheet information is used by Statistics Netherlands (since statistical year 1995) in the compilation of statistics on finances of small enterprises, see Geert Bruinooge, Frans P.M.M. Nijsten, Hen J.M.V. Pustjens and Eric Smeets, 'VIS as secondary EDI source' in: Netherlands Official Statistics, Volume 12, autumn 1997, pp. 78–85.
- 4) It is well-known that ratio estimators are biased, but the bias is negligible for 'large enough' samples

Revision of the Dutch National Accounts; first results and backgrounds¹⁾

Gert Buiten, Jacqueline van den Hof and Peter van de Ven

Abstract

As in many other countries, 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. As a consequence, the new national accounts data give a better picture of a number of recent developments, such as the increasing importance of services, automation, information and knowledge. In addition, new statistical insights and results have been incorporated. The revision has implications for the macro-economic description and for a number of policy indicators.

This article starts with a short introduction to the main reasons for the revision of the Dutch national accounts. Subsequently, attention is paid to the results on a macro-level. These parts mainly focus on the revision of data in relation to the production process. Finally, some issues in relation to the implementation of the revision are discussed.

Unless stated otherwise, the data in this article relate to the year 1995

Key words: national accounts, revision, ESA 1995, SNA 1993.

1. Reasons for the 1995 revision

The Dutch national accounts have been revised recently, using 1995 as the base year. Not surprisingly, the main cause for this revision was the introduction of new international guidelines for the compilation of national accounts: the world-wide System of National Accounts (SNA) 1993, and its European equivalent, the European System of National and Regional Accounts (ESA) 1995. In the first place, the introduction of the new guidelines means an adjustment of the national accounts to recent economic phenomena. In addition, the introduction enhances the international comparability of macro-economic data, which is particularly important under the terms of the Economic and Monetary Union (EMU).

Many of the changes in definition from the "old" European guidelines of the 1979 ESA to the 1995 ESA have had an effect on the main aggregates in general and on Gross Domestic Product (GDP) and Gross National Product (GNP) in particular. In addition, there are also a number of definitional changes which only affect the data by industry or the sector accounts, and not the economy as a whole. In order to ensure that the changes in the European guidelines are interpreted in the same way by everyone, the Commission adopted a Decision (97/178/EC, Euratom) which includes an exhaustive list of definitional changes which may affect GDP or GNP. The Decision also presents an in-depth analysis of the effects throughout the system of accounts. The statistical implementation of these principles is of course a different matter, which will inevitably depend on the primary statistics available in the countries concerned.

The 23 definitional changes included in the Commission Decision are presented in Table 1, in the order in which they appear in the Decision, together with the effects they have on Dutch GDP. Major changes in the Dutch national accounts due to the revision of the international guidelines which do not affect GDP or GNP are also included in the table. A short description of the changes is given in section 4.

GDP and GNP are extremely important indicators within the European (Monetary) Union, and not only for macro-economic

reasons. These indicators are also used for administrative and political purposes: financial contribution to the European Union, government deficit and debt as a percentage of GDP, etc. To enhance international comparability, in the past some general reservations have been made in relation to the national accounts data of the Member States: exhaustiveness, the inclusion of compensation of employees in kind, an internationally harmonised estimation of housing services from owner-occupied dwellings, etc. In addition, each Member State had a number of specific reservations. For the Netherlands, there was only one minor reservation: the inclusion of agricultural output for own final use from private allotments. Up to the 1995 revision, the changes in the macro-economic indicators based on these reservations were not included in the system of national accounts as published in the Netherlands. They were only included in a specific table, the GNP questionnaire, which had to be delivered to the European Union. As a consequence, the "harmonised" GDP/GNP differed from the published data. The 1995 revision has been used to incorporate the reservations.

New data sources, for among other things government statistics, statistics on holdings, statistics for the recycling industry, and statistics on R&D-institutions, were another important reason for the revision, as were new methods of calculation, not only for the above-mentioned services from owner-occupied dwellings, but also for the consumption of fixed capital. The interpretation of the data on imports and exports has also changed dramatically, although its effect on the balance of exports and imports, and consequently on GDP and GNP, is quite small.

In order not to complicate the 1995 revision process, the classification of industries and product groups according to NACE. Rev2 and CPA had already been introduced in the supply and use tables for the base year 1993. Nevertheless, the classification of some industries and the definition of some establishments has been changed in the 1995 revision. These changes especially relate to agriculture, financial intermediation, public administration, and the registration of privatised public enterprises.

Items 28 to 38 in Table 1 give an overview of the major changes caused by the incorporation of the EU reservations, the inclusion of new calculation methods and classifications. For a short description of the changes, reference is made to see Section 4. Two of the most important changes, however, still have not been mentioned. First the integration of labour market data in the system of national accounts and in the labour accounts; see also Leunis, 1999. Apart from the introduction of the new international guidelines, the integration of labour market data was one of the most important goals of the 1995 revision, and we consider the achievement of this goal as a major success.

Secondly, we have managed to integrate the energy statistics with the national accounts data. This integration offers numerous advantages. Apart from the wider range of source data that can be drawn on, an important advantage is that physical quantities of supply and use of energy are tallied with the relevant values in the national accounts. Thus an inherently consistent system is created featuring energy statistics, national accounts and related statistics such as the Pollutant Emission Register (PER: a set of air-pollution statistics directly linked to energy statistics). In the past, these sets of statistics were, in part, produced independently of one another. Lastly, numerous data in the national accounts have been more or less adjusted on the basis of the statistical integration process. To this end the results of a large number of statistics are confronted with each other, in such a way that a consistent statistical system results from the process.

2. Results of the 1995 revision

2.1 GDP and expenditure

The revision has increased the estimate for gross domestic product (GDP) in 1995 by 26.4 billion guilders, from 639.7 to 666.0 billion guilders, an upward adjustment of 4.1% (see Table 2). To a large extent, the increase of the GDP estimate can be attributed to the introduction of the ESA 1995 and definitional changes related to the EU reservations. On balance, the adjustments on the basis of the new statistical insights and results (including changes in calculation methods related to EU reservations) affect the level of GDP only a little downwards. The adjustment of net national income (NNI) is smaller than that of GDP: 1.1%. This is caused among other things by the higher estimate of consumption of fixed capital, which is extraneous to the NNI.

The most important reasons for the increase of GDP are the introduction of consumption of fixed capital on public infrastructure (+9.2 billion) and the registration of software as capital formation (+5.3 billion). In addition, the interpretation of people working in sheltered workshops as employees instead of benefit receivers

raised GDP by 3.6 billion guilders. An improved registration of company cars and other forms of wages and salaries in kind resulted in an upward change of 2.7 billion guilders. Changes in the output of insurance activities pushed up GDP by 2.4 billion guilders; shifts between market and non-market units increased it by 1.3 billion guilders; and the interpretation of military durables as fixed capital formation added another 1.5 billion guilders. These seven changes together put up GDP by 26.0 billion guilders. On the other hand, some definitional adjustments have a decreasing effect on GDP. The changes by the re-definition of government licences and fees have reduced GDP by 0.6 billion guilders. The non-definitional adjustments have on balance a decreasing effect of 2.1 billion guilders on GDP.

In relation to the data on expenditure for the total economy, the significance of capital formation in particular has increased. This is especially linked with the extension of the concept of capital formation. Indeed, from now on, software, mineral exploration expenditures, and purchases of durable goods by military authorities are considered as capital formation. Because of this, and some other minor changes, capital formation has increased by a total 13.2 billion guilders. Its contribution to total final expenditure has increased from 13.0% to 13.4%.

Table 1
Adjustments due to the revision of the National Accounts, 1995¹⁾

Adjustments compared to the publication "National Accounts 1997" ¹⁾	Effect	Effect
	on GDP	on GDP
	<i>billion</i>	<i>%-point</i>
	<i>guilders</i>	<i>GDP</i>
Adjustments related to the introduction of new international guidelines		
1. Change in residence criterion of installation and construction activities abroad	–	–
2. Financial intermediation services indirectly measured (FISIM)	–	–
3. Change in the definition of insurance output	1.1	0.2
4. Registration of reinvested earnings on foreign direct investment as property income	–	–
5. Registration of interest on accrual basis	–	–
6. Change in time of recording of cultivated natural growth of plants	0.4	0.1
7. Registration of software and large databases as fixed capital formation	5.3	0.8
8. Registration of part of military durables as fixed capital formation	1.5	0.2
9. Registration of work in progress in services	–	–
10. Registration of all mineral exploration expenditures as fixed capital formation	0.5	0.1
11. Introduction of consumption of fixed capital on roads, bridges, dams, etc.	9.2	1.4
12. Change in registration of government licences and fees	–0.6	–0.1
13. Valuation of output for own final use and output from voluntary activity	0.6	0.1
14. Change in the value threshold for capital goods	–	–
15. Change in market/non-market criteria	1.3	0.2
16. Change in the registration of subsidies	0.7	0.1
17. Registration of entertainment, literary and artistic originals as fixed capital formation	0.3	0.0
18. Change in registration of services associated with the use of entertainment, literary and artistic originals	0.1	0.0
19. Introduction of a rental value for separate garages	0.2	0.0
20. Change in registration of car registration taxes paid by households	–	–
21. Change in valuation of compensation of employees in kind	–	–
22. Change in registration of licences paid for the use of intangible non-produced assets	²⁾	–
23. Change in registration of stamp taxes	–	–
24. Change in registration of R&D-activities	–	–
25. Gross registration of services of travel companies and processing	–	–
26. Revision concepts of final consumption expenditure and introduction of non-profit institutions serving households	–	–
27. Introduction of additional specifications of output and operating surplus; dual acting	–	–
Adjustments not related to the introduction of new international guidelines		
28. Change in registration of people working in sheltered workshops	3.6	0.6
29. Introduction of wages and salaries in kind	2.7	0.4
30. Change in the valuation of output of financial institutions	1.3	0.2
31. Registration of valuables as capital formation	0.2	0.0
32. Change in the valuation of capital formation in livestock	0.6	0.1
33. Change in the valuation of output of owner-occupied dwelling and houses for recreation	–8.4	–1.3
34. Change in the calculation of consumption of fixed capital	0.1	0.0
35. Re-definition of financial institutions	–	–
36. Re-definition of public administration	–	–
37. Re-definition of agriculture	–	–
38. Subdivision of privatised public enterprises	–	–
Other changes in sources and methods	5.5	0.9

¹⁾ Some changes had already been introduced in the harmonised GDP.

²⁾ Included in 18.

Table 2
Adjustments because of the revision to the supply and disposition of goods and services, 1995

	Before revision	After revision	Change
<i>billion guilders</i>			
1. Domestic product (gross, market prices)	639.7	666.0	26.4
2. Imports	296.9	343.6	46.8
3. (1 + 2) Disposable for final expenditure (gross)	936.5	1 009.7	73.2
4. Final consumption expenditure	474.0	486.7	12.7
5. Fixed capital formation (gross)	122.0	135.2	13.2
6. Changes in inventories	1.0	4.6	3.6
7. (4 + 5 + 6) National final expenditure	596.9	626.5	29.5
8. Exports	339.6	383.2	43.6
9. (7 + 8) Total final expenditure	936.5	1 009.7	73.1

The new registration of final consumption expenditure related to social benefits in kind causes a shift from household to government consumption. Apart from this shift, total final consumption expenditure has been estimated 12.7 billion guilders higher. Largely, this refers to an increase of final consumption expenditure of general government because of the larger consumption of fixed capital and the registration of people working in sheltered workshops as employees. The contribution of consumption in total final expenditure has decreased from 50.6% to 48.2%.

In foreign trade, imports as well as exports have increased significantly. Both are more than 40 billion guilders higher after the revision. This is largely based on the gross registration of processing, the improvement of Intrastat data, and a re-interpretation of transit goods. The contribution of exports in total final expenditure has increased from 36.3% to 37.9%. Since the adjustment of imports is somewhat higher than that of exports, the estimate of net exports has decreased from 42.7 billion guilders to 39.6 billion guilders.

2.2 Generation of income

In relation to the generation of income, the estimate of compensation of employees has been adjusted upwards by 15.8 billion guilders (see Table 3). These adjustments are mainly caused by the change in wages and salaries in kind, the different treatment of people working in sheltered workshops, and the integration with the labour accounts. As a consequence, the share of compensation of employees in total generated income has increased slightly, from 50.9% to 51.2%.

Table 3
Adjustments of the income because of the revision, 1995

	Before revision	After revision	Change
<i>billion guilders</i>			
1. Wages and salaries	275.4	289.7	14.3
2. Employers' social contributions	49.9	51.4	1.5
3. Taxes on production and imports	82.0	79.1	-2.9
4. Subsidies (-)	-12.1	-11.3	0.9
5. Consumption of fixed capital	73.6	100.7	27.1
6. Operating surplus/mixed income (net)	170.9	156.4	-14.5
7. (1 to 6) Gross domestic product	639.7	666.0	26.4

Taxes on production and imports have been estimated 2.9 billion guilders lower. Here, the changed borderline of government licences and fees is the most important factor. The share of taxes on production and imports has decreased from 12.8% to 11.9%. The total amount of subsidies has been adjusted downwards by 0.9 billion guilders, mostly because of the change in the delineation between subsidies and government purchases. The (negative) contribution of subsidies in total generated income has decreased slightly, from 1.9% to 1.7%.

For consumption of fixed capital, the revision has resulted in upwards effect of 27.1 billion guilders. This is primarily caused by the inclusion of consumption of fixed capital on public infrastructure (9.2 billion guilders). Furthermore, the extension of the notion of capital formation and the revision of the estimated life expectancy of capital goods have an effect. As a consequence, the contribution of fixed capital consumption in total generated income has increased from 11.5% to 15.1%. The huge adjustment of fixed capital consumption – at the cost of operating surplus and mixed income – is the most important reason for the adjustment of NNI being much smaller than that of GDP. Because of the above changes, the estimate of operating surplus and mixed income (net) has decreased by 14.5 billion guilders. Its share in total generated income has decreased from 26.7% to 23.5%.

2.3 Government

As a consequence of the revision, both government deficit and government debt as a percentage of GDP have changed (see Table 4). Government deficit after revision amounts to 4.2%; before revision, it was 4.0% of GDP. Government debt has been adjusted from 78.8% to 76.9% of GDP. The government deficit and debt ratios are two important indicators for the further development of the Economic and Monetary Union (EMU).

The change in government deficit is mainly due to a different definition of the general government sector, and the change in the moment of registration of taxes and social contributions. The size of the sector general government has been adjusted on the basis of the changed criteria between market and non-market producers in the ESA 1995. Because of this, general government has been extended with some (former) parts of the railway company (e.g. the operation of the rail network and traffic control), and the Dutch Investment Bank for Developing countries (NIO). Furthermore, a number of private non-profit organisations, which are mainly financed and supervised by government have become part of general government. The latter include some research organisations (e.g. NWO), the Open Universities, organisations in the field of development aid (like the NOVIB), centres for asylum applicants, Chambers of Commerce and many cultural organisations (like museums and libraries).

The change in definition of social security funds has resulted in fewer units than before revision. After revision, some social arrangements, provided for by labour contracts, no longer belong to the government sector. Examples are early retirement funds (VUT-funds) and risk funds for the construction industry. This also applies to arrangements provided by the government for its own employees. Because of this, the fund for disablement benefits for government employees (the FAOP) and the private health insurance for police and local government officials (DGVP, IZA and IZR) have been excluded from the social security funds. The exclusion of the FAOP and the VUT-funds in particular lead to a deterioration in the government deficit, because of the large surplus of these funds in 1995. On balance, the changed definition of the general government increases the deficit by 0.3% of GDP in 1995. With the revision the moment of registration of taxes and social contributions has changed. After revision, all taxes and social contributions are recorded on a transaction basis, while before revision, current taxes on income and wealth were recorded on a

cash basis. Taxes on production and social contributions were already recorded on a transaction basis. The effect of this change is an upward adjustment of government deficit by 0.1% of GDP.

Table 4
Government deficit and debt, 1995

	1995
	% GDP
Government deficit before revision	4.0
Adjustments	0.2
because of transfer of units	0.3
because of changed registration of taxes and contributions	0.1
because of other changes	-0.0
because of the increase of the GDP	-0.2
Government deficit after revision	4.2
Government debt before revision	78.8
Adjustments	-1.9
Government debt after revision	76.9

Lastly, the positive adjustment of GDP itself of course has an effect on government deficit as a percentage of GDP: the so called "denominator effect". Because of the increase in GDP, government deficit has decreased by 0.2% of GDP. Government debt has decreased by 1.9% of GDP to 76.9%, mainly because of the "denominator effect". The change in the definition of general government has only a minor positive effect.

3. Some issues in relation to the implementation of the 1995 revision

Revising national accounts is a long and strenuous process. As the national accounts are a system of interrelated transactions which in the end should all be consistent with each other, they draw heavily on good communication between the people involved. This is not only true for the communication within the department of national accounts itself, but also for the communication between national accountants and those responsible for the source statistics: it is important, for example, to discuss changes in surveys several years in advance of the revision, in order to get the data needed for the implementation of the new guidelines. A good organisation and co-ordination is therefore essential for a successful implementation of the revision.

To make the revision process as smooth as possible, in 1994 a first inventory of all changes to be implemented at the 1995 revision was made. On the basis of this inventory, several project groups were formed, each consisting of the specialists involved and responsible for all matters concerning changes in a certain area, e.g. actual consumption, dual acting, intangible assets, etc. Furthermore, a "central project group" was created consisting of representatives from labour accounts and from each major field within the system of national accounts (sector accounts, output, expenditure, integration of supply and use). Among other things, this group was responsible for the overall co-ordination and the consistency of the proposals with the international guidelines.

In the previous revision of the national accounts (base year 1987), the whole system was turned upside down at once: changes in definitions and classifications, introduction of new source data and estimation methods, change from input-output tables to supply-and-use tables as the integrating framework for goods and services, and introduction of a new automation system. As a

consequence, it proved impossible to keep track of all the changes in the data, and at a very late stage it had to be decided to postpone the publication of revised data by one full year. Therefore, this time we decided to limit the extent of the 1995 revision to changes as a consequence of the introduction of the new international guidelines, and the introduction of new data sources and calculation methods, and to introduce the new international classifications of industries and product groups before the 1995 revision, using 1993 as a base year.

In the end, this certainly contributed to the success of the 1995 revision. A very useful result in this respect was the compilation of a complete database in which each of the various changes has been recorded for output, intermediate consumption and (components) of value added broken down by industry. As a consequence, changes in data could be tracked much better. On the other hand, however, the final stages of the revision process were more hectic than foreseen earlier. At a late stage, several matters still had to be sorted out, and all kinds of unexpected problems had to be solved. Also, the pre-integration of provisional revised data on goods and services in the beginning of 1998 was less successful than expected, mainly because revised data for several industries were not yet available and many conceptual issues still had to be untangled. On the other hand, the pre-integration did draw attention to some problematic areas in the consistency between supply and use.

In the actual implementation of the revision, we were able to achieve nearly all our goals. First of all, to the best of our knowledge, the Dutch system of national accounts is now in accordance with the 1993 SNA and the 1995 ESA. Furthermore, data on employment and compensation of employees in the national accounts are fully integrated with the relevant data in the labour accounts. In fact, the labour accounts including breakdowns by gender, level of education, etc. are now an integral part of the national accounts publication. Also the relationship with other source statistics could be improved, for example the integration of energy statistics. And last but not least, the revision project has been completed on the dates as planned.

Looking closer at the alignment with the new international guidelines, a major exception is as yet the compilation of a complete set of balance sheets for institutional sectors. In particular, it has not yet proved possible to compile reliable estimates for some non-produced assets, such as land. However, we hope to finalise this project in the near future. Furthermore, the guidelines on intangible fixed assets (software, originals, and mineral exploration) were difficult to implement in practice. In business accounting, these expenditures are usually registered as part of current costs and not as capital formation. As a consequence, most source statistics do not contain specific information on gross fixed capital formation in these assets. Neither could this information be derived from the statistics on capital formation. We were fortunate enough to have automation statistics at our disposal to estimate software, but these did not contain enough information to make solid estimates of own account production of software. We had to rely on wage costs for staff involved in the development of software. In addition to produced intangible assets, the information on sales and purchases of non-produced assets is quite scarce.

Another goal of the 1995 revision was the complete removal of all statistical discrepancies between net lending according to the capital account on the one hand and according to the financial account on the other. The accounts for non-financial corporations and households contained particularly large discrepancies before revision, positive for the former and negative for the latter sector. In the 1995 revision, the statistical discrepancies were reduced significantly, in particular for non-financial corporations. However, they still are not nil, and further research is needed here.

An important demand from users of national accounts data is the availability of long time series of good quality and sufficient detail.

Revising the system of national accounts is in contradiction with this demand, at least in the short term. Furthermore, as capital stock and consumption of fixed capital are calculated using the perpetual inventory method, long time series of revised data on fixed capital formation by industry and type of asset are needed right away to revise these items. Also for the purpose of seasonal adjustment, time series data on the aggregates included in the quarterly accounts need to be estimated at very short notice.

Meeting the demand of our users involves a strong tension between timeliness on the one hand, and quality and detail on the other hand. To improve the timeliness, a new method for the calculation of time series data has been developed, the so-called "benchmark/interpolation method". In this method, all revision-based changes are estimated at a detailed level for certain benchmark years, whereas the data for the years in between benchmark years are derived by interpolation using data before revision. Detailed supply and use tables are used as an integrating framework. For a more detailed explanation, see also Den Bakker and Van Rooijen, 1997. However, as we also give high priority to quality and detail, the results for the period 1987–1994 and the period 1969–1986 will not become available before the end of 2000 and the end of 2001, respectively.

For the calculation of capital stock and consumption of fixed capital, provisional time series data on fixed capital formation have been derived mainly by extrapolation. In addition, (non-integrated) time series data have been estimated for the newly introduced assets, such as software, originals and military durables. For the purpose of seasonal adjustment, provisional time series data will be calculated in September/October 1999. Here again, extrapolation will be the main technique. The results from this latter exercise will also be made available to our users.

One important aspect of a revision is good communication with the users. In this respect, the following was planned (and has up to now been realised):

- First public announcement in August 1998.
- Press conference on 27 April 1999. At this conference two papers were presented, one on the changes in main national accounts data, and one on the changes in important policy indicators.
- Meeting with people involved in the preparation of government policy (ministries, Central Bank, government modellers, etc.) on 28 April 1999.
- Publication of the National Accounts 1998, containing revised data for 1995 up to and including 1998 (both in guilders and euros), in September 1999. Together with this book, an eighty-page book containing a detailed description of the changes due to the 1995 revision was published.
- Publication of revised quarterly accounts from 1995 up to the second quarter of 1999 in October 1999.
- Publication of several, mainly Dutch papers on different aspects of the 1995 revision in the end of 1999 and the beginning of 2000.

In addition to this, several extensive information sessions have been held with our main users, such as the government's policy analysts and the Ministry of Finance. Lectures on the results were given in May 1999 for the staff of Statistics Netherlands.

Lastly, achieving international comparability of macro-economic data can be considered as the main goal of international guidelines. In this respect, the introduction of the 1993 SNA and the 1995 ESA is a major step forwards. Within the European Union, the international comparability has also been enhanced by the work of the GNP committee. Although there may be some drawbacks from the administrative use of national accounts data, it has certainly served as an enormous boost for the progress made in the field of international comparability. The EU research project on volume measurement should also be mentioned here. On the other hand, looking at the implementation of the new international guidelines, one can only conclude that there is still room for improvement. An example may be the calculation of consumption of fixed capital on public infrastructure. The adjustment caused by this change ranges from 0.2 percentage points of GDP in the United Kingdom to 1.4

percentage points in the Netherlands. Apart from actual differences between the countries, it may be assumed that this is also caused by things like major differences in expected service lives of public infrastructure (ranging from 30 years in France to 70 years in Finland and the United Kingdom). Another example for further improvement of international comparability may be the estimation of gross fixed capital formation in intangible fixed assets, in particular those produced on own account.

4. The main changes

The main changes caused by the revision of the Dutch national accounts are discussed briefly below. Only the most important aspects in relation to the production process are dealt with here. Furthermore, no attention is paid to all kinds of changes in the sector accounts. The numbers of the items discussed correspond with Table 1. For a more detailed analysis of the first 23 items, reference can be made to the Commission Decision which was published in the EU *Official Journal* No L75 of 15 March 1997. Lastly, usually reference is made to ESA 1995 instead of SNA 1993. As both guidelines are in principle consistent with each other, the former may be replaced by the latter.

4.1 *Change in residence criterion of installation and construction activities abroad*

According to the 1995 ESA, construction activities constituting gross fixed capital formation, performed in country B by corporations or quasi-corporations resident in country A, are always to be considered as output in country B regardless of the extent of duration. On the other hand, installation activities abroad should always be registered in the country of origin. The 1979 ESA gives no explicit guidance on this subject, and it has to be assumed that the one year rule is relevant for the residence of the production. For the Netherlands this change has no consequences. The activities in foreign countries by Dutch corporations concern mainly services of engineers and architects which were already treated as resident activities. Other activities like dredging work are often subcontracted by foreign corporations to Dutch enterprises.

4.2 *Financial intermediation services indirectly measured (FISIM)*

Financial intermediation services which are not paid for directly via charges but indirectly via interest margins (i.e. the difference between the lending and the borrowing rate of interest) will for the time being continue to be recorded in the national accounts as intermediate consumption of a notional industry and sector. As a consequence, no change is to be recorded until a new Commission Decision is taken in the future.

4.3 *Change in the definition of insurance output*

The new element here is that the output of non-life insurance services now also includes the revenues from the corporations' investments of insurance technical reserves. This change means that the figures are more meaningful in economic terms, in accordance with the way in which the insurance industry looks upon this activity. Due to this change, GDP has increased by 1.1 billion guilders or 0.2%.

4.4 *Registration of reinvested earnings on foreign direct investment as property income*

Foreign direct investment comprises investment in foreign enterprises where the owner's share is more than 10% of the total voting stock.

According to ESA 1995, the reinvested profits of foreign direct investments are to be included in the estimates of property income flows to and from the rest of the world. In the previous national accounts, only profits actually paid to or received from the rest of the world were included in the distribution of income account and the rest of the world account.

It should be emphasised that reinvested profits are seen as property income only in relation to foreign direct investments and not within the national economy, where they are included in the net saving of the corporation earning the profit. There is no effect on GDP, but GNP has increased by 8.1 billion guilders (1.4%) because of this adjustment.

4.5 Registration of interest on accrual basis

According to the 1979 ESA, interest should be recorded when it becomes due. ESA 1995 on the other hand states that interest is to be recorded as it accrues, i.e. in accordance with the concept of an effective interest rate. The quantitative effect on net property income from the rest of the world is negligible.

4.6 Change in time of recording of cultivated natural growth of plants

In the previous national accounts, the output value of agricultural crops was recorded as at the time of the harvest, and forestry output as on the date of felling. According to the 1995 ESA on the other hand, production is to be considered as an ongoing process of growth whereby the growth in the biological mass of plants over the period in question makes up the output of that period, which during the process of production is counted on the uses side as increases in inventories in the work-in-progress category, and when the process is completed as stocks of finished goods. When this output is sold or consumed, there is a corresponding reduction in inventories. Because of this change, GDP has increased by 0.4 billion guilders, or 0.06%.

4.7 Registration of software and large databases as fixed capital formation

In the previous national accounts, all purchased software other than pre-installed software supplied with hardware was registered as intermediate consumption. Pre-installed software supplied with hardware was considered as capital formation (machinery) and recorded under the capital formation together with the hardware on which it was installed.

Similarly, own account production of software was considered in the previous national accounts as an ancillary service which did not give rise to capital formation. According to ESA 1995, all purchases of software are to be considered as capital formation. Also own development of software and large databases has to be capitalised in all cases where the amounts involved are significant. Because of this, GDP has increased by 5.3 billion guilders, which is 0.8% of GDP.

4.8 Registration of part of military durables as fixed capital formation

Under the previous national accounts system, all purchases of durable goods by military authorities were by definition registered as intermediate consumption. According to ESA 1995, durable goods over a certain value – apart from weapons systems which, by convention, continue to be considered as intermediate consumption – are considered as capital formation in line with the rule governing all other industries. Since defence is general government non-market production, where the output value is compiled from the costs point of view, the effect on GDP is equal to

the resulting change in the consumption of fixed capital, whilst government consumption changes by the amount of the difference between the reclassified purchase of goods and the change in the consumption of fixed capital. As a consequence, GDP has increased by 1.5 billion guilders, which equals 0.2% of GDP.

4.9 Registration of work in progress in services

In the previous national accounts, only the production of goods was considered as a process generating stocks of products consisting of work-in-progress. In contrast, the output of services was recorded in connection with the supply of the final product. According to ESA 1995, services are to be dealt with in exactly the same way as goods. In the Netherlands, there is no effect on GDP because of this change. The output of the relevant services (e.g. services of architects) was already recorded at the moment when the production occurs.

4.10 Registration of all mineral exploration expenditures as fixed capital formation

In the previous national accounts, all expenditures on the sinking of wells for the extraction of oil, gas, etc. that incurred prior to a decision to explore a given deposit, were regarded as intermediate consumption. Expenditures after the decision to work the deposit were recorded as gross fixed capital formation. In the new international guidelines, all expenditures on mineral exploration are to be registered as fixed capital formation. This latter figure is thus increased by an amount corresponding to exploration expenditure prior to the decision to work the deposit and thus, in particular, includes expenditure on abortive research under gross fixed capital formation. The effect on GDP is an increase of 0.5 billion guilders, or 0.08% of GDP.

4.11 Introduction of consumption of fixed capital on roads, bridges, dams, etc.

In the previous national accounts, no consumption of fixed capital was calculated for public investments in roads, bridges, dams, etc., since this type of capital good was considered to have an infinite service life. According to the 1995 ESA, these fixed capital goods have a finite service life, and consequently consumption of fixed capital has to be calculated and included in the estimate of the value of government non-market output. Since roads and bridges etc. make up a large share of the capital stock of the government sector, this change in definition alone has caused a substantial upward adjustment in government consumption. The effect on the 1995 GDP is an increase of 9.2 billion guilders, which equals 1.4% of the GDP.

4.12 Change in registration of government licences and fees

According to ESA 1979, payments to public authorities in connection with permits and authorisations etc. are generally considered as miscellaneous current transfers or taxes when the permits are compulsory. This was the case with fees paid by households in their capacity as consumers – for passports and driving licences, for example – and safety checks etc. paid for by enterprises. According to ESA 1995, these fees are to be considered as payment for services unless the permit is granted automatically upon payment and has no connection with any check or monitoring function, or if the payment is out of proportion in relation to the cost of the checks carried out. In those cases the payments continue to be considered as taxes. In The Netherlands, this led among others to a change in the registration of waste disposal charges and passport fees. GDP has decreased by 0.4 billion guilders (0.06% of GDP) because of this change.

4.13 *Valuation of output for own final use and output from voluntary activity*

According to the 1995 ESA, wherever possible own account production should be valued including an element of operating surplus. Furthermore, in the construction of fixed assets by means of voluntary activity, an estimate for the value of labour used should be included in the value of output. No change has been recorded for the first element. The effect of the second element on GDP is an increase of 0.6 billion guilders, or 0.1%.

4.14 *Change in the value threshold for capital goods*

In the previous national accounts, all durable goods purchased by producers with an expected use in production over a period longer than one year were recorded under fixed capital formation, provided that their value exceeded a threshold of ECU 100 in 1970 prices. This threshold applied to individual orders and not to the individual goods in an order. Small purchases below the threshold were by definition considered as intermediate consumption. In ESA 1995, the value threshold for intermediate consumption was fixed at ECU 500 in 1995 prices, that is an upward shift in real terms. In the Netherlands, there is no noticeable effect on GDP.

4.15 *Change in market/non-market criteria*

In the previous national accounts system, many activities (industries) were by definition considered to be either market or non-market. For the remaining industries, a 50% criterion was used: a local kind-of-activity unit was classified as a market producer if its income from sales covered over 50% of its costs. According to ESA 1995, the 50% rule is to be applied throughout the economy regardless of the industry involved. This change in definitions means, for example, that parts of the railway company and the Dutch Investment Bank for Developing Countries (NIO) are now considered as non-market producers. On the other hand, the *Kadaster* (Offices for the Registration of Land) has been reclassified from a non-market producer to a market producer. The total effect on GDP is +1.3 billion guilders (0.2%).

4.16 *Change in the registration of subsidies*

Implementing the ESA 1995 meant a few changes in definitions relating to subsidies some of which have an effect on GDP. More specifically, payments to academic hospitals are now considered as purchases of services. In addition, non-market producers can be recipients of subsidies. On balance, these changes had an increasing effect on GDP of 0.7 billion guilders, or 0.1%.

4.17 *Registration of entertainment, literary and artistic originals as fixed capital formation*

In the previous national accounts, the production of entertainment, literary and artistic originals etc. was not considered as production. Accordingly, royalty payments which authors etc. received for the right to use an original were not considered as output of services. In the new national accounts, economic transactions connected with intellectual property rights are considered as a two-stage process: first, an original work such as a book, a musical composition, or a computer program is created. This is considered as a produced intangible fixed asset, which yields a future flow of income on a par with a building or a machine. The value of the original is taken to be the present value of the expected future flow of income and is recorded as capital formation in the period in which the work was produced. Subsequently, ongoing royalty payments for the right to use the originals are considered to be sales of services produced in a process of production in which the original is included as capital

stock. By analogy with other fixed assets, consumption of fixed capital is calculated for originals. The effect on GDP is an increase of 0.3 billion guilders (0.05%).

4.18 *Change in registration of services associated with the use of entertainment, literary and artistic originals*

The point at issue here is the royalty payments referred to above for the right to copy and distribute entertainment, literary and artistic originals. In the previous national accounts, these transactions were not considered as transactions relating to products but as distributive transactions in the category "income from land and intangible assets". This was the logical consequence of not considering originals to be produced assets. In the new national accounts, these royalties are considered as payments for services. The effect on GDP is an increase of 0.1 billion guilders (0.02%).

4.19 *Introduction of a rental value for separate garages*

Hitherto, the rental value of separate garages has not been included in the output value of dwellings. Garages were included only if they were part of the actual dwelling. According to ESA 1995, the rental value of separate garages is to be included in the estimate of total actual and imputed rents of dwellings. This change has increased GDP by 0.2 billion guilders, or 0.04%.

4.20 *Change in registration of car registration taxes paid by households*

According to the old European system, the ESA 1979, taxes on production could be paid only by producers and not by households in their capacity as consumers. As a consequence, car registration taxes paid by household in their capacity as consumers should not, according to the ESA 1979, be considered as taxes on products and thus included in GDP. In the ESA 1995, however, car registration taxes are to be recorded as taxes on products regardless of who pays the tax. This change has only a minor effect on Dutch GDP.

4.21 *Change in valuation of compensation of employees in kind*

In the previous system, own-produced goods supplied to employees as payment were valued at production cost, the producer's profit by convention being equal to zero. According to ESA 1995, the value is now to be estimated at basic prices, i.e. including the usual element of net operating surplus. These changes were already implemented in the Dutch national accounts, so this change does not effect GDP.

4.22 *Change in registration of licences paid for the use of intangible non-produced assets*

In the previous national accounts, payments on licences and patents were considered as distributive transactions, more precisely property income under the category "income from land and intangible assets". In the new system, they are treated as payments for services. In the rest-of-the-world account, therefore, there is an increase in exports and imports of services with a corresponding drop in property income from or to the rest of the world. This change has been included in 18 (Change in registration of services associated with the use of entertainment, literary and artistic originals).

4.23 *Change in registration of stamp duties*

According to the old European system, the 1979 ESA, stamp duties were not taxes on products, which by convention they are in every case according to the ESA 1995. This change is not relevant in the Netherlands.

4.24 Change in registration of R&D activities

The expenditure for research and development (R&D) is better presented in the new Dutch national accounts. R&D activities of research departments of companies in particular have become clearly visible. From now on, these activities are explicitly recorded as secondary activities of the relevant industries. As such, they produce output that is consumed by the companies themselves. In the past, these R&D activities were classified under the research and development industry, together with the separate research institutes.

From now on, this industry only consists of research institutes. This change of registration does not have any consequences for the GDP estimate. However, the estimate for R&D activities itself has increased, because of the use of new sources and insights.

4.25 Gross registration of services of travel companies and processing

In the past, for some activities a net registration was preferred in the national accounts. From now on, a gross registration is applied. This means that the purchases and sales are recorded for the full value. As a consequence, the true flows of money and goods in the economy are more accurately visible. First, this concerns all-in trips, which, from now on, are considered for the complete costs as a product of the travel agency or tour operator. Indeed, travel agencies compose products themselves, contrary to travel intermediaries. In the past only the margin of the travel agency was considered as the product. The payments for accommodation and transport were interpreted as direct payments by households to the catering establishments and transport companies. This change results in a shift within the consumption and between products, but on balance, it has no effect on GDP.

In addition, processing transactions to and from the rest of the world are recorded gross from now on. These are goods that are sent by the producer to another country for further processing, after which they are sent back to the original producer. This is particularly common practice in manufacturing of textiles and electronics. From now on, the figures of imports and exports contain the full value of these processing deals. So far, only the balance was recorded. This change has no consequences for GDP.

4.26 Revision concepts of final consumption expenditure and introduction of non-profit institutions serving households

The description of final consumption expenditure has been adjusted, as a result of which a better view arises of goods and services consumed by households and paid by general government (see

Table 5). In the first place, government consumption expenditure has been extended with goods and services paid by general government, but produced by others on behalf of households. This concerns for example health services. In the past, this was treated as consumption expenditure of households. These social transfers in kind involve about 50 billion guilders.

In addition, non-profit institutions serving households (NPIHHs) have been introduced as a separate institutional sector. Examples are sports clubs, trade unions, and religious organisations, which are mainly financed by contributions, donations, and voluntary offerings of households. From now on, the services financed in this way are treated as consumption by these NPIHHs. The amount involved is 4 billion guilders. Only goods and services they actually sell are recorded as consumption by households. In the past these NPIHHs were not treated separately. Their output was part of the various industries and their services were treated as consumption by households.

Simultaneously, the 1995 ESA introduces an extra method of presentation for final consumption: actual final consumption by households (see Table 5). In this case, consumption by NPIHHs and the elements of the government consumption that can be individualised are attributed to the households. The only consumption category left is the collective consumption by general government, i.e. the consumption of services which are collectively used by the society, such as defence, justice, etc. On balance these changes do not effect the level of GDP. They only result in a shift within the several categories of consumption expenditure.

4.27 Introduction of additional specifications of output and operating surplus; dual acting

The 1995 ESA introduces a number of additional specifications. For enterprises, the balance that remains when intermediate consumption, wages and salaries, social contributions, etc. are subtracted from the output will from now on be divided in an operating surplus and a "mixed income". Mixed income is used for self-employed persons; it consists of a compensation for the work of self-employed persons and any participating family members, plus a compensation for the capital invested and a compensation for the entrepreneurial risk. The operating surplus is used for corporations etc.; it does not contain an implicit compensation for labour.

In addition, the output of industries will be specified in market output, output for own final use and other non-market output. This provides a better view of the several types of production processes.

Lastly, output, intermediate consumption, and (components of) value added have been cross-classified by industry and by institutional (sub)sector. As a consequence, the link between production, income generation and income distribution is described much more clearly.

Table 5
Summary of the adjustments

	Sector making expenditures			Total acquisitions
	Government	NPIHHs	Households	
Individual consumption	X (= social transfers in kind)	X (= social transfers in kind)	X	Households actual final individual consumption
Collective consumption	X	0	0	Governments actual final collective consumption
Total	Governments final consumption expenditure	NPIHHs final consumption expenditure	Households final consumption expenditure	Actual final consumption = Total final consumption expenditure

4.28 *Change in registration of people working in sheltered workshops*

After revision, people working in sheltered workshops are considered as employees. Before revision, they were treated as benefit receivers. As a consequence, their income is no longer registered as social benefits, but as compensation of employees. This change, which was already introduced in the so-called harmonised GDP, results in a positive effect on GDP of 3.6 billion guilders.

4.29 *Introduction of wages and salaries in kind*

In the new system of national accounts, wages and salaries in kind have been introduced. Among other things, this category includes the private use of company cars, the provision of crèches by employers, reduced rates of transport tickets, and interest rebates by financial institutions. As in the case of sheltered workshops, this change was already included in the harmonised GDP. It pushes up GDP by 2.7 billion guilders, i.e. 0.4%.

4.30 *Change in the valuation of output of financial institutions*

In addition to the change mentioned under item 3, insurance output has been increased by 1.3 billion guilders (0.2% of GDP). Furthermore, for banking, property income from the investment of own net worth is no longer considered as part of output. This has resulted in a substantial decrease of the imputed bank services.

Other changes in banking output relate to reinvested earnings on foreign direct investment (see item 4). As these latter changes are compensated by a proportional adjustment of the consumption of imputed bank services, there is no effect on GDP.

4.31 *Registration of valuables as capital formation*

From now on, the balance of purchases and sales of paintings, jewellery and other valuables for purposes of investment is considered as capital formation. Before revision, these purchases were considered as private consumption (for households as consumers) or intermediate consumption (for enterprises). This change has resulted in an increase of GDP by 0.2 billion guilders.

4.32 *Change in the valuation of capital formation in livestock*

The method of valuation of capital formation in livestock has been adjusted. From now on, the relevant livestock is valued at entry prices (i.e. basic prices of similar livestock sold on the market) instead of at withdrawal prices (i.e. cull prices when e.g. sold to the slaughterhouse). This change has resulted in an increase of GDP by 0.6 billion guilders.

4.33 *Change in the valuation of output of owner-occupied dwellings and houses for recreation*

The estimation method for the output value of owner-occupied dwellings and holiday homes has been adjusted. As a consequence, the estimated output value of dwellings has been reduced and that of holiday homes increased. On balance, it has resulted in a reduction of GDP by 8.4 billion guilders. This change was already included in the harmonised GDP.

4.34 *Change in the calculation of consumption of fixed capital*

The estimates for consumption of fixed capital have changed dramatically. In total, consumption of fixed capital has been

increased by 27.1 billion guilders. Most of this (17.1 billion guilders) is caused by the extension of the concept of fixed capital formation with, among other things, software, mineral exploration expenditures and a number of purchases of durable goods by military authorities, and by the introduction of consumption of fixed capital on public infrastructure.

The rest of the adjustment is based on new assumptions about the expected service lives and the discard patterns of the relevant capital goods.

4.35 *Re-definition of financial institutions*

The implementation of new insights resulted in some changes in the definition of financial institutions, especially in relation to the operation of real estate. From now on, operation of real estate by financial institutions is registered as a secondary activity of financial institutions. In the past, it was registered as part of the industry "operation of real estate activities". Moreover, in accordance with the changes in the international guidelines, after revision, the financial institutions industry contains some institutions which before revision were considered as social security funds, like the so-called VUT-funds (funds for early retirement). Lastly, improved estimates have been used for several classes of activities auxiliary to financial institutions, like intermediaries in mortgages and stockbrokers.

4.36 *Re-definition of public administration*

The definition and subdivision of government activities has been changed, among other things because less detailed information is available from the source data. In particular, this means that the industry "public administration" contains a number of activities that in the past were registered as part of e.g. recreational, cultural and sports activities.

In addition, some funds have been moved from the social security funds to financial institutions (see also section 2.3).

4.37 *Re-definition of agriculture*

The delineation of the agriculture industry has been changed. From now on, this industry contains only enterprises for which agriculture is the main activity. Their secondary activities are also included. Before revision, all agricultural activities were contained in this industry, including those performed as a secondary activity by other industries. As a consequence, the forestry activities of Dutch Forestry Commission, for example, no longer fall under agriculture.

4.38 *Subdivision of privatised public enterprises*

For some industries the revision has been used to improve the representation of privatised public enterprises. In particular, the electricity companies, the railways, and the postal and telecommunication company have been privatised since the 1987 revision. In a number of cases this was accompanied by a division into several independent business units. The revision has been used to deal with these units separately in the national accounts. As a result, among others things a number of former internal supplies within a company now become explicitly visible as mutual supplies between the new units.

Note

- 1) This article is based on a paper presented at the OECD National Accounts Working Party meeting held in Paris, 21–24 September 1999.

References

Leunis, W.P., 1999. *Linking Social and Economic Statistics through the 1995 Revision of National Accounts and Labour Accounts* National Accounts Occasional paper, Statistics Netherlands. See also article on p. 41 of this issue.

Den Bakker G.P. and R.A.M. van Rooijen, 1997. *Backward Calculation of Dutch National Accounting Data – Lessons from the Past: Towards a New Approach*. Paper presented at the INSEE seminar on time series, Paris, 1997.

A simple module linking social protection statistics and the national accounts

Frits Bos¹⁾

Abstract

In our opinion, it would be very useful to have a standard module linking the European social protection statistics (ESSPROS96) and national accounts data (ESA95; SNA93). This note describes a simple set of tables that can be derived from the standard national account statistics. With intermediation through these tables, national accounts statistics can serve as a data base and frame of reference for social protection statistics. Provisional figures are presented for the Netherlands. This includes a first investigation of the consequences of the revision of the Dutch national accounts for Dutch social protection statistics.

Key words: national accounts, social protection

1. Introduction

European social protection statistics are a major tool for monitoring and analysing social protection in the EU member states. They were developed in the late seventies, and the first European guidelines were published in 1981. Recently, a revised manual was published: the *European System of Social PROtection Statistics-manual 1996* (ESSPROS96²⁾). This revised manual focuses on the description of a so-called core system of social protection statistics. The scope of the core is based on the data for which all member states can provide up-to-date and regular information.

The main focus of social protection statistics are the social protection benefits. Social protection statistics describe their size and composition, their financing and the administrative costs involved. Social protection benefits are classified by function (e.g. sickness and old age), by type (e.g. in cash or in kind) and whether they are means tested. Classifications are also used for the underlying schemes, for example public versus private schemes or basic versus supplementary schemes.

To describe specific aspects of social protection adequately, the modules should supplement the core information. These modules are a very flexible tool: they can elaborate on the core information, provide more detail and may also use different concepts. For example, the labour market policy module will contain labour market measures inside and outside the core. Another example is a module on net social protection expenditure, which corrects for the taxes and social security contributions levied on social protection benefits. The national accounts statistics provide an internationally standardised overview on the size, composition and growth of national economies. They also describe the role of social benefits and social contributions in the national economy.

Linking national accounts statistics and social protection statistics provides new opportunities for both types of statistics. From the point of view of social protection statistics, they will thus be related to the official statistics on the national economy, while national accounts statistics broken down by social protection scheme can also serve as a check on the completeness and reliability of social protection statistics. Furthermore, the compilation processes of both statistics can be linked, saving compilation costs, increasing reliability and providing new opportunities, for example to make European social protection statistics as timely as (future) national accounts statistics.

There are similar advantages for the national accounts: social protection statistics can be regarded as a module supplementing

the standard national accounts. This module is relatively easy to derive from the standard tables and is highly relevant for economic and social policy. Furthermore, it may serve as a check on the reliability and completeness of the standard national accounts figures.

An overview of the differences between the social protection concepts and those in the new national accounts (ESA95; SNA93³⁾) is provided by the above-mentioned manual on social protection. This article shows how new national accounts statistics can actually serve as a data base and frame of reference for social protection statistics.

Section 2 describes how social protection benefits can be derived from social benefits in the national accounts, presenting provisional figures for the Netherlands. These figures are also used to illustrate how social protection benefits can be related to other national accounts statistics, like GDP, government expenditure and adjusted disposable household income.

National accounts statistics can also be used to obtain data on a more encompassing concept of social protection benefits, as illustrated in Section 3.

In the Netherlands, the compilation of social protection statistics is embedded in the compilation of the national accounts. This implies that the national accounts concepts, data sources and compilation procedures influence the social protection statistics actually compiled. This issue is investigated by looking at the consequences of the revision of the Dutch national accounts. Section 4 describes the consequences for social protection benefits, while Section 5 focuses on social contributions. Conclusions are drawn in Section 6.

2. Social protection benefits (ESSPROS-core) and the national accounts

Social protection benefits according to ESSPROS core can be derived starting from the social benefits in cash and in kind in the new national accounts (ESA95 codes D.62 and D.631).

Table 1 is a standard table in the Dutch national accounts. It shows social benefits in cash in the Netherlands for the period 1995–1998. In 1995, social benefits in cash amounted to 64.8 billion euros, in 1998 to 67.6 billion euros. The total social benefits in cash are broken down by type of transaction, distinguishing between social security benefits, social assistance benefits, pension benefits, other private social insurance benefits and unfunded employee social benefits. For example, in 1998, social security benefits in cash amounted to 31.5 billion euros, while the level of pension benefits was 15.6 billion euros.

Table 1 also shows the schemes involved. For example, major social assistance benefits in cash in the Netherlands are those provided under the General Family Allowance Act (2.9 billion euros in 1998) and the National Assistance Act (4.1 billion euros in 1998).

Table 2 shows the size and composition of social benefits in kind according to the Dutch national accounts. Major schemes via market producers are the Medical Health Fund Act (10.7 billion euros in 1998) and the Exceptional Medical Health Act.

Social benefits in kind include also transfers of other non-market output by the government and non-profit institutions serving households. Only the transfers serving a social purpose are included. Examples of such transfers by the government are education services, social work services and free preventive health care by government bodies. Examples of non-profit institutions serving households (NPISH) are the provision by churches of (nearly) free food and shelter to the homeless or the financing of research on cancer by a charity fund.

Table 1
Social benefits in cash (D.62) according to the revised Dutch national accounts

	1995	1996	1997*	1998*
<i>bln euros</i>				
Social security benefits in cash (D.621)	32.3	32.6	32.6	31.5
Sickness Benefits Act (ZW)	1.9	0.3	–	–
General Disablement Benefits Act (AAW)	5.7	5.6	6.1	–
Disablement Insurance Act (WAO)	3.3	3.3	3.1	7.6
Disablement Insurance Fund (AOK)	–	–	–	0.3
Disablement Insurance Act for Self Employed (WAZ)	–	–	–	0.5
General Old Age Pensions Act (AOW)	15.2	15.9	16.6	17.6
Surviving Relatives Act (ANW) ¹⁾	2.1	2.1	2.0	1.6
Unemployment Insurance Act (WW)	4.2	5.4	4.8	4.0
Social assistance benefits in cash (D.624)	10.3	10.1	9.7	10.0
Benefits for War-victims	0.3	0.3	0.3	0.3
Act on Young Handicapped Disabled to Work (WAJONG)	–	–	–	1.0
Income Provision for Disabled Workers (IOAW/IOAZ)	0.2	0.2	0.2	0.2
General Family Allowance Act (AKW)	3.0	2.9	2.8	2.9
Contributions to owner-occupied dwellings	0.3	0.2	0.2	0.1
Scholarships	1.3	1.2	1.1	0.9
National Assistance Act (in cash) (ABW)	4.6	4.8	4.5	4.1
Supplementary Payments Act (TW)	0.3	0.3	0.3	0.3
Other	0.2	0.2	0.2	0.2
Pension benefits (part of D.622)	12.9	14.0	14.8	15.6
Industrial associations pension funds	5.3	5.8	6.2	6.5
Company pension funds	2.3	2.6	2.7	2.9
Pension funds n.e.c. (incl. Early Retirement Schemes)	2.8	2.8	2.8	2.8
Life insurance companies	2.5	2.8	3.1	3.3
Other private social insurance benefits (residual of D.622)	1.7	1.6	1.3	1.0
Fund for Disabled Civil Servants (FAOP)	0.8	0.7	0.4	–
Compulsory health insurance for civil servants	0.7	0.8	0.8	0.9
Other private social funds	0.2	0.1	0.1	0.1
Unfunded employee social benefits (D.623)	7.6	8.1	8.7	9.5
Paid sick leave	4.0	4.4	4.9	5.6
Reimbursement medical expenses civil servants	0.6	0.6	0.6	0.7
Unemployment benefits former civil servants	1.0	1.0	1.1	1.1
Military pension provisions	0.7	0.7	0.7	0.7
Other	1.3	1.3	1.4	1.4
Social benefits in cash by Dutch schemes	64.8	66.5	67.1	67.6

¹⁾ Until 1 July 1996 General Widows and Orphans Act (AWW).

Table 2
Social benefits in kind via market producers (part of D.631) according to the revised Dutch national accounts

	1995	1996	1997*	1998*
<i>bln euros</i>				
Social security benefits in kind (D.6311&D.6312)	18.4	17.9	20.7	21.9
Medical Health Fund Act (ZFW)	7.0	9.5	10.2	10.7
Exceptional Medical Health Costs Act (AWBZ)	11.2	8.3	10.5	11.2
General Disablement Benefits Act (AAW)	0.1	0.1	0.1	0.0
Social assistance benefits in kind (D.6313)	4.3	4.3	3.2	3.5
Act for social assistance to disabled persons (WVG)	0.5	0.5	0.6	0.7
Contributions to home for the elderly	1.5	1.5	–	–
Individual rent allowances	0.9	1.0	1.2	1.3
Public transport card for students	0.4	0.4	0.4	0.4
National Assistance Act (in kind) (ABW)	0.1	0.1	0.2	0.2
Legal assistance	0.2	0.2	0.2	0.2
Other	0.8	0.6	0.7	0.7
Social benefits in kind via market producers by Dutch schemes	22.7	22.2	24.0	25.5

Table 3
Social protection benefits and social benefits in the revised Dutch national accounts

	1995	1996	1997*	1998*
<i>bln euros</i>				
Social benefits in the national accounts	87.4	88.6	91.1	93.1
Social benefits in cash (see table 1)	64.8	66.5	67.1	67.6
Social benefits in kind via market producers (see table 2)	22.7	22.2	24.0	25.5
Social benefits in kind by other non-market output	2.6	2.6	2.7	3.0
by the government	2.2	2.1	2.2	2.6
by NPISH	0.4	0.4	0.5	0.5
Social benefits in the national accounts	90.1	91.2	93.7	96.1
minus Social benefits on education	-2.2	-1.9	-1.9	-1.7
Social security benefits in cash on education	0.0	0.0	0.0	0.0
Social security benefits in kind on education	0.0	0.0	0.0	0.0
Social assistance benefits on education	-1.3	-1.2	-1.1	-0.9
Social assistance benefits in kind on education	-0.9	-0.8	-0.8	-0.8
plus Governments capital transfers on health & social protection	0.0	0.0	0.0	0.0
plus Certain reductions on taxes and other obligatory levies	0.0	0.0	0.0	0.0
Social protection benefits (excl. re-routed social contributions)	87.9	89.3	91.9	94.4
by the sector general government	69.0	68.9	70.5	72.8
by other domestic sectors	18.9	20.4	21.4	21.7
Average population (millions)	15.5	15.5	15.6	15.7
Average number of households (millions)	6.5	6.6	6.7	6.8
GDP (billion euros)	302.2	315.1	333.5	352.2
Expenditure by the government (billion euros)	167.8	154.5	158.6	163.9
Expenditure by the government (% of GDP)	0.6	0.5	0.5	0.5
Adjusted disposable income of households (billion euros)	196.3	203.9	214.0	224.1
Social protection benefits, key-ratios				
per capita (thousand euros)	5.7	5.8	5.9	6.0
per household (thousand euros)	13.5	13.5	13.8	14.0
as a % of GDP	0.3	0.3	0.3	0.3
of which by the government	0.2	0.2	0.2	0.2
of which by other domestic sectors	0.1	0.1	0.1	0.1
as % of government expenditure	0.4	0.4	0.4	0.4
as a % of adjusted disposable income of households	0.4	0.4	0.4	0.4

¹⁾ Until 1 July 1996 General Widows and Orphans Act (AWW).

Table 3 shows the link between the total social benefits according to ESA95 and social protection benefits according to ESSPROS core (excluding re-routed social contributions⁴⁾). The Dutch figures illustrate that the two concepts are quite similar. For example, in 1998 social benefits according to the national accounts were 96.1 billion euros, while the social protection benefits amounted to 94.4 billion euros. The main difference is that social protection benefits exclude expenditure on education such as scholarships and public transport passes for students.

Social protection benefits also differ due to two other items:

- Capital transfers by the government on health and social protection, e.g. incidental lump-sum payments to poor households buying a dwelling.
- Certain reductions on taxes and other compulsory levies (see ESSPROS, para. 118, part 1). These reductions should be granted as flat rate allowances and be paid in cash when the taxable income is too low to benefit from a reduction. A case in point is child allowance in Germany: most households receive a reduction on taxes, but some households are actually paid, as their taxable income is too low.

In the Netherlands, the first item is very small (less than 20 million euros) and the second item does not occur.

Table 3 also provides some examples of how social protection statistics can be related to other national accounts statistics:

- social protection benefits per household in the Netherlands amounted to 14.0 thousand euros in 1998;
- social protection benefits amounted to 26.8% of Dutch GDP in 1998; most of this was granted by the Dutch government (20.7%);
- 44.4% of expenditure by the Dutch government consisted of social protection benefits in 1998;

- social protection benefits amounted to 42.1% of adjusted disposable income of households in 1998.

Table 4 shows the composition of social protection benefits by type of transaction, including the relevant social protection schemes.

Social protection schemes serve different functions, like sickness, disability and old age. In Table 5, Dutch social protection benefits are classified by function, showing the most important schemes involved for each function. In this way, the mix of schemes serving each function is made explicit. This mix can be analysed in various ways. For example, how important are social security benefits and other types of transactions for sickness and what is the role of the government in the protection for old age?

Some of the schemes pertain to more than one function, for example the Exceptional Medical Health Act (AWBZ). Some AWBZ benefits pertain to sickness, some to old age (e.g. the financing of old-age homes) and some to children or family (e.g. special care for pregnant women and children). Another case in point are pension benefits. They are to be split over the functions old age and survivors.

The table showing social protection benefits by function and scheme provides a simple overview of social protection in the Netherlands, and reveals most of the major changes. For example, it reflects the drastic reorganisation of disability insurance in 1998 (see function disability). The General Disablement Benefits Act and the Fund for Disabled Civil Servants were grouped together with the Disablement Insurance Act. However, a separate Act on Social Assistance for Young Handicapped Disabled to Work was introduced. This risk is no longer covered by social insurance. Similarly, the table also shows that in 1997 the financing of homes for the elderly was transferred to the Exceptional Medical Health Act.

Table 4
Social protection benefits by type of transaction and scheme

	1995	1996	1997*	1998*
	<i>bln euros</i>			
Social security benefits in cash and in kind	50.7	50.5	53.4	53.5
Sickness Benefits Act (ZW)	1.9	0.3	–	–
General Disablement Benefits Act (AAW) in cash and in kind	5.7	5.7	6.2	–
Disablement Insurance Act (WAO)	3.3	3.3	3.1	7.6
Disablement Insurance Fund (AOK)	–	–	–	0.3
Disablement Insurance Act for Self Employed (WAZ)	–	–	–	0.5
General Old Age Pensions Act (AOW)	15.2	15.9	16.6	17.6
Surviving Relatives Act (ANW) ¹⁾	2.1	2.1	2.0	1.6
Unemployment Insurance Act (WW)	4.2	5.4	4.8	4.0
Medical Health Fund Act (ZFW)	7.0	9.5	10.2	10.7
Exceptional Medical Health Costs Act (AWBZ)	11.2	8.3	10.5	11.2
Social assistance benefits in cash and in kind via market producers (excluding education)	12.4	12.4	11.0	11.8
Benefits for War-victims	0.3	0.3	0.3	0.3
Act on Young Handicapped Disabled to Work (WAJONG)	–	–	–	1.0
Income Provision for Disabled Workers (IOAW/IOAZ)	0.2	0.2	0.2	0.2
General Family Allowance Act (AKW)	3.0	2.9	2.8	2.9
Contributions to owner-occupied dwellings	0.3	0.2	0.2	0.1
National Assistance Act (in cash and in kind) (ABW)	4.7	4.9	4.7	4.3
Supplementary Payments Act (TW)	0.3	0.3	0.3	0.3
Act for social assistance to disabled persons (WVG)	0.5	0.5	0.6	0.7
Contributions to homes for the elderly	1.5	1.5	–	–
Individual rent allowances	0.9	1.0	1.2	1.3
Legal assistance	0.2	0.2	0.2	0.2
Other in cash and in kind via market producers	0.5	0.3	0.4	0.4
Pension benefits	12.9	14.0	14.8	15.6
Industrial associations pension funds	5.3	5.8	6.2	6.5
Company pension funds	2.3	2.6	2.7	2.9
Pension funds n.e.c. (incl. Early Retirement Schemes)	2.8	2.8	2.8	2.8
Life insurance companies	2.5	2.8	3.1	3.3
Other private social insurance benefits	1.7	1.6	1.3	1.0
Fund for Disabled Civil Servants (FAOP)	0.8	0.7	0.4	–
Compulsory health insurance for civil servants	0.7	0.8	0.8	0.9
Other private social funds	0.2	0.1	0.1	0.1
Unfunded employee social benefits	7.6	8.1	8.7	9.5
Paid sick leave	4.0	4.4	4.9	5.6
Reimbursement medical expenses civil servants	0.6	0.6	0.6	0.7
Unemployment benefits former civil servants	1.0	1.0	1.1	1.1
Military pension provisions	0.7	0.7	0.7	0.7
Other (mainly early retirement provisions)	1.3	1.3	1.4	1.4
Capital transfers to households for social protection purposes	0.0	0.0	0.0	0.0
Social (assistance) benefits in kind by other non-market output	2.6	2.6	2.7	3.0
by the government	2.2	2.1	2.2	2.6
by private non-profit institutions serving households	0.4	0.4	0.5	0.5
Social protection benefits by Dutch schemes	87.9	89.2	91.9	94.4
as a % of GDP				
Social security benefits in cash and in kind	0.2	0.2	0.2	0.2
Social assistance benefits in cash and in kind via market producers (excluding education)	0.0	0.0	0.0	0.0
Pension benefits	0.0	0.0	0.0	0.0
Other private social insurance benefits	0.0	0.0	0.0	0.0
Unfunded employee social benefits	0.0	0.0	0.0	0.0
Capital transfers to households for social protection purposes	0.0	0.0	0.0	0.0
Transfers of individual non-market goods & services (health & social protection)	0.0	0.0	0.0	0.0
Total	0.3	0.3	0.3	0.3

¹⁾ Until 1 July 1996 General Widows and Orphans Act (AWW).

Table 5
Social protection benefits by function and scheme (provisional figures)

	1995	1996	1997*	1998*
<i>bln euros</i>				
Sickness	24.8	24.2	24.3	26.3
Exceptional Medical Health Costs Act (AWBZ)	10.3	7.3	6.6	7.1
Sickness Benefits Act (ZW)	1.9	0.3	–	–
Unemployment Insurance Act (WW)	–	1.1	1.1	1.2
Medical Health Fund Act (ZFW)	7.0	9.5	10.2	10.7
Compulsory health insurance for civil servants	0.7	0.8	0.8	0.9
Reimbursement medical expenses civil servants	0.6	0.6	0.6	0.7
Paid sick leave	4.0	4.4	4.9	5.6
Other	0.3	0.2	0.2	0.2
Disability	11.0	10.9	11.1	11.0
General Disablement Benefits Act (AAW) in cash and in kind	5.7	5.7	6.2	–
Disablement Insurance Act (WAO)	3.3	3.3	3.1	7.6
Disablement Insurance Fund (AOK)	–	–	–	0.3
Disablement Insurance Act for Self Employed (WAZ)	–	–	–	0.5
Act on Young Handicapped Disabled to Work (WAJONG)	–	–	–	1.0
Act for social assistance to disabled persons (WVG)	0.5	0.5	0.6	0.7
Fund for Disabled Civil Servants (FAOP)	0.8	0.7	0.4	–
Other	0.5	0.5	0.5	0.9
Old age	28.5	30.1	32.5	33.8
General Old Age Pensions Act (AOW)	15.2	15.9	16.6	17.6
Contributions to homes for the elderly	1.5	1.5	–	–
Exceptional Medical Health Costs Act (AWBZ)	0.1	0.1	2.7	2.8
Pension benefits (funded)	9.9	10.7	11.3	11.5
Military pension provisions	0.7	0.7	0.7	0.7
Other (mainly early retirement provisions)	1.1	1.1	1.2	1.2
Survivors	4.9	5.2	5.3	4.9
Surviving Relatives Act (ANW) ¹⁾	2.1	2.1	2.0	1.6
Other (mainly pension benefits)	2.8	3.1	3.3	3.3
Children/Family	4.0	4.0	4.3	4.4
General Family Allowance Act (AKW)	3.0	2.9	2.8	2.9
Exceptional Medical Health Costs Act (AWBZ)	0.9	0.9	1.3	1.3
Other	0.2	0.2	0.2	0.2
Unemployment	8.8	9.0	8.2	6.7
Unemployment Insurance Act (WW)	4.2	4.3	3.7	2.8
Unemployment benefits former civil servants	1.0	1.0	1.1	1.1
Income Provision for Disabled Workers (IOAW/IOAZ)	0.2	0.2	0.2	0.2
National Assistance Act (in cash and in kind) (ABW)	3.0	3.2	3.0	2.4
Other	0.2	0.2	0.2	0.2
Housing	1.2	1.3	1.4	1.5
Contributions to owner-occupied dwellings	0.3	0.2	0.2	0.1
Individual rent allowances	0.9	1.0	1.2	1.3
Other	0.0	0.0	0.0	0.0
Social exclusion	4.7	4.6	4.7	5.7
National Assistance Act (in cash and in kind) (ABW)	1.7	1.7	1.7	1.8
Legal assistance	0.2	0.2	0.2	0.2
Social (assistance) benefits in kind by other non-market output	2.6	2.6	2.7	3.0
Other	0.2	0.2	0.1	0.7
Social protection benefits by Dutch schemes	87.9	89.2	91.9	94.4
as a % of GDP				
Sickness	0.1	0.1	0.1	0.1
Disability	0.0	0.0	0.0	0.0
Old age	0.1	0.1	0.1	0.1
Survivors	0.0	0.0	0.0	0.0
Children/Family	0.0	0.0	0.0	0.0
Unemployment	0.0	0.0	0.0	0.0
Housing	0.0	0.0	0.0	0.0
Social exclusion	0.0	0.0	0.0	0.0
Total	0.3	0.3	0.3	0.3

¹⁾ Until 1 July 1996 General Widows and Orphans Act (AWW).

3. Extended social protection benefits and the national accounts

The core concept of social protection benefits is limited. The national accounting concepts can be used to look at some possible extensions. Candidates for such an extended concept of social protection benefits are:

- Intermediate consumption for social protection purposes. This can pertain to expenditure by employers to monitor, safeguard and improve employee health. It can also cover the expenditure by employers on improving the working conditions of some handicapped employees.
- Wages and salaries in kind for social protection purposes, e.g. free or cheap childcare and housing provided to employees.
- Subsidies to producers granted for social protection purposes. Examples are subsidies to housing corporations in order to lower their rents and some wage subsidies, for example to reduce the costs of childcare or to encourage employment of low-skilled long-term unemployed workers. Since 1995, such wage subsidies have become an important tool for Dutch social protection policy. In 1995, these wage subsidies amounted to 0.2 billion euros. By 1998, they had already increased to 1.8 billion euros.
- Income transfers to producers granted for social protection purposes. Examples from the Netherlands are income transfers to other non-market producers like sheltered workshops and employment projects for the long-term unemployed. In 1998, these transfers amounted to 2.8 billion euros.
- Capital transfers to producers granted for social protection purposes. For example the Dutch government's buying off the goodwill of medical doctors and investment grants to housing corporations and hospitals. This also covers the redemption of the annual subsidies to Dutch housing corporations in 1995, involving a very substantial 14.9 billion euros, i.e. nearly 5% of Dutch GDP!

Although the national accounts do not record tax expenditure, for the government such expenditure can also be a major instrument for social protection policy. Examples of this are lower tax rates for the elderly and tax reductions for people with substantial medical expenses. Social protection benefits are gross, i.e. taxes and social contributions levied on these benefits have not been deducted. This can be very misleading for international comparisons of the purchasing power of social protection benefits or of government

expenditure on social protection. For example, in 1993 in the Netherlands direct taxes and social contributions levied on social protection benefits amounted to 6.5% of GDP, while this percentage was only 0.2% and 0.1% in the UK and the United States respectively!⁵⁾

International comparisons may also be misleading if they focus on what is protected. For most purposes, it is very important to look not only at what is protected, but also at what is not. Therefore, only if social protection statistics describe which risks are socially protected and which are not, can we really start to understand what is going on in a country. For example, social protection benefits for sickness in the Netherlands, UK and the United States are best understood by also taking into account household expenditure on sickness in these countries, for example the payment of insurance premiums or expenditure on medicines.

4. Social protection benefits and the revision

Table 6 shows the consequences of the revision of the Dutch national accounts for the social protection benefits. Before the revision, the official social protection benefits did not correspond fully with the Dutch national accounts, as – at the request of Eurostat – payments by the government to homes for the elderly were also included. Since the revision, this is now also included as a social benefit in the national accounts.

Table 6 shows that the change in the official Dutch social protection figures is very small, only 0.2 billion euros. However, this is the net result of much larger changes, for example, now also including 2.2 billion euros of individual consumption by the government. If we isolate the changes due to ESA95, social benefits increase by 2.6 billion euros (3% of total benefits). This is compensated by decreases of 2.4 billion euros caused by other reasons, mostly peculiar to the Netherlands.

The revision of the Dutch national accounts has not only changed the total amount but also the composition of social protection benefits. The ESA95 limits social security benefits to schemes in which certain groups of the population are obliged by law or regulation to participate. This implies that social schemes that do not meet this criterion are no longer regarded as social security benefits but as private funded social benefits or unfunded social benefits.

Table 6
Social protection benefits and the revision of the Dutch national accounts

	1995	ESA95?
	<i>bln euros</i>	
Social benefits in the Dutch national accounts before revision	86.2	
+ adjustment for national accounts treatment of government transfers to homes for the elderly	1.5	yes
=		
Social protection benefits before revision	87.7	
– The payments to handicapped people in sheltered workshops are now recorded as compensation of employees and not as social benefits	–1.6	no
– Individual direct payments by households are not recorded as benefits and contributions (e.g. payment for the services of a home for the elderly)	–0.7	no
+ Social benefits in kind: other non-market output by the government	2.2	yes
+ Social benefits in kind: other non-market output by NPISH	0.4	yes
+ Identification of some extra social assistance benefits in kind (e.g. to refugees)	0.2	no
+ Reclassification of transfers for owner occupancy of dwellings	0.4	no
=		
Social protection benefits fully based on the revised national accounts	87.9	
Change in official figures	0.2	
because of ESA95	2.6	
other reasons	–2.4	

The consequences of this conceptual change are that:

- Dutch private funded social benefits now also include benefits under early retirement schemes (VUT), compulsory health insurance for specific groups of civil servants (e.g. the police and people working in municipal government; IZA/IZR) and disablement insurance for civil servants (FAOP). For 1995, this reduced social security benefits by 3.2 billion euros, while increasing private funded social benefits.
- Unfunded social benefits now also include the legally required part of continued payment of wages and salaries by employers. For 1995, this diminished social security benefits by 1.7 billion euros, while increasing the unfunded social benefits by employers.

5. Social protection contributions and the revision

In several respects, the changes in the Dutch social protection contributions mirror those in the social benefits. For example:

- Changes in the composition of social benefits, i.e. the distinction between social security benefits, private funded benefits and unfunded benefits;
- Some of the changes in the size of social benefits, for example the individual direct payments by households for staying in homes for the elderly are no longer part of social contributions and social benefits.

However, some changes in the social benefits do not apply to social contributions, for example, the inclusion of individual non-market goods and services and the new treatment of the payments to people in the sheltered workshops. Furthermore, there are also changes that only pertain to social contributions.

Since 1990, taxes on wages and income are levied jointly with social contributions for some general social security schemes. In the Dutch national accounts, the taxes on wages and income were recorded on a cash basis, while the social contributions were recorded following the annual reports by the supervisory bodies of these social security schemes, i.e. less on cash basis and more on accrual. This inconsistent recording of jointly levied revenues also affected the Dutch government deficit.

As part of the revision, the Dutch tax figures have been adjusted following the most recent European jurisprudence. The jointly levied social contributions have been brought in line with this. As a consequence, for 1995 the social contributions were reduced by 0.5 billion euros.

The imputed social contributions by employers have also been adjusted with respect to military pensions. The military pensions are an unfunded scheme. The actual payments out of an unfunded pension scheme should be treated as imputed social contributions, provided there is a normal and stable ratio between the number currently employed and the number receiving a pension. However, this ratio is not normal and stable in the case of the Dutch military pensions. The drastic reductions on defence expenditure have also substantially reduced the number of active military personnel. Therefore the imputed social contributions had to be adjusted downward by amount of 0.1 billion euros.

The social contributions for pension funds have been adjusted in the Dutch national accounts. They now also include the income on the investment of pension fund reserves. However, this substantial change is irrelevant for the social protection benefits, as the ESSPROS-core does not include this type of imputed contributions.

6. Conclusions

Social protection statistics are very important for monitoring and analysing the social dimension of Europe and the world. They shed

light on major policy issues of the present and the future, for example, the costs and financing of ageing or health care and how to deal with social exclusion.

This article has presented a national accounts' module on social protection that can be derived from the standard national accounts statistics. These tables establish a link between European social protection statistics (ESSPROS96) and the new national accounts (ESA95;SNA93). Figures from the Netherlands demonstrate that this link is quite straightforward and not very complicated.

With the intermediation through the linking tables, new national accounts statistics can serve as a data base for social protection statistics, for example to check the completeness of social protection statistics or to improving their timeliness.

National accounts statistics can also serve as a frame of reference for social protection statistics. For example, social protection benefits and contributions can be related to total government expenditure, the government deficit, household income and household final consumption expenditure.

The national accounts statistics can also be used to extend the concept of social protection benefits, for example by also including wage subsidies intended to encourage the employment of the long-term unemployed.

In the Netherlands, the compilation of social protection statistics is embedded in the compilation of the national accounts, and therefore the Dutch social protection statistics have been affected by the revision of the national accounts. The implementation of ESA95 increased Dutch social protection benefits by 3%. However, this is compensated by a similar sized reduction caused by conceptual changes not related to ESA95. The changes in the social protection contributions are much smaller: about 1%. The largest changes caused by the implementation of ESA95 pertain to the composition of social protection benefits and contributions.

Notes

- 1) The views expressed are those of the author and do not necessarily reflect those of Statistics Netherlands. The author would like to thank Peter van de Ven for his comments and Jaap Cornelisse for compiling most of the basic data. Earlier versions of this paper were presented at the meeting of the Eurostat Working Party on Social Protection Statistics, on 20 and 21 September 1999 and discussed at the meeting of the Eurostat Working Party on National Accounts on 5 and 6 June 2000.
- 2) Office for official publications of the European Communities, Luxembourg, 1996
- 3) European Communities, European System of Accounts (ESA95), 1996 (Office for Official Publications of the European Communities, Luxembourg); United Nations and other various other international organisations, System of National Accounts 1993 (SNA93).
- 4) Re-routed social contributions are payments that a social protection scheme makes to another scheme in order to ensure that its protected people are also protected by the latter scheme (see ESSPROS96, para 76). For example, in the Netherlands the Disablement Insurance Act (WAO) pays the employers' part of social contributions to other schemes, like the Medical Health Fund Act (ZFW) and the Unemployment Insurance Act (WW). Re-routed social contributions are included in the definition of social protection benefits. However, in this note they are left out, as confining social protection benefits to those actually received by households seems more relevant for most purposes. A similar approach is taken by Eurostat in presenting statistics on social protection benefits in the EU; these social protection benefits also exclude the re-routed social contributions.
- 5) W. Adema, What Do Countries Really Spend on Social Policies? A Comparative Note. (OECD Economic Studies no. 28, 1997).

Software estimates in the Netherlands 1986–1997¹⁾

Kees van der Ende and Piet Verbiest

Abstract

The 1993 System of national Accounts (SNA) and 1995 European system of accounts (ESA) extend the asset boundary to include intangible assets in general and software in particular. The estimation of gross fixed capital formation is not straightforward. Definitions, data, assumptions and implementation are discussed.

Key words: software, gross fixed capital formation

1. Introduction

Both the 1993 System of national Accounts (SNA) and the 1995 European system of accounts (ESA) extend the asset boundary to include produced intangible assets in general and computer software and large databases in particular as gross fixed capital formation. This extension resulted in an increase in the level of gross fixed capital formation in the Netherlands by 5.1 billion guilders in 1995, and 7.7 billion guilders in 1997 (see Table 1). The contribution to GDP was about 1% in 1997.

The results presented in Table 1 do not reflect the problems involved in estimating gross fixed capital formation in software. There are no problems from a conceptual point of view, as the general definition is quite clear. The difficulties that arise are mainly based on the existence of various types of software, various types of ownership rights and last but not least company bookkeeping practices: most companies include purchased software in intermediate consumption and do not record software produced in-house.

This article discusses the estimation of gross fixed capital formation in software in the Netherlands. Section 2 focuses on the conceptual issues. Sections 3 and 4 discuss the measurement and the determination of the final estimates, and section 5 presents some concluding remarks.

2. Definition, valuation and implementation

The 1995 ESA defines computer software as:

“Computer programs, program descriptions and supporting materials for both systems and applications software. Included are purchased software and software developed on own account, if the expenditure is large. Large expenditures on the purchase, development or extension of computer databases that are expected to be used for more than one year, whether marketed or not, are also included” (ESA Annex 7.1).

On valuation ESA states that *“...computer software should be valued on the basis of the purchasers’ price paid on the market, on the basis of estimated basic prices when produced in house, or on the basis of costs of production when such prices are not available”*. (ESA per. 7.35 and 3.114b).

In addition to the definitions there are two more criteria to classify purchases of software in gross fixed capital formation. Firstly, the software must satisfy the common one-year criterion. It is assumed that all purchases of software will meet this touchstone.

Secondly, software should be submitted to the small-tools rule, in which purchases costing less than 500 euros are considered as intermediate consumption. However, the collected information contains no separate data on small purchases. In the Dutch national accounts the estimates of software do include small purchases, so these may tend to overestimate gross fixed capital formation.

Although it cannot be said for software that all roads lead to Rome, certainly several roads do. Software can be bought, leased, rented or included in purchased hardware; it can be a standard application or a tailor made computer program, etc. Following the classification of the Eurostat Task force on intangible assets, initially four types of software are distinguished:

- originals of general purpose software
- purchased bespoke software
- bought-in general purpose software
- bespoke software produced on own account

Table 1
Gross fixed capital formation 1995–1997

Types of Assets	1995	1996	1997	1995	1996	1997
	<i>mIn guilders</i>			%		
Dwellings	37 339	40 259	44 009	26.8	26.9	27.3
Non-residential buildings	22 373	22 260	23 437	16.1	14.8	14.5
Civil engineering works	15 716	17 024	16 580	11.3	11.4	10.3
Transport equipment	16 377	16 619	16 795	11.8	11.1	10.4
Computers	5 981	6 955	7 759	4.3	4.6	4.8
Machinery etc.	26 064	29 253	32 399	18.7	19.5	20.1
Cultivated assets	913	871	905	0.7	0.6	0.6
Other tangible assets	6 536	7 149	8 327	4.7	4.8	5.2
Transfer costs on land	1 858	2 160	1 825	1.3	1.4	1.1
Software	5 139	6 015	7 678	3.7	4.0	4.8
Other intangible assets	857	1 354	1 553	0.6	0.9	1.0
Total	139 153	149 919	161 267	100	100	100

Originals of general purpose software are intended for sale under licence for use by others in their production process. In this way original software is similar to a manuscript of a book and other literary originals, and indeed one could argue that this type of software should be included under literary originals and not under the asset 'software'. However, as both software and literary originals are considered to be intangible assets, it makes little practical difference how it is classified. From the users' point of view it may be confusing to record software originals with literary originals. On the basis of these arguments and because of the lack of relevant data, the Dutch national accounts classify software originals in the asset category software.

Purchased bespoke software is the most clear-cut example of gross fixed capital formation. Once produced, the software is available to the user including the program code, and the producing software company has no further rights over the asset.

Bought-in general purpose software can be purchased in itself or in a package with the purchase of hardware. In the latter case it is difficult to separate the constituent parts and these are therefore classified within computers as part of tangible assets.

As purchasing general purpose software implies purchasing the right to use the software rather than owning the original including the full program code, the difference between renting, leasing, purchasing is vague and seems artificial. Therefore in the Dutch national accounts all general purpose software purchased, rented or leased is included in gross fixed capital formation.

By its nature, in-house development of software by a company or institution for internal use within the production process resembles purchased bespoke software. Following the guidelines of the 1995 ESA, it should be valued at basic prices or on the basis of production costs. Using a cost approach, it is most appropriate to consider only software produced by professional computer staff as gross fixed capital formation (see also Eurostat 1997). In the Dutch national accounts this approach is applied.

3. Supply and demand

Estimates for gross fixed capital formation can be made from either the supply or the demand side. The Eurostat Task force considered measurement by a supply side approach to be inferior (Eurostat 1997) and recommended a demand side approach. Statistics Netherlands combines both approaches by compiling initial estimates for gross fixed capital formation in software from a demand side point of view and balancing these estimates within the framework of the (annual) supply and use table with supply side data. At the

moment of writing balanced data for 1995 to 1997 have been compiled.

Several possible sources can be identified for a demand side estimate. Where producing units are concerned expenditure on automation can show up as intermediate consumption and as gross fixed capital formation. However, as Dutch bookkeeping practices record nearly all automation costs as intermediate consumption, this information is not a useful starting point for the estimation of gross fixed capital formation in software. On the other hand, special surveys on gross fixed capital formation show very little investment in software.

Statistics Netherlands compiles specific automation statistics, covering among other things expenditure on software by private companies and government departments, subdivided by industry. These statistics cover three different types of software:

- Administrative and computer-aided design
- Computer-aided planning
- Computer-aided manufacturing

The administrative software is further divided into original general purpose software and bespoke software.

The survey collects information from enterprises with six or more employees and raises the outcomes for the national accounts. The results are presented in Table 2.

One practical consequence of using these data in combination with production statistics is that in order to avoid double accounting, the amount of purchased software already included in gross fixed capital formation must be deducted from intermediate consumption of *automation services*²⁾.

In the absence of 'real' data in-house produced software, the wage costs of automation staff are used as an approximation; these costs are included in the automation survey. They are classified as follows:

- management
- development
- support
- processing
- other, non-specified

The wage costs of development staff are used to estimate own account gross fixed capital formation in software. As no mark-up is applied, this probably results in an underestimation. On the other hand staff whose wages are included might be too broadly defined, resulting in an upward bias thus compensating the underestimation. Table 3 presents the estimates.

Table 2
Purchased software

NACE	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997*
	<i>mln guilders</i>											
Agriculture, fishing etc.	6	4	7	7	10	10	10	12	20	15	28	24
Mining and quarrying	24	29	32	42	45	40	83	63	39	49	67	65
Manufacturing	598	747	676	731	1 022	868	961	1 015	900	1 145	1 092	1 117
Public utilities	1	1	3	82	64	81	102	111	122	114	91	98
Construction	34	36	38	49	52	52	48	57	69	79	91	92
Trade, restaurants and repair services	233	358	287	353	333	414	462	399	380	339	329	369
Transport and communication	59	83	115	183	272	311	381	250	310	337	385	402
Other services (exc. govt.)	647	644	664	1 042	1 245	1 369	1 524	1 486	1 456	1 312	1 397	1 522
Government and social security	297	405	555	496	506	557	642	610	595	483	624	667
Education	14	9	19	10	9	10	13	33	29	29	32	34
Total	1 913	2 316	2 396	2 995	3 558	3 712	4 226	4 036	3 920	3 902	4 136	4 390

* Provisional figures.

Table 3
Software produced on own account

NACE	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997*
<i>mln NLG</i>												
Agriculture , fishing etc.	0	0	0	0	0	0	0	1	0	1	0	0
Mining and quarrying	1	1	1	5	4	4	6	6	3	4	4	4
Manufacturing	222	228	212	230	253	219	282	289	291	256	206	205
Public utilities	1	1	1	31	17	26	27	29	22	21	18	22
Construction	1	4	4	5	4	5	9	8	11	8	9	10
Trade, restaurants and repair services	93	89	102	128	132	156	141	152	147	223	302	365
Transport and communication	17	17	18	47	66	74	86	72	94	107	102	108
Other services (excl. Govt.)	244	373	329	399	336	458	447	635	485	532	576	1 548
Government and social security	178	189	169	208	187	190	211	196	180	209	246	270
Education	4	5	4	4	4	9	8	9	8	9	15	14
Total	761	819	840	1 057	1 003	1 141	1 217	1 397	1 241	1 370	1 478	2 546

* Provisional figures.

Software developed by companies themselves accounts for about 25% of total investment in software.

As in most cases it is not included in the output of industries as recorded in the production statistics, for the national accounts the output must be adjusted by the amount of this software³⁾.

The supply side is covered by data resulting from production statistics and foreign trade data. In the supply table this output is classified as *computer services*. The contents of this commodity are broader than software alone: it also includes maintenance and repair of computers, automation training, advice, CD-ROMs, etc. Home entertainment software is not included.

The main resident producers of software are classified under the *computer services* industry. However, other industries also produce computer services (see Table 4). Foreign trade data are derived from the statistics on imports and exports of goods (CD-ROMs) and from the balance of payments, in which a separate category *computer and software services* is distinguished.

Table 4
Supply of computer services by industry, current prices

	1995	1996	1997
<i>mln NLG</i>			
Wholesale trade	886	991	1 060
Computer services	8 148	10 140	13 263
Imports of goods	679	912	943
Imports of services	849	1 050	1 326
Others	388	394	415
Total supply	10 950	13 487	17 007

4. Balancing

The supply of computer services and gross fixed capital formation in software both play a part in the balancing process within the framework of supply in use tables, together with exports, household consumption and intermediate consumption. Table 5 gives an overview of demand and supply of computer services (including software).

Intermediate consumption accounts for more than 50% of the demand for computer services. The share of gross fixed capital formation amounts to 30%. The perceived millennium problems pushed up intermediate consumption tremendously between 1995 and 1997.

Balancing the supply and use table implies adjustment of data to achieve equality of supply and demand. The initial estimates of gross fixed capital formation in software are also adjusted to fit in the table. Table 6 shows the adjustments of the software estimates as a result of balancing and the eventual totals.

Table 5
Demand and supply of computer services

	1995	1996	1997
<i>mln NLG</i>			
Domestic production	9 422	11 525	14 738
Imports	1 528	1 962	2 269
Margins and tariffs	20	27	32
VAT	629	710	927
Total supply	11 599	14 224	17 966
Intermediate consumption	5 904	7 350	9 700
Exports	1 672	2 055	2 780
Household consumption	254	282	354
Gross fixed capital formation	3 769	4 537	5 132
Total demand	11 599	14 224	17 966

Table 6
Balancing adjustments for purchased software

NACE	Adjustments			Adjusted totals		
	1995	1996	1997*	1995	1996	1997*
<i>mln NLG</i>						
Agriculture, fishing etc.	0	3	4	15	31	28
Mining and quarrying	0	6	11	49	73	76
Manufacturing	0	106	188	1 145	1 198	1 305
Public utilities	0	9	17	114	100	115
Construction	0	9	16	79	100	108
Trade, restaurants and repair services	5	34	62	344	363	431
Transport and communication	0	34	68	337	419	470
Other services (excl. Govt.)	-77	137	258	1 235	1 534	1 780
Government and social security	-61	60	112	422	684	779
Education	0	3	6	29	35	40
Total	-133	401	742	3 769	4 537	5 132

* Provisional figures.

The 1995 ESA were implemented with the revision of the Dutch national accounts over the year 1995. The balancing process resulted in a negative adjustment of gross fixed capital formation in software of 133 billion guilders because of supply shortages. In 1996 and 1997 the supply of computer services showed a marked increase in the Netherlands. The initial estimates for gross fixed capital formation in software showed a lower growth rate. The balancing process resulted in positive adjustments for these two years. One could say that the final estimates for gross fixed capital formation in software are supply driven. Balancing corrections also reflect in many cases the underlying quality of the source material.

A major problem is the constant price estimation of software. Following the task force on volume measures for computers and computer software (Eurostat, 1999), an input-like method is applied. A wage rate index for computer staff is used to deflate the production of computer services and gross fixed capital formation in software.

5. Concluding remarks

This article has presented the results of the estimation of gross fixed capital formation in software in the Netherlands. Although Statistics Netherlands is in the favourable position of having survey data on the purchases of software at its disposal, the estimation is by no means straightforward. It was not possible to compile estimates that comply exactly with the definitions of the ESA. The basic data do not permit the proper delineation between intermediate consumption and gross fixed capital formation. The one-year criterion and the small-tools rule are violated, giving rise to an overestimation. In-house gross fixed capital formation is approximated by the wage costs of computer staff involved in the development of software. Constant price estimation of software is an even bigger problem. For the time being a wage rate index of computer staff is used for deflation. More appropriate price and/or volume indices are an important avenue for research in the near future.

The estimation of software is representative for the types of problems encountered in the estimation of gross fixed capital formation in intangible assets in general. Choices made in the estimation process have an impact on the outcomes, which in turn have their impact on GDP. In order to ensure international comparability of national accounts data, exchange of information on estimation practices in different countries is essential, so as to ensure a definition of new standards.

Notes

- 1) This paper was presented at the OECD – National Accounts Working Party meeting, 21– 24 September, Paris.
- 2) The amount deducted from intermediate consumption is not equal to purchased software, because a minor part of the expenditure on software has already been recorded as gross fixed capital formation within enterprises.
- 3) The adjustment does not necessarily equal own account produced software, as a fraction may have already been recorded as gross fixed capital formation.

References

- Bitboek, 1997. *De markt voor home entertainment software in Nederland* (The market for home entertainment software in the Netherlands). NVI interactief.
- Central Statistics Office, 1996. *Workshop on the implementation of the new SNA: capital formation. Minutes and papers*. London 22–23 February 1996,
- Dalgaard, E., 1998. *Estimating gross fixed capital formation in software*. Statistics Denmark.
- Eurostat, 1996. *European System of National and Regional Accounts in the European community*, Brussels/Luxembourg.
- Eurostat, 1997. *Report from the task force on intangibles*, Eurostat document BI/CN 351 e. Brussels/Luxembourg.
- Eurostat, 1999. *Report from the task force on volume measures for computers and software*. Brussels/Luxembourg.
- INSEE, 1998. *Evaluation of the gross fixed capital formation in the French national accounts*. INSEE, Paris.
- Rainer, N., 1999. *Measurement of own account produced software*. NSO Austria.
- Rizki, U., 1999. *Investment in computer software and large databases*, Central Statistics Office, London.
- Statistische Bundesamt, 1997. *Methods and principles for the calculation of intangible fixed capital formation and valuables according to 1995 ESA*. Statistische Bundesamt, Wiesbaden.
- Verbiest, P., K. van der Ende and F. Bos. 1998. *Bruto investeringen, immateriële activa en defensie*, (Gross capital formation, intangible assets and defence). Statistics Netherlands.

Labour Accounts principles and practice: experiences in Denmark, the Netherlands and Switzerland¹⁾

Brigitte Buhmann, Wim Leunis, Alain Vuille and Kirsten Wismer

Abstract

The necessity of resolving conflicting data and the wish to describe interrelationships on the labour market both 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 encounter, 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 article gives an overview of the characteristic features of Labour Accounts.

Key words: Labour Accounts, integration, labour statistics, quality, transparency, comparability over time, cross-sectional, longitudinal.

1. Labour statistics in general

The labour phenomenon can be interpreted from several perspectives:

- as a *production factor*, labour is often designated as human capital. Both paid and unpaid labour may contribute to the production of goods and services. The level of production correlates with the quality of the labour input;
- labour activities and the earnings they provide represent a *social phenomenon*, since they bestow a socio-economic status, enhance social integration and stimulate social relations;
- as a *market commodity*, paid labour has a price largely conditioned by supply and demand on the labour market which is mediated institutionally. Existing market inefficiencies may lead to vacancies and unemployment. The coexistence of regional and functional sub-markets is a complicating factor, which also needs to be reflected in labour statistics.

Labour market statistics have a very special part to play as a link – or rather an interface – between population and economic statistics. Timeliness and reliability are the most outspoken conditions which they should fulfil.

The objects of description, or 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. organisation 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, volumes) and follow them in time.

2. Labour Accounts: why and how

The Labour Accounts can be described as a statistical system of core variables on labour acquired through integration, within the statistical information system on labour. The Labour Accounts consist of a set of tables describing the interrelations between linked

variables. These tables should provide a systematic consistent overview, mutually and over time, of the core variables.

At the 15th *International Conference of Labour Statisticians (ICLS)* in 1993, the ILO 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.

Within Labour Accounts one can distinguish between a cross-sectional and a longitudinal approach. The cross-sectional approach was the main objective in discussions within ILO setting in the eighties, and for the time being the Netherlands is concentrating on this aspect. The longitudinal approach can be seen as being in line with the *Arbeitsmarktgesamtrechnung* developments in German-speaking countries. Denmark and Switzerland are developing both the cross-sectional and the longitudinal variant.

2.1 The need for Labour Accounts

There are good reasons – both internal and external – to compile Labour Accounts. External arguments focus on the elimination of output deficiencies, while internally, Labour Accounts have proved a powerful tool to increase data input efficiency and to increase quality.

The shortcomings in the output from labour-related statistics can be traced back their long and varied history: most developed countries have been systematically collecting labour data since the beginning of this century. Population 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 to monitor labour market trends on a regular basis. However, despite the availability of a variety of information, researchers, statisticians and politicians have serious problems obtaining a satisfying picture of the labour market situation. These difficulties are based on the following problems:

a. Occurrence of contradictory results between data sources

Many users obtain their statistics from one regular source, for example monthly results of one particular survey. Conflicting data are revealed if the source statistics publish different results. This happens for instance in statistical yearbooks which bring together in one volume labour statistics from various surveys and sources. Some users, mainly researchers and policy makers, themselves combine results from different sources and find discrepancies in the statistics. Obviously the users are less equipped to sort out this confusion than the statisticians who collect and supply the information. The underlying reasons for apparent differences in levels and trends between figures can best be explained by the provider of the statistics. These differences are caused by the lack of comparability between the data sources and/or sampling and non-sampling errors.

To start with the former of these causes, the comparability factor, data are not comparable because they have different reference populations, different measurement units, different reference periods and different definitions. Statistical co-ordination is the best known instrument that has been used to increase the coherence between the output of source statistics. It involved using similar populations, sample frameworks, definitions, classifications, research methods and observation frequency. However, the practical implementation of co-ordination has proved difficult over the years and it has only turned out to be a first step towards full data

reconciliation. In many countries the co-ordination of surveys has improved a lot in recent years, but inevitably this has been limited to co-ordination within the same kind of data source: household surveys or establishment surveys. In addition to conflicting data from separate sources, statistics resulting from one and the same survey or source covering different periods may also hamper comparability because of changes in questionnaires or processing or because of adaptations of the legislation or regulations underlying the registration used.

The other factors that reduce comparability of statistics are the sampling errors resulting from the data collection processes and non-sampling errors in collection and processing and which may affect the survey results. Although it is true that the extent of sampling errors can be analysed, reliable estimates of the effect of non-sampling errors are hard to come by. Even the basic registrations may be polluted, thus distorting the subsequent statistics.

b. Lack of complete 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. There is no total overview.

c. Difficulties in describing labour market dynamics

The description of labour market dynamics is very limited. Most surveys present only the situation at a given point in time or net changes between two points in time and do not show the gross changes. It is often impossible to perceive fully important labour market phenomena with no knowledge of the dynamic interplay.

d. Missing links between labour market data and other statistical systems

The necessary links between labour market data and data from the National Accounts and other statistical systems, for example population or education statistics, are often missing.

The more internally oriented reasons for compiling Labour Accounts are in the field of input efficiency and increased quality. The Labour Accounts approach opens new opportunities for statistical offices to combine two important goals: a reduction of both survey costs and response burden with an increase in data quality.

a. Differences between available and required concepts can be an advantage

Administrative and respondent friendly concepts often do not coincide with the statistical concepts needed. Within the process of statistical integration leading to Labour Accounts, the concepts available from the data sources are explicitly transformed into the statistical concepts with a more general use, like those agreed upon internationally in NACE, SNA/ESA and ILO standards. The process leads to a description of phenomena instead of survey results. Such a procedure is profitable from various points of view:

- comparability over time; e.g. breaks in administrative data concepts and questionnaire changes can be substantially remedied in the accounting framework;
- comparability between countries; if the statistical information system is linked to the existing international standards, it facilitates world-wide comparisons of trends, levels, and so on, because of the harmonised methodology.

b. Best practices and data input variability

Some countries have extensive administrative data, while others rely largely on census data. Unequal opportunities for gathering data should not lead to a situation where only data sources available for all countries can be used to improve data quality. An accounting approach enables the utilisation of best practices. Some examples:

- the number of survey respondents can be reduced by extending the use of register data: administrative sources are both cheap and integral;
- asking the same question twice in different surveys can be limited to the absolute minimum needed for quality control and

interlinkage. More and more respondents need only to be asked questions on personal characteristics (for household surveys) or on readily available information from administrations (for business surveys), reducing costs through the utilisation of different surveys and register output;

- institutional differences between countries, as reflected in micro-data, can to a large extent be remedied

c. Quality checks

Definition relationships between different variables play a prominent role in the quality control within accounting systems. Examples of such relationships are additive relationships: effectuated supply of labour (by personal characteristics) equals filled demand (by all industries); and multiplicative relationships: wages and salaries in a certain sector equal total employment in that sector times the average wage rate.

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. It should be noted in this respect that in most cases these discrepancies result after the normal control-correction procedures of the separate sources. Further data analysis has to result in well founded adjustments leading to higher reliability of the data included.

d. Data linkage

Linking data enlarges the scope for monitoring, analysis, forecasting and policy simulation, without increasing the response burden. A statistical information system yields more stable and more precise summary indicators. In addition to the cost effectiveness and data quality aspects, this data linkage can also be used to achieve:

- 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.

As every country with a developed system of labour market statistics faced the above-mentioned problems, in the early eighties, a broad-based international discussion was initiated to ascertain how these difficulties could be overcome within an integrated framework. The proposed solution is called the *labour accounting system*²⁾ (LAS). Quite a number of conceptual principles and practical solutions have since been developed.

The task of the Labour Accounting System is to address the above-mentioned problems 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 population statistics.

2.2 General principles of the Labour Accounts

Although the three countries presenting their labour accounting experiences in the present article have different priorities and have chosen to emphasise different aspects, their work shows or aims at many similarities which can be regarded as principles underlying the Labour Accounts approach.

a. Full coverage

Labour Accounts are exhaustive. They cover all economic activities, all jobs and the entire labour force and may quantify all central indicators of all labour dimensions. If this is not yet fully the case, the aim is to achieve this in the near future.

b. Uniform use of ILO and SNA concepts

Questionnaire concepts and concepts available from administrations and registrations are limited by the description possibilities of the direct sources. In the Labour Accounts, concepts and breakdowns are translated into uniform definitions and classifications, linked to ILO and SNA recommendations and resolutions. ILO concepts describe employment (paid and self-employment), unemployment, earnings and labour costs, the SNA define labour and compensation of employees.

When linking population and economic statistics labour data have to be published according to a national concept (people who *live* in the country) and a domestic concept (people who *work* in the country). Different concepts can be used to describe employment: employed persons, jobs, full-time equivalents and hours of work. Within these various definitions differences can still occur with respect to the kind of hours underlying these concepts (hours paid or hours actually worked, etc.). For international comparison ideally this variety should be restricted or a number of concepts should be selected which can be presented by the majority of countries.

c. Reference point and period and corresponding type of data

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

d. Full consistency

Labour Accounts provide data which are in full harmony and satisfy strict identity relations. There are no contradictory results. 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 the SNA serves as a co-ordinating tool for economic and financial statistics (Hoffman, 1999).

Labour Accounts offer a framework to bring labour data from all kinds of source statistics together. 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 categorised by relevant characteristics. The aggregates have to satisfy a set of identity relations. Employment, unemployment and underemployment together form total labour supply. Wage cost totals again should follow employment trends, employee age distributions and wage rate developments. The identities exist in the static description of core objects as well as between stock and flow data.

e. High quality data (combining strengths 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 two main arguments in support of this thesis. First the combination of sources: each source has its strengths and weaknesses. 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 above household surveys with respect to sample design (stratification according to size of enterprise), registrations give integral data on their subjects. Labour Accounts combine the strong points of the various sources. Secondly, the various possibilities for confronting results help to trace and quantify errors in data processing, which can be corrected in the process of statistical integration.

f. Comparability over time

Continuity is given high priority in the Labour Accounts, resulting in consistent time series. Labour Accounts do not suffer from design changes as surveys do, nor are they affected by changes in legal and administrative procedures that affect register based statistics. Surveys aim to present representative figures on the current situation and to a certain extent discard previous results, which are overtaken by new insights and data which become available in the meantime. In the processing of Labour Accounts explicit adjustments are made for unreal changes in the figures from the direct sources. There always is friction between comparability over time and current accuracy. This friction is typical to time series statistics and only regular revisions can relieve this.

g. Timeliness

On the face of it, integrated statistics may seem less timely than the results of source statistics: integration takes time; however, for fully integrated quarterly and annual accounts the opposite is true. Labour Accounts are based on as many sources as possible, some of them are available very early, some of them only after one or two years. By combining short-term measurement with updating procedures for structural variables Labour Accounts may facilitate provisional releases which precede the findings of source statistics on structural data.

Via a process of different releases ranging from *provisional* to *definite* data, first results can already be published very soon after a reference period, whereas the data results are not made definite before the more reliable, but sometimes tardy structural statistics are integrated.

h. Data variable flexibility

The idea that an accounting system is less flexible than a direct source is not necessarily the case either. Of course it is true that a key focus of such a system is the compilation of consistent time-series for a set of variables, and regularly introducing or deleting core variables within the integrated system is out of the question. However, such a system does not function independently of the source statistics which supply supplementary data on the areas concerned. Once integration has been achieved, additional parts can be introduced by linking detailed source data to aggregated accounts data. This has various ramifications:

- 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.
- The sample error in the source data can be reduced. Accuracy will be improved if the source data are reweighted with data which are correlated with the target variable.

So if surveys come up with new information on related subjects, this can immediately find its way to the accounts as specific indicators or supplements, without affecting the general coherence.

i. Transparency

During the process of integration many decisions are made to adjust data results from the various sources used. The reliability of some of these adjustments is not subject to doubt, but others are based on assumptions which cannot always be tested. In documenting the different steps taken in the process, decisions can be challenged and thus improved wherever needed.

j. Organisation

What is the relevance of organisation for the development of Labour Accounts? Three aspects are relevant here:

- Division of responsibilities: if the different source data are produced in different parts of the organisation and no one is held responsible for the whole or for the fit with related figures from other sources, there might be little pressure on reconciliation of different data results;
- Distance to direct source: if the work on Labour Accounts is carried out close to one of the direct sources there is the danger of a bias in adjustment of the data from this particular source and

a lack of commitment from people who work on the other sources; if the work is done in a completely different part of the organisation (viz. national accounts and labour statistics) this may lead to a sub-optimal use of the knowledge gathered by the producers of the direct source. So, one should strive for a middle of the road solution.

- Cultural aspects and priorities: the extent of success of developing Labour Accounts depends on openness with respect to the practised methodologies, on willingness to learn from criticism and last but not least, on the attitude of the people in control with respect to the publication of conflicting data.

2.3 Process of statistical integration

In the integration process the findings from source statistics and derived statistics are harmonised and adjusted for errors. For purposes of quality control, the process is in principle reproducible. Even if subjective decisions are taken, these are explicitly documented and published to enable adjustments in subsequent versions whenever there is evidence in favour of other decisions occur. The resulting integrated statistics will have to be reliable approximations of real life aggregates and distributions.

The process can be broken down into three steps:

- In the first step definitions, classifications, reference periods and the level of breakdown used by the source statistics are harmonised. Full coverage is also achieved in this stage. The adjustments in 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 types and sizes 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 harmonisation and the achievement of full coverage, the aggregate values may still disagree in practice, but the findings from source statistics are aligned on shared parameters.
- If after this first stage there is still no full compatibility, it can be concluded that the data material contains errors. The data are checked for the definitional equations which have to hold.
- In the second stage of the integration process, which is called the minimisation of measurement errors, errors and sampling imprecision are traced and eliminated whenever possible. There is no foolproof survey procedure with regard to either random or systematic non-sampling errors. Most data which originate from surveys are also afflicted by sampling errors. By confrontation in identity relations, errors, irregularities and improbabilities are traced and corrected. The Labour Accounts offer an adequate framework to confront data from co-ordinated sources and to verify how they compare. The causes of error are often only detected in this second step.
- Very small differences are neglected. These are smoothed out in the third and final step of the integration process: the balancing. Here a mathematical procedure is used by which the adjustments are minimised under the condition that the values attached meet the identity equations set beforehand

3. Labour Accounts practices

In Denmark, Switzerland and the Netherlands labour accounts are now in regular production. Buhmann et al. (1999) describe content and results for the national practice on labour accounts in the three countries. In Hoffmann (1990, 1998 and 1999) reflections from an international point of view are given on the underlying principles of labour accounts and the present state of affairs.

In Denmark two separate systems had been developed under the umbrella of labour accounts: the Working Time Accounts (cross-sectional accounts, see Wismer et al, 1999 and Statistics

Denmark, 1999) and the Labour Market Accounts (longitudinal accounts, see Sølling et al, 1999). In the Netherlands quarterly and annual results have been regularly produced since the early nineties (Altena et al. 1987, Statistics Netherlands 1999 and Leunis, 2000a). Recently a unique 1-to-1 linkage has been reached between Labour Accounts and National Accounts in the Netherlands (Leunis, 1999 and 2000b). Within the Swiss national statistical system only the longitudinal accounts are called Labour Accounts (*Arbeitsmarktgesamtrechnung*), the cross-sectional accounts are called Labour Market Indicators (*Arbeitsmarktindikatoren – AMI*). At the Siena Group meeting on Social Statistics in Maastricht (May 2000) a more refined description of the integration process used for labour accounts was presented for the three countries mentioned above (Buhmann et al. 2000). In that paper the emphasis is more on the description of the models underlying the identity relations. Finally, following the need for a consistent and more elaborated description of the labour statistics as an interface between population and social statistics on the one hand and economic statistics (national accounts) on the other, a EU leadership group was started in 1999 (final report expected in 2001). In this group labour statisticians and national statisticians from seven EU countries work together on Social Accounting Matrices and their relation with Labour Accounts

Notes

- 1) This paper is based on the introductory chapter of Buhmann et al (1999), complemented in section 3 with a short overview of different practices and recent publications.
- 2) Here the term accounting is not used to present a kind of bookkeeping system where receipts and expenditures have to balance out, but to reflect the importance of identity relations between the different variables, both for users and producers of such statistics.

References

- Altena, J.W., C.A. van Bochove, and W.P. Leunis, 1987. Reconciling Labour Data from various Sources: The Compilation of Labour Accounts Data for the Netherlands. In: *CBS select*, Statistics Netherlands.
- Buhmann, B., W.P. Leunis, A. Vuille and K. Wismer, 1999. Labour Accounts, *Principles and Practices, Experiences in Denmark, the Netherlands and Switzerland*. Papers prepared for the Eurostat Seminar on Labour Accounts: Integrated Labour Statistics, 14 December 1999.
- Buhmann, B., W.P. Leunis, L. Sølling, A. Vuille and K. Wismer, 2000. *Labour Accounts: A Step Forward to a Coherent and Timely Description of the Labour Market*. Paper presented at the Siena Group Meeting on Social Statistics, Maastricht, 22–24 May 2000.
- Hoffmann, E., 1990. A Labour Accounting System – Reflections on Main Concepts and Principles. In: *Statistical Journal of the United Nations* ECE, 1990-7.
- Hoffmann, E., 1998. Developing labour account estimates: Issues and approaches. In: UN Department for Economic and Social Affairs, Statistics Division: *Household Accounting: Experiences in the Use of Concepts and Their Compilation*. Vol. 2: *Household Satellite Extensions*. United Nations, New York. (Sales no: ST/ESA/STAT/SER.F/75).
- Hoffmann, E., 1999. *Labour Accounts: Integrated labour statistics: Where do we stand? How to go further*. ILO. Revision of draft prepared for Eurostat Seminar on Labour Accounts: Integrated Labour Statistics, 14 December 1999.

Leunis, W.P., 1999. *Linking social and economic statistics through the 1995 revision of national accounts and Labour Accounts*. Paper presented at the OECD national accounts working party meeting, Paris, 21–24 September. See also article on p. 20 of this issue.

Leunis, W. P., 2000a. *Labour Accounts, general principles, various practices*. Paper presented at the Workshop on labour and unemployment: measurement and analysis issues, organised by the University of Padova, Brixen, 10–12 February 2000.

Leunis, W. P., 2000b. *The description of ESA '95 employment; relation between labour force survey and national accounts in the Netherlands*. Interim summary report prepared for the Taskforce on ESA employment, 25 February 2000.

Sølling, L. P., Stender and M.K. Masden, 1999. *Labour Dynamics from the Perspective of Labour Accounting System (LAS)*. Paper written for the 3rd meeting of Group de Paris INSEE, Paris, 18–19 November, 1999.

Statistics Denmark, 1999. *Working Time Accounts. Denmark. Results*. Statistics Denmark, Paper presented at a EUROSTAT seminar Labour Accounts: integrated labour statistics, Copenhagen, 14 December 1999.

Statistics Netherlands, 1999. *Labour Accounts in theory and practice, the Dutch experience*, Statistics Netherlands, Voorburg/Heerlen.

Towards a new Statistics Netherlands blueprint for a process-oriented organisation structure

Ad Willeboordse

Abstract

Statistics Netherlands is currently preparing for a fundamental reorganisation. This paper sketches the outlines of the new structure, which is due to be implemented autumn 2000. The new organisation offers better opportunities for standardisation and integration of statistical processes, and hence is expected to have positive effects on efficiency of processes and coherence of products.

Key words: Statistics Netherlands, organisation structure, statistical process, information technology

1. Introduction

The current structure of Statistics Netherlands is characterised by rather isolated statistical processes, carried out in a number of more or less independently operating business units. Each of these units covers a particular statistical subject-matter area and is responsible for most of the stages in the statistical process cycle itself. This ranges from monitoring user needs, via data collection and processing, to publication and dissemination. Central steering is kept to a minimum. Gradually, the insight grew that this model entails a number of artificial cuts which obviously disrupt "natural" coherence among statistical processes and among statistical products, and which hamper the full use of economies of scale. Moreover, there are drawbacks for respondents and users, the former bothered by irrelevant questionnaires sent from different places in the Bureau, and the latter forced to gather their data by shopping around, only to eventually find out that the data do not fit in with each other.

The drive to knock down the walls and to unite what logically belongs together was further strengthened by two external factors. First, the emergence of advanced IT tools encourages the streamlining, standardisation and integration of the numerous processes, and thus urges the shift from a subject matter to a process oriented structure. Secondly, Dutch government recently imposed annual budget cuts of 10–15% on Statistics Netherlands, to start in 2004, with the added requirement that neither the quantity nor the quality of the output will suffer.

In the summer of 1999 this culminated in the decision to reorganise Statistics Netherlands. The outline of the new structure has now been established far enough to sketch a broad picture of the organisation, as due to be implemented in October 2000. Here this sketch is preceded by an elaboration of Statistics Netherlands' view on the statistical process and the role of IT tools in this process. This view actually provides the conceptual foundation for the new organisation.

2. The Statistical process

The standard statistical process can be conceived as a cycle that is essentially similar to the production cycle of a composite industrial product. The following stages and steps apply:

A. Design stage

1. Exploration of user needs.
2. Exploration of production possibilities and cost.

After balancing 1 and 2:

3. Product design, resulting in a blueprint of the final product (i.e. the framework of a publication; a set of - empty - tabulations).
4. Specification of the production process:
 - input: choice of administrative sources; set up of surveys; questionnaire and sample design; rules for straightforward/administrative editing;
 - throughput: rules for advanced/statistical editing; methods for imputation, translation (bridging the gap between input and output concepts); estimation; integration.

B. Implementation Stage

1. Input:
 - data collection / use of administrative registrations;
 - administrative editing;
 - matching administrative sources and surveys.
2. Throughput:
 - statistical editing; imputation; translation; micro-integration;
 - estimation;
 - meso/macro-integration.
3. Output:
 - tabulation;
 - publication;
 - dissemination.

3. The role of IT tools

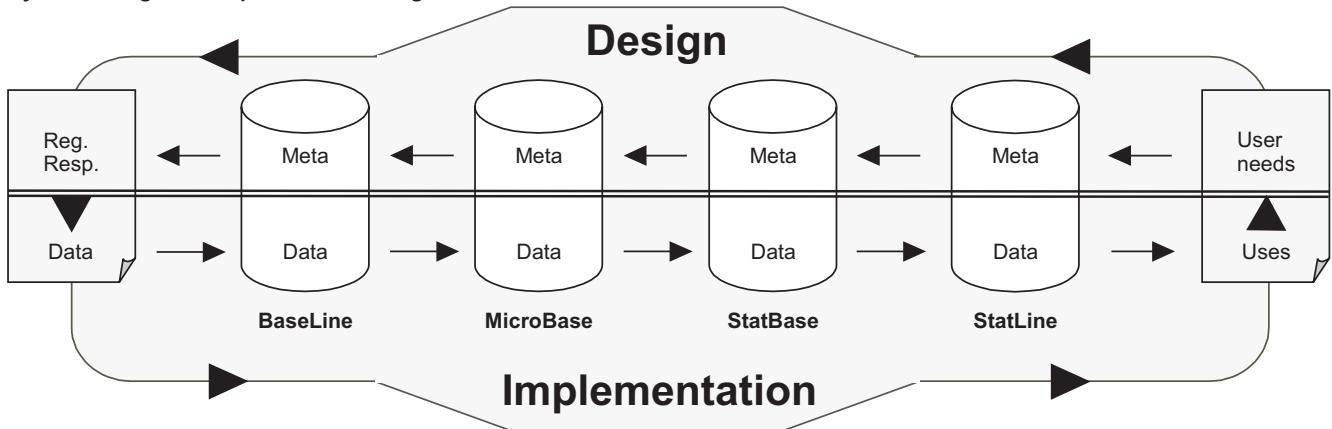
New information technology provides tools for both for storage and processing of data. At present four main databases are being developed, each representing a particular moment and demarcating a particular stage in the statistical process:

1. The input micro-database *BASELINE*, holding all data as supplied by data sources, be they administrative registers or respondents from direct surveys. *BASELINE* eventually shows the data after straightforward/administrative editing and mapping on statistical units.
2. The output micro-database *MICROBASE*. Actually, there are two databases of this type; one for persons/households and one for enterprises/institutions. *MICROBASE* contains the data as they result from imputation, translation and micro-integration.
3. The output aggregate database *STATBASE*. This database contains the results after estimation for populations and sub-populations of statistical units, and eventually after macro-integration. It can be claimed that *STATBASE* holds all publishable data produced by the Bureau.
4. The publication data warehouse *STATLINE*. This can be seen as a set of views on *STATBASE*: it shows the total output of Statistics Netherlands as a structured set of multi-dimensional tables (data cubes), each covering an area of societal interest. The contents of *STATLINE* are published on cd-rom and via the Internet.

The four databases are ranked above according to their role in the implementation stage of the process. Notice that in the design stage the order is the other way around: agreed user needs are first represented as – empty – *STATLINE* cubes and specified in *STATBASE* in terms of metadata on statistical concepts and classifications. Subsequently, corresponding meta-data are stored in *MICROBASE*, and finally input concepts are derived and stored in *BASELINE*.

Figure 1 shows the joint design and implementation stage as a complete cycle:

Figure 1
Cycle of design and implementation stages



4. The new structure: top level and staff services

The new organisation comprises three main levels: at the top level the *executive board*, at the second level *four divisions* and at the third level *twenty departments*. Appendix 1 shows the organisation chart, with staff numbers as foreseen after the reduction by 300, as imposed by the government.

Executive Board

The Executive Board consists of three people: the Director-General and directors for statistical policy and statistical processing respectively. The Board's main tasks are strategic decision-making for the Bureau as a whole and day-to-day management. Corporate issues are dealt with in the *Management Committee*, i.e. the Executive Board plus the directors of the four *divisions*.

Four centralised staff units support the Executive Board, namely:

Policy staff

This staff unit will support the Executive Board in the preparation of policy related issues, such as statistical programming, international relations, the secretariat of the Central Commission of Statistics and corporate communication.

Human Resource Management (HRM)

This unit develops and controls an HRM strategy in terms of career planning, management development programmes and in particular training and education. For the latter purpose an in-house *School of Statistics* will be set up to provide systematic statistical training facilities and programmes. All personnel staff belong functionally to the HRM unit, although in operational terms most will be assigned to Division staff units.

Planning and control

This unit is responsible for the preparation of the annual budget and all reporting requirements, both internally and externally. Its main tool is the recently introduced management information system *BISNIS*, in which working hours and expenditures are accounted for on a project basis. Transparency of principal-contractor relationships is crucial to the system.

Financial administration

All administrative systems of the Bureau, including financial matters, fall under the responsibility of this unit.

5. Divisions: the basics

Production versus R&D

A first distinction refers to production versus R&D. There is a separate division for the latter, which will also incorporate facilities such as domestic matters, printing and documentation in addition to

information technology and statistical methodology. This division is called *Technology and Facilities (TNF)*.

With respect to the traditional dilemma of the benefits of concentration of specialised knowledge on the one hand and the need for involvement of R&D staff in primary working processes on the other, a compromise solution has been adopted. Functionally, all IT and most methodology staff of the Bureau are assigned to TNF. In operational terms, staff involved in the development of tailor-made IT tools and in the day to day control are placed in the production divisions. For general methodological issues and general tool development, often carried out in large projects, there is a pool of methodologists and IT specialists, about half of whom are involved in the direct support of the production divisions.

Input versus throughput versus output; business statistics versus social statistics

Within the production sphere, similarity of processes is the leading criterion for distinguishing the three intended production divisions. The initial inclination was towards the well-known delineation between input, throughput and output, with the databases *BASELINE* and *STATBASE* as logical and physical demarcation points. However, further study revealed that the input and throughput processes for data on persons and for data on businesses have little in common, while on the other hand the input and throughput processes within the two populations proved much more coherent.

These findings formed the basis for the decision to set up separate divisions for *Business Statistics (BES)* and persons-oriented *Social and Spatial Statistics (SRS)*. The spatial statistics were included in the latter division mainly for reasons of balance with respect to size. As there are also stages in the process that cannot be assigned to either of these two divisions, a third production division was needed to accommodate cross-division issues, of which statistical programming, macro-integration and publication are the most obvious. Thus the division *Macro-economic statistics and publication* emerged.

6. The divisions and their departments

The four divisions break down into a total of twenty *departments*, each described briefly below. All the divisions have a *Support and Development* department, with high-skilled staff responsible for specific projects on statistical and automation issues and financial and administrative matters. Some of these staff are seconded from pools, which functionally belong to other units.

6.1 *The Technology and Facilities Division (TNF)*

The goal of this Division is to ensure the quality and effectiveness of statistical processes and products, both through innovation and by supporting the production divisions. In the light of the specific

purposes and conditions of the current reorganisation, the focus is on integration of statistical methods in application tools, as well as on standardisation of these tools.

The division comprises four departments:

- *Methodology and Informatics* exercises the human resource management for three staff pools. The R&D pool consists of researchers and project managers, half of whom support the production divisions. All staff members from the pool for application development and management are assigned to the production divisions. Lastly, there is the trainee pool, consisting of recruits with academic or senior vocational qualifications who are involved in a diversity of projects and thus become familiar with a variety of statistical skills.
- *Information and Communication Technology* is responsible for the organisation and maintenance of the technological infrastructure. There are sub-departments for front-office services, back-office and research.
- The *Facilities* department provides services with respect to the building, office space, printing and copying, documentation management and purchasing.
- *Support and Development* develops policies and implements projects with respect to corporate quality management.

6.2 The Business Statistics (BES) and Social and Spatial Statistics (SRS) Divisions

BES compiles statistical information on the activities of companies and institutions, as well as on business-related aspects such as technology, energy and the environment. SRS collects information on the demographics, activities and quality of life of persons and households, and on spatial issues. As their internal structure is essentially similar, the two divisions will be discussed simultaneously here.

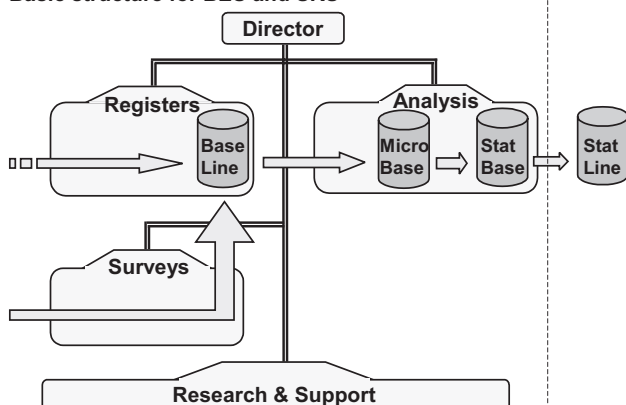
In terms of the logical process description outlined above, the goals of these sister divisions can be phrased as follows:

1. fill STATBASE with publishable data that comply with concepts and classifications as developed in co-operation with division MSP. "Publishable" means comprehensive, reliable, consistent and non-confidential;
2. contribute to the compiling of publications, to be issued by MSP;
3. provide MSP with input for macro-integration.

Within the Divisions, the predominant distinction is that between data collection (from external sources) on the one hand and data analysis on the other, with the input database BASELINE as the demarcation point. The former demands skills that are primarily oriented towards the world of the data sources, whereas the latter is more subject-matter oriented. There is a further distinction with respect to data collection, i.e. according to type of source: existing registers versus own surveys.

These considerations result in a basic structure for each of the two divisions as illustrated in Figure 2.

Figure 2
Basic structure for BES and SRS



Registers Department

Both divisions have a *Registers* department, with the following tasks:

- to map the data derived from a variety of registers on the relevant statistical units (persons/households/dwellings for social data; establishments/companies for economic data), and to enter units and data in BASELINE;
- to check the data for straightforward administrative errors;
- to supply sampling frames for data collection (i.e. for the *Surveys Department*).

Surveys Department

There is one *Surveys* department in SRS, and two in BES. Their main tasks are:

- the development and execution of surveys, according to designs as provided by the *Statistical Analysis Departments*;
- editing. The scope of this may vary with the type of statistics concerned. For specific subjects (e.g. the environment) the editing is limited to obvious errors, while for general subjects (e.g. turnover) editing includes relational checks;
- supplying the data to the *Registers Department*, which maps them on the statistical units in BASELINE.

To satisfy the one-counter principle, the departments are structured in such a way that respondents are contacted by one sub-department only, whatever the type of survey. For the 250 largest companies, this includes the profiling of statistical units and their attributes.

BASELINE

BASELINE is the final product of *Registers* and *Surveys* departments. It is the one and only source for the further processing of all statistical information by the two Divisions, containing data on input concepts that have been edited to a certain extent and mapped on statistical units, but not checked on consistency between different primary or secondary data sources.

Statistical Analysis Department

Each of the two divisions has two *Analysis Departments*. They are the linking pins with the MSP division, both in the design and implementation stage of the process:

- in the design stage, they put the working programme as established by MSP and as embodied in the meta-compartment of STATBASE into practice;
- in the implementation stage, they supply MSP with:
 - inputs for publications, by filling the data compartment of STATBASE, and by contributing to publication texts;
 - inputs for macro-integration.

The *Analysis Departments* bridges the gap between incomplete and inconsistent data on the input concepts of BASELINE and the complete, consistent, reliable and non-confidential, thus publishable data on the output concepts of STATBASE. They do this by statistical editing, imputation, translation, micro-integration, entering in MICROBASE, assigning weights, and lastly estimation.

STATBASE

is the final product of the Divisions BES and SRS. It contains publishable data on statistical concepts and classifications that satisfy the statistical programme as developed by MSP.

6.3 Division Macro-economic Statistics and Publications (MSP)

In general, MSP has the responsibility for stages in the statistical process that surpass the scope of the Divisions SRS and BES. The division embodies both the *alpha* (statistical programming) and the *omega* (publication) of the statistical process cycle:

Department Prices, Short term indicators and Programming

This department actually initiates the statistical process cycle. Based on user needs, among which those of strategic relations have a paramount position, the department prepares Statistics Netherlands' statistical programme, which is subsequently discussed in the Programme Council (in which all divisions are represented) and the Advisory Committees and is eventually authorised by the Central Commission for Statistics. Lastly, the department puts the programme into practice in terms of entering metadata in STATBASE. As such, STATBASE entails the specification of the intended output, to be produced by Divisions BES and SRS.

The concentration of all output-metadata in one central database provides promising opportunities for the long cherished goal of standardisation and harmonisation of concepts and classifications. Statistical co-ordination is therefore an explicit task of this department.

Besides programming and co-ordination, the department compiles price indices and short term indicators

Department Information services

This department is responsible for the publication and dissemination of all statistical information, wherever it is produced at Statistics Netherlands. It comprises a publishing unit, an editorial unit, a communication unit and an information service unit.

Obviously, the output data warehouse STATLINE is the hub of the wheel of core activities of the department. STATLINE is one publication, composed of a number of data cubes, each describing a certain theme or sub-theme, together covering the whole statistical programme. All STATLINE tabulations are based on STATBASE; thematic cubes are actually structured views on STATBASE. Themes are "owned" by editors, who are responsible for cube design and delineation, as well as for all other publications in their area, including relevant parts of the Internet site. The actual preparation of cubes and publications is the common responsibility of editors and data suppliers from the Analysis departments in the BES and SRS divisions.

As STATLINE is to comprise all published data in a structured and easily accessible form, it is also the proper data source for the central information service. Only in case of very specific questions, will clients be referred to subject-matter specialists.

Department of Financial Institutions and Government

The macro-economic character of these statistics and the fact that they serve similar user groups, led to the decision to place these statistics in the neighbourhood of the national accounts.

National Accounts Department

This department produces a variety of cross-division integrated statistics, most of which are based on data entered in STATBASE within BES and SRS. National Accounts will benefit greatly from the impact STATBASE is expected to have on overall standardisation of concepts and consistency of data.

7. Conclusion

At the time of writing, the design of the new organisation structure has not yet been finalised. Some of the issues presented in the paper will be discussed and worked out further. Therefore, the views expressed here are preliminary and subject to change. This is particularly the case for:

- the delineation of tasks between the *Surveys* and *Analysis departments* in the BES and SRS divisions with respect to editing and micro-integration;
- the extent to which the one-counter principle can be actually adhered to, in particular with respect to data collection and editing of business surveys;
- the extent to which statistical processes for different subject matters can be actually integrated;
- the degree of centralisation of the publication and dissemination function in the Division MSP.

Appendix Organisation Chart of Statistics Netherlands (from October 2000)
Total staff in 2003: 1980
numbers are provisional

