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**Time use changes in the Netherlands:
The analytical strength of a time-use module.**

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Summary:

This paper first summarizes the ongoing discussion around the construction of a household satellite account² and then continues to present the extension of the Dutch National Accounts with a time-use module. The module is developed to investigate the potential of data on paid (SNA) and unpaid (non-SNA) labour measured in time-units to serve the purpose of analyses, while keeping the link with the SNA framework and bypassing the controversial issue of the valuation of unpaid labour. The development of the time-use module is described and illustrated with results based on time-use data for the years 1987 and 1997 in the Netherlands.

1 Introduction

The System of National Accounts (SNA, 1993) provides a comprehensive accounting framework within which economic data can be compiled and presented in a format that is designed for purposes of economic analysis, decision-taking and policy-making. However, in the SNA the focus is primarily on market transactions. The SNA treats households mainly as consumers and household production, particularly the unpaid labour that takes place within the home, remains largely excluded from the core accounting framework of the SNA. The need for improved knowledge of this large share of the unrecorded non-market sector of the economy and its interrelationships with the market sector is today widely recognized. The improvement of this knowledge has been implemented in several studies of household production by valuing household production in monetary units and constructing (the full sequence of) accounts for households (e.g. Landefeld and McCulla, 2000; Goldschmidt-Clermont and Pagnossin-Aligisakis, 1999; Task Force Report for EUROSTAT, 2003). In the current paper this kind of implementation and controversies in the ongoing discussion are summarized and the analytical capacity of a time-use module describing paid and unpaid

labour in terms of hours, while keeping the link with the SNA framework, is illustrated with data for the years 1987 and 1997 in the Netherlands.

1.1 Household production in SNA and ESA

In the SNA two production boundaries are distinguished. The general production boundary includes all activities, which are “using inputs of labour, capital and goods and services to produce outputs of goods and services” (para. 6.15). The second, more restricted production boundary defines that part of production which is included in the System of National Accounts. Own-account production of goods by households is included “When the amount of a good produced within households is believed to be quantitatively important in relation to the total supply of that good in a country”... (para. 6.24-6.25).³ Furthermore, ...“ production accounts are not compiled for household activities that produce domestic or personal services for own final consumption within the same household, except for services produced by employing paid domestic staff.”... (para. 6.17). Another exception is the own-account production of housing services by owner-occupiers (para. 6.18 c).

The reasons for the exclusion of own-account production of services within households are summarized in paragraph 6.22: “Thus, the reluctance of national accountants to impute values for the outputs, incomes and expenditures associated with the production and consumption of domestic and personal services within households is explained by a combination of factors, namely the relative isolation and independence of these activities from markets, the extreme difficulty of making economically meaningful estimates of their values, and the adverse effects it would have on the usefulness of the accounts for policy purposes and the analysis of markets and market disequilibria -- the analysis of inflation, etc. It could also have unacceptable consequences for labour force and (un)employment statistics. According to International Labour Organisation (ILO) guidelines, economically active

persons are persons engaged in production included within the boundary of production of the System. If that boundary were to be extended to include the production of own-account household services, virtually the whole adult population would be economically active and unemployment eliminated. In practice, it would be necessary to revert to the existing boundary of production in the System, if only to obtain meaningful employment statistics.”

In the SNA 1993 it is suggested that households’ production for own consumption be handled in a satellite account, i.e. a flexible frame allowing for concepts that are alternatives to the ones of the SNA. For instance, a different production boundary or enlarged concepts of consumption and capital formation may be introduced. The System does not make standardized recommendations as to this type of work, which by definition must remain open (para 2.247, 21.4, 21, 18, 21.46 and 21.47). The satellite account is linked to the central framework which provides data to the satellite, but the two remain separate thus preserving the traditional uses of national accounts aggregates.

The European System of National and Regional Accounts (ESA, 1995) also suggests that analyses of households’ production for own consumption be handled in a satellite account, but details the characteristics of satellite accounts in stricter terms than the SNA. In principle, all basic concepts and classifications of the standard framework should be retained. Only when the specific purpose of the satellite account definitely requires a modification, are changes in the basic concepts introduced. In such instances, the satellite account should also contain a table showing the link between the major aggregates in the satellite account and those in the standard framework (para 1.20).

1.2 Implications of implementing a satellite account of household production

Although many researchers have argued in favor of recognizing household production in national accounts for various reasons (e.g. Wood, 1997; Chadeau, 1992), the implementation of a satellite account of household production has proven a complicated task, on which consensus has not yet been reached. What kind of information a satellite account of household production should contain depends on its purposes. Although often implicitly suggested as the ultimate implementation, the production of the full sequence of accounts (as presented in the SNA and ESA) for households may not necessarily be the best option to serve the main purposes of a satellite account of household production. However, if the implementation includes the production of the full sequence of accounts for households while extending the production boundary, i.e. expanding the role of households to include the producer role, implications are numerous.

First of all it needs to be established what part of household output (currently not included in the SNA) is production and what is not. The distinction between productive activities and non-productive activities is usually based on the *third party criterion* first introduced by Margaret Reid (Reid, 1934). Although slightly modified interpretations have been used by different researchers, basically the interpretation is that an activity is considered productive if it can be delegated to another person. In other words, an activity is productive if it yields an output that is capable of being exchanged. The third party criterion clearly facilitates the demarcation of productive activities as distinguished from non-productive activities such as eating and sleeping. Even though the discussion on some issues is still ongoing, e.g. the classification of travel/transport activities, there seems to be consensus among researchers about the application of the third party criterion in most instances. The following types of (non-SNA) activities are generally considered productive: care of persons,

meal preparation, cleaning, laundering, ironing, maintenance and repair or do-it-yourself activities, administration. Most researchers only consider transport activities to be productive if they support a productive activity. Non-productive activities include for instance self-education, washing/dressing oneself, sleeping, eating, and leisure activities.

The subsequent implication of establishing the full sequence of accounts for households is the need to determine the monetary value of household production. Much less consensus exists about the method to be used here. Two methods of valuation are distinguished: the output-based and the input-based method. The advantages and disadvantages of both these methods have been extensively discussed (e.g. Goldschmidt-Clermont, 1993 and 1982; Murphy, 1978; Task Force Report for EUROSTAT, 2003); the following is a short summary of this discussion.

The first and generally preferred method is to value output directly, as the market value of the goods and services produced. The main advantages of the output-based method are that it measures real products, it is compatible with the main body of the SNA, and it reflects household productivity situations. Although it is generally agreed upon that -if household production is valued at all- this is the method that should be applied based on conceptual grounds, only a few studies (e.g. Fitzgerald, Swenson and Wicks, 1996; Holloway, 2002) have actually applied this method. The main reason for this is the lack of established definitions of outputs and price tags for these outputs and the difficulties in acquiring such definitions and price tags. In stead, in most studies the value of household production has been estimated by means of the input-based method, i.e. the valuation of household production on the basis of costs of production, comprising the value of labour, taxes less subsidies on production, consumption of household durables and intermediate consumption. In this context the value of labour is estimated by adding a certain wage to the time spent on household production as measured in time use surveys. Although simpler to

implement with the data currently available in most countries, this method has serious drawbacks. The most important disadvantage is the fact that the value of production is highly dependent on the wage rate adopted for the purpose of valuing labour inputs in non-SNA household production (hereafter roughly referred to as “unpaid labour” or “non-SNA/ESA productive activities”). Two methods for calculating wage rates are often distinguished: the opportunity cost method and the market replacement cost method. The opportunity cost method values the unpaid labour time by estimating the market wage rate of the person performing the unpaid labour. It draws on consumer theory in which a rational consumer is assumed to divide time between leisure, housework and market work in such a way as to gain maximum utility. This leads to different values for similar products depending on who performed the task. There are different ways of calculating this kind of wages but many researchers have argued that this method should not be used for purposes of measuring household production, mainly because of the invalidity of underlying assumptions (e.g. Goldschmidt-Clermont, 1993; Chadeau, 1992). The market replacement cost method aims at calculating equivalent market wages. This produces several options including: the use of the wages of specialized workers in market enterprises (e.g. a cook in a restaurant), the use of the wages of specialized workers in the home (e.g. household cleaner) and the use of the wages of generalist workers or polyvalent substitutes (a person who’s job is to do all the tasks that a household requires). Obviously these different methods of valuation result in different estimates of the value of unpaid labour. Values of unpaid labour obtained using the opportunity cost method are generally twice as high as those obtained using the replacement cost method with a polyvalent/generalist worker. Values obtained using wages of specialized workers vary according to the combinations of different occupations and wage levels used. Whether to impute gross wages (including income tax and social security contributions paid by the employer and employee) or net wages is yet another question on which consensus has

not been reached. However, the answer to this question has a major impact on the obtained value of unpaid labour.

Besides the valuation of household production, establishing the full sequence of accounts for households implies a modification of the SNA/ESA classification of final individual consumption. In the SNA and ESA, all goods and services purchased by households in the role of consumers are treated as final consumption. Since households are now considered producers of goods and services for their own use (or for others without compensation), the goods consumed or transformed during the production process should be treated as intermediate consumption and household durables as fixed assets. The SNA/ESA final consumption should therefore be divided into final, intermediate and capital consumption. Furthermore, consumption of fixed capital (household durables) should be determined. In addition, taxes and subsidies related to household production should be identified. As compared to those associated with the valuation of household production, fewer difficulties are associated with the determination of the above since it is restricted to rearranging transactions that are already recorded in the SNA.

1.3 Position of the time-use module in the Netherlands

As mentioned above, the kind of information shown in a satellite account of household production should depend on its purposes. Many purposes of a satellite account of household production have been suggested in literature, including the possibility to monitor shifts from non-market to market production, to describe more completely how resources are used, to show more completely the economic contribution of women to production, to describe more completely how much households consume and how much they invest in durable goods (e.g. Landefeld and McCulla, 2000; Wood, 1997; Ironmonger, 1996; Chadeau, 1992). The possibility to analyze interactions between market and non-market production seems to be

one of the main purposes. To serve this purpose, and some of the other, it is not necessary to produce the full sequence of accounts for households. Furthermore, there are several unsolved methodological problems with the input-based valuation of household production and these may disturb a sound representation of shifts between market and non-market production. Concerning the output-based valuation method, it should be noted that even when more consensus is reached about the definition of most outputs and corresponding market prices in the future, this will remain problematic for some household activities. For instance (passive) childcare is an activity/service that is very difficult to value. Should the time that a parent is sleeping be measured as passive childcare if the child is sleeping in the same house? If yes, the decision what price to use to value this time becomes very crucial since it will add up to an enormous amount for the population as a whole. Surely, it is possible to reach consensus about the way to value such activities in order to establish comparability of results between countries/studies. It is questionable though whether such data should be published by institutions responsible for the national accounts. The correct interpretation of the monetary value of household production as estimated by the different methods mentioned requires the user of results to be informed about their differences, advantages and disadvantages. Furthermore, figures published by institutions in charge of the national accounts have a reputation of being unquestionable. Publishing figures on the monetary valuation of household production could damage this reputation. For these reasons, a satellite account may best be implemented by showing non-SNA productive activities performed by households in time-units, in connection with Labour Accounts on hours worked which are already presented as non-monetary data and linked to the SNA system boundary. Additional advantages of this kind of presentation are the universality of the time-unit and the fact that the field of time-use methodology is relatively well coordinated, facilitating both the international comparability and the comparability over time. Institutions responsible for the

national accounts should therefore primarily be focusing on the integration of Labour Accounts with data from time-use surveys. In the future, when the necessary data are available, this could possibly be (partly) complemented by figures in monetary units based on the output-method of valuation. The current paper aims to show the potential of data on paid (SNA) and unpaid (non-SNA) labour in time-units to serve the purpose of analyses while keeping the link with the SNA framework and bypassing the controversial issue of the valuation of unpaid labour. For this purpose a time-use module has been developed using time-use data for the years 1987 and 1997 in the Netherlands.

2 Method

2.1 Construction of the time-use module 1997

The comparison between time spent on SNA and non-SNA activities can only be achieved by means of time-use studies which record both in a single operation. Labour Accounts provide data on hours worked on activities included in the SNA and so do time-use studies. However, the two sets of data are not compatible because of different data collection methods. The time-use data utilized in this paper stem from the mini-time-use survey (mini-TUS), that is held from 1997 onwards every other year in the Netherlands (CBS, 1999). To keep the link with the central SNA framework, data from the mini-TUS, more specifically data on the number of employed persons and the amount of hours spent on paid work, were re-weighted to equal data as recorded in the Labour Accounts (CBS, 2000). Dutch Labour Accounts and National Accounts are fully compatible and consistent systems.

The mini-TUS data were collected from January until December 1997. The population consisted of the resident population aged 12 years and over, not including the institutional population. Approximately 5000 persons completed a time-use diary registering what

activities they had done the day before. Activities were recorded in fixed intervals of one quarter of an hour. For recording activities a closed variant was chosen with a precoded list comprising 32 (categories of) activities (see appendix 1), including the activity “Paid labour”. The diary recordings ran from six o’clock in the morning until six o’clock the following morning. Respondents were allowed to enter more than one activity per time unit whenever (categories of) activities took place at the same time (so-called simultaneous activities). Besides diary data, demographic characteristics were collected. Data-sampling was spread over the year, to represent all days of the week and all months of the year. In addition, each person was weighted such that the sample represents the Dutch population concerning sex by age, marital status, social position, degree of urbanization and household composition, and that each day of the week occurs equally often. There was no information available on the activities performed during vacations, unless the respondent spent his or her vacation at home. For the data to be representative of the year as a whole, it is necessary to assume that the distribution of activities during vacations is equal to the distribution of activities during the rest of the year. Since this assumption is not very plausible it is probably better to view the data as being representative of all days of the year except for vacations outside the home, thereby assuming that people did not go on a vacation.

For the purpose of the time-use module, activities from the mini-TUS were classified in (ESA and non-ESA) productive activities and non-productive activities based on the ‘third-party criterion’. Non-ESA productive activities were further classified into (informal) goods and services as well as (informal) industries. The applied classification of activities is described in detail in Appendix 1. Paid productive activities (the item “paid labour” in the mini-TUS) are included in Labour Accounts, and unpaid productive activities are not included in Labour Accounts. The time-use module aims to describe both the paid and the unpaid productive activities. In addition, the non-productive activities are included in the

time-use module. As such, the totals in the tables of the time-use module reflect the total time spent by persons, facilitating interpretation.

Where simultaneous activities occurred during one interval (15 minutes), the time was allocated to the productive activity if the simultaneity consisted of a productive and a non-productive activity. This procedure is debatable but it was followed in order to prevent underestimation of productive time. When the simultaneity consisted of two productive activities or two non-productive activities, the time was subdivided and allocated to both activities on the basis of the proportions of time spent on the individual activities. The proportion of total time spent on simultaneous activities was 1.9 percent. The most common combinations of activities were in order of appearance: “preparing food and drinks (cooking, baking, making coffee/tea), eating at home” and “maintaining contact with family, friends, acquaintances, neighbors by means of talking, telephoning and personal correspondence”; “washing, dressing” and “preparing food and drinks (cooking, baking, making coffee/tea), eating at home”; “preparing food and drinks (cooking, baking, making coffee/tea), eating at home” and “care for and playing with children exclusively belonging to own household“.

For the purpose of the time-use module the number of employed persons and the number of paid hours from the mini-TUS were integrated with data from Labour Accounts on these variables (concerning the same population e.g. non-institutionalized populations aged 12 years and older). To enable this, the initial figures from Labour Accounts were first corrected for in- and outgoing cross-border labour. Employed persons in Labour Accounts are all persons holding a job in business units or private households residing in the Netherlands. These figures include incoming cross-border workers and exclude outgoing cross-border workers. With regard to analyzing interaction-effects between paid and unpaid labour (which mainly takes place at home), it is the population living in the Netherlands that is of interest. Therefore the data from Labour Accounts were decreased with an estimate of

the amount of incoming cross-border labour (23 million hours in 1997), and increased with an estimate of the amount of outgoing cross-border labour (32 million hours in 1997).

Subsequently, the amount of employed persons in the mini-TUS was re-weighted to equal the amount of employed persons as recorded in Labour Accounts (corrected for cross-border workers) at the level of employee/self-employed by sex by age-group.⁴ Because the total population figures cannot be changed, the correction of the amount of employed persons in the mini-TUS of course implied an opposite correction of the amount of unemployed persons at the level of sex by age-group.

After this, the total amount of hours spent on paid labour, derived from the mini-TUS, was re-weighted to equal the data from Labour Accounts concerning paid hours (corrected for cross-border labour) at the level of employee/self-employed by sex by age-group.⁵ The downward correction of the number of hours spent on paid labour in the mini-TUS to link up with the number of paid hours recorded in Labour Accounts, implied an upward correction on the remaining hours of these persons (consisting of unpaid productive and non-productive hours).⁶ After all, the total number of hours of the population remains the same. The hours to be added were distributed to the different categories of unpaid productive and non-productive activities by adopting the original distribution of the time spent on these activities per person.

2.2 Revision of the time-use module 1987

Already in 1992 a pilot time-use module was developed at Statistics Netherlands (Kazemier and Exel, 1992). The source data for this module, came from an extensive time-use survey that was held in 1987 (CBS, 1989). The method described in paragraph 2.1 comprises a revision of the method developed for the pilot time-use module. The revised method was also applied to the data from the time-use survey held in 1987. Furthermore, with regard to paid

labour, the results were linked with the Labour Accounts data after the ESA revision of 1995, enabling a comparison with the results of 1997.

The comparison of the two years is somewhat complicated by differences in the questionnaires. The TUS of 1987 was very comprehensive, the activity list counting 107 activities. In 1997 the list consisted of only 32 categories of activities. Classifying activities to meet the classification of informal services and informal industries in a comparable way for both years is therefore complicated. The comparison of the category childcare is particularly complicated due to differences in the activity lists on this topic. The questionnaire of 1987 consisted of an extensive list of possible activities, done for or with children, e.g. spent time on caring for children, on playing with children, on ferrying children to and from places, on helping with their homework and on tutoring. The activity list of the mini-TUS of 1997 included only one compound category “care for and play with children”. It is likely that the more detailed activities as registered in 1987 were not always registered within the category “care for and play with children” in 1997. Notwithstanding the above-mentioned differences in the questionnaires, an attempt has been made to compare the results of the two years to illustrate the kind of analyses possible with data from the time-use module for more than one year.

3. Results of the time-use module 1997

The time-use module results in tables on paid and unpaid labour, expressed in hours and differentiated by background characteristics including employee/self-employed (only for paid labour), sex, age-group and household composition.⁷ In these tables, the amount of paid labour is equal to that recorded in Labour Accounts. The aggregate of the hours is equal to the total number of available hours of the population in 1997 (the 24 hours per person as recorded in the re-weighted mini-TUS multiplied by 365). Dividing by the total amount of

time available results in the proportion of total time spent on certain activities. A selection of the results of 1997 is discussed here first by sex, age, and household composition. Later on the results of 1997 are compared with the earlier revised time use module of 1987.

3.1 Distribution of paid and unpaid labour by sex

The proportion of time spent in 1997 productive activities by sex is presented in Table 1. More than a quarter of the available hours was spent on productive activities: 9.8 percent of the available hours per person was spent on paid labour and 15.6 percent was spent on unpaid labour (including volunteer work). The amount of unpaid labour was 1.5 times the amount of paid labour. Almost 75 percent of the available time was spent on non-productive activities (such as sleeping, following education and leisure activities).

The proportion of time spent on productive activities was practically equal for men and women in 1997. However, the distribution of paid and unpaid productive activities are different for men and women.⁸ Men spent 13.3 percent of their time on paid labour and 11.4 percent on unpaid labour. Women spent less of their available time on paid labour (6.3 percent) and more of their time on unpaid labour (18.3 percent). The proportion of time spent on volunteer work did not differ significantly between men and women.⁹

Considerable differences were also found when the types of paid and unpaid labour that men and women spent their time on are investigated. With regard to paid labour, in almost all industries men spent more hours than women, except for the industry 'care and other services', where the share of women labour was the highest. With regard to unpaid labour, women spent 10.3 percent of their available time on household work whereas this percentage was only 3.7 for men.¹⁰ Furthermore, the proportion of time spent on childcare was twice as high for women (2.7 percent) compared to men (1.3 percent). Men on the other

hand spent three times as much time on do-it-yourself activities (2.5 percent) as women (0.8 percent).

3.2 Distribution of time spent by age group

Proportions of time spent on different activities with regard to age in 1997 are presented in Table 2, where time spent on studying/school is displayed separately because of its strong relation with age. The results show that people in the age groups of 25 to 64 are the most productive.

Almost no paid labour is performed by people of 65 years and older, because of retirement regulations. The age group of 25 to 44 years spent more time on paid labour than the age group of 45 to 65, which spent more than the age group of 12 to 24 years.

The age group of 12 to 24 years spent the smallest proportion of time on unpaid labour, but this group spent 10.3 percent of their time on education. The proportion of time spent on household activities showed an increase with age in 1997. The age group of 25 to 44 years spent with a proportion of 3.8 percent of their time much more on childcare than the other age groups.

3.3 Distribution of productive activities by household composition

Table 3 presents the proportion of time spent on productive activities by household composition in 1997. To facilitate analyzing paid and unpaid labour of parent and non-parents by household composition, the time spent by children under 18 years of age is excluded.

Mainly due to a high proportion (9.8 percent) of time spent on childcare, multiple-persons households with the youngest child aged 0-3 years spent a much larger proportion of

their time on unpaid labour (23.8 percent) than multiple-persons households with the youngest child in the age of 4-17 years (17.7 percent), multiple-persons households without children in the age of 0-17 years (14.1 percent) and single-person households (13.2 percent). Although household with children spent more time on unpaid labour, they also spent more time on paid labour than households without children.

3.4. Comparison with the time-use modules of 1987

Between 1987 and 1997 the number of paid hours increased with 1.5 billion hours from 9.7 billion hours in 1987 to 11.2 billion hours in 1997. This growth of 15.1 percent is partly the result of the growth of the population (6.2 percent), but mostly of an increase of the average number of paid hours per person (8.9 percent). As a result, the proportion of time spent on paid labour increased between 1987 and 1997 from 9.0 percent to 9.8 percent. (See also Table 1.) The proportion of time spent on unpaid labour decreased from 15.5 percent to 14.9 percent. These results clearly show a shift towards paid labour at the cost of unpaid labour between 1987 and 1997.

On closer examination of Table 1, the shift appears to be completely on the account of women.⁸ Between 1987 and 1997 the proportion of time spent on paid labour by women increased from 4.9 percent to 6.3 percent. This shift is completely compensated by the decrease of the proportion of time spent on unpaid hours from 20.5 percent to 18.3 percent. So the proportion of time they spent on non-productive activities increased slightly. Among men, a different, smaller shift was found. In 1997 as compared to 1987 men spent a little more time on unpaid labour at the expense of non-productive activities. The proportion of time spent on paid labour remained almost unchanged. The proportion of total available time spent on unpaid labour increased between 1987 and 1997 from 10.4 percent to 11.4 percent. On the contrary, non-productive activities decreased from 75.4 percent to 74.3 percent of

total available time in men. Among both men and women the proportion of time spent on volunteer work remained constant between 1987 and 1997.

The results indicate that the decrease of the number of hours spent on household work by women (from 13.9 percent to 10.3 percent) was an important reason for the overall decrease of unpaid labour between 1987 and 1997. Among men the average time spent on household work remained the same, which is 3.7 percent of total time available. Part of the explanation could be that an increasing number of double-income households employed household personnel to take over part of the household work. This is supported by the increase of labour input (in full-time equivalent jobs) reported by Labour Accounts in the industry "Private households with employed persons" in the same period (70000 in 1987 and 80000 in 1997). In addition, the increasing use of modern household equipment, like the microwave and the dishwasher probably caused household work to be less time-consuming in 1997 as compared to 1987.

Bearing in mind the differences in the questionnaires mentioned in paragraph 2.2, a tentative conclusion can be drawn that there was an increase in time spent on childcare in 1997 as compared to 1987. This concerns both men and women. The interpretation of the increased proportion of time spent on childcare is difficult. A well-known phenomenon with regard to time-use surveys is that childcare is often underreported. In particular when childcare takes place at the same time as other household work, the respondent often considers the household work to be the main activity. This is especially the case for mothers without a paid job. The number of mothers without a paid job was much higher in 1987 than in 1997, complicating the comparison. It appears from the data of the mini-TUS 1997 that mothers with a paid job on average spent a little more time on childcare in 1997 than mothers without a paid job (data not shown). Perhaps mothers with a paid job are more aware of the time they spent with their children, and thus tend to report this "quality time" more exactly.

Also with regard to the proportion of time spent on taking care of relatives or other persons, a small increase in 1997 as compared to 1987 was found among men as well as women. This increase may partly be a result of a government policy in the Netherlands since well over two decades aiming at a diminution of the growth of homes for the elderly and stimulating to nurse elderly at home as long as possible. The other unpaid labour categories distinguished in Table 1 showed no significant differences between 1987 and 1997.

4. Discussion on the analytical strength of the time use module

4.1 Objective framework for inequality studies

The results described in paragraph 3 clearly demonstrate the potential of time-use measurements for analyses related to paid (market) and unpaid (non-market) labour. It reveals the unpaid hours worked that go totally unrecorded in Labour Accounts. Furthermore, it permits analyses on for instance shifts from non-market to market production and the contribution of women to production. The results of our time use module demonstrate that there are no differences between men and women in the total contribution on productive activities. The total time spent on productive activities is more dependent on household composition and age. The results also demonstrate that the increase of the proportion of spent on paid labour by women came from a decrease of the proportion of time spent on unpaid labour.

In addition, since relatively few conceptual problems are associated with the development of a time-use module as described in this paper, and time-use data as well as Labour Accounts are available in many countries today, a meaningful comparison of results between countries is less complicated and easier to accomplish than would be the case with monetarily valued household production. The time use module is also an objective measure

of the cost of personal labour time inputs. A debate on the inequalities between groups of people based on the labour input will be more transparent, than a debate based on the valued production of the labour. For example: The results of the time use module presented here do not show inequality between men and women in time spent on productive activities. However, a valuation method might give a different value of production for men as compared to women based on subjective and arbitrary elements of the valuation methods. In other words, the valuation method can obscure the facts and influence the outcome of an inequality debate.

4.2 Limitations

Certainly, the developed time-use module cannot answer all questions. Questions with regard to intermediate inputs used in non-SNA production, how much households invest in durable goods or the size of final consumption if non-SNA household production is included may be addressed by presenting monetary data in addition to time-use data. When the monetary valuation of household production is considered a prerequisite to answer a certain question, this should preferably be based on the output-method mentioned earlier. Whether data involving monetary valuations of household production should be published by institutions in charge of the national accounts remains questionable. It will be important to at least explain the method used and the underlying assumptions made. Only when the data-availability problem for direct valuations at output value is solved and the method standardized over countries, a (partial) presentation of such data by these institutions could be considered.

4.3 Further developments

Because of differences between the questionnaires used in 1987 and 1997, caution is warranted with regard to the comparison of the results of the two time-use modules presented in this paper, in particular results on childcare. In the future, if the time-use module will be produced on a regular basis in the Netherlands, the interpretation of shifts in time-use will become less troublesome, since there will only be small differences between the questionnaires of mini-time-use surveys held in 1997, 1999, 2001 and so on. Possibly, some problems with the classification of items in productive versus non-productive could also be solved by differentiating more items in the mini-TUS to be held the coming years.

5. Conclusions

This paper describes the development and results of a time-use module in the Netherlands for 1997 and 1987. The time-use module provides a description -in terms of hours- of paid, unpaid, and non-productive activities conducted by households in the Netherlands while keeping the link with the central SNA framework by means of Labour Accounts data. The time-use module can be easily used for international comparison, because it has few methodological difficulties and the necessary data is available in many countries today. It can be very useful for analysis for inequalities between groups of people, and transition between market and non-market production over the years.

The time-use module of 1997 demonstrates an equal contribution of men and women to productive activities, but an unequal distribution of paid and unpaid labour. Adult members of households with especially young children spent relatively more time on productive activities than other people. An increase of the proportion of time spent on paid labour for

women in Netherlands between 1987 and 1997 was compensated by a decrease of unpaid labour for women during this period.

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Table 2. Proportion of time spent on paid labour, unpaid labour and non-productive activities by (in)formal industries and age-group (1997)

	12-24 years	25-44 years	45-64 years	65+ years	Total
Productive activities	14.1%	32.7%	27.8%	16.6%	25.4%
Paid labour	6.3%	14.8%	10.3%	0.3%	9.8%
Agriculture, forestry and fishing	0.3%	0.6%	0.7%	0.1%	0.5%
Mining and quarrying, Manufacturing, Electricity, gas and water supply	0.7%	2.5%	1.8%	0.0%	1.6%
Construction	0.5%	1.1%	0.8%	0.0%	0.7%
Trade, hotels, restaurants and repair	2.0%	2.7%	1.7%	0.1%	1.9%
Transport, storage and communication	0.3%	1.0%	0.7%	0.0%	0.6%
Financial and business activities	1.5%	3.0%	1.5%	0.1%	1.9%
General government	0.2%	1.6%	1.5%	0.0%	1.1%
Care and other service activities	0.7%	2.4%	1.7%	0.1%	1.6%
Unpaid labour	7.4%	17.3%	16.4%	15.4%	14.9%
Household work	2.9%	7.1%	8.4%	10.0%	7.1%
Shopping	1.5%	1.9%	2.3%	2.3%	2.0%
Childcare	0.8%	3.8%	1.0%	0.7%	2.0%
Care of relatives or other persons	0.3%	0.4%	0.8%	0.4%	0.5%
Do-it-yourself	0.7%	1.8%	2.3%	1.6%	1.7%
Transport services concerning productive activities	1.2%	2.3%	1.7%	0.4%	1.6%
Volunteer work	0.4%	0.6%	1.1%	0.9%	0.7%
Non-productive activities	85.9%	67.3%	72.2%	83.4%	74.6%
Study / school	10.3%	1.0%	0.6%	0.2%	2.5%
Other non-productive activities	75.6%	66.3%	71.6%	83.2%	72.0%
Total time available	100.0%	100.0%	100.0%	100.0%	100.0%

Table 3. Proportion of time spent on paid labour, unpaid labour and non-productive activities by informal services and household composition (1997) ¹

	One person households	> 1 persons. 0 members below age 18	> 1 persons. youngest child 0-3 years old	> 1 persons. youngest child 4-17 years old	Total
Productive activities	22.5%	25.0%	37.1%	31.0%	27.1%
Paid labour	8.4%	10.1%	13.0%	12.4%	10.6%
Unpaid labour	13.2%	14.1%	23.8%	17.7%	15.8%
Meals and restaurant services	3.5%	3.6%	3.4%	3.5%	3.5%
Cleaning	2.6%	2.2%	2.4%	2.8%	2.4%
Clothing, repair of clothes	0.7%	0.9%	1.0%	1.3%	1.0%
Purchases, daily	1.4%	1.0%	1.0%	1.0%	1.1%
Incidental purchases	1.1%	0.9%	1.1%	1.1%	1.0%
Childcare	0.5%	0.6%	9.8%	2.9%	2.1%
Care of relatives or other persons	0.2%	0.6%	0.5%	0.7%	0.5%
Maintenance, repair, construction, gardening, care of animals	2.0%	2.5%	2.5%	2.4%	2.4%
Transport services concerning productive activities	1.3%	1.7%	2.0%	2.1%	1.8%
Volunteer work	0.8%	0.8%	0.3%	0.9%	0.8%
Non-productive activities	77.5%	75.0%	62.9%	69.0%	72.9%
Total time available	100%	100%	100%	100%	100%

1. To facilitate interpretation, the time spent by children below the age of eighteen was excluded from the data presented this table. In- or excluding time spent by children under 18 years of age does not influence the overall conclusions with regard to household composition. A table including their time is available from the authors on request.

Appendix 1

The precoded list of 1997 contained the following activities:	Goods and services distinguished in the time-use module:	Industries distinguished in the time-use module:
1. sleep, rest (may include illness)	O Non-productive activities	Non-productive activities
2. Washing, dressing	O Non-productive activities	Non-productive activities
3. preparing food and drinks (cooking, baking, making coffee/tea), eating at home	G/O ¹ Non-productive activities/ Meals and restaurant services	Non-productive activities/ Household work
4. care for and playing with children exclusively belonging to own household	G Childcare	Childcare
5. care for and playing with children exclusively belonging to other household	G Childcare	Childcare
6. care for and playing with children belonging to own and other household	G Childcare	Childcare
7. personal care of relatives in own household	G Care of relatives or other persons	Care of relatives or other persons
8. personal care of relatives outside own household	G Care of relatives or other persons	Care of relatives or other persons
9. personal care of others	G Care of relatives or other persons	Care of relatives or other persons
10. travel in relation to shopping, courses and education, work and leisure ⁵	G/O ¹ Non-productive activities/ Transport services concerning productive activities	Non-productive activities/ Transport services concerning productive activities
11. paid labour (including work brought home with you)	E Paid labour	Paid labour
12. attending lessons, courses and lectures	O Non-productive activities	Non-productive activities
13. making homework, studying	O Non-productive activities	Non-productive activities
14. Running errands and shopping	G Purchases, daily/ Incidental purchases ⁴	Shopping
15. visit to doctor, dentist, physiotherapist, hairdresser, pedicure, solicitor, estate agent, taking car to garage	O Non-productive activities	Non-productive activities
16. Cleaning house, tidying	G Cleaning	Household work
17. clothes washing, ironing, sewing, etc.	G Clothing, repair of clothes	Household work
18. maintenance, odd jobs, do-it-yourself, gardening	G ² Maintenance, repair, construction, gardening,	Do-it-yourself

19.	work for a religious, political, ideological organization,	G ³	care of animals Volunteer work	Volunteer work
20.	work for an educational organization, caring/nursing via an organization	G ³	Volunteer work	Volunteer work
21.	work for sports club, hobby or social club, cultural organization	G ³	Volunteer work	Volunteer work
22.	sports participation, exercising	O	Non-productive activities	Non-productive activities
23.	watching TV, video, listening to radio, cd's, cassettes	O	Non-productive activities	Non-productive activities
24.	maintaining contact with family, friends, acquaintances, neighbors by means of talking, telephoning and personal correspondence	O	Non-productive activities	Non-productive activities
25.	eating, drinking out (restaurants, pubs)	O	Non-productive activities	Non-productive activities
26.	reading	O	Non-productive activities	Non-productive activities
27.	walks, cycling-tour for fun	O	Non-productive activities	Non-productive activities
28.	taking care of pets	G	Maintenance, repair, construction, gardening, care of animals	Household work
29.	visit to museum, library, concert, theatre, cinema, sport spectacles, zoo etc.	O	Non-productive activities	Non-productive activities
30.	doing games, technical hobbies for fun (no odd jobs see no. 14), artistic creations (music, film, photography, etc.)	O	Non-productive activities	Non-productive activities
31.	doing nothing	O	Non-productive activities	Non-productive activities
32.	other, not elsewhere specified	O	Non-productive activities	Non-productive activities

Legend to Appendix 1.

O = Non-productive activities

G = Activities within the general production boundary, not the ESA

E = Activities within the ESA production boundary

Notes in Appendix 1.

1. Activity-categories which are marked with G/O consist partly of productive and partly of non-productive productive activities. In the time-use module, time spent on these categories in 1997 was therefore subdivided on the basis of proportions found between G/O activities within these categories as recorded with the (more detailed) TUS from 1987.

2. House construction and renovation (including dwelling repairs and maintenance of the type that tenants do not generally do) are included in the ESA. Also storage and processing of agricultural products is included in the ESA. If these types of activities were performed by respondents, they are most likely to have been entered here. According to ESA all other own-account production of goods by households are deemed to be insignificant for EU countries. In theory, the amount of time spent on the activities already included in ESA, should have been moved to the category "paid labour" since this is the category that in the time-use module was set equal to the total amount of time spent on labour as presented in the SNA Netherlands. This has not been done in the current time-use module because of the practical problems associated with properly estimating and separating such time.

3. Volunteer activities that result in goods, e.g. the construction of a dwelling, church or other building are included in ESA. If these types of activities were performed by respondents, they are most likely to have been entered here Volunteer activities that do not result in goods, e.g.

care taking and cleaning without payment, are excluded from ESA. In theory, the amount of time spent on the activities already included in ESA, should have been moved to the category "paid labour" since this is the category that in the time-use module was set equal to the total amount of time spent on labour as presented in the SNA Netherlands. This has not been done in the current time-use module because of the practical problems associated with properly estimating and separating such time.

4. The goods-and-services-classification of the time-use module distinguishes between daily and incidental purchases. In the time-use module, time spent on item 14 in 1997 was therefore subdivided on the basis of proportions of time spent on daily versus incidental purchases as recorded with the (more detailed) TUS from 1987.

5. The mini-TUS aims to describe the general time-allocation per day. For a more complete figure on the average amount of time spent on traveling per day in the Netherlands we would like to refer to the results of the research on mobility ("onderzoek verplaatsingsgedrag", OVG) published at <http://statline.cbs.nl> .

Text notes

1. Mrs. van Rooijen-Horsten and Mr. Milot are employed at the Division of Macro-economic Statistics and Dissemination of Statistics Netherlands. Mrs. Gringhuis is currently employed at the Division of Social and Spatial Statistics of Statistics Netherlands. At the time of the development of the described module she was employed at the Division of Macro-economic Statistics and Dissemination. The authors would like to thank B. Kazemier, J.M.M. Geurts, J. Oudhof and J. Smits for the expertise provided. The views expressed in this paper are those of the authors and do not necessarily reflect the views of Statistics Netherlands.

2. The phrases “satellite account” and “module” are interchangeable in the current paper.

3. In European countries these products are defined by the European System of National and Regional Accounts (ESA, 1995). By convention in ESA, only own account construction of dwellings and production, storage and processing of agricultural products are recorded as own-account production of goods. All other forms of own-account production of goods by households are deemed to be insignificant for the European Union countries (para. 3.08). However, volunteer activities that result in goods, e.g. the construction of a dwelling, church or other building, are to be recorded as production (para. 3.08). The ESA’s definition of services (paras. 3.08 and 3.09) is comparable to the SNA’s.

4. Differences between mini-TUS data and Labour Accounts in the number of employed persons were relatively small and probably mainly due to sampling error and non-sampling error such as non-response. The largest differences were found within the category self-employed, where in general fewer persons were recorded with the mini-TUS as compared to Labour Accounts.

5. ‘Paid hours’ as well as “paid labour” in the time-use module concerns paid hours of employees and worked hours of self-employed.

6. Differences between mini-TUS data and Labour Accounts in the number of paid hours recorded are likely to originate from different sources including sampling error and non-sampling error like non-response; differences in the definition of paid hours, e.g. paid hours in Labour Accounts include sickness hours and working hours lost due to frost and strikes while in the mini-TUS, hours spent during sickness, frost or strikes are not recorded as paid labour; the possibility that in the mini-TUS (part of) the working respondents register their lunch-break, which is not paid for, with the activity paid work.

7. A complete set of the results in terms of tables expressed in hours is available from the authors on request.

8. It could be argued that age is an important factor in the comparison of the sexes, since more women exist in the age-group 65+ and this group differs importantly from the other age-groups with respect to time spent on paid and unpaid labour. Because of the limited number of observations in the mini-TUS (detailed) data should not be shown by more than one background characteristic. Therefore the analyses on sex were repeated while excluding persons older than 65 years. Excluding these persons does not have a large impact on the general conclusions.

9. To illustrate the magnitude of the reliability margins around these figures: the 95 percent confidence interval for the proportion of time spent on volunteer work by men (0.9 percent) is 0.58-1.34 percent. For women (0.6 percent) the interval is 0.35-0.88 percent. These margins are based on the data source (TUS '97), under the assumption that the weighting procedures do not influence the standard error of the estimates.

10. To illustrate the magnitude of the reliability margins around these figures: the 95 percent confidence interval for the proportion of time spent on household work by men (3.7 percent) is 3.00-4.60 percent. For women (10.3 percent) the interval is 9.19-11.57 percent. These margins are based on the data source (TUS '97), under the assumption that the weighting procedures do not influence the standard error of the estimates.