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Calculating the value of unpaid labour: a discussion document

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Introduction

The Beijing Platform for Action which emerged from the 1995 Fourth United Nations World Conference on Women called for the development of 'suitable statistical means to recognise and make visible the full extent of the work of women and all their contributions to the national economy, including their contribution in the unremunerated and domestic sectors'. In other words, it called for the valuation of unpaid labour.

During 2000, Statistic South Africa (Stats SA) conducted the fieldwork for the first national time use study. The study was made possible by financial and technical assistance from the Norwegian Agency for Development Cooperation (Norad) and Stats Norway. The survey provided the data that allows the first estimations of the value of unpaid labour in South Africa.

This paper presents various suggested ways of undertaking the valuation.

- The first part of the paper describes what is currently included in national accounts, and how the valuation of unpaid labour relates to that.
- The second part of the paper discusses different methods of valuing unpaid labour.
- The third part describes how the methods were applied in South Africa and the data sources used.
- The final part of the report presents the results of the valuation exercise.

GDP, national accounts and satellite accounts

What the standard GDP measures

The System of National Accounts 1993 (SNA93) provides the basis for calculations of gross domestic product (GDP), which is the traditional measure of the size of the economy of a country. Growth in GDP is generally seen as the main indicator of how well or how poorly an economy is performing.

The GDP level and rate of change in GDP are often used to compare the economic performance of different countries. It is therefore important that all countries calculate their GDP in the same way. The System of National Accounts (SNA) provides an internationally agreed set of standards for how countries should calculate GDP. In particular, it states what should be included and what should be excluded in the calculations. It also states how different components should be measured. The latest version of the standard is known as SNA93. It was developed by international agencies such as the United Nations, the Organisation for Economic Cooperation and Development (OECD) and the International Monetary Fund.

The 1999 South African Budget Review defines GDP as 'a measure of total national output, income and expenditure in the economy'. It notes, however, that 'GDP per head … does not take account of the distribution of income, nor of *goods and services that are produced outside the economy, such as work within the household*' (Department of Finance, 1999; emphasis added).

SNA93 distinguishes between three types of production that form part of the calculation of output, and therefore of GDP, namely (a) market; (b) own final use; (c) non-market. GDP measures all transactions that occur in the market. In respect of non-market production, the GDP calculations exclude the production of (unpaid) household *services* for own consumption, but include the production of *goods* by households for their own final use (for example subsistence production), an imputed value for owner-occupied dwellings, and paid household services such as wages of domestic workers.

The way that production is covered by national accounts can result in different interpretations of the meaning of trends in GDP. This happens in particular if the way in which people provide for their needs changes over time. For example, most people will interpret an increase in the GDP as implying an improvement in living standards. However, this may not be the reality. GDP may increase when goods and services which were previously produced by the household for itself are instead obtained through the market. The household may still be enjoying the same level of goods and services, but GDP may increase because of the shift to the market. In addition to this undercount, Acharya (1995:2) notes that 'marketisation involves costs also in terms of transportation, increased requirements for nutrition, etc.'

Exclusion of household services

The basic SNA93 rule for household production is that production of goods is included, but not production of services. SNA documents explain the exclusion of services produced in households as follows:

> A large volume of household services including the imputed values derived from production would distort the usefulness of the accounts for policy purposes and for the analysis of markets and market disequilibria – the analysis of inflation, unemployment, etc. (quoted in Varjonen et al, 1999:12; also see paragraph 6.21 of SNA93)

The documents also argue that household production 'is relatively isolated from, and independent of, market activities' (quoted in Varjonen et al, 1999:14). Other arguments against inclusion of household services include the lack of data, difficulty of measurement, and inability to make historical comparisons because services were not previously included.

Kulshreshtha and Singh (n.d.:6) point to a further reason. They note that 'if personal and domestic services by members of households for own final consumption are included, all persons engaged in such activities would become self employed, making unemployment virtually impossible by definition'. On the other hand, there are various other anomalies in SNA93. For example, fetching of water and fuel for household use should, according to SNA93, be included in GDP calculations. Yet few people would regard a person who spends an hour collecting water each day as employed if that person engaged in no other economic activity.

More generally, Chadeau (1992:87-8) notes that the 'arguments for excluding domestic and personal services from the production boundary in the System are not all equally convincing'.

Interaction of household and market production

Duncan Ironmonger has illustrated the many different ways in which household and market capital and labour can be combined. He uses the service of laundry as an example (described in Varjonen, 1999:15). Similar examples could be constructed for other services, such as acquisition of water for domestic use. The matrix below illustrates the four possibilities:

Cell 1: Sending the laundry to a laundry service;

Cell 2: Paying a domestic worker to do the laundry at home using the household's washing machine;

Cell 3: Going to the self-service laundry and using their washing machine and your own labour;

Cell 4: Washing laundry at home using own labour and own washing machine.

		Use of capital	
		Market (monetary production)	**Household**
Use of labour	**Market (monetary production)**	1 laundry service	2 paid domestic worker
	Household	3 own labour at launderette	4 own labour at home

While the output of each of the four alternatives is the same (clean laundry), they would not all be fully recorded in GDP. Cell 4 would not be recorded at all, while cell 1, for example, should be fully recorded.

The need for satellite accounts

Standards regarding the activities to be included or excluded in GDP calculations are set internationally. There is, however, another route for valuing the excluded production. The SNA93 suggests that satellite accounts be drawn up for activities that are not included in the national accounts proper, or in cases where activities are included, but not in sufficient detail. These satellite accounts allow for some redefinition of concepts and changes in scope, as well as greater detail. Areas suggested for satellite accounts include tourism, financing of health care, the environment and unpaid labour.

Varjonen et al (1999:17) distinguish between two different types of satellite accounts. Tourism accounts are an example of the first type. Here the objective is to take information that is already included in national accounts, but to present it in new ways to show aspects that are hidden in the standard approach. The second type involves

the development of alternative concepts and classifications. Unpaid labour accounts are an example of the second type.

Methods of valuing unpaid labour

All household production or only excluded production?

There are different approaches to constructing satellite accounts for unpaid labour. Varjonen et al (1999:7) describe a 'household' satellite account, which measures all production taking place in the household. It thus includes some production that is already included in GDP, as well as production that is excluded. However, they suggest that as far as possible these accounts should distinguish between the production that is already included in national accounts and that which is not. Schafer and Schwarz (n.d.:6) also argue that satellite household production accounts should include both household work that is already included in national accounts, and that which is not.

The alternative approach, which is the one adopted in this paper, is to estimate the value of excluded production only.

Input vs output

Most studies use the costs of the inputs to production to value household production. The input method is also used as one method in standard national accounts. It is the approach adopted in relation to valuing production by government and non-profit institutions. The alternative method is to value output. This method may be used in both GDP and satellite calculations. It is, however, difficult when the goods and services produced are not sold on the market.

For output-based valuation one needs (a) household output, measured in physical units; (b) intermediate consumption, measured in either physical or monetary terms, and (c) market prices for the physically-measured items in (a) and (b) so as to be able to convert them into a monetary measure.

The calculation of the value of excluded production from an output-based standpoint is fraught with difficulties. For example, Acharya's (1995) output-based calculations for Nepal yield value added equal to the official GDP if all goods and services produced for household consumption and household maintenance activities are counted. She notes that this is much higher than the value added equal to 40% of GDP recorded in a Norwegian study. One part of the reason could be the data used. For meal preparation, Acharya relied on a special, but small, survey of 276 households that generated the frequency that each product was produced or activity was performed, a unit of measurement, the average quantity produced in the time, the per unit cost of preparation at home, and the total persons involved in making the product. This allowed her to use output values for these products.

However, for other activities and products Acharya used wages. Further, she used aggregated earnings figures for a 'polyvalent' worker – a notional average worker performing a range of jobs rather than one performing the specific activity concerned – because of the lack of detailed statistics.

A further reason is that the Norwegian calculations assumed operating surplus and consumption of fixed capital to be zero. However, the method and data would

probably explain only a small part of the difference between the Norwegian and Nepalese results. A far more important reason is almost certainly the different nature of the Norwegian and Nepalese economies. In Nepal, far more productive activities are likely to be non-marketised than in Norway.

One advantage of output-based valuation is that it corrects for different productivity levels. Instead of focusing on the means by which a good or service is produced, the focus is on what is actually produced. For example, two households may spend an equal number of hours cooking meals of similar nutritional value. However, because one household has an electric stove or microwave, while the other relies on woodfuel, the first household will expend far less time in preparing the meal. With the input-based approach, the meal of the second household would be assigned a higher value than the meal of the first household because the estimate is based primarily on time. With the output-based approach, the two meals would be assigned the same value.

There are many other reasons why outputs, rather than productivity levels, should be measured. For example, unpaid work activities may be done partly for leisure. Thus, where someone does gardening or cooking partly because they enjoy this, they may spend longer than strictly necessary on the task (Australian Bureau of Statistics, 1990). In calculating the value of unpaid labour, we contend that it is better to focus on the nature of the activity, rather than the purpose or level of enjoyment. We therefore do not distinguish between unpaid work done for leisure and unpaid work done for other reasons.

Schafer and Schwarz (n.d.:8) point out that the productivity differences sometimes favour households. They note, for example, that with person-related services, households may have better information about needs, be more willing to provide services on an ongoing basis, be more flexible, and adjust more rapidly to unforeseen circumstances. Further, they will not have to factor in the travel, idle time and breaks which are necessary when the services are produced commercially.

The approach used in this paper

Because we do not have the necessary data for South Africa, we adopted an input-based approach in spite of our preference for an output-based approach. In household production, the input costs of production include labour, taxes less subsidies on production, consumption of household durables, and the goods and services used in production. The latter is referred to as intermediate consumption. Taxes which should be taken into account in the calculation include taxes on ownership of dwellings and cars, and taxes on use of vehicles. Subsidies on production would include home care allowances and housing allowances. The input approach does not take net operating surplus into account, or treats it as zero.

To perform the full input-based calculations described above, we need to decide which goods purchased by the household are used for final consumption, which for intermediate consumption and which are fixed assets. Some European countries are attempting to use the Classification of Individual Consumption by Purpose (COICOP) to help with this decision. Varjonen et al (1999:38) provide a table suggesting how different categories of goods could be allocated. Schafer and Schwarz (n.d.:21) also include a chart of ‘Goods and services for intermediate consumption and consumer durables used in household production’ which they allocate either completely or partly to different types of household production.

Unfortunately this approach is not possible in South Africa. South Africa has not yet developed the COICOP system in sufficient detail. Further, if we had, we would need to review Varjonen et al's allocation of categories to see whether they are valid for our situation.

In the absence of the necessary data, many analysts have used the estimated value of labour as a rough indication of the value added by household production. This is the approach followed in this paper where, as in other countries, we convert the time-based values obtained from our time use study into a monetary equivalent. Labour-only estimates are a good start if we remember that household production is more labour-intensive than production in most other economic sectors. However, we note Brathaug's (1990) caution that the resulting calculations produce an underestimate of the full value added in household production.

Which wage to use

Time use surveys provide an estimate of the number of hours spent on unpaid labour. These hours and minutes then need to be converted into a monetary value. This is done by assigning an hourly wage to the time spent. Kulshreshtha and Singh (n.d.:4) report that in 1996 Jackson was able to identify at least twelve different approaches to wage imputation. We can cluster the approaches into four broad categories:

- the mean (average) wage approach
- the opportunity cost approach
- the generalist approach
- the specialist approach.

The *mean wage* approach assigns the mean wages in the economy as a whole to each hour. Usually, the mean is calculated separately for male and female and the appropriate wage assigned according to who performed the unpaid labour. Where sex-disaggregated wages are used, the value of unpaid work falls. This happens because (a) women generally perform more unpaid work than men; and (b) the average female wage is usually lower than the average male wage.

The disadvantage of the mean wage approach is that it is based only on employed people, who are not representative of the total population. It assigns values to unemployed and not economically active people that are appropriate for the employed, but perhaps not for everyone. This disadvantage is accentuated where a country has large wage discrepancies between the highest and lowest paid.

The *opportunity cost* approach uses the economic concept of opportunity cost. This concept refers to the benefit foregone by making one choice over another. In this case, it refers to the earnings that the person could have earned in paid work if they had not, instead, done unpaid labour.

Theoretically there are problems with this approach. Because the opportunity cost approach applies the wage that the person would earn if they were working in their paid job, it applies different rates for the same task – and thus similar output – when the work is performed by different people. This implies, for example, that time spent cooking a meal by a university graduate has more value than time spent cooking a meal by someone without formal schooling, even if they use the same ingredients.

Another problem with this approach is the difficulty in finding the opportunity cost for many respondents in a situation of high unemployment. In the time use survey we

targeted respondents aged ten years or above. We found that under half of the respondents were employed: 44% were not economically active, and 8% were unemployed. Many of the unemployed and not economically active people would never have been employed. It would thus be difficult to assign an occupation and associated opportunity cost wage.

A third weakness of the opportunity cost method is that it assumes that people can always choose whether to spend an extra hour on paid work or other activity. In practice, especially with formal work, there is not this flexibility. For these and other reasons, Varjonen et al (1999:31) report that the opportunity cost method is 'widely rejected by researchers'.

The *generalist* approach assigns the mean wages of workers performing similar work to the unpaid work. For housework, the workers concerned would include paid domestic workers. For child care work it would include workers in preschools. Where the generalist approach uses domestic worker wages, it may provide an underestimate of the true value of housework to the extent that it does not take into consideration some possible management-type tasks associated with household maintenance.

Schafer and Schwarz (n.d.:16) therefore argue that the housekeeper wage is more appropriate than that for ordinary domestic workers, as it better reflects the range of tasks performed by household members. South African data does not have sufficient observations of housekeepers to provide a reliable estimate with this category alone. It is also not clear that the housekeeper wage would be appropriate in South African circumstances.

The *specialist* approach assigns different wages to different activities, regardless of who performs them. In each case, the paid worker whose functions and circumstances most closely match the unpaid work concerned is chosen. For example, for housework the cooking activities would be assigned the wage of a paid chef or cook, the cleaning activities those of a paid cleaner, and so on. This approach requires data of sufficient detail and quantity on both the time use and wage side. It is sometimes applied in a broad way. For example, one can assign one wage to the household maintenance work, another wage to the care work, and a third wage to the community services work. The difference in total value resulting from the specialist and generalist approaches varies according to the mix of occupations and wage levels.

Chadeau (1992:95) notes that, across all countries that have done the calculations, the opportunity cost approach always gives the highest values, and the generalist approach almost always gives the lowest. The exception is Norway, where the generalist approach resulted in a higher value than the specialist substitute. Other studies have generally found that the opportunity cost value is twice as high as that obtained with the generalist wage.

The above discussion assumes that for all but the opportunity cost method, the relevant mean wage is used. Some analysts have suggested using union and statutory minimum wage rates. Schafer and Schwarz (n.d.:11) argue that this approach is incorrect, and that the wage rates should be the actual wages prevalent on the market. These would – or should – usually be higher than minima, unless enforcement and coverage are poor.

In this paper, we use all four approaches to calculate the contribution of unpaid labour, and compare the results.

What to include in the wage

There is some agreement among those calculating the value of unpaid labour that the gross wage should be used in the calculations. (See Varjonen et al, 1999, for a discussion of the rationale.) The total should also include amounts paid by the employer in respect of the worker in some formal employment jobs but which the worker does not directly receive. These amounts should be included because, if the household had to buy the product on the market, the price would include all employer expenses. The all-inclusive approach is in line with the overall SNA approach.

In South Africa, the wage amount should thus include payments such as employer contributions to the Unemployment Insurance Fund (UIF), the skills levy, and any employer contributions to medical aid and pension funds where these are applicable for the job and wage under consideration.

Estimating the hours

The main decision to be made in respect of hours worked is whether to allow for the performance of more than one activity at a time. Some time use studies from the start allow for only one activity to be reported in a given period. Other studies allow for more than one activity to be performed at a time. Usually when this is done, the instrument distinguishes between the main or primary activity, and secondary or tertiary activities.

Research in other countries has found a systematic bias in which activities are nominated as primary and which as secondary or tertiary. In particular, child care is typically reported as a secondary activity when performed at the same time as another activity. Thus, for example, Brathaug notes that the time use data that she used focused on the main activity. She suggests that the low value for care tasks is probably explained by the fact that many of these tasks are conducted simultaneously with other tasks (1999:14).

Varjonen et al (1999:27) suggest that European countries ignore simultaneous activities when doing their calculations for satellite accounts. They provide two reasons for doing so. The first is that such activities are infrequently reported. The second is the suspected lack of reliability in respect of activities such as child care. In essence, by advocating ignoring the under-reported activity, Varjonen et al increase the undercount.

Schafer and Schwartz (n.d.:7) provide an estimate of the difference when only primary, and when both primary and secondary, activities are included. They state that in the German case, an average of about 20 minutes per day are used for primary child care, while about 90 minutes per day are spent with children if secondary activities are included. This longer estimate still does not include ‘standby’ times during which the person is available for children.

Households vs institutions

Varjonen et al (1999:20) note that, theoretically, one should include institutional households in household production calculations, but that this is not usually done. They suggest that the exclusion is not too serious as the amount of unpaid labour performed in institutions is probably insignificant. This latter contention could be disputed. However, for the South African estimates we excluded institutions as they were not covered in the time use survey.

Applying the methods in South Africa

Using the time use survey

As noted above, input-based unpaid labour valuation relies on time use studies to provide estimates of time spent on non-SNA production. The fieldwork for South Africa's first national time use study was conducted in three rounds or tranches – February, June, and October 2000. This was done so as to capture possible seasonal variations in time use. The sample covered all nine provinces and, within each province, four different settlement types – formal urban, informal urban, commercial farms, and other rural settlements. The latter consist largely of the areas that comprised the 'homelands' during the apartheid era.

Within each household, two people aged ten years or above were selected systematically and asked what activities they had performed on the previous day. A total of 14 306 individuals, from over 8 500 households, were successfully interviewed about their activities on the previous day. The study used a 24-hour diary, divided into half-hour slots, as the core instrument to record activities. In each slot, a maximum of three activities could be recorded. The diary was administered face-to-face with the respondent by means of an interview.

For coding the activities recorded in the half-hour slots, the survey used a trial classification developed by the United Nations Statistics Division (UNSD). The UN classification is organised according to ten broad categories, namely:

1 Work in establishments, for example working for government, in a factory or mine;

2 Primary production, for example growing maize or other vegetables on a household plot or collecting fuel and water;

3 Work in non-establishments, for example selling fruit and vegetables at the side of a road, or doing hairdressing at home;

4 Household maintenance, for example cooking and cleaning the dwelling;

5 Care of persons, for example looking after children, the sick or elderly people in the household;

6 Community service, for example attending a political meeting or helping other households;

7 Learning, for example attending school or doing homework;

8 Social and cultural, for example socialising with family or friends;

9 Mass media use, for example watching television or listening to the radio; and

0 Personal care, for example sleeping, eating and drinking, dressing and washing.

An important aspect of the UN classification system is the fact that these ten categories can be grouped according to how they are treated in the SNA, and thus in the calculation of GDP.

- Activity categories 1-3 fall in the SNA production boundary. They would thus be included in national accounts and the GDP calculation. Stats SA reports on time use refer to activities in these categories as 'SNA production'.

- Activity categories 4-6 fall outside the SNA production boundary. They may, however, be recognised as 'productive' activities and largely correspond to unpaid work. For time use analysis, Stats SA refers to activities in these categories as 'non-SNA production'.
- The remaining four activity categories are not covered at all by the SNA. They fail what is referred to as the 'third person test' in that these activities cannot be performed for a person by someone else – people cannot hire someone else to sleep, learn, or eat for them. Thus they cannot become part of the market economy. In its time use analysis, Stats SA refers to activities in these categories as 'non-productive activities'.

Assumptions for valuation

In our calculations of the value of unpaid labour, we assumed that most production resulting from categories 1, 2 and 3 of the coding scheme would be included in the gross domestic product (GDP) calculations. The exceptions are collecting of fuel and water. Although SNA93 specifies that this activity should be included in the GDP computations, this has not been attempted to date by Stats SA – or indeed by many other statistical agencies in developing countries.

Our calculations in respect of productive activities not currently included in GDP calculations thus focused on categories 4 (household maintenance), 5 (care for household members) and 6 (community work), plus collecting fuel and water. Schafer and Schwarz (n.d.) describe all three of our chosen categories as 'household production'.

Ironmonger (personal communication) and others (e.g. Acharya, 1995) argue that education should be seen as a type of production in that it produces improved human capacity. However, the standard approach is to regard learning activities as non-productive as they do not pass the third-person test, i.e. one cannot pay someone else to do the learning for you. We follow the standard approach in this report.

There is also some debate as to how travel should be treated. Chadeau (1992:89) argues that the third party criterion dictates that 'transporting oneself should be considered as a productive activity provided it is not performed as a non-productive leisure activity'. In the activity classification system used by Stats SA all travel associated with a particular category of work is included in that category. In order to be consistent with calculations of GDP, in which travel in relation to paid work would usually be excluded, we have excluded all travel related to non-SNA production from our calculations of the value of this production.

Calculating the hours

The Stats SA time use survey allowed for up to three activities to be reported for each half-hour timeslot. The respondent was asked to state for each activity whether it was performed simultaneously with other activities or alone. The Stats SA survey did not distinguish between primary, secondary and tertiary activities. All activities in a given period were given equal weight.

In order to obtain a fuller understanding of simultaneous activities, Stats SA used two different methods of assigning minutes to activities. When there was only one activity in a half hour, it was obvious that 30 minutes should be assigned to that activity. When there were two or three activities in a half hour which were performed sequentially, one after the other, it was also simple – each activity was assigned 10 or

15 minutes. However, when two or more activities were performed simultaneously, it was more complicated. If, for example, two activities were performed simultaneously in a particular half hour, should one assign 30 minutes or 15 minutes each?

The advantage of assigning 15 minutes is that the total minutes per person per day then sum to 24 hours. This method makes our results more easily comparable with those of other countries. One disadvantage of this method is that it can give the impression of less time being spent on an activity than is the reality. For example, if a person spends eight hours at work, during which the person also listens to the radio, the approach will record only four hours of work and four hours of listening to the radio. This is not how most people would intuitively understand the situation.

The advantage of assigning 30 minutes to each of the two activities is that it shows the truer duration of a particular activity – the full time it spanned.

In this report we mainly use the '24-hour' method. We do, however, provide some comparisons with what would have resulted from using the 'full minutes' method.

Calculating the wage

Mean hourly wages were calculated from data from the labour force survey (LFS) conducted in September 2000. The LFS is a six-monthly rotating panel household survey specifically designed to measure labour market dynamics in the country. Each round of the survey collects information from approximately 70 000 adults aged 15-65 years living in 30 000 households spread across the country.

As with most other household surveys, the LFS probably provides an underestimate of actual earnings as respondents tend to under-report income of all kinds. It is, however, the best source available in terms of coverage of both formal and informal sectors.

Employees were selected by means of question 4.3 of the survey. This question asks about the situation of the respondent in their main work. Respondents were selected if they answered that they were either (a) working for someone else for pay, or (b) working for one or more private households as a domestic employee, gardener or security guard. In both cases, the questionnaire specified that payment could be in cash, kind or accommodation. This implies that the cash wages reported could understate the true value of compensation.

Mean hourly wages were calculated on the basis of the responses to questions 4.15a to 4.15c and 4.20a of the LFS. Question 4.15a asks for the respondent's total salary/pay at his or her main job. The instruction was to include overtime, allowances and bonus, before any tax or deductions i.e. the response is a measure of gross pay. Question 4.15b asks whether the amount stated is paid per week, per month or annually. These two variables allow the calculation of a weekly equivalent.

For those who will not or cannot specify an exact amount, question 4.15c asks for the wage range. This is specified in terms of 14 income brackets. Where the answer was specified in terms of a bracket, the logarithmic mean of the bracket was used for all but the bottom non-zero and top brackets. For the bottom bracket, an amount equal to two-thirds of the top cut-off was used. For the top bracket, an amount equal to double that of the second from the top was used.

The LFS provides estimates of the gross wage received by the worker. We do not have estimates of all additional payments by employers. Our estimations will thus be an underestimate. This problem is, however, probably less serious than it might have

been in some other countries. In South Africa, for many workers there are no contributions or very small contributions by employers. The employer UIF contribution is equal to 1% of the wage. It is not paid by informal sector employers or by employers of domestic workers. The skills levy was equal to 0,5% of the payroll for most of the year 2000, when the time use survey was conducted. It was payable only by formal sector employers with payrolls of R250 000 or more per month.

The gross wage should also include extra, irregular payments such as a 13th cheque and other bonuses. The data we use below probably excludes these payments.

Of the 21 875 total employee respondents in the LFS, we obtained valid non-zero responses to questions 4.15a and 4.15b for 19 045 (87%), and non-zero income bracket responses for a further 2 023 (9%). The remaining records were ignored in the calculations of the mean.

Time use surveys produce information in terms of hours and minutes. We therefore needed to obtain an hourly rather than a weekly wage. Question 4.21a of the labour force survey asks how many hours per week, including overtime, the respondent usually works in his or her main job or activity. We used the weekly wage and the number of hours worked in combination to obtain an hourly wage. In those cases where there was no valid answer for question 4.21a, we used 45 hours as a default, as this is the maximum number of ordinary hours specified in the Basic Conditions of Employment Act. The default was necessary for 5% of all employees.

The inclusion of possible overtime in both the wage and the hours could result in a higher than normal mean wage. We could not avoid this possible bias given the data source. Perhaps the long hours worked by some people on unpaid work on top of their paid work justified some adjustment for overtime.

Selecting observations for different methods

Despite our reservations about the *opportunity cost* method, we nevertheless attempted to apply it to the available data. Applying the method in South Africa is not as simple as in some other countries where unemployment is not as high, and fewer people have never been employed. Here, instead of basing the opportunity cost on the occupation of the individual, we based it on the mean wages of people of similar sex and educational level. In terms of educational level, we distinguished between those with no formal education, those who had not completed grade 7 (incomplete primary), those who had not completed grade 12 (incomplete secondary), and those with grade 12 or higher.

Table 1 below shows the occupations selected for the *generalist* calculations involving work similar to housework and care of persons. The codes in the first column of the table are the occupational codes used by Stats SA for all relevant surveys and censuses. Close on two-thirds (64%) of respondents selected from the LFS are in the category of domestic helpers and cleaners. This is the occupation people most readily associate with unpaid labour. Unlike some studies in other countries, we did not include nursing-type occupations. Care work certainly does involve some nursing-type activities. We omitted the category because the number of observations is relatively large and would have thus had a disproportionate impact on the mean. The omission results in a lower mean, as nurses – and especially professional nurses – generally earn more than those in the selected occupations. Thus inclusion of the 284 nursing associate professionals (code 3231), would have resulted in a mean hourly wage of R6,23 rather than the R5,08 obtained without them.

Table 1: Respondents selected for calculation of housework and care wage

Code	Occupation	Male	Female	Total
5121	Housekeeper & related	1	14	15
5122	Cooks	76	164	240
5123	Waitrons	38	88	126
5131	Personal care of children & babies	6	106	112
5132	Institution-based personal care workers	13	45	58
5133	Home-based personal care workers	0	8	8
5139	Personal care workers n.e.c.	2	1	3
9131	Domestic helpers & cleaners	90	2485	2575
9132	Helpers & cleaners in establishments	213	634	847
9133	Hand-launderers & pressers	5	39	44
Total		**444**	**3584**	**4028**

In addition to the occupation codes, table 1 shows the number of male and female respondents for each in the LFS. Because there were relatively few observations overall, and because male respondents accounted for only 11% of the total, the wage computations were not sex-disaggregated for this calculation.

For the *specialist* approach, we considered each of the different activities included in non-SNA production, and decided on the paid occupation/s that most resembled them. The assignment of activity codes (from the time use survey) was as follows:

- Activity codes 410 (cooking-related) and 620 (community organised work) were equated with the work of cooks and waitrons;
- Activity codes 420 (cleaning-related), 440 (shopping), 450 (household management), 490 (miscellaneous housework), 615 (cleaning of classrooms), 250 (collecting water) and 236 (collecting fuel) were equated with the work of paid domestic workers, housekeepers and cleaners in establishments;
- Activity code 430 (care of textiles, etc) was equated with the work of hand launderers;
- Activity code 460 (do-it-yourself home improvements) was equated with the work of craftspersons;
- Activity codes 470 (pet care), 511/2 (physical care of household children), 531/2 (accompanying household children), 550 (accompanying household adults), 561/2 (supervising household children), 590 (miscellaneous care of household persons) and 671/2/3/4 (care of non-household persons) were equated with the work of child carers, institution- and home-based personal carers, and general personal care workers;
- Activity code 540 (physical care of household sick, aged and elderly) was equated with the work of nursing associate professionals;
- Activity code 521/2 (teaching household children) was equated with the work of primary and secondary teachers;

- Activity code 610 (community organised construction) was equated with the work of construction labourers; and
- Activity codes 630 (volunteering for an organisation), 650 (participation in meetings), 660 (involvement in civic responsibilities) and 690 (miscellaneous community services) were equated with the work of unskilled (elementary) workers.

The population census as an alternative data source

The population census provides an alternative source of income data. The strength of the Census is its greater coverage than the LFS. Weaknesses include (a) less specific questions about employee incomes; (b) the fact that the Census was conducted in 1996 whereas the time use data is from 2000; and (c) apparent under-estimation of income when compared with other sources (Alderman et al, 2000:10-1).

In terms of the first weakness, there are several aspects:

- Census '96 enquired about every individual's personal income, whether that person was employed or not. The responses could, therefore, include non-earned property income. To approximate earned income, we restricted the calculations to people who were classified as employed. This category would include self-employed and employers as well as employees, but the latter predominate.
- Census '96 asked for income information only in terms of income brackets. This is less accurate than the exact figures obtained in respect of most employees in the LFS. To overcome this weakness, we adopted the same logarithmic mean approach as for the income bracket data from the LFS.
- Census '96 data does not include a question as to how many hours the person worked. To overcome this obstacle we assumed a working week of 46 hours. This was the maximum ordinary hours specified in the Basic Conditions of Employment Act in 1996. (A later amendment reduced the maximum to 45 hours.)
- Census '96 only recorded employment status for people aged 15 years and above whereas the time use information is available for people aged 10 years and above.

In terms of the second weakness, we have adjusted the 1996 figures by the consumer price index, in the absence of a more reliable basis of adjustment. In terms of the third weakness, we made no adjustments. We can thus expect the Census-based calculations to yield lower estimates of value added in household production.

For the generalist calculation based on the Census, we took two categories – domestic and related helpers, and personal care workers. There were 1,3 million of the former and 17 875 of the latter.

Results of valuation of unpaid labour

Table 2 provides the basic statistics relating to how male and female South Africans spend a 24-hour day. The values are calculated as a weighted average of the time spent by all respondents to the survey. The table distinguishes between activities included in GDP calculations as specified by SNA93, production activities that are not included, and non-productive activities. In arriving at these figures, a number of

adjustments were made to the division suggested by the activity classification. In particular, all travel activities and looking for work were reclassified as non-productive, and water and fuel collection were reclassified from SNA production to non-SNA production. Ironmonger (1993:9) estimates that in 1987, Australian market industries used 252 million hours while 'household industries' used 282 million hours. Unpaid work thus was 12% greater than paid work in terms of time. Table 2 suggests that in South Africa unpaid work is 33% greater than paid work in terms of time.

Table 2: Mean minutes per day spent on different activities by sex in the time use survey

Activity type	Male	Female	Combined
Production included in GDP calculations	148	85	115
Production excluded from GDP calculations	80	220	154
Non-productive activities	1 211	1 134	1 170
All activities	**1 439**	**1 439**	**1 439**

Table 2 reveals that South African men spend an average of 80 minutes per day and women an average of 220 minutes per day on productive activities that are not included in GDP calculations. If we use the 'full minutes' method for calculating time spent on simultaneous activities rather than the '24-hour' method, the average minutes per day increase to 87 for men, 247 for women and 172 for both combined. In this paper we attempt to assign monetary value to these activities using each of the different methods.

We take the following steps to arrive at the value of unpaid labour:

(a) We calculate the number of hours spent by individuals in a year, by multiplying the daily number of minutes by 365 days and dividing by 60 to convert to hours.

(b) We multiply the amounts for individuals by the total relevant population. Because the time use survey targeted people aged 10 years and older, we restrict our calculations to this group. We note, however, that this results in an underestimation of the extent that children under ten years engage in unpaid production.

(c) We calculate the appropriate wage for particular groups and particular non-SNA productive activities. As noted in the previous section, different methods can be applied for this step. In presenting the results below, we explain how the appropriate wage was arrived at in each case.

(d) We multiply the number of hours by the appropriate mean wage.

(e) We calculate the value of unpaid labour as a percentage of South Africa's GDP for the year 2000 of R887 797 million.

Economy-wide mean wage approach

In the simplest case, we calculate the mean wage for all employees across all occupations and assign this mean to unpaid hours. One sophistication is that we calculate the mean wage separately for women and men. To clarify the method, we

will go through the steps one at a time for this method and then summarise the results in a table.

In step (a), using the time use data, we arrive at an average of 487 hours per year for men, 1 338 hours for women, and 937 hours for women and men combined if we use the 24-hour method. For step (b), the weighted LFS records 15 885 322 men and 17 672 377 women aged 10 years and above, giving a total of 33,6 million people.

For step (c), when we include all employees with valid wage data in the LFS, the mean hourly wage for men is R16,64 and that for women R13,17.

Combining the different sets of data, we tabulate the results in table 3. The table shows that the economy-wide sex-disaggregated mean wage calculation gives a value equal to 50% of GDP. (The apparent discrepancy whereby the male percentage is 14% and the female 35%, whereas combined they are 50%, is due to rounding.)

Table 3: Valuation using economy-wide sex-disaggregated mean wage from LFS, and 24-hour measure for simultaneous activities

	Male	Female	Combined
Minutes per day	80	220	154
Hours per year	487	1 338	937
Population 10 years plus	15 885 322	17 672 377	33 557 699
Total hours per year	7 736 151 814	23 645 640 426	31 443 563 963
'Wage' per hour	R16,64	R13,17	-
Total wages per year (Rm)	128 641	311 491	440 132
% of GDP	14%	35%	50%

The above calculations are based on the 24-hour measure for simultaneous activities. Table 4 reflects similar calculations, but this time based on the 'full minutes' method, which allocates the full time value to simultaneous activities. The table shows a value equal to 55% in GDP with this measure.

Table 4: Valuation using economy-wide sex-disaggregated mean wage from LFS, and full minutes measure for simultaneous activities

	Male	Female	Combined
Minutes per day	87	247	172
Hours per year	529	1503	1046
Population 10 years plus	15 885 322	17 672 377	33 557 699
Total hours per year	8 407 306 669	26 554 219 141	35 112 539 054
'Wage' per hour	R16,64	R13,17	-
Total wages per year (Rm)	139 898	349 719	489 617
% of GDP	16%	39%	55%

The above calculations are based on LFS data. The same approach, but using Census data, is reflected in table 5. The population census may provide underestimates of income when compared with other sources. We obtain a mean male hourly wage of R12,17 and a female mean of R8,10. As expected, this gives a value equal to a smaller percentage of GDP, namely 32%, than that shown in the last line of tables 3 or 4.

Table 5: Valuations using economy-wide sex-disaggregated mean wage from Census, and 24-hour measure for simultaneous activities

	Male	Female	Combined
Minutes per day	80	220	154
Hours per year	487	1 338	937
Population 10 years plus	15 885 322	17 672 377	33 557 699
Total hours per year	7 736 151 814	23 645 640 426	31 443 563 963
'Wage' per hour	R12,17	R8,10	-
Total wages per year (Rm)	94 149	191 530	285 679
% of GDP	11%	22%	32%

Opportunity cost approach

Table 6 shows the mean wage for each of the chosen educational levels (see above), as well as the percentage of the male and female population aged 10 years and above estimated to be at each level. The final row of the table shows the resultant average male wage to be R13,65 per hour and the female wage to be R9,74 per hour.

Table 6: Mean wage and average minutes spent on unpaid labour by education

	Male			Female		
	%	Wage	Minutes	%	Wage	Minutes
No schooling	8	5,51	88	10	2,10	242
Incomplete primary	40	6,61	75	34	4,56	187
Incomplete secondary	29	11,34	83	35	8,90	238
Matric plus	24	30,90	80	21	22,94	216
Average		13,65	80		9,74	216

Table 7 is the usual one depicting the value of non-SNA production. The total wages in the row second from the bottom reflect the result of calculations based on figures to greater accuracy than those shown in higher rows of the table, which are rounded off. Multiplying the total hours shown in the table by the hourly wage will thus give slightly different results. The total wages shown in the table are, however, the more accurate figures. The final row shows that this basis of valuation results in a value equal to 38% of GDP.

Table 7: Valuation using opportunity cost sex-disaggregated wage from LFS, and 24-hour measure for simultaneous activities

	Male	Female	Combined
(Weighted) minutes per day	80	216	n/a
Hours per year	487	1 314	n/a
Population 10 years plus	15 885 322	17 672 377	33 557 699
Total hours per year	7 730 856 707	23 221 503 378	30 952 360 085
'Wage' per hour	R13,5	R9,74	-
Total wages per year (Rm)	105 498	229 281	334 779
% of GDP	12%	26%	38%

Generalist approach

In the generalist approach we take the mean wage earned by paid workers doing work similar to domestic and care work. We do the calculations first based on LFS data, and then on Census data. The occupations selected for this exercise are discussed above. We do not disaggregate by sex, because relatively small numbers of men do these occupations on a paid basis. In the LFS, the mean hourly wage for the selected occupations is R5,08. The valuation calculation gives a value equal to 18% of GDP.

Table 8: Valuation using generalist wage from LFS, and 24-hour measure for simultaneous activities

	Population
Minutes per day	154
Hours per year	937
Population 10 years plus	33 557 699
Total hours per year	31 437 971 013
'Wage' per hour	R5,08
Total wages per year (Rm)	159 705
% of GDP	18%

Table 9 shows that, with the full minutes measure, the value increases slightly, to 20% of GDP.

Table 9: Valuation using generalist wage from LFS, and full minutes measure for simultaneous activities

	Population
Minutes per day	172
Hours per year	1 046
Population 10 years plus	33 557 699
Total hours per year	35 112 539 054
'Wage' per hour	R5,08
Total wages per year (Rm)	178 372
% of GDP	20%

The Census produces a mean generalist hourly wage of R3,02. Table 10 shows that this produces an amount equal to a low 11% of GDP.

Table 10: Valuation using generalist wage from Census, and 24-hour measure for simultaneous activities

	Population
Minutes per day	154
Hours per year	937
Population 10 years plus	33 557 699
Total hours per year	31 437 971 013
'Wage' per hour	R3,02
Total wages per year (Rm)	94 943
% of GDP	11%

Specialist approach

The specialist approach disaggregates in terms of activities rather than the person performing them. Above we describe the way in which the different activity codes which are part of non-SNA production are equated with different occupations. Table 11 shows the average minutes per day spent on each of the categories, as well as the average wage assigned to these minutes.

Table 11: Average minutes spent per day on activities and mean relevant specialist wages

Activity	Daily minutes	Average wage R/hr
General domestic	60,5	4,58
Cooking	53,7	7,37
Laundry	16,8	7,9
Do-it-yourself	2,5	12,2
Care of sick, aged	0,4	20,29
Care of other people	17,9	9,65
Teaching	1,1	39,34
Construction	0,1	7,65
General unskilled	1,9	5,17
Total	**154**	

Table 12 shows the value calculations in the usual format. This time, the value is equal to 24% of GDP.

Table 12: Valuation using specialist wage from LFS, and 24-hour measure for simultaneous activities

	Population
Minutes per day	154
Hours per year	937
Population 10 years plus	33 557 699
Total hours per year	31 437 971 013
'Wage' per hour	Differentiated
Total wages per year (Rm)	217 327
% of GDP	24%

Table 13 summarises the results of the different calculations.

Table 13: Comparison of results of different valuation approaches

Data	Approach	Time measure	Value (Rm)	% of GDP
LFS	Economy-wide mean wage	24-hour	440 132	50
LFS	Economy-wide mean wage	Full minutes	489 617	55
Census	Economy-wide mean wage	24-hour	285 679	32
LFS	Opportunity cost	24-hour	334 779	38
LFS	Generalist	24-hour	159 705	18
LFS	Generalist	Full minutes	178 372	20
Census	Generalist	24-hour	94 943	11
LFS	Specialist	24-hour	216 467	24

Finally, we present Norwegian results for similar calculations as a point of comparison. Table 14 shows much less variation in the Norwegian results for different approaches than in South Africa. The only exception is the relatively high value for the specialist method for 1972. The smaller variation can, at least to some extent, be explained by smaller differences in pay between different occupations in Norway than in South Africa. The South African value for the opportunity cost approach is very similar to the Norwegian values. The South African value for the generalist and specialist approaches is significantly lower than the Norwegian values. Again, this can be largely explained by greater variations in wages within South Africa, with relatively low wages for domestic work and for other female-dominated and care-related occupations. Further, the value for the generalist approach in Norway was based on wages for a municipally employed housewife substitute, an occupation that does not exist in South Africa.

Table 14: Norwegian results for different approaches and years

Approach	Year	% of GDP
Generalist (housekeeper)	1990	37
Specialist	1990	38
Opportunity cost	1981	40
Specialist	1981	39
Specialist	1972	50

The way forward

The calculations above provide a wide variety of estimates of value added in household production. At the most conservative, using Census data, the domestic and care wage and the 24-hour measure, household production would be equal in value to 11% of GDP. The paper points to a range of reasons why this calculation is an underestimate of true value added. At the other end of the scale, using LFS data, economy-wide mean wages and the full minutes measure, household production would be equal to 55% of GDP. All of these methods exclude the value of non-labour inputs.

The paper discusses the strengths and weaknesses of each of the different methods, as well as the implications of using different data sources and different ways of calculating minutes. Which measure is best is a matter of judgement, and the choice of approach might differ for different purposes. The situation is similar to that in respect of unemployment rates, where the official unemployment rate is appropriate for some purposes, and the expanded unemployment rate appropriate for others.

As important as the value of unpaid labour in comparison to that of GDP are changes over time in the relative values. This paper presents estimates of the value of unpaid labour in South Africa for 2000. At this stage, we do not have the data on which to base estimates for any other date. Over time, however, Stats SA hopes to produce the data that will make analysis of changes over time possible.

GDP estimates are produced on a quarterly basis. Time use estimates do not need to be produced so frequently as time use patterns are unlikely to change as rapidly. Stats SA has plans to include a time use module in the LFS on a five-yearly basis. This will, in future, allow for comparison over time of the relative contributions of paid and unpaid labour. Chadeau (1992) notes that the inclusion of housework usually lowers the (extended) growth rate of GDP and unpaid labour combined. This happens, in particular, if activities performed unpaid are progressively transferred onto the market. Time will tell whether this pattern holds in South Africa.

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Appendix: Activities included in household production calculations

The table below provides the mean minutes per day spent by male, female and the full population on each activity included in the calculations of production falling outside GDP calculations. Where either the male or female column is blank, this indicates that no male or female respondents engaged in a particular activity. The table includes a number of incorrect codes. These are included so as to be comprehensive. However, as can be seen, each of these activities accounts for less than a tenth of a minute on average. Further, the errors appear to occur with the third digit, which was not taken into consideration in most calculations. We can fairly safely assume that the miscoded activities fall within the three broad categories of activities of non-SNA production and will not change the overall calculations.

Code	Description of activity	Male	Female	Full population
236	Collecting fuel, firewood, dung	2.7	5.1	4.0
250	Collecting water	3.1	7.9	5.6
402	Miscode	0.0	0.0	0.0
410	Cooking, making drinks, etc	18.8	83.8	53.4
412	Miscode	0.0	0.0	0.0
412	Miscode		0.0	0.0
414	Miscode		0.0	0.0
417	Imputed cooking	0.0	0.0	0.0
420	Cleaning & upkeep of dwelling	23.9	47.7	36.6
421	Miscode		0.0	0.0
427	Imputed cleaning of dwelling		0.0	0.0
430	Care of textiles	6.4	25.9	16.8
431	Miscode		0.0	0.0
432	Miscode		0.0	0.0
437	Imputed care of textiles		0.0	0.0
440	Shopping	5.7	6.7	6.3
441	Accessing government service	0.1	0.2	0.1
442	Miscode		0.0	0.0
443	Miscode		0.0	0.0
444	Miscode		0.0	0.0
447	Imputed shopping	0.0	0.0	0.0
448	Waiting for government service	0.7	1.0	0.9
450	Household management	0.5	0.3	0.4
458	Waiting for household mngment		0.0	0.0
460	Home improvements	4.4	0.8	2.5
461	Miscode		0.0	0.0
470	Pet care	0.6	0.4	0.5
471	Miscode	0.0		0.0
490	Household work n.e.c.	0.8	0.2	0.5

Code	Description of activity	Male	Female	Full population
491	Miscode	5.2	6.7	6.0
497	Imputed household work n.e.c.		0.0	0.0
498	Waiting for household work	0.0	0.0	0.0
502	Miscode	0.0		0.0
510	Physical child care	0.0	0.0	0.0
511	Physical child care: no prompt	1.3	23.0	12.8
512	Physical child care: prompted	0.3	0.8	0.5
517	Imputed physical child care		0.0	0.0
518	Waiting for physical child care		0.0	0.0
520	Teaching children		0.0	0.0
521	Teaching children: no prompt	0.4	1.6	1.0
522	Teaching children: prompted	0.0	0.1	0.1
527	Imputed teaching children		0.0	0.0
531	Accompanying children: no prompt	0.2	0.6	0.4
532	Accompanying children: prompted	0.0	0.0	0.0
538	Waiting to accompany children		0.1	0.0
540	Physical care of non-child	0.1	0.7	0.4
550	Accompanying adults	0.1	0.2	0.1
558	Waiting to accompany adults		0.0	0.0
560	Supervising children		0.0	0.0
561	Supervising children: no prompt	0.4	2.4	1.5
562	Supervising children: prompted	0.1	0.3	0.2
571	Miscode		0.0	0.0
590	Care of people n.e.c.	0.1	0.5	0.3
610	Community construction	0.1	0.0	0.1
611	Miscode		0.0	0.0
615	Miscode	0.1	0.1	0.1
620	Community cooking, etc	0.2	0.4	0.3
627	Imputed community cooking	0.0		0.0
630	Volunteering with an organisation	0.2	0.1	0.1
650	Participation in meetings	1.8	1.2	1.5
651	Miscode		0.0	0.0
660	Involvement in civic responsibilities	0.3	0.1	0.2
671	Caring for non-household children: no prompt	0.0	0.4	0.2
672	Caring for non-household children: prompted	0.0	0.0	0.0
673	Caring for non-household adults	0.0	0.0	0.0
674	Other informal help to households	1.3	0.2	0.8
688	Waiting for community travel	0.0	0.0	0.0
690	Community services n.e.c.	0.1	0.1	0.1