5240.0

Australian Bureau of Statistics

Unpaid Work and the Australian Economy

1997

Unpaid Work and the Australian Economy

1997

Dennis Trewin
Australian Statistician

AUSTRALIAN BUREAU OF STATISTICS

EMBARGO: 11.30AM (CANBERRA TIME) TUES 10 OCT 2000

ABS Catalogue No. 5240.0
ISBN 0 642 54298 8

© Commonwealth of Australia 2000

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced by any process without written permission from AusInfo. Requests and inquiries concerning reproduction and rights should be addressed to the Manager, Legislative Services, AusInfo, GPO Box 84, Canberra, ACT, 2601.

In all cases the ABS must be acknowledged as the source when reproducing or quoting any part of an ABS publication or other product.

Produced by the Australian Bureau of Statistics

INQUIRIES

- For further information about these and related statistics, contact Ross Harvey on Canberra 02 6252 6713 or the National Information Service on 1300 135 070.

CONTENTS

CHAPTER 4 *continued*

ADDTIONAL INFORMATION

PREFACE

In most economies, large amounts of unpaid work fall outside conventional definitions of economic production. Although most of this unpaid work constitutes production in a broad sense, international statistical standards recommend its exclusion from defined production because of conceptual and measurement difficulties. The unpaid work cannot be valued in the same way as recorded production and there are unresolved issues surrounding the boundary between unpaid work and leisure activities and between unpaid work and personal care activities.

There is nevertheless a strong interest among analysts in monitoring the value, composition and growth of this unpaid work. This paper has been prepared to provide the latest available measures (relating to calendar year 1997) of such unpaid work in the Australian economy. It is the third paper on this subject prepared by the ABS. However, the estimates of unpaid work for 1986–87 included in the first paper were considered experimental. The estimates for 1992 in the second paper were not experimental but have been revised in this paper to take account of conceptual changes arising mainly from changes to international statistical standards for the national accounts.

Preparation of estimates of the value of unpaid work requires data on the volume of unpaid work of various types undertaken by Australian residents. Reliable information of this type is currently only available from the periodic time-use surveys conducted by the ABS. The surveys involve asking a random sample of households to record their time spent on various activities over specified periods. The estimates for unpaid work included in this paper are based on the time-use surveys conducted for 1992 and 1997.

The unpaid work that is the subject of this paper consists of two broad types: services produced by households for their own consumption (e.g. meal preparation, child care) and volunteer and community work (e.g. care of aged relatives) provided free of charge to others. Separate estimates are provided for these categories and are classified according to the types of activities constituting unpaid work, the gender, marital status and employment status of people undertaking the work, and the various methods for estimating the value of the work.

Besides providing the latest estimates for unpaid work the paper includes a discussion of issues associated with the valuation of unpaid work and the boundary between unpaid work and leisure activities. Information is also provided on factors that can cause shifts between unpaid work and measured production.

Also included (in Appendix 1) is a discussion paper on the closely related topic of household satellite accounts within the national accounts framework. Readers who would like to see measures of unpaid work integrated within the framework of the national accounts should find this appendix of particular interest.

The ABS would welcome any comments and suggestions that readers might have on the content of the paper, particularly regarding the possible future directions for development of this field of statistics that are discussed in Appendix 1.

Dennis Trewin
Australian Statistician

ABBREVIATIONS

$/hr	dollars per hour
$b	billions of dollars
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
ASCO (1)	Australian Standard Classification of Occupations—First Edition
ASCO (2)	Australian Standard Classification of Occupations—Second Edition
ASNA	Australian System of National Accounts
GDP	gross domestic product
hr	hours
m^2	square metres
NPISH	Non-profit institutions serving households
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
SA	South Australia
SNA93	System of National Accounts 1993
Tas.	Tasmania
TUS	Time use survey
UN	United Nations
Vic.	Victoria
WA	Western Australia

CHAPTER 1 INTRODUCTION

NATURE OF UNPAID WORK

This paper presents estimates of the value of productive unpaid work that falls outside the definitions of conventional measures of production in the Australian System of National Accounts (ASNA), such as gross domestic product (GDP). The latest estimates presented relate to calendar year 1997 and are based on the Time Use Survey (TUS) conducted for that year. Also included are estimates for 1992 that extend and refine estimates, based on the 1992 TUS, which were first published by the ABS in 1994. (More information on time use surveys is provided later in the paper).

Unpaid work that is the subject of this paper consists of services (but not goods)—other than the value of dwelling services provided to owner-occupiers—produced by households for their own consumption (called unpaid household work) and volunteer and community work provided free of charge to others.[1] The value of work associated with the production of goods by households for their own consumption is included in GDP and is therefore excluded from the estimates in this paper.

Although most unpaid work relates to activities that constitute 'production' in a broad sense, international statistical standards have defined the types of unpaid work covered by this paper as falling outside the conventional definition of production, mainly because of conceptual and measurement difficulties associated with including the unpaid work with the conventional measures. These difficulties are discussed in detail later in this paper. For ease of reference, the production arising from the unpaid work covered by this paper is referred to as 'unrecorded household production'. The international statistical standard that establishes the conventional definitions and is followed by the ABS is set out in *System of National Accounts, 1993* (SNA93).[2] SNA93 recommends that estimates of unrecorded household production should be included in 'satellite accounts' outside the core set of national accounts. Preparation of such satellite accounts is discussed later in this paper and in Appendix 1.

Ideally, unrecorded household production would be valued directly using the market value of the output of that production. Given that there is no market price for output arising from unrecorded household production, indirect methods of valuation must be employed, as in the valuation of government non-market output in the national accounts. In the ASNA, government unrecorded output is measured at its costs of production, which consist of compensation of employees, taxes less subsidies on

1 The value of dwelling services provided to owner-occupiers is included within the production boundary of the national accounts. This ensures that GDP is not distorted by changes over time in the proportions of rented and owner-occupied dwellings within the economy. The imputation is possible because there is a sufficiently broad market for rented dwellings to provide reasonable estimates of imputed rent for comparable owner-occupied dwellings. In effect, owner-occupiers (like other owners of dwellings) are regarded as operating businesses; they receive rents (from themselves as consumers), pay expenses, and make a net contribution to the value of production which accrues to them as owners.

2 *System of National Accounts, 1993*, Inter-Secretariat Working Group on National Accounts, Commission of the European Communities–Eurostat, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations and World Bank.

NATURE OF UNPAID WORK *continued*

production and consumption of fixed capital. Therefore, as a second-best option, household unrecorded production would be valued at its costs of production. In practice, that approach is not yet feasible, and unpaid work is valued using various valuation methods that are based on wage rates and therefore represent only the wages component of the costs of production. In this paper, separate estimates are provided for the various valuation methods used. Two main approaches and variants thereon have been used:

- market replacement cost or what it would cost a household to hire someone to provide the services concerned; and
- opportunity cost or the amount that an unpaid worker would have earned had he or she spent the same time on paid work that was spent on unpaid work.

Within the market replacement cost approach, the costs of hiring specialists to do each of the activities concerned can be applied to the time spent on each activity (the individual function replacement cost method) or all of the activities can be valued at the cost of hiring a housekeeper to undertake all of the unpaid work (the housekeeper replacement cost method). A hybrid of these two methods (the hybrid replacement cost method) can also be used.

Within the opportunity cost approach a choice exists between using gross opportunity cost (i.e. before deduction of taxes and work related costs) or net opportunity cost (i.e. after deduction of taxes and work related costs).

For each of the methods discussed a choice must be made between using separate male and female wage rates or the weighted average of the male and female rate (called the persons rate) in each category.

Each of the valuation methods used and the advantages and disadvantages of their use are discussed in Chapter 3.

Increased efforts have been made by statistical agencies to provide estimates of the value of unpaid work associated with household unrecorded production in recognition of the fact that there can be important shifts between market and household unrecorded production. For example, as more women enter the work force households purchase services, such as child care and prepared meals, that were previously provided by the unpaid work of the women. Trends in the opposite direction can be caused by households' greater investment in capital items and adoption of a 'do-it-yourself' approach to activities that were previously purchased from market suppliers. Changes in GDP over time need to be viewed in the context of such shifts, which can be cyclical.

Chapter 2 presents estimates of the value of unpaid work associated with household unrecorded production in Australia in 1997 at the national level (including by gender) and gives separate results for both unpaid household work, and for volunteer and community work. Comparisons are made with the results for 1992. State estimates are also presented. Trends in social and economic statistics that might explain changes between 1992 and 1997 are also presented. Some international comparisons of estimates of unpaid work are also made. Chapter 3 provides information about concepts, definitions, scope, actual estimation methodologies and data sources. A set of tables providing more detailed information is presented after Chapter 3, followed by

NATURE OF UNPAID WORK *continued*

appendices that deal with satellite household accounts and other matters referred to in the main text of the paper.

CHAPTER 2 ANALYSIS OF RESULTS

SUMMARY

Various estimates of the value of unpaid household work, volunteer and community work and total unpaid work in 1992 and 1997 are shown in Table A below. The estimation methods listed in the table are described in detail in Chapter 3 of this paper.

TABLE A: VALUE OF UNPAID WORK BY VALUATION METHOD, 1992 and 1997

	VALUE OF UNPAID HOUSEHOLD WORK		VALUE OF UNPAID VOLUNTEER AND COMMUNITY WORK		TOTAL VALUE OF UNPAID WORK	
	1992	*1997*	*1992*	*1997*	*1992*	*1997*
Estimation method	$b	$b	$b	$b	$b	$b
Market replacement cost						
Individual function method						
Male and female wage rates	207	237	18	24	225	261
Persons wage rates	210	236	18	25	228	261
Housekeeper method						
Male and female wage rates	196	214	18	24	214	238
Hybrid method						
Male and female wage rates	na	234	na	24	na	258
Gross opportunity cost method						
Male and female wage rates	244	297	21	30	265	327
Persons wage rates	251	308	21	31	272	339
Net opportunity cost method						
Male and female wage rates	190	233	16	24	206	257
Persons wage rates	190	238	16	24	206	262

na not available

According to all valuation methods, the value of unpaid work increased significantly between 1992 and 1997. The lowest increase in percentage terms (11%) was recorded using the housekeeper replacement cost method based on male and female wage rates. The highest increase (27%) was recorded using the net opportunity cost method based on the wage rate for persons. The highest value of unpaid work in 1997 ($339 billion) was recorded using the gross opportunity cost method based on the wage rate for persons.

For the reasons outlined in Chapter 3 the ABS considers that the market replacement cost approaches provide the most useful measures of unpaid work. As noted in Appendix 1, Eurostat recommends the housekeeper replacement cost method as the most appropriate method to use to value household labour.

SUMMARY *continued*

Table B shows estimates of the percentage contribution of females to the value of unpaid household work and the ratio of household work to GDP in 1992 and 1997, as derived using various estimation methods.

TABLE B: PERCENTAGE CONTRIBUTION OF FEMALES TO THE VALUE OF UNPAID WORK AND RATIO OF THE VALUE OF UNPAID WORK TO GDP

	FEMALE CONTRIBUTION TO TOTAL UNPAID WORK		RATIO OF TOTAL VALUE OF UNPAID WORK TO GDP	
	1992	*1997*	*1992*	*1997*
Estimation method	%	%	%	%
Market replacement cost				
Individual function method				
Male and female wage rates	65	63	54	48
Persons wage rates	65	64	55	48
Housekeeper method				
Male and female wage rates	66	65	51	43
Hybrid method				
Male and female wage rates	na	64	na	47
Gross opportunity cost method				
Male and female wage rates	66	63	64	60
Persons wage rates	66	65	65	62
Net opportunity cost method				
Male and female wage rates	66	64	50	47
Persons wage rates	66	65	50	48

na not available

The female contribution to the value of unpaid work was recorded as having dropped under each of the methods used but by no more than three percentage points.

The ratio of the value of unpaid work to recorded GDP was shown to have decreased by each of the methods used, although there was considerable variation in the percentages recorded using each method, from as low as 43% in 1997 (using the housekeeper replacement cost method) to as high as 65% in 1992, which was recorded using the gross opportunity cost method based on the persons wage rate. Readers should note that the percentage of GDP is recorded without adding the value of unpaid work to GDP in the calculation. The estimates of GDP used to calculate the ratios were the latest available and therefore include revisions to those used to derive the ratios previously published in respect of 1992, which were based on the concepts in the 1968 version of the SNA. (More information on the impact of revisions introduced with SNA93 can be found in *Introduction of Revised International Standards in the Australian National Accounts* (Cat. no. 5251.0)).

UNPAID HOUSEHOLD WORK BY ACTIVITY, GENDER AND MARITAL AND EMPLOYMENT STATUS

Table C shows, for 1997, the percentage of the total value of females unpaid household work (i.e. excluding volunteer and community work) arising from various work activities classified by marital and employment status. Table D presents comparable information for males. These analyses are based on the individual function replacement cost approach, using male and female wage rates. Comparable data for 1992 are not available because of changes made since then to the definitions of some of the activity categories. Details of these changes are provided in Chapter 3.

TABLE C: SHARE OF THE VALUE OF UNPAID HOUSEHOLD WORK OF FEMALES ATTRIBUTABLE TO VARIOUS WORK ACTIVITIES, by marital and employment status—1997

	MARRIED FEMALES		UNMARRIED FEMALES		
	Employed	*Not employed(a)*	*Employed*	*Not employed(a)*	*Total females*
Activity	%	%	%	%	%
Food and drink preparation and cleanup	24.3	27.3	21.1	25.0	25.3
Laundry, ironing and clothes care	11.6	10.7	8.9	9.6	10.6
Other housework	12.3	13.9	11.9	14.4	13.3
Gardening, lawn care and pool care	4.2	5.0	4.3	8.4	5.3
Pet care	1.8	1.6	2.9	2.8	2.0
Home maintenance	1.2	1.1	2.2	1.3	1.3
Household management	3.8	3.2	5.3	4.2	3.8
Communication	0.6	0.5	0.8	0.3	0.5
Transport	12.0	9.6	17.3	11.3	11.5
Child care	16.0	17.5	6.8	9.7	14.4
Purchasing	12.2	9.5	18.5	12.9	12.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Unemployed or not in the labour force.

Food preparation and clean-up accounted for the highest percentage of the value of unpaid household work of females in all marital/employment status categories. Child care accounted for the second highest share of the value of unpaid work of married women in both employment categories but accounted for a significantly lower share of the value of the unpaid work of unmarried women. Unmarried women in both employment categories had higher shares relating to purchasing (i.e. shopping), pet care and home maintenance than married women. Women who were not employed recorded a higher share of unpaid work arising from food preparation and other housework than employed women, while employed women had a higher share arising from shopping than women who were unemployed or not in the work force.

UNPAID HOUSEHOLD WORK BY ACTIVITY, GENDER AND MARITAL AND EMPLOYMENT STATUS *continued*

TABLE D: SHARE OF THE VALUE OF UNPAID HOUSEHOLD WORK OF MALES ATTRIBUTABLE TO VARIOUS WORK ACTIVITIES, by marital and employment status—1997

	MARRIED MALES		UNMARRIED MALES		
	Employed	*Not employed(a)*	*Employed*	*Not employed(a)*	*Total males*
Activity	%	%	%	%	%
Food and drink preparation and cleanup	15.4	16.6	19.7	21.2	17.2
Laundry, ironing and clothes care	2.3	1.9	4.7	5.6	3.0
Other housework	5.7	7.4	9.5	11.8	7.6
Gardening, lawn care and pool care	12.1	19.5	6.5	12.7	13.4
Pet care	2.5	3.6	3.6	2.5	3.0
Home maintenance	12.0	12.5	10.1	11.1	11.7
Household management	5.8	4.9	7.0	4.6	5.5
Communication	0.8	0.6	0.4	0.4	0.6
Transport	13.5	11.3	17.5	13.1	13.4
Child care	17.0	7.8	2.2	2.9	10.4
Purchasing	12.8	14.0	18.7	14.2	14.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Unemployed or not in the labour force.

The highest share of the value of unpaid work of unmarried men arose from food preparation. For employed married men the highest share related to child care, and for married men who were unemployed or not in the work force, the highest share related to gardening, lawn and pool care. Men in all categories had much higher shares arising from gardening and home maintenance than women, although the difference was much smaller for unmarried men. The share accounted for by child care was slightly higher for married men than for married women.

Table E shows, for 1997, the shares of the value of unpaid household work on various activities accounted for by females categorised according to marital and employment status. Table F shows comparable information for males. This analysis is based on the individual function replacement cost approach, using male and female wage rates.

UNPAID HOUSEHOLD WORK BY ACTIVITY, GENDER AND MARITAL AND EMPLOYMENT STATUS *continued*

TABLE E: SHARE OF THE VALUE OF UNPAID HOUSEHOLD WORK ON VARIOUS ACTIVITIES ATTRIBUTED TO FEMALES, by marital and employment status—1997

	MARRIED FEMALES		UNMARRIED FEMALES		
	Employed	*Not employed(a)*	*Employed*	*Not employed(a)*	*Total females*
Activity	%	%	%	%	%
Food and drink preparation and cleanup	22.4	30.4	6.5	13.5	72.7
Laundry, ironing and clothes care	30.3	33.8	7.8	14.7	86.5
Other housework	22.5	30.9	7.2	15.4	76.0
Gardening, lawn care and pool care	10.5	15.2	3.6	12.4	41.7
Pet care	15.4	17.1	8.4	14.3	55.3
Home maintenance	5.0	5.7	3.0	3.2	16.9
Household management	17.8	18.2	8.2	11.5	55.7
Communication	22.5	20.4	9.4	7.0	59.3
Transport	20.3	19.7	9.7	11.2	60.9
Child care	24.6	32.5	3.5	11.9	72.4
Purchasing	19.7	18.7	10.0	12.2	60.5
Total	**20.5**	**24.8**	**6.8**	**12.4**	**64.6**

(a) Unemployed or not in the labour force.

TABLE F: SHARE OF THE VALUE OF UNPAID HOUSEHOLD WORK ON VARIOUS ACTIVITIES ATTRIBUTED TO MALES, by marital and employment status—1997

	MARRIED MALES		UNMARRIED MALES		
	Employed	*Not employed(a)*	*Employed*	*Not employed(a)*	*Total males*
Activity	%	%	%	%	%
Food and drink preparation and cleanup	10.8	7.2	4.4	4.9	27.3
Laundry, ironing and clothes care	4.6	2.3	2.9	3.7	13.5
Other housework	8.0	6.4	4.2	5.5	24.0
Gardening, lawn care and pool care	23.3	22.9	4.0	8.1	58.3
Pet care	16.9	14.7	7.6	5.5	44.7
Home maintenance	37.6	24.0	10.0	11.6	83.1
Household management	20.5	10.6	7.8	5.4	44.3
Communication	23.4	10.1	3.9	3.3	40.7
Transport	17.5	8.9	7.1	5.6	39.1
Child care	20.0	5.6	0.8	1.1	27.6
Purchasing	15.8	10.6	7.3	5.8	39.5
Total	**15.7**	**9.7**	**4.9**	**5.2**	**35.4**

(a) Unemployed or not in the labour force.

UNPAID HOUSEHOLD WORK BY ACTIVITY, GENDER AND MARITAL AND EMPLOYMENT STATUS *continued*

Women accounted for 64.6% of the value of unpaid household work. They accounted for most of the value of all activity categories other than gardening, lawn and pool care, and home maintenance. Overall, married men and women accounted for a much higher percentage of unpaid household work than unmarried men and women. Employed women accounted for a lower percentage of the total value of unpaid household work than women who were unemployed or not in the work force, whereas married men who were unemployed or not in the work force accounted for a lower percentage than employed men.

VOLUNTEER AND COMMUNITY WORK BY ACTIVITY, GENDER AND EMPLOYMENT STATUS

Table G shows the activity shares of the value of volunteer and community work of females in each employment status category using the individual function replacement cost approach with female wage rates. Table H shows comparable information for males. Volunteer and community work was divided into four sub-categories: adult care, volunteer and community work (referred to subsequently as just volunteer work to distinguish it from the overall category under discussion), associated communication and associated travel. Marital status data were omitted because sampling errors were too high in many instances.

TABLE G: SHARE OF THE VALUE OF VOLUNTEER AND COMMUNITY WORK OF FEMALES IN EMPLOYMENT STATUS CATEGORIES ATTRIBUTED TO VARIOUS ACTIVITIES—1997

	FEMALES		
	Employed	*Not employed(a)*	*Total*
Activity	%	%	%
Adult care	5.7	9.7	8.5
Volunteer work	74.1	74.6	73.5
Associated communication	0.7	0.4	0.5
Associated travel	19.6	15.3	17.4
Total	**100.0**	**100.0**	**100.0**

(a) Unemployed or not in the labour force.

Unpaid work (excluding travel and communication) on activities other than adult care accounted for about three quarters of the total value of volunteer and community work of women, whether employed, unemployed or not in the work force. Travel associated with volunteer and community work accounted for the next highest share in each of the categories and in total. Women's share of volunteer and community work devoted to travel was lower than the share for men (see Table H).

VOLUNTEER AND COMMUNITY WORK BY ACTIVITY, GENDER AND EMPLOYMENT STATUS *continued*

TABLE H: SHARE OF THE VALUE OF VOLUNTEER AND COMMUNITY WORK OF MALES IN EMPLOYMENT STATUS CATEGORIES ATTRIBUTED TO VARIOUS ACTIVITIES—1997

MALES

Activity	*Employed* %	*Not employed(a)* %	*Total* %
Adult care	3.3	6.9	4.0
Volunteer work	72.1	75.2	73.5
Associated communication	0.8	0.5	0.7
Associated travel	23.9	17.4	21.9
Total	**100.0**	**100.0**	**100.0**

(a) Unemployed or not in the labour force.

Like females, males major share of the value of volunteer and community work was devoted to work (excluding travel and communication) on activities other than adult care. This was true of males in both employment status categories. Similarly, travel associated with volunteer and community work accounted for the second-largest share of the value of males unpaid work on volunteer and community work.

Table I shows the shares of the value of volunteer and community work of each type attributable to females and males classified by employment status.

TABLE I: SHARE OF THE VALUE OF VOLUNTEER AND COMMUNITY WORK ON VARIOUS ACTIVITIES ATTRIBUTED TO MALES AND FEMALES, by employment status—1997

Activity	*Employed* %	*Not employed(a)* %	*Total* %
MALES			
Adult care	12.2	19.8	32.0
Volunteer work	24.4	19.4	43.8
Associated communication	34.3	16.4	50.7
Associated travel	31.9	17.7	49.6
Total	*25.1*	*19.1*	*44.2*
FEMALES			
Adult care	18.1	49.9	68.0
Volunteer work	21.4	34.8	56.2
Associated communication	25.0	24.3	49.3
Associated travel	22.3	28.0	50.3
Total	*21.4*	*34.5*	*55.9*

(a) Unemployed or not in the labour force.

VOLUNTEER AND COMMUNITY WORK BY ACTIVITY, GENDER AND EMPLOYMENT STATUS *continued*

Females accounted for more of the total value of all types of volunteer and community work than males. Women who were not employed accounted for a higher percentage than employed women. On the other hand, employed men contributed a higher overall share than men who were unemployed or not in the labour force. Not employed women accounted for 50% of the value of all volunteer and community work on adult care, while not employed males contributed about 20%. Not employed females contributed 35% of the value of other volunteer work and community work, while employed males contributed 24% and employed females contributed 21%. Females and males contributed about equally to the value of associated communication. Employed males, however, accounted for the highest share (32%) of the value of all associated travel.

STATE ESTIMATES

State estimates of the value of unpaid household work were compiled for the five largest States—New South Wales, Victoria, Queensland, South Australia and Western Australia, using both the housekeeper replacement cost approach and the gross opportunity cost approach. The estimates are shown in Table J. Estimates were not compiled for the following categories because the sampling errors were considered to be too large:

- separate estimates of unpaid household work for Tasmania, the Northern Territory and the Australian Capital Territory (the estimates that can be derived by deduction in Table J are not considered reliable);
- estimates of volunteer and community work by State;
- estimates using the individual function replacement cost approach by State.

TABLE J: VALUE OF UNPAID HOUSEHOLD WORK, by State—1997

	Value of female contribution	*Female share of unpaid household work*	*Value of male contribution*	*Male share of unpaid household work*	*Total unpaid household work*
	$b	%	$b	%	$b
HOUSEKEEPER REPLACEMENT COST					
NSW	46.2	65.6	24.3	34.4	70.5
Vic.	36.2	67.3	17.6	32.7	53.8
Qld	26.6	67.0	13.1	33.0	39.7
SA	11.5	63.1	6.7	36.9	18.2
WA	13.9	67.5	6.7	32.5	20.6
Tas., NT, ACT	na	na	na	na	11.2
Total	*141.5*	*66.1*	*72.5*	*33.9*	*214.0*
GROSS OPPORTUNITY COST					
NSW	61.9	63.2	36.0	36.8	97.9
Vic.	48.3	64.9	26.1	35.1	74.3
Qld	35.6	64.7	19.4	35.3	55.0
SA	15.3	60.8	9.9	39.2	25.2
WA	18.7	65.3	9.9	34.7	28.6
Tas., NT, ACT	na	na	na	na	16.0
Total	*189.5*	*63.8*	*107.5*	*36.2*	*297.0*

na not available

STATE ESTIMATES *continued*

The five largest States accounted for some 95% of all unpaid work done, with NSW accounting for about 33%, Victoria 25%, Queensland 18.5%, South Australia 8.5% and Western Australia 9.5%.

The female and male contributions to the value of unpaid household work varied only slightly across the five largest States. The female contributions resulting from the two methods differed, largely because the housekeeper replacement cost approach used a female wage rate (for both male and female unpaid work), while the gross opportunity cost approach used male wage rates for male unpaid work and female wage rates for female unpaid work. However, in both sets of estimates, the share of unpaid work performed by women in South Australia was slightly lower than in Queensland even though both States have the same proportion of females in their adult populations. In contrast, the contribution by females was as high in Western Australia as in Victoria and Queensland, even though females are a slightly lower proportion of the adult population in Western Australia than in the other two States.

ANALYSIS OF THE CHANGES IN UNPAID WORK BETWEEN 1992 AND 1997

Using male and female wage rates, the following percentage increases in the value of all unpaid work between 1992 and 1997 were recorded:

- individual function replacement cost approach—16%
- housekeeper replacement cost approach—11%
- gross opportunity cost approach—23%
- net opportunity cost approach—25%.

GDP increased by 32% over the same period, while GDP per capita increased by 25%. As indicated in Table B, the value of total unpaid work as a proportion of GDP fell between 2 and 7 percentage points between 1992 and 1997, depending on the valuation method used. Various factors which have contributed to this outcome are discussed below. The discussion draws on various indicators of the state of the economy and of social developments over this period. These indicators are shown in Table K. The discussion is organised into subsections, each of which concerns a particular aspect of the measurement of unpaid work. These include the quantity of unpaid work, the valuation of unpaid work, methodological differences between the estimates for 1992 and 1997 and other issues.

Quantity of unpaid work

As Table K indicates, the average time spent on unpaid household work fell by 1% between 1992 and 1997, while the average time spent on volunteer and community work rose by 10% over this period, with the result that the time spent on all unpaid work did not change. The female labour force participation rate rose over the period 1992 to 1997 by 3%, while the male participation rate fell by 1%. A rising participation of females in the work force usually has implications for the balance between time spent on child care at home and child care provided by the market. Between 1993 and 1996 (data for 1992 and 1997 were not available) the proportion of children under age 3 enrolled in formal child care (of all children under age 3) rose by 27%, indicating an increasing demand for paid child care. As well, between 1992 and 1997, the proportion of children under age 5 in the total population fell by 5%. These indicators suggest a reduction in the need for unpaid work for child care over the period.

TABLE K: SELECTED ECONOMIC AND SOCIAL INDICATORS, Australia—1992 and 1997(a)

	1992	*1997*	*Percentage change*
GDP—original *($b)*	416	549	32
GDP per capita *($)*	23 750	29 648	25
Mean resident population *('000)*	17 495	18 529	6
Proportion of children under age 5 to the total mean resident population *(%)*	7.4	7.0	–5
Total labour force *('000)*	8 562	9 208	8
Females—proportion of total labour force *(%)*	41.9	43.1	3
Female participation rate *(%)*	52.0	53.7	3
Male participation rate *(%)*	74.2	73.1	–1
Unemployed persons *('000)*	925.1	786.5	–15
Unemployment rate *(%)*	10.8	8.6	–20
Total households *('000)*	6 302	6 956	10
Lone person households(b) *(%)*	21.8	23.8	9
Females in the labour force with children aged 0–4—proportion of all females with children aged 0 to 4 *(%)*	46.6	47.7	2
Couple families with children under 15—proportion of all families with children under 15(c) *(%)*	83.5	80.0	–4
Children aged under 3 using formal care—proportion of all children under 3(d) *(%)*	17.0	21.6	27
Average time spent on unpaid household work *(min./day)*	217	215	–1
Average time spent on volunteer and community work *(min./day)*	20	22	10
Average hours worked per full-time worker *(hours/week)*	40.6	41.1	1
Hours worked for the market sector(c) *(index)*	92.8	99.9	8
Average weekly ordinary times earnings wage rate(e)			
Males *($/hour)*	14.8	18.1	23
Females *($/hour)*	13.7	16.4	20
Persons *($/hour)*	14.3	17.5	22
Domestic housekeeper wage rate(e) *($/hour)*	11.2	12.2	9
Size of new public sector dwellings(c) *(m^2)*	122	154	26
Size of new private sector dwellings(c) *(m^2)*	187	212	13
Separate houses—proportion of total dwellings(c)(f) *(%)*	78.2	79.5	2
Semi-detached townhouses—proportion of total dwellings(c)(f) *(%)*	7.0	7.9	13
Flats or appartments—proportion of total dwellings(c)(f) *(%)*	12.5	11.9	–5

(a) All data on calendar year basis unless specified otherwise.

(b) Data for 1992 not available. Data for 1991 and 1997.

(c) As at June.

(d) As at June 1993 and March 1996.

(e) As at May.

(f) Dwellings excludes caravans or cabins in a caravan park, houseboats and houses or flats attached to shops.

Other developments over the period 1992 to 1997 could have contributed to a rise in the quantity of unpaid work. The proportion of single person households increased appreciably from 21.8% 1991 (figures are not available on a comparable basis for 1992) to 23.8% in 1997. Average floor area of new private sector and public sector housing rose by 13% and 26% respectively, between 1992 and 1997. There was also a trend towards more separate houses and semi-detached townhouses at the expense of flats and apartments. These developments each suggest an increasing need for unpaid work. In lone person households there are less opportunities to share tasks and benefit from economies of scale. Larger houses require more housework and maintenance, and the larger space devoted to gardens in separate housing requires more time on gardening and maintenance of grounds.

Australia was at different stages of the business cycle in 1992 and 1997. In 1992 it was just beginning to emerge from a recession which bottomed in 1991. By 1997, economic growth was increasing quite strongly. Table K reflects these changes by the fall in the

ANALYSIS OF THE CHANGES IN UNPAID WORK BETWEEN 1992 AND 1997 *continued*

numbers of unemployed persons and in the unemployment rate between the two years. The fall in unemployment is likely to have resulted in a lower level of unpaid work as a percentage of GDP because employed persons do less unpaid work than those who are not employed (see Table 1 in Chapter 4).

The proportion of the female population in the labour force was 3% higher in 1997 than in 1992. In 1997 females in paid work performed around 26.5 hours of unpaid work per week while females not in paid work performed around 36.5 hours per week (see Table 1 in Chapter 4). As female participation in paid work rises, those females entering paid employment have both less time to perform unpaid work and more income to purchase services from the market sector.

Valuation of unpaid work

Relatively lower movements in the average wage rates that are used to calculate the value of unpaid work were important contributors to the decline in the value of unpaid work as a percentage of GDP between 1992 and 1997. The wage rates that were used to value labour inputs to unpaid work were typically those of less skilled workers, whose rates generally rose more slowly than average wage rates over this period. As shown in Table K, the rise in wage rates of female domestic housekeepers was only 9% over the period compared with 20% for females as a whole and 23% for males. This factor acts to reduce the value of unpaid work relative to paid work and GDP over this period.

Unpaid work is predominantly undertaken by females, whose average wage rates grew less over the period from 1992 to 1997 than male wage rates. (As indicated in Table K, female wage rates grew by 20% over the period while male wage rates grew by 23%.) This factor had a depressing effect on the change in the value of unpaid work as a percentage of GDP over the period and explains why estimates of the value of unpaid work using male and female wage rates showed less change than those calculated using the wage rate for persons.

Methodological differences between the 1992 and 1997 estimates

There were two main methodological differences between the compilations of estimates for 1992 and 1997. First, more detailed activity coding of the 1997 TUS permitted the exclusion of previously included activities that are not considered to be work, including: window shopping, purchases of personal and medical services, and emotional care of adults (only partially excluded). The exclusion of these activities in 1997 but not 1992 contributed to the decrease in the ratio of unpaid work to GDP over the period.

Second, in the compilation of the 1997 data, different occupations were chosen to represent unpaid work activities in some cases. In both the 1992 and 1997 compilations, the wage rates used were obtained from *Employee Earnings and Hours, Australia* (Cat. no. 6306.0), which is compiled from data collected in the Survey of Employment, Earnings and Hours. These data were available for occupations at the 4 digit level of the Australian Standard Classification of Occupations (ASCO). In the individual function replacement cost approach, the occupations selected were different in many cases in 1997 than in 1992. The key reason for the changes was revisions to ASCO. The 1992 estimates are based on the first edition of ASCO, whereas the 1997 estimates are based on the second edition, which was published in that year. The revisions reflected widespread industry and award restructuring, technological change and competency-based approaches to career entry and progression that had occurred since 1986, when ASCO was first published. Use of the second edition of ASCO permitted

ANALYSIS OF THE CHANGES IN UNPAID WORK BETWEEN 1992 AND 1997 *continued*

choice of more appropriate occupations and corresponding wage rates for the main activity groups. In a number of cases the occupations chosen had lower skill requirements. As a result, lower average wage rates were applied to household activities in the 1997 compilation than in the 1992 data, contributing to the lower value of unpaid work as a percentage of GDP in 1997.

A different approach to activity classification was used in the 1997 TUS. A 'for whom' column was added to the diary and provided additional information on the purpose of activities. This enabled a more accurate identification of unpaid work activities between unpaid household work and volunteer and community work. For example, an activity described as cooking 'for volunteer firemen' reported in the 'for whom' column, was classified as voluntary work whereas, without the information about the purpose of the cooking, the activity would have been classified as unpaid household work in 1992.

Other issues

The gross opportunity cost approach gave a higher valuation as a ratio of GDP in 1997 compared with the other estimation methodologies because it uses average wage rates for the economy as a whole rather than the wage rates of particular occupations. The wage rates of the occupations used in methodologies other than the gross opportunity cost approach have risen less than average wage rates for the economy as a whole. Had the growth in female wage rates kept pace with that of male wage rates, the valuation of unpaid work using the gross opportunity cost approach would have been even higher as a percentage of GDP. The lower growth in domestic housekeeper average wage rates over the period ensured that the housekeeper replacement cost approach continued to give the lowest share for the value of unpaid work as a percentage of GDP of all the estimation methods. The ABS has calculated that had the domestic housekeeper wage rate risen by as much as average wage rates, the housekeeper replacement cost approach would have given a value of unpaid work equal to 49% of GDP in 1997. The gap between the ratio of the total value of unpaid work to GDP for the gross opportunity cost approach and the housekeeper replacement cost approach widened by 4 percentage points over the period.

INTERNATIONAL COMPARISONS

Table L compares the value of unpaid work as a percentage of GDP for Australia, Canada and Switzerland for the year 1997. Canada and Switzerland were chosen for comparison because of the availability of estimates for that year. Sousa-Pouza[1] et al (1999) have produced a range of estimates for Switzerland employing various estimation methodologies. The Swiss estimates are based on wage rates that include social security contributions, which would slightly raise their valuations compared with those for Australia and Canada. No adjustments have been made to the data shown in Table L to allow for this and other methodological differences between the three countries.

A more extensive set of international comparisons is provided in Appendix 2, which also discusses some of the methodological differences and other issues that affect international comparisons.

1 Souza-Pousa, A., Widmer, R. & Schmid, H., 1999 'Assigning Monetary Values to Unpaid Labour Using Input-Based Approaches: The Swiss Case', Paper presented at the 52nd Session of the International Statistical Institute, Helsinki, August, 1999.

INTERNATIONAL COMPARISONS *continued*

TABLE L: COMPARISON OF ESTIMATES OF UNPAID WORK, as a percentage of GDP—Australia, Canada and Switzerland—1997

	Australia	*Canada*	*Switzerland*
Estimation method	%	%	%
Individual function replacement cost	48	43	52
Housekeeper replacement cost	43	34	41
Gross opportunity cost	60	54	49
Net opportunity cost	47	32	38

CHAPTER 3 CONCEPTS SOURCES AND METHODS

THE PRODUCTION BOUNDARY IN SNA93 AND UNPAID WORK

In SNA93, the 'general production boundary' is defined as encompassing all activities 'carried out under the control and responsibility of (institutional units) that use inputs of labour, capital and goods and services to produce outputs of goods and services.'[1] Most unpaid work fits within this definition. The production boundary used in SNA93, however, is more restricted than the general production boundary. Production is defined as excluding the value of most unpaid work and as comprising:[2]

> '(a) the production of all individual or collective goods and services that are supplied to units other than their producers, or intended to be so supplied, including the production of goods or services used up in the process of producing such goods or services;
>
> (b) the own-account production of all goods that are retained by their producers for their own final consumption or gross capital formation; and
>
> (c) the own-account production of housing services by owner-occupiers and of domestic and personal services produced by employing paid domestic staff.'

Therefore, SNA93 excludes from production all own-account production of services (which are the equivalent of 'unpaid household work' as defined in this paper) within households other than services produced by employing domestic staff and housing services produced by owner-occupiers. SNA93 also omits from production the value of volunteer and community work that is provided free by householders to nonprofit institutions or other households. The value of this work is not included in the costs of production of the recipients of the services generated by the unpaid work.

Own-account production of household services (unpaid household work)

SNA93 lists those domestic and personal services for which no entries are recorded in the national accounts when they are produced and consumed within the same household:[3]

- the cleaning, decoration and maintenance of the dwelling occupied by the household, including small repairs of a kind usually carried out by tenants as well as owners;
- the cleaning, servicing and repair of household durables or other goods, including vehicles used for household purposes;
- the preparation and serving of meals;
- the care, training and instruction of children;
- the care of sick, infirm or old people; and
- the transportation of members of the household or their goods.

SNA93 recognises that a considerable amount of labour is devoted in most countries to the production of households services for consumption within the same household but

1 SNA93, para. 6.15, p. 123.
2 SNA93, para. 6.18, p. 124.
3 SNA93, para. 6.20, p. 124.

THE PRODUCTION BOUNDARY IN SNA93 AND UNPAID WORK *continued*

gives the following reasons for not imputing values for these services for inclusion in the system as production:[1]

- The own-account production of services within households is a self-contained activity with limited repercussions on the rest of the economy. The decision to produce services for own consumption is necessarily made at the time production takes place, since services are consumed as soon as they are produced, whereas this may not be the case for goods, which may be marketed some time after they are produced.
- Since services for own-account consumption are not marketed, there are typically no suitable market prices that can be used to value the services. Not only is it difficult to value the output of the services but it is also difficult to value the expenditures and income associated with the services and to add these meaningfully to the monetary transactions on which most of the entries in the national accounts are based.
- Imputed values have a different economic significance from monetary values. For example, if a householder were offered the choice between producing services for own consumption and producing the same services in return for cash, the paid employment would normally be preferred because of the wider range of consumption possibilities it affords. Thus, imputing values of own-account production of services would yield values that would not be equivalent to monetary values in their economic effect.

Volunteer and community work

In looking at the relationship of volunteer and community work to SNA93's boundary of production, several points must be noted. First, such work can be undertaken by an individual or group of individuals acting on their own initiative. Alternatively, such work can be done by nonprofit institutions serving households (NPISHs). These are defined as nonprofit institutions (excluding government organisations) that provide goods and services to households free or at prices which are not economically significant. The output of NPISHs is recorded in the national accounts and is valued at its costs of production.[2] The relevant costs of production are compensation (including wages) of employees of the NPISHs, consumption of fixed capital (depreciation), and taxes payable on the production of the NPISHs less subsidies receivable on that production. No imputation is included for the services of volunteers who work for NPISHs for no monetary compensation.

Such unpaid voluntary and community work nevertheless falls within the scope of the 'general production boundary' defined in SNA93 and, like unpaid household work, properly falls within the scope of any measure of unpaid work that is excluded from the conventional measures of production. The value of volunteer and community work calculated in this study accordingly encompasses unpaid work done for NPISHs as well as volunteer and community services provided by individuals or groups of individuals directly to other households.

Unpaid work and satellite accounts

SNA93 recommends that the boundary of production could be extended by incorporating unpaid household work and volunteer and community work in so-called

1 SNA93, para. 6.21, p. 124–125.
2 SNA93, para. 6.51, p. 129.

THE PRODUCTION BOUNDARY IN SNA93 AND UNPAID WORK *continued*

'satellite accounts'.[1] These are accounting statements which are separate from, but consistent with, the existing national accounts. They provide supplementary information which can be used in conjunction with the data in the main accounts. SNA93 suggests that such a satellite analysis could be presented in the form of an input-output table.[2] The timing, frequency and quality of such accounts would depend on the availability of appropriate data and the resolution of what are regarded internationally as very difficult methodological issues. Although much research has gone into the issue of measuring total unpaid work, there are at present no established international guidelines. However, the statistical office of the Commission of European Communities (Eurostat) has published a proposal for a satellite account of household production,[3] which will probably serve as the main basis for developing internationally accepted guidelines.

Appendix 1 is an ABS discussion paper on the subject of household satellite accounts and the issues that would have to be addressed if they were to be developed by the ABS.

DEFINITION AND SCOPE OF UNPAID WORK

A prerequisite for the measurement of total unpaid work is a satisfactory definition of what constitutes such work. The boundary between productive and nonproductive activity is not clearly distinguishable in many cases. For example, the distinction between unpaid work and leisure is often very difficult to draw.

A widely accepted principle for determining the scope of total unpaid work is the 'third person' or 'market replacement' criterion originally stated by Reid in 1934, and re-quoted by many writers;[4]

> 'Household production consists of those unpaid activities which are carried on, by and for the members, which activities might be replaced by market goods or paid services, if circumstances such as income, market conditions and personal inclinations permit the service being delegated to someone outside the household group'.

Under this criterion a household activity would be considered as unpaid work if an economic unit other than the household itself could have supplied the latter with an equivalent service.

Arguments can be made for and against the inclusion of some of the activities that would qualify as unpaid work by applying Reid's 'third-party' criterion. Many household activities that meet the Reid criterion, for example cooking and shopping, could be considered leisure activities in a number of circumstances. In the Australian studies, travel to/from work has been excluded from unpaid work because it is not possible to hire someone to travel to work on one's behalf and it is also clearly associated with paid employment rather than household production. Work done from home in relation to paid employment (for example, telephoning clients) which is unpaid but frequently a necessary part of the job, has been classified with paid activities and excluded from estimates of unpaid work. The unpaid assistance provided by relatives and others in family businesses has also been excluded, as the value added by such activities is already included in production in the national accounts.

1 SNA93, para. 21.120, p. 507.
2 SNA93, para. 21.102, p. 503.
3 Eurostat (1999), Proposal for a Satellite Account of Household Production, Project SC96L09, 9/1999/A4/11.
4 Goldschmidt-Clermont, L., 1984, Unpaid Work in the Household, International Labour Organisation, p. 4.

DEFINITION AND SCOPE OF UNPAID WORK *continued*

Caring for others, for example playing with children, from some perspectives is a debatable inclusion in unpaid household work, even though it satisfies the third person criterion. Individuals perceive the status of these activities differently. Some people would view the raising of children as unpaid work, while others would view it as something more akin to leisure. Some would argue that these caring activities should not be classified as work or leisure but something else—they are activities that satisfy biological and cultural codes of behaviour to ensure desirable outcomes for the whole of society. Despite these reservations this paper includes caring in the scope of unpaid household work. However, the ABS recognises that the distinctions between paid work, unpaid work and leisure are still subject to world-wide debate and refinement.

The conceptual basis for the activity classifications used in the 1992 and 1997 TUSs was taken from work done by Dagfinn Aas[1], a renowned time-use researcher. Unpaid work as defined in this paper is consistent with his concept of committed-time activities, which are activities to which a person has committed him/herself because of previous acts or behaviours or community participation such as having children, setting up a household or doing voluntary work. The consequent housework, care of children, shopping or provision of help to others are committed-time activities. In most cases, similar services could be purchased from the market sector rather than provided by the individual. Committed-time activities are distinguished from contracted-time activities, such as paid work, and free-time activities such as social interaction, recreation and leisure.

The estimates of total unpaid work for 1997 presented in this paper are based on data for the time spent on relevant activities from the 1997 TUS. Separate lists are provided below indicating which time-use classifications were included as unpaid household work, and volunteer and community work. (For more information on the 1997 TUS refer to *How Australians Use Their Time 1997* (Cat. no. 4153.0)).

UNPAID HOUSEHOLD WORK ACTIVITIES	ABS 1997 TIME USE CODES
Food and drink preparation	410–413
Clean-up	414–415, 219
Laundry, ironing and clothes care	420–427, 429
Other housework	400, 430–439
Gardening and lawn care	441–443
Cleaning grounds etc	440, 444–445, 449
Pet care	446
Home maintenance	450–457, 459
Household management	460–469
Associated communication	471, 499
Associated travel	481
Child care	500, 510–512, 521, 531, 541, 551, 599
Associated communication	571
Associated travel	581
Purchasing	600, 610–612, 619–622, 625–626, 629, 699
Associated communication	671
Associated travel	681

A degree of judgement was required to allocate two TUS classifications, codes 400 and 499, to unpaid household work activities. Code 400, 'Domestic activities n.f.d.', refers to domestic activities for which the description was general, e.g. 'working in the shed',

1 Australian Bureau of Statistics, 1998, Time Use Survey, Australia, Users Guide, December 1997, Cat. no. 4150.0, p. 17.

DEFINITION AND SCOPE OF UNPAID WORK *continued*

'domestic duties', 'working outside', 'working in study', 'various household jobs', 'odd jobs around the house'. It was considered likely that the most significant part of the time recorded against code 400 could be characterised as 'other housework' so all time classified to this item was included with 'other housework' in this study. Code 499, 'Domestic activities n.e.c', included inspecting damage to houses after a break-in or storm etc. and helping children 15 or over with homework. It was assumed that much of this time would involve communication associated with the management of the household and it was accordingly allocated to that activity. Code 613, 'Window shopping', was excluded from unpaid work on the grounds that it does not satisfy the third person criterion as, in general, people would not pay another person to window shop on their behalf.

Code 623, 'Purchasing personal care services', and Code 624, 'Purchasing medical care services', were excluded on the grounds that these are personal care activities—the time spent on these activities involves consumption, rather than household production (having a hair cut or visiting the doctor are activities that only the recipient of the services can undertake). Statistics Canada also excluded these activities from the scope of its 1994 study.[1] Statistics Norway excluded all purchasing of goods and services and associated travel in its three studies in respect of 1972, 1981 and 1990, because these activities include some elements for which the third person criterion is not satisfied. Dahle and Kitterod (of Statistics Norway) acknowledged in their 1992 study that shopping for groceries and associated travel should be included as part of the value of unpaid household work, but to maintain comparability with previous Norwegian unpaid work studies, they have continued to exclude them.[2]

Travel associated with purchasing was included in the scope of unpaid household work for this study. However, Code 681, 'Associated travel', also included the travel time involved in driving to/from the hairdressers or the doctor's surgery. If separate data had been available for these components they would have been excluded. Consequently, the value of unpaid work in this category has been marginally overstated. It could also be argued that some time spent purchasing some services, such as 'Administrative services' (code 622), which includes, for example, travel services, are borderline inclusions in unpaid work. Householders could pay someone else to purchase the services for them but few would do so.

The 1997 TUS had a high degree of conceptual comparability with the 1992 survey, although some changes were made. Classification changes have enabled a separate category 'communication' to be identified within the estimates of unpaid work in this study. Also, in the 1997 classification, 'Pet care' was split into two categories 'Pet care' (code 446) and 'Interaction with pets/walking pets' (code 967). 'Pet care' has been included in unpaid work while 'Interaction with pets' has been excluded on the grounds that it is a leisure activity.

The activity classifications for both the 1992 and 1997 TUSs did not provide a clear distinction between activities associated with the own-account production of goods by households and those associated with the own-account production of services. The

1 Chandler, W., 1994, 'The value of Household Work in Canada, 1992', National Income and Expenditure Accounts: Quarterly Estimates, Statistics Canada, Cat. no. 13–001, First Quarter, 1993, p. xxxvii.
2 Dahle, A-B, & Kitterod, H., 1992, 'Time Use Studies in Evaluation of Household Work, The Norwegian Experience', Paper presented to the 19th Nordic Statistical Meeting, Reykavik, p. 4.

DEFINITION AND SCOPE OF UNPAID WORK *continued*

own-account production of goods within households is included within the measured value of production and is therefore outside the scope of unpaid work as defined in this paper. The ABS imputes the market value (less the input costs) of the more common types of such production in Australia (fruit, vegetables, eggs, beer, wine, fish and meat) for inclusion in the national accounts. For 1992 and 1997, the imputed production was around $0.9 billion and $1 billion, respectively. Some of this production will have been included in the category 'Gardening and lawn care' activities. The extent of the resulting overstatement of unpaid work cannot be quantified but is considered likely to be relatively minor compared with the total value of unpaid work.

The time-use classifications used for volunteer and community work are shown below.

UNPAID HOUSEHOLD WORK ACTIVITIES	ABS 1997 TIME USE CODES
Adult care	710–711
Volunteer work	700, 721, 731, 799
Associated communication	771
Associated travel	781

Code 712, which relates to 'Caring for adults—emotional support', was not considered to represent unpaid work. While it satisfies the third-person criterion, in practice people generally perform this activity themselves rather than pay a third person to do it. For example, people do not usually pay someone else to provide emotional support for their spouse or a friend, or to visit a friend in hospital. Some elements of adult emotional support that were included in unpaid household work in 1992 could have been coded as adult care in the 1997 TUS because an additional classification relating to communication associated with such support was available. However, to be consistent with the previously mentioned treatment of code 712, such communication was not included in adult care and was excluded altogether from the estimates of unpaid work.

Some commentators have questioned whether volunteer and community work is 'work' or whether it is leisure. Most probably it contains elements of both to a greater or lesser extent depending on what type of volunteer and community work is under consideration. Volunteer caring for sick, frail or disabled adults can be done by a third person, which means that it qualifies as unpaid work under the third party criterion. On the other hand, spending time doing community activities, for example, organising and attending rehearsals for a school play, contains a strong leisure component and in practice people would not hire someone else to undertake these activities on their behalf.

In summary, unpaid work is defined in this paper as comprising unpaid household work and volunteer and community work. Unpaid household work consists of domestic work about the house, child care and shopping and associated communication and travel. The following list gives a broad indication of the activities included under various categories of unpaid work.

- Domestic work has been classified into broad groups as follows:
  - Food preparation and clean-up: includes the cooking and serving of meals, and washing dishes;

DEFINITION AND SCOPE OF UNPAID WORK *continued*

  - Laundry and clothes care: includes washing, ironing, mending and making clothes;
  - General housework: includes cleaning the bathroom/toilet, vacuuming, dusting and tidying;
  - Grounds and animal care: includes gardening, pool care and feeding and tending to animals;
  - Home maintenance: includes repairs or improvements to the home, equipment, and motor vehicles and chopping wood; and
  - Household management: includes paperwork, bills, budgeting, organising, packing, selling household assets and disposing of rubbish.
- Child care: includes the physical, emotional and educational care of children and general interaction with, and supervision of, children;
- Shopping: includes the purchasing of a wide range of goods and services for people in the household—purchasing durables and consumer goods and purchasing repair services, administration services, child care, domestic and gardening services etc.;
- Volunteer and community work: includes the physical care of adults, doing favours for others and active involvement in various forms of unpaid voluntary work;
- All communication and travel associated with unpaid work is also included within the scope of unpaid work.

VALUATION METHODS

In the literature, two basic approaches to measuring unpaid work are identified: the 'direct' or 'output' method; and the 'indirect' or 'input' method. The first method involves the measurement of output by direct observation of prices and requires data on the quantities of services produced (see Appendix 1 for a more detailed discussion). This method is considered to be conceptually superior because it adopts the same approach as that used to value market production and is therefore appropriate for comparisons with national accounting aggregates. In general, data to apply the output method are not available and the ABS, like most statistical agencies, has used 'indirect' or 'input' methods to measure the value of unpaid work.

'Indirect' or 'input' methods involve valuing output in terms of the cost of inputs and require information about the time spent on household work which, in Australia, is provided by TUSs. It is similar but not identical to the approach adopted in SNA93 for valuing other non-market output, for example, non-market services produced by government. However, non-market output is valued using all relevant costs of production. In valuing unpaid work the ABS and most other practitioners use only labour inputs. There are two broad approaches to this application of the input method.

- The *market replacement cost* approach, i.e. what it would cost households in wages to hire others to do the household work for them. Three variants of this approach are:
  - individual function replacement cost approach;
  - housekeeper replacement cost approach; and
  - replacement cost hybrid approach.
- The *opportunity cost* approach, i.e. what household members would have earned in wages had they spent the same amount of time on paid work as actually spent on unpaid work. Two variants of this approach are:
  - gross opportunity cost approach; and
  - net opportunity cost approach.

VALUATION METHODS *continued*

Each of these approaches is discussed in detail in the following subsections. Algebraic models of the approaches are provided in Appendix 3. The ABS recommends the replacement cost approaches in preference to the opportunity cost approaches, for reasons explained below. However, estimates based on opportunity cost have continued to be derived to provide data that can be compared with opportunity cost estimates produced in the past or by other countries.

Individual function replacement cost

The individual function replacement cost approach assigns values to the time spent on unpaid work by household members according to the cost of hiring a market replacement for each individual function. Thus, for example, time spent on cleaning is valued using a rate of pay for commercial cleaners, and time spent on child minding is valued according to the rate of pay for child care workers. Use of this method is based on the key assumption that household members and market replacements are equally productive in their work activities.

It is not easy to determine an appropriate market rate of pay for household activities because commercial rates may embody a level of skill, responsibility or capital not required or reflected in household work. For example, it would obviously be inappropriate to value the time spent on all household cooking at the wage rates paid in the market to professional chefs. The application of commercial wage rates is also inappropriate where there are differences in productivity between households and the market sector due to economies of scale or the availability of expensive equipment in commercial operations.

For children aged 15–18 years (who are in scope of the Australian TUS) the market wage rate is theoretically too high to use because they generally receive juvenile wages. However, the resulting over-estimation is likely to be insignificant as this group does relatively little unpaid work.

In this paper, valuation is based on male and female wage rates. In the 1992 estimates, the so-called 'persons' rate for each activity was used. The persons rate is a weighted average of male and female rates. Estimates using the persons rate have been included in this paper to facilitate comparisons with the 1992 data. The ABS prefers to use male and female wage rates rather than the persons wage rate because there are sometimes significant differences between male and female wage rates and many household activities are performed more by one gender than the other. In choosing rates, it has been assumed that the replacement workers are working full-time, non-managerial workers. In most cases the activity groups have to be matched to several occupations, each of which entails tasks involved in the matched household activities. In practice it is difficult to identify exact matches between household work activities and occupations. The matches made in compiling the 1997 data are shown in Appendix 4.

The estimates derived using the replacement cost approaches will underestimate or overestimate the contribution of unpaid work to GDP depending on the relationship between the productivity of households and the market sector. This point is noted by Fitzgerald and Wicks.[1] If households and market producers are equally productive, that is, if they have the same average output per hour, the replacement cost approaches

1 Fitzgerald, J. & Wicks, J., 1990, 'Measuring the Value of Household Output: A Comparison of Direct and Indirect Approaches', Review of Income Wealth, Series 36, No. 2, June, p. 131.

VALUATION METHODS
continued

undervalue unpaid work by ignoring the contribution of non-labour inputs (e.g. capital). If households are more productive, the replacement cost approaches further understate the value of unpaid work because a household will do more work in a given time than a replacement would. If, on the other hand, households are less productive, (if they have, say, access to less capital or technology), the value estimates will be too high because they will be derived by multiplying market wages by the longer time that will be taken by households to do the same amount of work.

Two questions concerning the choice of an appropriate average wage concept are frequently raised in the literature.

- Whether gross or net wages are most appropriate?
- Whether actual or paid working time should be used?

As the Swiss point out, for most methods there is no precise prescription, and there is also very little consensus. They note, however, that the choice of a wage rate is very important, because the calculated value is directly dependent on this choice and can vary significantly depending on the choice.[1]

Concerning the first question in the previous paragraph, it is necessary to define what is meant by gross and net wages. Gross wages include income tax and social security contributions, which in many cases may represent a significant portion of the total wage depending on the country and the nature of the welfare system. These two components should obviously be deducted in arriving at net wages. Deduction of other components such as work-related expenses is more problematical.

Eurostat has the following to say about the choice between gross and net wages.

> 'If households were to buy the service from the market, they would have to pay the gross wage. However, if it is thought that households earn the money by producing the services themselves, then the net wage would obviously be more appropriate because the household would not have to pay taxes or social security contributions for themselves.'[2]

Eurostat recommends that gross wages should be used for the following reasons:

> '–When the output of non-market services of general government and of nonprofit institutions serving households (NPISHs) is measured in terms of costs (i.e. the input approaches used to value nonmarket output), labour inputs are valued ... gross of income tax and other charges and include employers' contributions to social security schemes. Using gross wages is consistent with this.
>
> –If households sold their services on the market, or if the services had to be produced on the market, the price would cover all costs of production, including social security contributions;
>
> –Wage statistics are based on gross wages. Comparable figures for net wages are generally not available.'[3]

In the Australian compilations for 1992 and 1997, a gross wages concept, weekly ordinary time earnings, was preferred. In any event, net wages data were not available.

1 Sousa-Poza et al, p. 12.
2 Eurostat, p. 33.
3 Eurostat, p. 33.

VALUATION METHODS *continued*

It could be further argued that total labour costs should be used, including employers contributions to superannuation, fringe benefits and workers compensation schemes. However, such data are not available in Australia by occupation on a per hour per employee basis. For this reason estimates of unpaid work including such additions to gross wages have not been calculated.

Regarding use of actual or paid working time, the latter is determined by law or collective agreements, and includes paid holidays and paid sick leave. Actual working time refers to the time spent actually working and includes paid and unpaid overtime but excludes public holidays and weekends (except in cases where a worker does work at those times).

In this study the concept of paid working hours has been used. Hourly wage rates were obtained by dividing weekly ordinary-time earnings by ordinary-time hours paid for. (Ordinary-time excludes overtime). 'Ordinary-time hours paid for' refers to employees' award, standard or agreed hours of work that are paid at the ordinary-time rate. It includes stand-by or reporting-time hours that are part of standard hours of work, and any part of annual leave, paid sick leave or long service leave taken during the reference period.

Housekeeper replacement cost

The housekeeper replacement cost approach values the time spent on unpaid household work by household members according to the cost of hiring a housekeeper to undertake the relevant tasks.

The key assumption underlying this approach is that household members and housekeepers are equally productive in performing household work, which may or may not be true. For example, a housekeeper is likely to be more productive at cleaning than a household member who may also be looking after small children. Alternatively, a housekeeper may clean more quickly but less thoroughly than the household member. Use of this approach also assumes that there is a well-established labour market for persons who undertake all household tasks, which is not the case in Australia in the 1990s.

Eurostat recommends use of a wage of a qualified generalist housekeeper,[1] who can be hired to do all the tasks that the normal running of a household requires. The preferred examples Eurostat gives are the International Standard Classifications of Occupations (ISCO) categories 5121, 'Housekeepers and related workers' and 9131, 'Domestic helpers and cleaners'.[2] The two ISCO categories mentioned correspond approximately with the Australian Standard Classification of Occupations (ASCO) category 8313 'Domestic housekeepers', which was the occupation chosen for the 1997 Australian estimates.

In both the 1992 and 1997 estimates, a female wage rate for domestic housekeepers was used as there was no male wage rate available. The tasks identified in the category included:

- preparing, cooking and serving meals and refreshments;
- purchasing food and household supplies;

1 Eurostat, p. 34.
2 Eurostat, p. 57.

VALUATION METHODS *continued*

- washing dishes, kitchen utensils and equipment, sweeping and washing floors and vacuuming carpets, curtains and upholstered furnishings;
- dusting and polishing furniture, and cleaning mirrors, bathrooms and light fixtures; and
- washing and ironing garments, linen and household articles.

In the 1992 and 1997 estimates the housekeeper wage rate was used to value all household tasks including those that would not normally be undertaken by a housekeeper. This avoided the need for a separate valuation of those tasks not normally performed by a housekeeper, the selection of which would, in any event, have been somewhat arbitrary. The household tasks not covered by ASCO (2) category 8313 included gardening, pool care, lawn care, chauffeuring and shopping.

The wage rate used for 1997 was $12.15 per hour, a rise of just over 9 per cent from the wage rate of $11.14 used in 1992. These rates are likely to have been biased downward overall as the earnings data for housekeepers from *Employee Earnings and Hours, Australia* (Cat. no. 6306.0) did not include any income-in-kind that they may have received through their employment. Also, the fact that many households employ paid housekeepers who are not covered by the Survey of Employment, Earnings and Hours, might have had some effect on the quality of the estimates.

The housekeeper replacement cost approach is only applicable to the derivation of the value of unpaid household work and does not apply to the derivation of the value of volunteer and community work. In this paper, estimates of the value of total unpaid work under a housekeeper replacement cost heading are derived by adding estimates of unpaid household work derived using the housekeeper replacement cost approach to estimates of volunteer and community work derived using the individual function replacement cost approach, based on the persons wage rate. The discussion in the section describing individual function replacement cost about the choice of gross or net wage rates and whether actual or paid working time should be used is also relevant to housekeeper replacement cost.

Replacement cost hybrid

Under this approach the housekeeper wage rate was applied to those tasks normally carried out by a housekeeper (as described in the previous section). The value of tasks not normally undertaken by a housekeeper was estimated using the wage rates employed in the *individual function replacement cost* approach. The resulting estimates were higher than the estimates made using the *housekeeper replacement cost* approach because the housekeeper wage rate was the lowest of all the wage rates used in this study. The hybrid approach would appear to be appropriate given that Australians typically hire housekeepers to clean house interiors, manage laundry and occasionally prepare meals while they hire specialists to carry out child care, household maintenance and gardening tasks. The hybrid approach was not used in the compilation of the previously published estimates for 1992.

Gross opportunity cost

The gross opportunity cost approach values unpaid work in terms of the earnings assumed to be foregone by householders when they devote time to unpaid work rather than paid employment. The approach is based on the assumption that the value of time spent doing unpaid work at home equals its 'opportunity cost' elsewhere, i.e. the valuation of the next best alternative use. The assumption is made that the worker has

VALUATION METHODS
continued

given up paid work in order to perform unpaid work and that its value per hour is equal to the individual's marginal hourly wage in the market. In other words, to do an extra hour of unpaid work, an hour of paid (market) work is given up. However, in practice, the total time spent on unpaid work is multiplied by the *average wage* applicable to relevant groups in the population. There are many problems with this approach. Some particular reservations are outlined below.

- *Labour market structures*. The gross opportunity cost approach does not represent the way the choice between paid and unpaid work is made. Most workers have limited choice in the short run regarding the hours they have to work and few have the option to refuse overtime. By doing unpaid work after the standard working week they are more likely to be giving up leisure than paid work. The opportunity cost is not the wage they receive in the market but the value they place on leisure. This value can be greater or less than the average wage rate depending on the person's attitude to work. If overtime rates reflect supply and demand in the labour market it is implied that workers value an extra hour of leisure above an extra hour of paid work at overtime rates. It is not valid, therefore, to use the normal hourly wage rate as being representative of the opportunity cost. In theory, that wage rate can only be used if work hours can vary without limit, but at present this is not an option for the vast majority of workers.
- *Employment status.* This method does not hold up well when patterns of labour force participation other than a rigid fixed-hours working week are considered. For example, what if someone can take an hour off without losing pay? Does this mean that their unpaid work is valued at zero? What is given up by doing unpaid work on the weekend if one works at paid work during the week? The answer is leisure, not paid work. What about the retired? What about the unemployed or those not in the labour force? What do they give up? With respect to the unemployed, their opportunity cost of doing unpaid work is either leisure, time spent searching for work or retraining. As a large number of unemployed persons receive a benefit irrespective of how they spend their day, the opportunity cost to them of doing unpaid work might be zero or might even be negative (if the costs of searching for work or expenses associated with retraining are considered). Doing unpaid work prevents them from searching for work, and the search would probably cost money in terms of research, transport and clothes.
- '*Psychic income*'. A probably unquantifiable but theoretically precise valuation would take account of the worker's net psychic income from doing unpaid work and from doing paid work, i.e. where the net psychic benefit equals the psychic benefit from doing unpaid work minus the psychic benefit from paid employment. Net psychic benefit must be at least as great as the opportunity cost in order to move a person to perform unpaid work in preference to paid employment. This leads back to the issues discussed earlier in this section as to whether some of the 'work' in unpaid work is in fact work or leisure. Some examples here include whether child care and shopping are work or leisure - it may depend on the individual's perception.

VALUATION METHODS *continued*

- *Relevance of market wage rates for individual workers*. Hawrylyshyn stated that the main disadvantage of the gross opportunity cost approach relates to the determination of the opportunity cost of an unpaid worker. The cost was not necessarily equal to wages. He gave the example of two unpaid workers identical in relation to house, family size and all other factors except that one could earn an hourly wage 2.5 times that of the other. The approach would therefore tell us that the value of the unpaid work performed by one of the workers is 2.5 times that of the other, an unrealistic concept.[1] How is the 'foregone wage' to be determined when an unpaid household worker has had no market employment and therefore an indeterminable potential wage?

Opportunity cost measures tend to be higher than those for the housekeeper replacement cost approach because wages for professional housekeepers are lower than the economy-wide average wage which is used for the opportunity cost approach. In view of the above discussion, the opportunity cost approach will give useful results only if very strict and probably implausible assumptions apply,

- at the margin, time devoted to unpaid work precludes market work;
- the value of time at the margin is gross hourly wages; and
- the average potential hourly earnings of the not-employed are equal to the average hourly earnings of the employed.

In the Australian studies relating to 1992 and 1997, estimates of unpaid work using the gross opportunity cost approach have been produced using average male and female wage rates, and also using the persons' average wage rate. The ABS regards the gross opportunity cost approach as the least appropriate of the estimation methodologies.

Net opportunity cost

This section discusses a refinement to the opportunity cost approach—the net opportunity cost approach. The decision to undertake paid work as an alternative use of time to unpaid work could reasonably depend on the remuneration (wages and salaries, superannuation and fringe benefits) after tax and any work-related costs. The net opportunity cost approach recognises this and recommends valuation of unpaid work at the after-tax hourly wage rate less work-related expenses plus income by way of employer costs of superannuation and fringe benefits.

The rationale behind this approach is that the unpaid worker will be equating the value of doing unpaid work with the net benefit of working in paid work conferred by this 'adjusted' hourly wage rate. In the Australian context, estimates of the wage rate applicable to a net opportunity cost valuation were derived by subtracting from average annual ordinary time earnings, the relevant taxes and levies payable and work-related expenses, and adding to the result the imputed employer on-costs relating to superannuation and fringe benefits and then converting the final result to an hourly wage rate.

The calculation of the net opportunity cost wage rate is really only a first round attempt to find the appropriate and most realistic net wage rate. Ideally, a number of other factors should also be taken into account, if it were possible to measure them (but this would be an enormous task). For example, there is the question of whether tax rebates

1 Hawrylyshyn, O., 1976, 'The Value of Household Services: A Survey of Empirical Estimates', Review of Income and Wealth, Series 22, No. 2, June, p. 112.

VALUATION METHODS *continued*

and social security benefits should be taken into account. In the Australian context these include family allowances, family income supplements, medical insurance rebates, and a variety of means-tested welfare programs. Indeed, the net opportunity cost of working in the paid work force could well be negative in some cases.

However, given the lack of data to sort out such a complicated concept, the simplified net opportunity cost hourly wage rate as outlined above was used. The results indicated considerable differences between the gross opportunity cost values and the net opportunity cost values. It should be noted that, in applying the net opportunity cost approach, significant assumptions had to be made relating to the value of on-costs, particularly, work-related expenses.

INPUT DATA FOR THE ESTIMATES

The preparation of the 1997 estimates of total unpaid work presented in this paper required three sets of data, namely:

- estimates of average time spent on household work obtained from the 1997 TUS;
- population estimates; and
- appropriate wage rates.

Estimates of the value of unpaid household work in 1997 were derived for each 'demographic subgroup' by expanding average daily minutes recorded in the TUS to derive average weekly hours spent on unpaid household tasks. 'Demographic subgroups' refers to groups of females and males classified according to their marital status and to whether they were employed, or were unemployed or not in the work force. The hourly wage rate appropriate to each estimation methodology was applied to the average weekly hours to obtain an estimated weekly value of unpaid household work. These average amounts were then multiplied by the number of weeks in a year, applied to the population in each demographic subgroup and summed to provide annual estimates of the value of unpaid household work. The same methodology was used for volunteer and community work. The addition of estimates of unpaid household work and volunteer and community work provided the value of total unpaid work.

Time Use Surveys

As for the 1992 estimates, a TUS was the principal statistical base for deriving the 1997 estimates of the value of total unpaid work. TUSs record the time spent by people on different kinds of activities and TUS data by activity can be classified by demographic, socioeconomic and other personal characteristics. The ABS ran its second national TUS in 1997. Respondents were requested to complete a questionnaire and to provide detailed information on daily time use by keeping a diary covering two successive days. In order to take account of the seasonal impact on time use, the survey was conducted during each quarter of the year, the four survey periods being January 27—February 8, April 21—May 3, June 23—July 5 and October 27—November 8. The final sample included 4,555 households (7,260 persons), slightly more than the 1992 sample of 4,400 households. The scope of the survey was restricted to persons 15 years of age and over, as in 1992. It covered residents of private dwellings in urban and rural areas across all States and Territories of Australia. The following exclusions were made for conceptual and operational reasons:

- foreign diplomatic personnel and members of their households who did not qualify as Australian residents;
- other overseas residents in Australia;

INPUT DATA FOR THE ESTIMATES *continued*

- members of foreign defence forces (and their dependants) stationed in Australia;
- some 175,000 persons living in remote and sparsely settled parts of Australia;
- all persons living in special dwellings (e.g. prisons, hospitals); and
- Australian defence force members.

As the TUS is only in respect of four two-week periods in a year that fall outside school holiday periods there is the possibility that the unpaid work estimates are significantly biased. However, given that the TUS reference periods in the 1992 and 1997 surveys were similar it is likely that any bias is similar in the two years.

Wage rate data

As mentioned above, the estimates for the *individual function replacement cost* approach were compiled using the wage rates for males, females and persons, based on the publication *Employee Earnings and Hours, Australia* (Cat. no. 6306.0). The hourly wage rates were calculated from the average weekly ordinary time earnings and the hours paid for in each ASCO occupational group. Because the data were available only biennially from 1996, the relevant wage rates for 1996 and 1998 were selected and averaged to give estimated wage rates for 1997.

The *Survey of Employment, Earnings and Hours*, which was the survey in which the wage rates published in Cat. no. 6306.0 were collected, is a sample survey of employers. It is designed to provide statistics on the distribution of employees according to levels of weekly earnings and paid hours, and on the levels of weekly earnings and paid hours for various categories of employees and principal occupations. Employers with fewer than 10 employees are asked to report details for every employee, while those with 10 or more employees are asked to select a random sample of their employees in accordance with instructions supplied by the ABS. The employer describes the tasks each employee performs and the ABS classifies the tasks to an occupation based on the grouping of tasks by occupation set out in the ASCO. For the purpose of compiling unpaid work data, only a selection of occupational wage rates were used, namely those applying to occupations that were deemed to involve tasks that qualify as unpaid household work and volunteer and community work.

In the previous two ABS studies, occupations (and accompanying wage rates), were chosen on the basis that they were most similar to the type of unpaid work under consideration. If several occupations were considered relevant to the one unpaid activity they were all selected and the wage rates of all relevant occupations were averaged. In its 1997 study, Statistics Canada devised rules that provided a more refined procedure for selecting occupations.[1]

- First, the occupations chosen were those that would be directly affected by an increase in demand when a particular type of unpaid work was transferred to the market.
- Of the occupations selected in the first step above, only those deemed most similar to the type of unpaid work under consideration were selected.
- If this procedure resulted in a group of occupations being matched to an unpaid work category, the average earnings were weighted according to the employment in each occupation within the group.

1 Statistics Canada, 1995, 'Households Unpaid Work Measurement and Valuation. Studies in National Accounting.' Catalogue 13- 603E, No. 3, p. 38.

INPUT DATA FOR THE ESTIMATES *continued*

The first two rules used by Statistics Canada were applied in compilation of the ABS's 1997 estimates. The rules were considered appropriate because it can be argued, for example, that if people start eating out more, demand for cooks and kitchen hands, whose work is most similar to the unpaid work of food preparation in the home, would increase. However, the ABS did not consider that weighting each of the groups of occupations according to employment (i.e. Statistics Canada's third rule) would always be appropriate. Employment weightings for the market sector might be quite different from weightings appropriate for the activities comprising unpaid household work. The difference would be compounded if the wage rates within each group of occupations varied widely. The approach adopted for the 1997 ABS estimates was to allocate the weightings within each group by activity weights derived from the TUS. This was possible because the TUS provided data at a detailed level of the ASCO. This approach was used in all except a small number of cases for which sampling errors were too high.

The matching of occupational wage rates used from the May 1997 issue of *Employee, Earnings and Hours, Australia* to the various unpaid household work activities is shown in Table 15 of this publication. These wage rates provided the initial input to the *individual function replacement cost* approach. For a number of household activities (denoted by 'na' in Table 15) female wage rates were not available and male wage rates were used in lieu. As explained in the previous paragraph, where there was more than one occupation matched to each household activity, weightings from the TUS were used. The wage rates shown in main Tables 1–14 of this publication have been derived from the wage rates listed in Table 15. Average wage rates for the various demographic groups differ because of the varying amounts of time spent on each activity by each demographic group.

The hourly wage rates used for the *opportunity cost* approaches are shown in the table below. With respect to the *net opportunity cost* approach the data sources are as follows. Average weekly ordinary time earnings and hours worked were obtained from *Employee, Earnings and Hours, Australia*. Taxation rates were obtained from the Australian Taxation Office. Employer on-costs were compiled from ABS sources, mainly *Labour Costs, Australia* (Cat. no. 6348.0). Work-related expenses were calculated from data classified by type of family and number of dependent children, and employment structure within each family, from the ABS Household Expenditure Survey.

WAGE RATES USED FOR THE OPPORTUNITY COST APPROACHES

	Males	*Females*	*Persons*
	$/hr	$/hr	$/hr
Gross opportunity cost	18.13	16.43	17.47
Net opportunity cost	13.92	12.84	13.47

Population data

For the unpaid work calculations in respect of 1992, population estimates were based on ABS monthly labour force survey estimates of the civilian population aged 15 years and over, classified by sex, marital status, labour force status and age. The estimates were benchmarked to the 1986 Population Census. The population estimates were obtained by taking a simple average of the labour force data for the months during which the TUS

INPUT DATA FOR THE ESTIMATES *continued*

was conducted, i.e. February/March, May/June, August/September and November/December.

For the unpaid work calculations in respect of 1997, population estimates were based on ABS monthly labour force survey estimates that were benchmarked to the 1991 Population Census. A change from 1992 was the exclusion of persons in special dwellings (e.g. prisons, hospitals) and persons living in remote and sparsely settled parts of Australia. The resulting population estimates were then obtained by weighting the labour force data according to the number of days during which the TUS was conducted in each month of the four enumeration periods of January/February, April/May, June/July and October/November.

CHAPTER 4 TABLES

1 VALUE OF UNPAID HOUSEHOLD WORK, Australia—Individual Function Replacement Cost Method: **Male and Female Wage Rates**—1992 and 1997

	Average weekly hours 1997	*Wage rate 1997*	*Population 1997*	*Value of unpaid household work 1997*	*Value of unpaid household work 1992*
	hr	$/hr	'000	$b	$b
Males					
Employed					
Married	16.44	14.27	3 023	37	32
Not married	9.44	14.21	1 668	12	9
Total	*14.14*	*14.27*	*4 691*	*49*	*41*
Not employed(a)					
Married	25.94	14.14	1 187	23	21
Not married	16.11	13.91	1 049	12	9
Total	*21.44*	*14.04*	*2 236*	*35*	*30*
Total males					
Married	19.05	14.26	4 210	60	54
Not married	12.12	14.06	2 717	24	18
Total	**16.51**	**14.18**	**6 927**	**85**	**72**
Females					
Employed					
Married	32.50	13.18	2 166	48	43
Not married	16.37	13.36	1 415	16	12
Total	*26.49*	*13.21*	*3 581*	*65*	*55*
Not employed(a)					
Married	43.55	13.14	1 966	59	56
Not married	26.37	13.16	1 566	28	24
Total	*36.45*	*13.13*	*3 532*	*87*	*80*
Total females					
Married	37.73	13.17	4 132	107	99
Not married	21.65	13.22	2 981	44	36
Total	**31.51**	**13.15**	**7 113**	**152**	**135**
All persons	na	na	**14 040**	**237**	**207**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

2 VALUE OF UNPAID HOUSEHOLD WORK, Australia—Individual Function Replacement Cost Method: **Persons Wage Rates**—1992 and 1997

	Average weekly hours 1997	*Wage rate 1997*	*Population 1997*	*Value of unpaid household work 1997*	*Value of unpaid household work 1992*
	hr	$/hr	'000	$b	$b
Males					
Employed					
Married	16.44	13.88	3 023	36	32
Not married	9.44	13.82	1 668	11	8
Total	*14.14*	*13.87*	*4 691*	*48*	*40*
Not employed(a)					
Married	25.94	13.74	1 187	22	21
Not married	16.11	13.52	1 049	12	9
Total	*21.44*	*13.67*	*2 236*	*34*	*30*
Total males					
Married	19.05	13.84	4 210	58	53
Not married	12.12	14.06	2 717	24	17
Total	**16.51**	**13.78**	**6 927**	**82**	**70**
Females					
Employed					
Married	32.50	13.52	2 166	50	45
Not married	16.37	13.62	1 415	16	12
Total	*26.49*	*13.50*	*3 581*	*66*	*57*
Not employed(a)					
Married	43.55	13.33	1 966	60	58
Not married	26.37	13.30	1 566	29	24
Total	*36.45*	*13.30*	*3 532*	*89*	*83*
Total females					
Married	37.73	13.43	4 132	109	103
Not married	21.65	13.37	2 981	45	36
Total	**31.51**	**13.16**	**7 113**	**154**	**139**
All persons	na	na	**14 040**	**236**	**210**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

3 VALUE OF UNPAID HOUSEHOLD WORK, Australia—Housekeeper Replacement Cost Method: **Male and Female Wage Rates**—1992 and 1997

	Average weekly hours 1997	*Wage rate 1997(a)*	*Population 1997*	*Value of unpaid household work 1997*	*Value of unpaid household work 1992*
	hr	$/hr	'000	$b	$b
Males					
Employed					
Married	16.44	12.15	3 023	31	29
Not married	9.44	12.15	1 668	10	8
Total	*14.14*	*12.15*	*4 691*	*42*	*37*
Not employed(b)					
Married	25.94	12.15	1 187	19	20
Not married	16.11	12.15	1 049	11	8
Total	*21.44*	*12.15*	*2 236*	*30*	*28*
Total males					
Married	19.05	12.15	4 210	51	49
Not married	12.12	12.15	2 717	21	16
Total	**16.51**	**12.15**	**6 927**	**72**	**65**
Females					
Employed					
Married	32.50	12.15	2 166	45	42
Not married	16.37	12.15	1 415	15	11
Total	*26.49*	*12.15*	*3 581*	*60*	*53*
Not employed(b)					
Married	43.55	12.15	1 966	54	55
Not married	26.37	12.15	1 566	27	23
Total	*36.45*	*12.15*	*3 532*	*82*	*78*
Total females					
Married	37.73	12.15	4 132	99	96
Not married	21.65	12.15	2 981	42	34
Total	**31.51**	**12.15**	**7 113**	**142**	**131**
All persons	na	na	**14 040**	**214**	**196**

na not available

(a) Only a female rate was available and has been applied throughout.

(b) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

4 VALUE OF UNPAID HOUSEHOLD WORK, Australia—Replacement Cost Hybrid Method(a): **Male and Female Wage Rates**—1997

	Average weekly hours	*Wage rate*	*Population*	*Value of unpaid household work*
	hr	$/hr	'000	$b
Males				
Employed				
Married	16.44	14.06	3 023	36
Not married	9.44	13.91	1 668	11
Total	*14.14*	*14.03*	*4 691*	*48*
Not employed(b)				
Married	25.94	13.90	1 187	22
Not married	16.11	13.58	1 049	12
Total	*21.44*	*13.77*	*2 236*	*34*
Total males				
Married	19.05	14.03	4 210	59
Not married	12.12	13.74	2 717	24
Total	**16.51**	**13.92**	**6 927**	**83**
Females				
Employed				
Married	32.50	13.01	2 166	48
Not married	16.37	13.20	1 415	16
Total	*26.49*	*13.06*	*3 581*	*65*
Not employed(b)				
Married	43.55	12.93	1 966	58
Not married	26.37	12.96	1 566	28
Total	*36.45*	*12.93*	*3 532*	*87*
Total females				
Married	37.73	12.98	4 132	106
Not married	21.65	13.04	2 981	44
Total	**31.51**	**12.96**	**7 113**	**151**
All persons	na	na	**14 040**	**234**

na not available

(a) This method was not used in the previous study, therefore there are no estimates available for 1992.

(b) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

5 VALUE OF UNPAID HOUSEHOLD WORK, Australia—Gross Opportunity Cost Method: **Male and Female Wage Rates**—1992 and 1997

	Average weekly hours 1997	*Wage rate 1997*	*Population 1997*	*Value of unpaid household work 1997*	*Value of unpaid household work 1992*
	hr	$/hr	'000	$b	$b
Males					
Employed					
Married	16.44	18.13	3 023	47	38
Not married	9.44	18.13	1 668	15	10
Total	*14.14*	*18.13*	*4 691*	*62*	*47*
Not employed(a)					
Married	25.94	18.13	1 187	29	25
Not married	16.11	18.13	1 049	16	11
Total	*21.44*	*18.13*	*2 236*	*45*	*36*
Total males					
Married	19.05	18.13	4 210	76	63
Not married	12.12	18.13	2 717	31	21
Total	**16.51**	**18.13**	**6 927**	**108**	**84**
Females					
Employed					
Married	32.50	16.43	2 166	60	51
Not married	16.37	16.43	1 415	20	14
Total	*26.49*	*16.43*	*3 581*	*81*	*65*
Not employed(a)					
Married	43.55	16.43	1 966	73	67
Not married	26.37	16.43	1 566	35	28
Total	*36.45*	*16.43*	*3 532*	*108*	*95*
Total females					
Married	37.73	16.43	4 132	134	118
Not married	21.65	16.43	2 981	55	42
Total	**31.51**	**16.43**	**7 113**	**189**	**160**
All persons	na	na	**14 040**	**297**	**244**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

6 VALUE OF UNPAID HOUSEHOLD WORK, Australia—Gross Opportunity Cost Method: **Persons Wage Rates**—1992 and 1997

	Average weekly hours 1997	*Wage rate 1997*	*Population 1997*	*Value of unpaid household work 1997*	*Value of unpaid household work 1992*
	hr	$/hr	'000	$b	$b
Males					
Employed					
Married	16.44	17.47	3 023	45	38
Not married	9.44	17.47	1 668	14	10
Total	*14.14*	*17.47*	*4 691*	*60*	*48*
Not employed(a)					
Married	25.94	17.47	1 187	28	25
Not married	16.11	17.47	1 049	15	11
Total	*21.44*	*17.47*	*2 236*	*44*	*36*
Total males					
Married	19.05	17.47	4 210	73	63
Not married	12.12	17.47	2 717	30	20
Total	**16.51**	**17.47**	**6 927**	**104**	**83**
Females					
Employed					
Married	32.50	17.47	2 166	64	54
Not married	16.37	17.47	1 415	22	15
Total	*26.49*	*17.47*	*3 581*	*86*	*68*
Not employed(a)					
Married	43.55	17.47	1 966	78	70
Not married	26.37	17.47	1 566	38	29
Total	*36.45*	*17.47*	*3 532*	*117*	*99*
Total females					
Married	37.73	17.47	4 132	143	124
Not married	21.65	17.47	2 981	60	44
Total	**31.51**	**17.47**	**7 113**	**204**	**168**
All persons	na	na	**14 040**	**308**	**251**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

7 VALUE OF UNPAID HOUSEHOLD WORK, Australia—Net Opportunity Cost method: **Male and Female Wage Rates**—1992 and 1997

	Average weekly hours 1997	*Wage rate 1997*	*Population 1997*	*Value of unpaid household work 1997*	*Value of unpaid household work 1992*
	hr	$/hr	'000	$b	$b
Males					
Employed					
Married	16.44	13.92	3 023	36	29
Not married	9.44	13.92	1 668	11	8
Total	*14.14*	*13.92*	*4 691*	*48*	*36*
Not employed(a)					
Married	25.94	13.92	1 187	22	20
Not married	16.11	13.92	1 049	12	8
Total	*21.44*	*13.92*	*2 236*	*35*	*28*
Total males					
Married	19.05	13.92	4 210	58	49
Not married	12.12	13.92	2 717	24	16
Total	**16.51**	**13.92**	**6 927**	**83**	**65**
Females					
Employed					
Married	32.50	12.84	2 166	47	40
Not married	16.37	12.84	1 415	16	11
Total	*26.49*	*12.84*	*3 581*	*64*	*51*
Not employed(a)					
Married	43.55	12.84	1 966	57	52
Not married	26.37	12.84	1 566	28	22
Total	*36.45*	*12.84*	*3 532*	*85*	*74*
Total females					
Married	37.73	12.84	4 132	104	92
Not married	21.65	12.84	2 981	44	33
Total	**31.51**	**12.84**	**7 113**	**150**	**125**
All persons	na	na	**14 040**	**233**	**190**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

8 VALUE OF UNPAID HOUSEHOLD WORK, Australia—Net Opportunity Cost Method: **Persons Wage Rates**—1992 and 1997

	Average weekly hours 1997	*Wage rate 1997*	*Population 1997*	*Value of unpaid household work 1997*	*Value of unpaid household work 1992*
	hr	$/hr	'000	$b	$b
Males					
Employed					
Married	16.44	13.47	3 023	35	28
Not married	9.44	13.47	1 668	11	8
Total	*14.14*	*13.47*	*4 691*	*47*	*36*
Not employed(a)					
Married	25.94	13.47	1 187	22	19
Not married	16.11	13.47	1 049	12	8
Total	*21.44*	*13.47*	*2 236*	*34*	*27*
Total males					
Married	19.05	13.47	4 210	56	47
Not married	12.12	13.47	2 717	23	16
Total	**16.51**	**13.47**	**6 927**	**80**	**63**
Females					
Employed					
Married	32.50	13.47	2 166	49	41
Not married	16.37	13.47	1 415	16	11
Total	*26.49*	*13.47*	*3 581*	*67*	*52*
Not employed(a)					
Married	43.55	13.47	1 966	60	53
Not married	26.37	13.47	1 566	29	22
Total	*36.45*	*13.47*	*3 532*	*90*	*75*
Total females					
Married	37.73	13.47	4 132	110	94
Not married	21.65	13.47	2 981	45	33
Total	**31.51**	**13.47**	**7 113**	**157**	**127**
All persons	na	na	**14 040**	**238**	**190**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

9 VALUE OF VOLUNTEER AND COMMUNITY WORK, Australia—Individual Function Replacement Cost Method: **Male and Female Wage Rates**—1997

	Average weekly hours	*Wage rate*	*Population*	*Value of unpaid household work*
	hr	$/hr	'000	$b
Males				
Employed	1.75	14.55	4 691	6
Not employed(a)	2.80	14.53	2 236	5
Total males	*2.07*	*14.54*	*6 926*	*11*
Females				
Employed	2.04	13.48	3 581	5
Not employed(a)	3.35	13.45	3 532	8
Total females	*2.68*	*13.46*	*7 113*	*13*
All persons	na	na	**14 040**	**24**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

10 VALUE OF VOLUNTEER AND COMMUNITY WORK, Australia—Individual Function Replacement Cost Method: **Persons Wage Rates**—1992 and 1997

	Average weekly hours 1997	*Wage rate 1997*	*Population 1997*	*Value of unpaid household work 1997*	*Value of unpaid household work 1992*
	hr	$/hr	'000	$b	$b
Males					
Employed	1.75	13.96	4 691	6	5
Not employed(a)	2.80	13.96	2 236	5	4
Total males	*2.07*	*13.96*	*6 926*	*11*	9
Females					
Employed	2.04	13.96	3 581	5	4
Not employed(a)	3.35	13.96	3 532	9	5
Total females	*2.68*	*13.96*	*7 113*	*14*	9
All persons	na	na	**14 040**	**25**	**18**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

11 VALUE OF VOLUNTEER AND COMMUNITY WORK, Australia—Gross Opportunity Cost Approach: **Male and Female Wage Rates**—1997

	Average weekly hours	*Wage rate*	*Population*	*Value of unpaid household work*
	hr	$/hr	'000	$b
Males				
Employed	1.75	18.13	4 691	8
Not employed(a)	2.80	18.13	2 236	6
Total males	*2.07*	*18.13*	*6 926*	*14*
Females				
Employed	2.04	16.43	3 581	6
Not employed(a)	3.35	16.43	3 532	10
Total females	*2.68*	*16.43*	*7 113*	*16*
All persons	na	na	**14 040**	**30**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

12 VALUE OF VOLUNTEER AND COMMUNITY WORK, Australia—Gross Opportunity Cost Method: **Persons Wage Rates**—1992 and 1997

	Average weekly hours 1997	*Wage rate 1997*	*Population 1997*	*Value of unpaid household work 1997*	*Value of unpaid household work 1992*
	hr	$/hr	'000	$b	$b
Males					
Employed	1.75	17.47	4 691	7	5
Not employed(a)	2.80	17.47	2 236	6	5
Total males	*2.07*	*17.47*	*6 926*	*13*	*10*
Females					
Employed	2.04	17.47	3 581	7	5
Not employed(a)	3.35	17.47	3 532	11	6
Total females	*2.68*	*17.47*	*7 113*	*18*	*11*
All persons	na	na	**14 040**	**31**	**21**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

13 VALUE OF VOLUNTEER AND COMMUNITY WORK, Australia—Net Opportunity Cost Method: **Male and Female Wage Rates**—1997

	Average weekly hours	*Wage rate*	*Population*	*Value of unpaid household work*
	hr	$/hr	'000	$b
Males				
Employed	1.75	13.92	4 691	6
Not employed(a)	2.80	13.92	2 236	5
Total males	*2.07*	*13.92*	*6 926*	*11*
Females				
Employed	2.04	12.84	3 581	5
Not employed(a)	3.35	12.84	3 532	8
Total females	*2.68*	*12.84*	*7 113*	*13*
All persons	na	na	**14 040**	**24**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

14 VALUE OF VOLUNTEER AND COMMUNITY WORK, Australia—Net Opportunity Cost Method: **Persons Wage Rates**—1992 and 1997

	Average weekly hours 1997	*Wage rate 1997*	*Population 1997*	*Value of unpaid household work 1997*	*Value of unpaid household work 1992*
	hr	$/hr	'000	$b	$b
Males					
Employed	1.75	13.47	4 691	6	4
Not employed(a)	2.80	13.47	2 236	5	4
Total males	*2.07*	*13.47*	*6 926*	*11*	*8*
Females					
Employed	2.04	13.47	3 581	5	4
Not employed(a)	3.35	13.47	3 532	8	4
Total females	*2.68*	*13.47*	*7 113*	*13*	*8*
All persons	na	na	**14 040**	**24**	**16**

na not available

(a) The term 'not employed' includes 'unemployed' and 'not in the labour force'.

15 WAGE RATES USED FOR THE INDIVIDUAL FUNCTION REPLACEMENT COST APPROACH

Unpaid work activities and matching ASCO occupations	*Male* $/hr	*Female* $/hr	*Persons* $/hr
UNPAID HOUSEHOLD WORK			
Housework			
Food and drink preparation			
4513 Cooks	13.08	12.59	12.89
9931 Kitchen maids	13.04	13.36	13.22
Clean-up			
6323 Waiters	12.19	12.29	12.25
9931 Kitchen hands	13.04	13.36	13.22
Laundry, ironing and clothes care			
8315 Laundry workers	12.44	11.48	11.80
4941 Clothing tradespersons	13.83	13.54	13.62
Other housework			
9111 Cleaners	13.06	12.44	12.83
Other domestic activities			
Gardening and lawn care			
4623 Gardeners	13.09	..	13.05
Cleaning grounds, pools, etc.			
8314 Caretakers	13.52	..	13.44
Pet/animal care			
6399 Other intermediate service workers	15.92	13.19	15.33
Home and durables maintenance			
9993 Handy persons	13.72	10.33	13.67
9916 Construction and plumbing assistants	14.88	..	14.90
4211 Motor mechanics	14.60	11.90	14.57
Household management			
6111 General clerks	16.08	14.49	14.83
6141 Accounting clerks	17.01	15.06	14.83
9991 Garbage collector	14.15	..	14.40
6153 Stocks and purchasing clerks	16.08	15.17	15.77
Child care			
6312 Child care workers	17.99	11.82	11.99
6314 Personal care workers and nursing assistants	14.30	13.90	14.04
2411 Pre-primary school teachers	17.51	19.00	18.89
6311 Education aides	13.93	13.57	13.61
Purchasing goods and services			
6153 Stock and purchasing clerks	16.08	15.17	15.77
6313 Special care workers	15.64	14.05	14.45
Associated communication			
5111 Secretaries and personal assistants	16.71	15.97	15.99
Associated travel			
7313 Automobile drivers	14.54	..	14.59
VOLUNTEER AND COMMUNITY WORK			
Adult care			
6314 Personal care workers and nursing assistants	14.30	13.90	14.04
Volunteer work			
Average of all unpaid occupations	14.53	13.16	13.73
Associated communication			
5111 Secretaries and personal assistants	16.71	15.97	15.99
Associated travel			
7313 Automobile drivers	14.54	..	14.59

.. not applicable

APPENDIX 1 HOUSEHOLD SATELLITE ACCOUNTS

HOUSEHOLD ECONOMIC ACTIVITY AND THE NATIONAL ACCOUNTS

The 1993 System of National Accounts (SNA93) recommends inclusion of part of households' non-market production within the SNA93 production boundary and the use of a satellite account for recording the other part. The SNA93 production boundary includes subsistence production in agriculture, other goods produced by households for their own consumption, the own-account construction of dwellings and housing services provided by owner-occupied dwellings, and paid services of domestic servants in the household sector. Excluded are services generated from unpaid work, including services for the producing household, services for other households and volunteer and community work.

The SNA93 suggests that, in practice, goods produced in households for own use are to be included within the production boundary if the production is believed to be quantitatively important in relation to the total supply of those goods in the country concerned. The Australian national accounts include an imputation for the market value (less the input cost) of the more common types of such production in Australia (fruit, vegetables, eggs, beer, wine and meat) for inclusion in estimates of household final consumption expenditure. For 1997 this amounted to just over $1 billion. An estimate for such 'backyard production' is also included on the income side of the accounts, as part of gross mixed income.

A number of commentators, including Ironmonger,[1] have expressed concern that the SNA93 production boundary records only a partial picture of the production of household goods and services and the accompanying use of capital and labour. For example, household members can obtain goods and services by buying them from the market. This activity is fully captured in the national accounts. Households can also produce goods and services entirely themselves, using their own labour and capital. While such production of goods will be captured if it is significant, the production of services (other than housing services provided by owner-occupied dwellings) is not measured in the national accounts. However, to the extent that the non-market production of services involves the use of market inputs, then that use of market inputs would be measured in the national accounts.

The exclusion of most forms of household non-market production of services from the national accounts is due, in part, to the difficulties in measuring non-market output. In particular, non-market activities, by their very nature, must be valued using imputations and it is not always clear what these imputations should be. Also, it is more difficult to define non-market production than to determine the scope of market activity. Because of these concerns, national accountants generally hold the view that broadening the accounts to include a wide range of non-market activity would produce a less useful tool for analysing overall economic activity.

Nonetheless, as economic activity crosses over from non-market to market, or vice versa, this can lead to distortions in the accounts. A classic example is the marriage of a housekeeper to his or her employer. Prior to the marriage, the housekeeper's output (presuming that housekeeper was being paid a wage) was

1 Ironmonger, Duncan, (1994), 'The Value of Care and Nuture Provided by Household Work', *Family Matters*, No.37, April 1994.

HOUSEHOLD ECONOMIC ACTIVITY AND THE NATIONAL ACCOUNTS *continued*

included in GDP. After the marriage, the same output is excluded if the new spouse is not paid a wage. However, there has been no change in underlying economic activity. Only the institutional arrangements underlying the activity have changed.

In order to provide a more comprehensive picture of economic activity, SNA93 suggests that satellite accounts be used. Two types of satellite accounts can be distinguished: internal and external. Internal satellite accounts are used to reorganise transactions recorded within the 'core' accounts. In other words, the basic concepts underlying the accounts are not altered. An example is a tourism satellite account, which involves reclassifying a number of transactions relating to tourism to yield an identifiable 'tourism' sector. External satellite accounts alter the concepts, in particular the production boundary, underlying the core accounts, but they do this in such a way that there are clear linkages with the core accounts. Household satellite accounts are of this type. Internal satellite accounts have to be compiled in monetary terms, whereas external satellite accounts can be compiled in both monetary and non-monetary terms. Thus it would be possible, for example, to make non-monetised comparisons based on time spent in formal and informal economic activity as well as to monetise unpaid work, if so desired. Therefore, a household satellite account can provide comprehensive information on household economic activity within a framework that is consistent with the core national accounts, without subjecting the core accounts to the vagaries associated with defining and measuring household non-market output.

Many writers have argued strongly for the development of satellite accounts of household production. Murgatroyd and Neuberger[1] of the United Kingdom Office of National Statistics argued that much of what is presented in the national accounts as final consumption can be viewed as intermediate consumption by the household production industries. They also argue that the market economy is a poor proxy for total production and that additional sets of estimates are required because:

- household production activities and production in the formal economy are as often substitutes as they are complements;
- in different countries and, even more importantly in the same economy at different times, activities have been undertaken either in the formal economy or in households;
- different household activities have both substitutes and complements within the market economy;
- there are very different patterns of paid and unpaid work in the economies of different countries.

Ironmonger is another strong advocate of household satellite accounts. He argues that the focus of research is increasingly on the household as a separate economic unit. Economies are going through rapid economic and social changes because, for example, of globalisation and technological change, for which new social and economic policies are required. He recommends that the household satellite account be based on input-output tables.[2]

It is possible to widen the scope of household activity to look at frameworks that encompass not only household production but also describe consumption, saving and accumulation of wealth activities in households. This could be done at

1 Murgatroyd, Linda and Neuberger, Henry (1997), 'A Household Satellite Account for the U.K., *Economic Trends*, No. 657, October 1997.

2 Ironmonger, Duncan, (1997), 'Counting Outputs, Capital Inputs and Caring Labour: Estimating Gross Household Product', *Feminist Economics*, Vol 2, No.3, p. 39.

HOUSEHOLD ECONOMIC ACTIVITY AND THE NATIONAL ACCOUNTS *continued*

either the macro or micro level, that is, at the level of the household sector as a whole or disaggregated by types of household. A macro framework has been developed by Eurostat and a provisional micro framework has been developed by the ABS. Statistics Netherlands has developed a framework that seeks to show macro-micro linkages. Each of these frameworks is discussed below.

VALUATION APPROACHES

As mentioned above, one of the main issues in measuring non-market household production is to determine an appropriate method for valuing the production. Three approaches have been suggested: the unpaid work approach, input approach and the output approach. The most common method used to date has been the unpaid work approach (also called the 'net approach' in the literature), which takes account only of (unpaid) working time and its imputed value. ABS studies to date have used this approach. The input approach values household production as the sum of the values of all of its inputs: time use, intermediate consumption, and capital costs. The output approach values household production at its imputed output value, in the same way that in-scope household non-market production is valued in the core national accounts.

The unpaid work approach

The essence of this approach is to multiply hours of unpaid work, usually obtained from a time use survey (TUS) by an appropriate wage rate.

The first Australian unpaid work study, published in 1990, used data from a 1987 pilot TUS, which was conducted in the Sydney statistical division. Three basic methods of valuation were used:

- the opportunity cost method
- the individual function replacement cost method
- the housekeeper replacement cost method

Each of these methods used wage rates that were on a 'before-tax', or gross, basis.

The second study, completed in 1994, used data from the first national TUS of 1992 and retained these three methods. It refined the housekeeper replacement cost method and also distinguished between a gross opportunity cost method and a more appropriate net opportunity cost method, based on after-tax wage rates. The individual function and housekeeper replacement cost methods remained on a gross basis.

The third Australian study, completed in 2000 and based on the results of the 1997 national TUS, used the same methods as the second study, and also introduced a hybrid of the individual function and housekeeper replacement cost methods.

The main limitations of the unpaid work approach are:

- the contribution to the value of household production that comes from other inputs (e.g. intermediate consumption and capital) is not captured;
- it cannot provide information on the labour productivity of household production;
- it cannot be used to analyse whether households are more efficient in their production than comparable market units;
- it does not take into account the joint production of services through simultaneous or parallel uses of time;
- a choice is required among multiple wage rates and valuation methodologies, each of which have their limitations.

With regard to the last point, the pros and cons of the various approaches are well summarised in a 1999 Eurostat document entitled '*Proposal for a satellite account of household production*'.[1] (This proposal is discussed in more detail in

1 Eurostat (1999), 'Proposal for a Satellite Account on Household Production': 9/1999/A4/11.

VALUATION APPROACHES
continued

the section 'The Eurostat Proposal'.) The document provides the broad consensus of national accountants in Europe about the preferred method of valuation of the labour input into household production. Of the possibilities, Eurostat recommends that the housekeeper replacement cost method is the most appropriate method to use to value household labour. The reasons cited include:

- the nature of the work performed by a housekeeper is rather similar to the nature of housework performed by a household member;
- housekeeper productivity is similar to that of the householder, as regards the performance of several household activities simultaneously, the quality of household equipment used and the amount of intermediate consumption involved;
- the method of valuation is simple and straightforward.

A potential problem with the housekeeper replacement cost method is that a housekeeper does not perform all the tasks undertaken in households, such as household management, home maintenance, servicing vehicles and volunteer work. Using this approach then could possibly see an undervaluation of the labour input to household production unless those tasks not typically undertaken by a housekeeper were also included in the valuation on the basis of specialists' wages (in effect utilising a hybrid of the housekeeper replacement cost and individual market replacement cost methods). As to the issue of gross or net wages Eurostat recommends that gross wages, which include income tax and social security contributions paid by the employer and employee, be used, although it acknowledges that net wages do have certain advantages from a theoretical point of view. However, net wage statistics are generally not available on an occupational basis. (This is one of the reasons that Australia uses the gross wage concept in its valuation of unpaid work using the replacement cost methods).

The input-based approach

Under this approach, the household is regarded as a production unit in which commodities and services are produced by combining work, intermediate consumption and household durables. This approach allows for better integration of household production into the system of national accounts. The formula used is as follows:

Value of labour
\+ wages paid to domestic servants
\+ taxes less subsidies on production
= net value added
\+ consumption of fixed capital
= gross value added
\+ intermediate consumption
= gross output

This formula is similar to that used in the national accounts to value the non-market output of the general government and non-profit institutions serving households sectors. The input-based approach was used by the German Federal Statistical Office in its estimates of the value of German household production in 1992.

In measuring the non-market output of households using the input-based method the value of labour component obviously relates to unpaid labour. Accordingly, the observations in the preceding section on the unpaid work method also pertain to this component.

VALUATION APPROACHES
continued

The taxes less subsidies on production component refers to transfer payments made by households to governments and vice-versa that are recorded as secondary income transactions in the core national accounts but would be considered to relate to non-market household production. These transfer payments would then be reclassified in the household satellite account. Further work would be required to identify in the Australian context what, if any, transfer payments fall into this category.

The consumption of fixed capital component relates to the depreciation of household durables used in the household production process. In the core accounts, purchases of durables (e.g. motor vehicles, refrigerators, washing machines) by households are recorded as final consumption expenditures and not as capital formation. In the satellite accounts, household expenditure on consumer durables would need to be reclassified from final consumption to gross fixed capital formation. Such a split would be reasonably straightforward as the classification that underlies household final consumption expenditure has separate categories for household durable and semi-durable goods. Problems would arise if certain durables were used for non-production purposes as well as for production purposes. In the satellite account, expenditure on these durables would need to be split into gross fixed capital formation and final consumption. This could be done on the basis of TUS data. If a car was used for say, one hour a day, and twenty minutes of that time was associated with household production, one third of the expenses of the car would be treated as gross fixed capital formation and two-thirds as final consumption. Special studies on particular goods and services could also be used to make such a split.

It would be important to properly delineate the extent of fixed capital formation in households because it would impact upon the productivity of household labour. An increase in the amount of capital goods in households would increase labour productivity, which could either result in increased output or a reduction in the amount of time spent on household work.

The more difficult aspect of measuring the consumption of fixed capital component would be in actually determining the appropriate amounts of depreciation in each period. In the Australian national accounts, estimates of the consumption of fixed capital for assets used in the production of goods and services that fall within the SNA93 production boundary are derived using the 'perpetual inventory method' (PIM). This method requires information about the decline in the efficiency of assets as they age, asset lives, the distribution of these lives about the average life, and changes in the price of assets. The ABS currently provides estimates of the stock of household durables as a memorandum item in the national accounts balance sheets. These data could be used as a starting point for deriving estimates of consumption of fixed capital. However, the quality of these estimates could be significantly improved, and the ABS is currently investigating ways of doing this.

The intermediate consumption element would consist of goods and services acquired by households that are used up in household production. To the extent that this production fell outside the SNA93 production boundary, measuring the associated intermediate consumption would require identifying and reclassifying expenditures treated as final consumption in the core accounts. For some goods or services, it would be reasonable to assume that all expenditure on them should be classified to intermediate consumption. For example, meat purchases would all be classified to intermediate consumption because meat products generally have to be prepared or cooked before they are ready for a meal. Other goods or services could be used in production or as final consumption. For

VALUATION APPROACHES
continued

example, ice-cream can be eaten as such or used as an ingredient in desserts. As it is usually eaten directly, it would probably be allocated to final consumption. On the other hand, fruit, even though it is eaten mostly fresh, might have to be allocated to intermediate consumption as most fruits that are eaten fresh need to be rinsed, peeled, stored and distributed. The alternative to allocating expenditure on a particular product to either intermediate consumption or final consumption would be to split expenditure based on studies of the use of the product. However, it is highly unlikely that the ABS could commission such studies, so the use of such a technique would need to be based on studies undertaken by others.

In deciding which expenditures should be classified as capital and intermediate in the household satellite account, the ABS would consider work already undertaken internationally in this area.

Estimates of household production developed using the input-based method could be presented in their own right or used to develop alternative estimates to those shown in the core accounts. As an example of the latter, the table below shows the affected GDP account aggregates and describes how they would differ in a household satellite account compared with those shown in the core national accounts. Aggregates not shown (e.g. government final consumption expenditure, exports) would not be affected.

AGGREGATE	DIFFERENCE BETWEEN HOUSEHOLD SATELLITE ACCOUNT AND CORE NATIONAL ACCOUNTS
Expenditure side	
Household final consumption expenditure	Increased by households non-market gross output that is additional to that already recorded in the national accounts.
	Decreased by (a) expenditure on goods and services reclassified as intermediate consumption and (b) expenditure on durables reclassified as gross fixed capital formation.
Gross fixed capital formation	Increased by expenditure on household durables reclassified from household final consumption expenditure.
Income side	
Compensation of employees	Increased by value of unpaid work.
Gross operating surplus	Increased by consumption of fixed capital on household durables.
Taxes less subsidies on production and imports	Increased by transfer payments reclassified from secondary income.
GDP	Increased by households non-market gross value added that is additional to that already recorded in the national accounts.

Rather than use estimates of consumption of fixed capital (i.e. depreciation) as a measure of the cost of capital input it has been argued by a number of commentators that it would be better to use an estimate of the value of capital services or rentals associated with capital goods, of which depreciation is only a part in the formula at the beginning of this sub-section. Just as market sector wage rates can be used to value the labour component of household work, so, in theory at least, could rentals be used to value the input of household durables. With the exception of motor vehicles, however, there is little or no market for

VALUATION APPROACHES *continued*

the long-term rent or lease of household durables, and so the rents would have to be imputed. Such imputations are already made by the ABS for capital goods and services using the PIM (described previously) in its estimation of multifactor productivity for the market sector. The rents associated with non-market household production would form part of the gross operating surplus relating to that production.

The output-based approach

In the output-based valuation method, the gross output from household non-market production is valued by multiplying the volume of household output for different activities by market-equivalent prices for each activity. The rationale for this approach is that given market goods and services could replace those generated in the household, the most appropriate way of valuing household non-market production is to use the prices of similar market production. Under the output-based method, the gross value added in household production is equal to the value of gross output less the value of intermediate inputs (where intermediate inputs are as described in the preceding section).

This method is considered to be the best for comparisons with national accounting aggregates, which are generally based on the use of market prices for valuing output. Valuing output in this way ensures that outputs are valued independently of their inputs, and avoids problems arising because of productivity differences between market and non-market producers.

The output-based approach resolves the issue of the joint production of services through simultaneous or parallel uses of time. The value of the labour used simultaneously can be found by deducting intermediate inputs and capital costs from the market value of the joint outputs.

The data requirements for the output-based approach are extensive, particularly data on the volume of household output for different activities and corresponding market-equivalent prices. For this reason there have been very few output-based studies to date. A comprehensive study (in terms of the range of household activities covered) was undertaken by Fitzgerald and Wicks, who collected sample quantity and price data on 57 types of household outputs from 480 households in Montana in 1985.[1] Their study concluded that household production was approximately the same size as GDP, which is twice the size generally indicated by input-based studies.

No organisation in Australia has conducted a comprehensive survey of household outputs. However, information on some household outputs may be available from other sources. For example, there are good sources of data relating to child care and care of the elderly, handicapped and the ill, such as ABS's *Survey of Child Care and Disability, Aging and Caring*. Data on accommodation are available from the *Census of Population and Housing*. Data on the number of meals prepared are available from the ABS's *National Nutrition Survey*. However, for other areas, such as laundry outputs, there does not appear to be much information.

It would require significant effort to take data from the above-mentioned sources and compile a household satellite account. A particular problem to be overcome would be that periods covered by each of the sources differ. Ways would need to be found to compile data in respect of a common time period. To develop high quality estimates, new statistical collections might have to be developed to cover gaps. Developing and conducting such collections would probably require significant resources, and for such collections to be justified there would need to

1 Fitzgerald, John and Wicks, John (1990), 'Measuring the value of household output: a comparison of direct and indirect approaches', *The Review of Income and Wealth*, Vol 36, No.2, June 1990.

VALUATION APPROACHES *continued*

be far greater user interest in measuring household outputs than what has been shown so far.

Obtaining relevant market prices would also require effort. Some prices might be obtained from existing ABS price collections, such as those underlying the *Consumer Price Index* (CPI), but others would probably have to be sought separately. There is also the question of what constitutes a 'relevant' price, particularly for those household outputs that can vary significantly in quality. For example, should a 'dinner' output be valued with reference to prices at a fast food restaurant, or at a five-star hotel?

Finally, as with the other approaches, decisions would need to be taken on what exactly constitutes a household 'output' and how these outputs should be classified.

INTEGRATION OF OUTPUT AND INPUT-BASED METHODOLOGIES

One of the foremost authorities on the valuation of unpaid work, Goldschmidt-Clermont, argues that it is possible to value households' non-market productive time by relating it to the value of the associated output[1].

Goldschmidt-Clermont's approach involves first measuring household production using the output-based method. She suggests 'returns to labour' could then be derived by deducting from gross value added the value of taxes less subsidies on production and imports and consumption of fixed capital. To obtain an hourly rate of return to labour, the total return for a particular output would be divided by the actual time expended in producing the output. (These time data would be obtained from a TUS.) Goldschmidt-Clermont argues that these hourly returns to labour could be used to gradually build up output-related valuations of household production without the need for large-scale data collections of household outputs. For example, returns to labour could be calculated for a limited number of activities such as meal preparation or the care of children or the elderly. The returns to labour obtained for these activities could be applied to other household outputs, using time use data. Perhaps, as more household outputs were valued, the average of several returns to labour could be used to apply to those remaining uncalculated. Over time, sample size and coverage of activities could be expanded as resources became available until a complete range of household outputs was obtained.

A problem with the Goldschmidt-Clermont approach is that her 'returns to labour' also include returns to capital used in conjunction with the labour because consumption of fixed capital does not include returns to capital. This shortcoming could be remedied by replacing consumption of fixed capital with actual values or imputations of rents for household durables. Imputations could come from the PIM model, as discussed in the previous section. However, information on the use of capital for different household outputs would still be required in order to produce estimates of the value of household production using this approach.

Goldschmidt-Clermont's ideas have been extended by Harvey and Mukhopadhyay who demonstrated in a study using data from the 1992 Canadian TUS that TUSs can be used to provide estimates of some of the major outputs of household production, particularly meals, child care, accommodation and laundry[2]. Their methodology combined TUS data with family expenditure data to derive estimates of outputs of household production. The approach involved a

1 Goldschmidt-Clermont, Luisella (1990), 'Output related evaluations of unpaid household work: a challenge for time-use studies', Home Economic Research Journal, Vol.12, No.2, June 1990.
2 Harvey, Andrew and Mukhopadhyay, Arun, 'The role of time-use studies in measuring household outputs', Conference of the *International Association for Research on Income and Wealth*, Lillehamer, Norway, August 1996.

INTEGRATION OF OUTPUT AND INPUT-BASED METHODOLOGIES *continued*

complex process of linking the two data sets to yield output-type measures. Interestingly, the values of unpaid work for household maintenance derived from this approach (which excluded care of others, volunteer work and education) were significantly greater than the values derived using the housekeeper replacement cost method (which included care of others, but not volunteer work or education). Their approach yielded values equivalent to 41% of GDP whereas the housekeeper replacement cost method gave values equal to 34% of GDP.

INPUT-OUTPUT TABLES

A satellite account for household production could be presented in the form of an input-output table. Such a presentation would provide breakdowns of the value added (into capital and labour components) and intermediate consumption (into the various types of products used up in the production of household output) for each type of household output. Non-household production would also be shown so that the relationships between the economic activity of households and that of the other sectors of the economy could be explored. Supplementary information on the volume of household outputs or the time spent in the production of the outputs could also be shown. The value of household outputs could be derived using either the input- or output-based methodologies.

Ironmonger and others have argued that the development of such an input-output table is essential for a proper analysis of household economic activity. Thoen[1] lists the advantages of placing household production within an input-output framework:

> 'household production can be linked to the SNA through the development of a satellite account with links through 'personal expenditures' which are common to both accounts: the complex interdependence between household and market activities in terms of the raw materials, intermediate goods and services, or labour inputs required to produce outputs can be analysed within a familiar accounting framework: the impact of macroeconomic policy on the 'household sector of the economy' can be analysed in terms of the substitutability of market supplied services for household production and the household capital/labour ratio and, consumer demand can be linked to the underlying household activities.'

Ironmonger suggests that labour and capital inputs be broken down into market and non-market components and that, similarly, household outputs be broken down into market and non-market production. His model, which is explained in a paper entitled ' National Accounts of Household Product Activities', is intended to be a complete accounting of the household and market economies, incorporating both the capital and labour used in each sector.

Deriving a household satellite account in the form of an input-output table would be a more difficult exercise than deriving estimates of household production in aggregate because each of the components of production (labour, capital and intermediate consumption) would have to be allocated across the various types of household products. Ideally, this would be done based on studies of the various types of household activities. In the absence of pre-existing studies, it would be expensive to undertake such studies and it is highly unlikely that such expense could be justified. Alternatively, in cases where the allocation of a component is not clear-cut, indicators (such as the time spent on activities) could be used as a basis of allocation. However, this would reduce the usefulness of the

1 Thoen, M., 'The value of household production in Canada 1981–1986', Statistics Canada, National Accounts and Environmental Division, April 1993.

NPUT-OUTPUT TABLES *continued*

input-output approach, as any analysis based on the relationship between inputs and outputs would be affected by (unknown) errors in the allocation process.

THE EUROSTAT PROPOSAL

Eurostat commissioned Statistics Finland to develop a harmonised satellite system of household production.[1] The Eurostat proposal is based on the European System of National and Regional Accounts (ESA 95), which is broadly consistent with SNA93. While Eurostat acknowledges that the output-based method has analytical advantages compared with the input-based method, it advocates the latter as the basis for measuring household production as there are currently insufficient data available to implement the former. However, the proposal recognises that an output-based method could eventually be implemented. The focus of the system is the production account. However, the proposal has guidelines for adjusting the core income and capital accounts to provide comprehensive information on the consumption, income, saving and wealth of households. Such information would increase the analytical usefulness of the system as a whole.

If a satellite production account could be compiled that covered household production comprehensively, relatively little effort would be required to compile consistent income and capital accounts along the lines suggested in the Eurostat proposal.

A PROVISIONAL FRAMEWORK FOR HOUSEHOLD INCOME, CONSUMPTION, SAVING AND WEALTH (ICW)

The ABS has been at the forefront in the development of a conceptual framework for household income, consumption, saving and wealth (ICW). This framework was developed by the ABS in response to the process of revising the provisional 1977 United Nations (UN) *Guidelines on Distribution of Income, Consumption and Accumulation of Households* (known as M61). The UN guidelines were issued to assist countries to collect and disseminate income distribution statistics and to provide for international reporting and publication of comparable data. The provisional guidelines had a particular emphasis on linking income distribution statistics to current national accounting standards (they relate to the 1968 version of the System of National Accounts). There have been continuing demands for revisions to the 1977 UN guidelines to supplement SNA93. In particular, a need is seen to broaden the concept of income and develop analytical techniques to measure income inequality.

The ABS framework, published in 1995[2], describes how the range of flows and stocks of household economic resources can be brought together to provide a comprehensive measure of economic wellbeing for individual households. The framework also provides a conceptual link between these components of individual household economic wellbeing and those of the national economy as a whole. As such, the concepts and terminology used in the ICW framework are consistent with those used in the national accounts. However, because the focus of the ICW is on the individual household rather than the household sector, concepts, definitions and terminology have been modified where necessary.

More specifically the framework is designed to allow for the measurement of:

- a household's power or command over economic resources;
- the extent to which a household is able to both consume and accumulate wealth and to make choices between these options; and
- the changes that take place in a household's economic wellbeing over time.

Together, these measures constitute a model that reconciles the various elements of income, consumption and net worth at the individual household

1 Eurostat (1999), 'Proposal for a Satellite Account on Household Production', 9/1999/A4/11
2 ABS 1995, ' *A Provisional Framework for Household Income, Consumption, Saving and Wealth*' (ABS Cat. no. 6549.0).

A PROVISIONAL FRAMEWORK FOR HOUSEHOLD INCOME, CONSUMPTION, SAVING AND WEALTH (ICW) *continued*

level. Such a reconciliation will enable derivation of measures of both household saving and total accumulation of wealth. The ICW presents a synthesis between economic and social statistics, particularly as they relate to the household economy. However, the ICW still has a provisional status and the ABS has not yet begun to make it operational.

It is worthwhile elaborating on the differences between the ICW and the Eurostat satellite accounting system for the household. Eurostat's system focuses on the macro-side of the economy, with the household sector being the main statistical unit. The production side of the household economy tends to be the central area of analytic interest. Production and generation of income accounts are seen as 'crucial' for the system of household satellite accounts. The input-output tables are a detailed elaboration of the household production account but represent only one part of a system of accounts for the household sector. The Eurostat framework does not provide as detailed an insight into the income flows and financing decisions of households as the ICW system does. However, it does have guidelines for an extended system of accounts that describes the behaviour of the household sector in relation to consumption, disposable income and wealth. The ICW focuses on the micro-side of the economy, with four possible statistical units to measure the economic wellbeing of the population: persons, households, families and income units. The area of analytic interest is broader than the Eurostat central focus on production, with emphasis on how economic resources are mobilised within households and affect the different variables of household income, consumption, saving and wealth. Considerable work would be needed to further integrate the two systems. Integration would give better information on the dynamics of individual households, the household sector and the linkages to the market economy.

THE NETHERLANDS APPROACH

The Netherlands Central Bureau of Statistics started the development of satellite accounts of household production in 1991, using data from their national TUS conducted in 1987. Another TUS was conducted in 1998 and the data from that TUS are to be incorporated in the development of a System of Economic and Social Accounting Matrices and Extensions (SESAME), a form of a social accounting matrix (or SAM for short). SNA93 defines a SAM as 'the presentation of SNA accounts in a matrix which elaborates the linkages between supply and use tables and institutional sector accounts'[1]. Traditionally, SAMs have been applied to specific types of analysis, focusing on causes and consequences of various aspects of inequality among household groups.

A SESAME is a 'core' SAM that has associated satellite tables and it provides a set of monetary and non-monetary macro-indicators potentially encompassing social, economic and environmental change. Such an integrated set of satellite tables can show:

> '(a) Various stocks underlying the SAM flows, such as size and composition of the population by household group (including the potential labour force), production capacity by industry and the possession of assets (e.g. agricultural land, consumer durables and financial assets) and liabilities (e.g. external debts) by sub-sector;
>
> (b) A decomposition of (changes in) values into (changes in) volumes and prices: this refers not only to products but also to various categories of labour services, and to fixed capital formation by industry;
>
> (c) Related non-monetary socioeconomic indicators, such as life expectancy, infant mortality, adult literacy, nutrient intake, access to (public) health and education facilities, and housing situation by household group; and

1 SNA93, para 20.4

THE NETHERLANDS APPROACH *continued*

(d) Some re-routings (e.g. final consumption by household group paid for by government and nonprofit institutions serving households (NPISHs).'[1]

SNA93 sees the benefits of developing SAMs as:

'(a) Rigorous theorising based on micro-economic insights;

(b) Formal modelling, including feed-backs from non-monetary to monetary variables;

(c) Monitoring and forecasting the impact of government policies or external influences on non-monetary variables.'[2]

The Dutch system utilises an extra layer of operational principles to define the framework of its SAM for the household economy. In addition to defining productive activities by utilising the third person criterion (Chapter 3), it also defines productive activities in terms of formal and informal activities. The operational principle used is as follows:

'Informal activities are productive activities which do not contribute to the national income as currently defined, and in which unpaid labour is involved.'[3]

When these principles are operationalised into a SAM there is a consistent representation of both the production processes and the income distribution and income spending processes. The system makes explicit the linkages between the formal and informal economies in terms of production and income generation and distribution and has entry points for data on fixed capital and consumption of fixed capital in the informal economy.

A key feature of this system is that goods and services in the informal sector are not always given a monetary valuation. The SAM is split up into two parts, making the module independent from the valuation of informal labour[4]. The first part shows all transactions, expressed in monetary value, with the value of informal labour as zero. In the second part, all informal transactions are expressed in informal labour equivalents, such as working years, derived from the TUS. The Dutch see this framework as allowing formal and informal labour to be merged without disturbing the consistency in valuation. Various kinds of multiplier analyses can be applied where pricing is not a prerequisite. Future extensions will include informal fixed capital formation and a further disaggregation of labour by type, for example, by education level or position within household. Any number of disaggregations and micro-economic analyses could be made if the data were available, for example, data by household type. At this stage the framework is in place but very few of the cells have been developed. The ABS will be interested to see how these accounts are used in the Netherlands as they develop through time, particularly as the system does try to detail macro-micro linkages. The ABS, however, would prefer to use a framework where all activities of the household economy are valued.

1 SNA93, para 20.29
2 SNA93, para 20.31
3 Kazemier and Exel, Jeanette, 1992, 'The Allocation of Time in the Netherlands in the context of the SNA: a Module', Central Bureau of Statistics, The Netherlands, p.2.
4 Kazemier and Exel, Jeanette, 1992, 'The Allocation of Time in the Netherlands in the context of the SNA: a Module', Central Bureau of Statistics, The Netherlands, p.6.

CONCLUSION

As part of the expansion of its analytical capacity, the ABS will continue to investigate issues associated with the compilation of household satellite accounts. There remain a number of conceptual and methodological issues that need to be resolved. It is the ABS's intention to publish more comprehensive measures of household production than those contained in this publication should it prove feasible to do so. However, given the degree of uncertainty that currently surrounds this work it is not possible at this stage to indicate the time frame in which these measures might become available.

APPENDIX 2 INTERNATIONAL COMPARISONS

TABLE OF INTERNATIONAL COMPARISONS

International comparisons of estimates of unpaid work are presented in the table below. To facilitate comparisons between alternative estimates which apply to different reference periods and are calculated in the currencies of individual countries, all comparisons are presented as percentages of national accounting aggregates—GDP, or gross national product (GNP) (where estimates expressed as a percentage of GDP are not available). (GNP is now called gross national income in SNA93 terminology.) The comparisons are based on the estimates as published by statistical agencies and individual authors. In cases where there are several sets of estimates, those estimates which are most similar to Australian estimates in terms of definitions, estimation methodologies etc. are the ones which have been included in the comparisons. For example, Schettkat[1] published estimates based on both gross wages and also wages adjusted to include social security contributions by employers. His estimates quoted in the table are based on gross wages only, as Australian estimates are not produced using a wage concept that includes social security contributions by employers. No adjustments for methodological differences have been made to any of the estimates shown in the table.

There are numerous methodological differences between the various studies listed, particularly in terms of the scope of the studies, reference periods used and the wage rates used. Of course, the various estimates in the table also reflect different economic, social, cultural and climatic conditions in the various countries. Of particular importance would be variations in wage rate relativities and work force participation rates. The populations used for time-use surveys appear to be one of the most variable methodological factors, although the variations were relatively small. For example, the USA estimates related to persons aged 18 and over, while the New Zealand and German estimates included persons aged 12 years and over, compared with the Australian estimates, which were based on persons aged 15 and over. The definitions of net opportunity cost used in the various countries also differed. For example, in the French estimates, net opportunity cost was defined simply as compensation less income tax, compared with the 1992 and 1997 Australian estimates in which work-related expenses as well as taxes were deducted from compensation.

1 Schettkat, R., '*The Size of Household Production: Methodological Problems and Estimates for the Federal Republic of Germany in the period 1964 to 1980*', *Review of Income and Wealth*, Series 31, No.3, September.

INTERNATIONAL COMPARISONS OF ESTIMATES OF UNPAID WORK, by estimation method

COUNTRY	AUTHOR	SCOPE	REFERENCE YEAR	PERCENTAGE OF GDP OR GNP
		INDIVIDUAL REPLACEMENT COST		
Australia	ABS	UW	1986–87	52 (GDP) (a)
				57 (GDP) (b)
		UW	1992	58 (GDP)
		UW	1997	48 (GDP) (c)
Canada	Adler and Hawrylshyn	UHW	1971	40 (GDP)
Canada	Statistics Canada	UHW	1992	41 (GDP)
		UW	1992	43 (GDP)
Denmark	Bonke	UHW	1987	40 (GNP)
Germany	Federal Statistical Office	UW	1992	71 (GDP)
New Zealand	Department of Statistics	UW	1990–91	52 (GDP)
Norway	Central Statistics Bureau	UHW	1972	50 (GDP)
		UHW	1989	39 (GDP)
		UHW	1992	37 (GDP)
Switzerland	Sousa-Poza/Widmer/Schmid	UW	1997	52 (GDP) (d)
USA	Murphy	UHW	1976	44 (GNP)
		HOUSEKEEPER REPLACEMENT COST		
Australia	ABS	UHW	1986–87	47 (GDP)
		UW	1992	54 (GDP)
		UW	1997	43 (GDP)
				47(GDP) (e)
Canada	Adler and Hawrylshyn	UHW	1971	33 (GDP)
Canada	Statistics Canada	UW	1992	34 (GDP)
Denmark	Bonke	UHW	1987	37 (GNP)
Germany	Schetkatt	UHW	1980	32 (GNP)(f)
	Federal Statistical Office	UW	1992	67 (GDP)
Finland	Statistics Finland	UHW	1980	42 (GNP)
Finland	Statistics Finland	UW	1990	45 (GDP)
France	Chadeau and Fouquet	UHW	1975	31 (GNP)
New Zealand	Department of Statistics	UW	1990–91	43 (GDP)
Norway	Central Statistics Bureau	UHW	1972	53 (GDP)
		UHW	1981	41 (GDP)
		UHW	1990	38 (GDP)
Sweden*	Statistics Sweden	UHW	1990–91	45 (GNP)
Switzerland	Sousa-Poza/Widmer/Schmid	UW	1997	41 (GDP)
USA	Murphy	UHW	1976	32 (GNP)

UHW Unpaid household work

UW Unpaid work

* These estimates are not official Swedish estimates but are only intended as a rough approximation.

(a) award rates (persons).

(b) adjusted award wage (persons).

(c) male and female wage rates.

(d) estimates of similar wage and hour concepts as Australia.

(e) housekeeper replacement cost hybrid.

(f) estimates based on gross wages (excluding social security contributions of employers) as in Australia.

INTERNATIONAL COMPARISONS OF ESTIMATES OF UNPAID WORK, by estimation method
continued

COUNTRY	AUTHOR	SCOPE	REFERENCE YEAR	PERCENTAGE OF GDP OR GNP
		GROSS OPPORTUNITY COST		
Australia	ABS	UW	1986–87	58 (GDP) (a)
				62 (GDP) (b)
		UW	1992	69 (GDP)
		UW	1997	60 (GDP) (c)
				62 (GDP)
Canada	Statistics Canada	UHW	1981	40 (GDP)
		UW	1992	54 (GDP)
		UHW	1992	46 (GDP)
Denmark	Bonke	UHW	1987	35 (GNP)
France	Chadeau and Fouquet	UHW	1975	44 (GNP)
Germany	Schettkat	UHW	1990	42 (GNP) (a)
New Zealand	NZ Dept of Statistics	UW	1990–91	68 (GDP)
Norway	CBS	UHW	1981	40 (GDP)
Switzerland	Sousa-Poza/Widmer/Shmid	UW	1997	49 (GDP)
USA	Murphy	UHW	1976	60 (GNP)
		NET OPPORTUNITY COST		
Australia	ABS	UW	1992	52 (GDP) (c)(g)
		UW	1997	48 (GDP) (g)
				47 (GDP) (c) (g)
Canada	Statistics Canada	UHW	1986	32 (GDP) (h)
		UHW	1992	32 (GDP) (h)
Germany	Schettkat	UHW	1990	29 (GNP) (f)
Switzerland	Sousa-Poza/Widmer/Schmid	UW	1997	38 (GDP) (d)
USA	Murphy	UHW	1976	51 (GDP) (i)
				44 (GDP) (j)

UHW Unpaid household work
UW Unpaid work
(a) award rates (persons).
(b) adjusted award wage (persons).
(c) male and female wage rates.
(d) estimates of similar wage and hour concepts as Australia.
(e) housekeeper replacement cost hybrid.
(f) estimates based on gross wages (excluding social security contributions of employers) as in Australia.
(g) total renumeration after taxes less work related expenses.
(h) average hourly employment net of marginal taxes.
(i) after-tax compensation—less marginal taxes.
(j) net compensation—compensation less marginal taxes less work related expenses.

Murphy (1982)[1] used a similar concept to the Australian net opportunity cost measure in his 'net compensation' measure but used somewhat different tax, on-cost and work-related expenses concepts as does Canada(1995).[2]

The estimates presented for Australia represent in most cases a higher proportion of GDP than those for other countries included in the comparison. This reflects, in part, methodological differences such as those noted above. It may also be attributable to cultural factors. For example, Australia has a relatively high level of home ownership and a predominance of detached housing with gardens which could lead to more time being spent in Australia than in other countries on home maintenance, gardening and similar activities.

1 Murphy, M., 1982, '*Comparative Estimates of the Value of Household Work in the United States for 1976*', *Review of Income and Wealth*, Series 28, No.1, March.
2 Statistics Canada (1995), '*Households Unpaid Work: Measurement and Valuation Studies in National Accountancy*' Catalogue 13–603E, No.3.

APPENDIX 3 ALGEBRAIC MODELS

1997 MODELS

The various methods for valuing unpaid work can be represented in algebraic terms. This appendix presents the algebraic models of each of the methodologies used for the 1997 estimates.

NUMBER OF HOURS

Estimates of the number of hours spent on unpaid household work per person in 1997 in Australia were derived as follows (note that, unlike 1992, 1997 was not a leap year):

$$H_{ij} = (MD_{ij}/60) * 365$$

where

H_{ij} = average hours in 1997 on unpaid work function i per person in demographic group j

MD_{ij} = average daily minutes on work function i per person in demographic group j

INDIVIDUAL FUNCTION REPLACEMENT COST

For the individual function replacement cost method estimates for Australia in 1997 were derived as follows:

$$UWA_{IFR} = \sum_{i=1}^{M} \sum_{j=1}^{N} H_{ij} PA_j W_{ij}$$

where

UWA_{IFR} = individual replacement cost estimate for unpaid household work

H_{ij} = average hours in 1997 on upaid work function i per number of persons in demographic group j

PA_j = number of persons in Australia in demographic group j

W_{ij} = average hourly rate of pay applicable to unpaid work on function i for demographic group j

HOUSEKEEPER REPLACEMENT COST

For the housekeeper replacement cost method the following algebraic from was used:

$$UWA_{HRC} = \sum_{j=1}^{N} H_j PA_j W_H$$

where

UWA_{HRC} = housekeeper replacement cost estimate for unpaid household work

H_j = average hours in 1997 on all upaid work functions per person in demographic group j where

$$H_j = \sum_{i=1}^{M} H_{ij}$$

PA_j = number of persons in Australia in demographic group j

W_H = average hourly rate of pay applicable for housekeepers in 1997

REPLACEMENT COST HYBRID

The replacement cost hybrid method consists of the sum of two components, the first using the housekeeper replacement cost model but restricted to those activities carried out by a houskeeper, and the second using individual function replacement cost method for the rest of the activities within scope.

GROSS OPPORTUNITY COST

The algebraic form of the gross opportunity cost method is as follows:

$$UWA_{GOC} = \sum_{j=1}^{N} H_j PA_j W_{GOCj}$$

where

UWA_{GOC} = gross opportunity cost estimate for unpaid household work

H_j = average hours in 1997 on all upaid work functions per person in demographic group j where

$$H_j = \sum_{i=1}^{M} H_{ij}$$

PA_j = number of persons in Australia in demographic group j

W_{GOCj} = gross opportunity cost average hourly rate of pay for demographic group j

NET OPPORTUNITY COST

The algebraic form of the net opportunity cost method is as follows:

$$UWA_{NOC} = \sum_{j=1}^{N} H_j PA_j W_{NOCj}$$

where

UWA_{NOC} = net opportunity cost estimate for unpaid household work

H_j = average hours in 1997 on all upaid work functions per person in demographic group j where

$$H_j = \sum_{i=1}^{M} H_{ij}$$

PA_j = number of persons in Australia in demographic group j

W_{NOCj} = net opportunity cost average hourly rate of pay applicable for demographic group j

APPENDIX 4

OCCUPATIONS MATCHED TO UNPAID WORK ACTIVITIES

The table below shows the Australian Standard Classification of Occupations (ASCO) occupation classifications that were matched to the unpaid work activity classifications used in the compilation of the data on unpaid work presented in this publication.

OCCUPATIONS MATCHED TO UNPAID WORK ACTIVITIES

TIME USE CODES	UNPAID WORK ACTIVITIES	ASCO CODE	ASCO DESCRIPTION
	UNPAID HOUSEHOLD WORK ACTIVITIES		
	Housework		
410–413	Food and drink preparation	4513	Cooks
	Food and drink preparation	9931	Kitchenhands
414–415, 419	Clean-up	6323	Waiters
420–427, 429	Laundry and clothes care	8315	Laundry workers
425–426	Laundry and clothes care	4914	Clothing tradespersons
400, 430–439	Other housework	9111	Cleaners
	Other domestic activities		
441–443	Gardening and lawncare	4623	Gardeners
444–445, 449, 440	Cleaning grounds etc.	8314	Caretaker
450–451, 453, 459	Home maintenance	9993	Handyman
456	Home maintenance	9916	Construction and plumbers assistants
446	Pet care	6399	Other intermediate service workers
460, 465, 469	Household management	6111	General clerks
461–462	Household management	6141	Accounting clerks
464, 468	Household management	9991	Garbage collector
463, 466–467	Household management	6153	Stock and purchasing clerks
471, 499	Associated communication	5111	Secretaries and personal assistants
481	Associated travel	7313	Automobile drivers
	Child care		
500, 510, 541, 599	Child care	6312	Childrens' care workers
511-512, 551	Child care	6314	Personal care and nursing assistant
521	Child care	2411	Pre-primary school teacher
531	Child care	6311	Education aide
571	Associated communication	5111	Secretaries and personal assistants
581	Associated travel	7313	Automotive drivers
	Purchasing goods and services		
610–612, 619–622, 625–626, 629, 699	Purchasing	6153	Stock and purchasing clerks
671	Associated communication	5111	Secretaries and personal assistants
681	Associated travel	7313	Automotive drivers
	VOLUNTEER AND COMMUNITY WORK		
710–711	Adult care	6314	Personal care and nursing assistant
700, 721, 731, 799	Volunteer work		Average of all unpaid work categories
771	Associated communication	5111	Secretaries and personal assistants
781	Associated travel	7313	Automotive drivers

FOR MORE INFORMATION...

INTERNET	**www.abs.gov.au** the ABS web site is the best place to start for access to summary data from our latest publications, information about the ABS, advice about upcoming releases, our catalogue, and Australia Now—a statistical profile.
LIBRARY	A range of ABS publications is available from public and tertiary libraries Australia-wide. Contact your nearest library to determine whether it has the ABS statistics you require, or visit our web site for a list of libraries.
CPI INFOLINE	For current and historical Consumer Price Index data, call 1902 981 074 (call cost 77c per minute).
DIAL-A-STATISTIC	For the latest figures for National Accounts, Balance of Payments, Labour Force, Average Weekly Earnings, Estimated Resident Population and the Consumer Price Index call 1900 986 400 (call cost 77c per minute).

INFORMATION SERVICE

Data which have been published and can be provided within five minutes are free of charge. Our information consultants can also help you to access the full range of ABS information—ABS user-pays services can be tailored to your needs, time frame and budget. Publications may be purchased. Specialists are on hand to help you with analytical or methodological advice.

PHONE	**1300 135 070**
EMAIL	**client.services@abs.gov.au**
FAX	1300 135 211
POST	Client Services, ABS, GPO Box 796, Sydney 1041

WHY NOT SUBSCRIBE?

ABS subscription services provide regular, convenient and prompt deliveries of ABS publications and products as they are released. Email delivery of monthly and quarterly publications is available.

PHONE	1300 366 323
EMAIL	subscriptions@abs.gov.au
FAX	03 9615 7848
POST	Subscription Services, ABS, GPO Box 2796Y, Melbourne 3001